

© 2023 Erica Ballou

**Adverse Childhood Experiences, Their Effects on the Brain, and Trauma-Informed Strategies  
for Supporting Students with ACEs**

By  
Erica Ballou  
B.A., University of Wyoming, 2014

Plan B Project  
Submitted in partial fulfillment of the requirements for the degree of  
Masters of Science in Natural Science Education – Middle Level Mathematics  
in the Science and Mathematics Teaching Center  
at the University of Wyoming  
2023

Laramie, Wyoming

Masters Committee:

Ana Houseal, Associate Professor, Chair  
Richard Kitchen, Professor, Member  
Amanda DeDiego, Associate Professor, Member

## **Abstract**

Adverse childhood experiences impact the brain and interfere with a student's ability to learn in the classroom. This literature review was driven by questions about *how* ACEs affect the brain and a student's ability to learn, and how teachers can support students in their classrooms. Human motivation, ecological systems, and resiliency theories acted as a combined lens to examine the literature about student needs and behaviors and the teacher's position to support students in classroom settings. The literature explored four areas of the brain that are directly affected by the stress response brought on by ACEs and how they are detrimental to a student's ability to behave appropriately and participate in learning activities. While ACEs increase negative outcomes for students' learning, the literature also showed that there are a variety of strategies teachers can employ to support their students and increase positive outcomes. Three categories of trauma-informed strategies presented in this literature review are: (a) positive interactions and environment; (b) consistency, structure, and routine; and (c) voice, choice, and control.

## **Acknowledgements**

I would first like to thank my committee chair, Ana Houseal, for her support and guidance through this project. Her dedication to her students and willingness to give of her time for our success is admirable. Thank you to my committee members, Richard Kitchen and Amanda DeDiego, for their time and support every step of the way. Their encouragement motivated me to keep pushing forward. Finally, a special thank you to my husband, Matthew, and our two boys. They made many sacrifices and lightened the load when things got hard, and their belief in me caused me to believe in myself.

## Table of Contents

|   |            |
|---|------------|
| <b>Abstract .....</b>   | <b>ii</b>  |
| <b>Acknowledgements .....</b>   | <b>iii</b> |
| <b>Table of Contents .....</b>  | <b>iv</b>  |
| <b>Chapter 1: Introduction .....</b>                                    | <b>1</b>   |
| Statement of the Problem .....  | 1          |
| Purpose .....   | 3          |
| Research Questions .....  | 4          |
| Methodology.....  | 4          |
| <b>Chapter 2: Literature Review .....</b>                               | <b>6</b>   |
| Theoretical Framework.....  | 6          |
| Trauma and ACEs .....   | 9          |
| Effects of ACEs on the Brain.....                                       | 10         |
| The Lions Analogy .....   | 12         |
| Amygdala .....  | 13         |
| Hippocampus .....   | 13         |
| Pre-frontal Cortex .....  | 14         |
| Corpus Callosum .....   | 15         |
| Human Needs.....  | 18         |
| Behaviors Through a Trauma Lens.....                                    | 19         |
| The Role of Schools in Recognizing Trauma and Supporting Students ..... | 20         |
| ACEs-Informed Strategies for Teachers .....                             | 21         |
| Strategies for Positive Interactions and Environment.....               | 21         |
| Positive Interactions.....  | 21         |
| Leveraging Strengths.....   | 22         |
| Building Trust .....  | 23         |
| Change the Channel .....  | 23         |
| Provide Positive Feedback .....   | 24         |
| Promote Hope and Growth.....  | 24         |
| Strategies for Consistency, Structure, and Routine.....                 | 27         |
| Minimize Surprises .....  | 27         |

|  |           |
|--|-----------|
| Avoid and Manage Triggers.....                           | 27        |
| Structured Transitions.....                              | 28        |
| Check-In / Check-Out .....                               | 29        |
| Strategies for Providing Voice, Choice, and Control..... | 31        |
| Students Prioritize their Needs .....                    | 31        |
| Democratic Classrooms.....                               | 31        |
| Project-based Learning .....                             | 32        |
| Embedding Choice into the Desired Outcome.....           | 32        |
| Embrace Students’ Individual Learning Styles .....       | 33        |
| <b>Chapter 3: Discussion .....</b>                       | <b>36</b> |
| Conclusions .....  | 39        |
| Implications.....  | 36        |
| Connections to Multi-tiered System of Supports .....     | 36        |
| Connections to Classroom Practice .....                  | 37        |
| Limitations.....   | 38        |
| Recommendations for Future Research .....                | 38        |
| Final Thoughts for Educators .....                       | 41        |
| <b>References .....</b>                                  | <b>44</b> |

## **Chapter 1**

### **Introduction**

Three years ago, I started a teaching position that would change my life; as a teacher, a mother, a wife, and as a human. Coming from a traditional middle school science classroom, I was excited to be teaching older students in an alternative high school setting. Now, in the middle of my fourth year, I am forever changed by my experiences over the past three and half years working with, and learning from, my students in this setting. I will be a better teacher in the future, no matter the school or position, because I now have a better understanding of the difficulties that many students face. I will continue to learn how best to help my students find academic and social success, despite the struggles they have.

#### **Statement of the Problem**

Trauma is an emotional response to harmful experiences in an individual's life that has long-term effects on their physical, mental, emotional health (Cavanaugh, 2016; Sitler, 2009; Von Dohlen et al., 2019). Adverse childhood experiences (ACEs) are traumatic, early-life experiences that affect the victim's daily life including abuse, neglect, and household dysfunction (Brunzell et al., 2016; Cavanaugh, 2016; Von Dohlen et al., 2019). Studies show that approximately half of America's youth have experienced at least one ACE and 10-20% have experienced three or more ACEs before their eighteenth birthday (Cavanaugh, 2016; Murphey & Sacks, 2019). ACEs have negative effects on a young person's social, emotional, and academic abilities, and the greater the number of ACEs they have experienced the more compounded those effects can become (Brunzell et al., 2016; Cavanaugh, 2016; Navalta et al., 2018; Stokes, 2022).

When a person experiences a traumatic event, their brain responds to the stressor by releasing hormones that help the person's body and brain react to the event. Under normal circumstances, when the stressor is no longer present, the stress response subsides and the person returns to a relaxed state. When the stress is repeated or prolonged, as is the case with ACEs, the stress response in the brain becomes dysregulated (Anda et al., 2006; Brunzell et al., 2016; Rawson, 2020; van der Kolk, 2003; Von Dohlen et al., 2019). When the hormones associated with the stress response become dysregulated, they can cause structural and functional changes in the brain including impairment or reduced volume of the amygdala, hippocampus, pre-frontal cortex, and corpus callosum (Anda et al., 2006; Danese & Baldwin, 2017; Danese & McEwen, 2012; Luby et al., 2019; Rawson, 2020; Teicher et al., 2016; Thomason et al., 2015; van der Kolk, 2003).

Students who struggle to perform or behave in school are not "lazy" or "bad", they have trauma or unmet needs. Behaviors are a communication of trauma (Morton, 2022; Rawson, 2020; Sitler, 2009; Terrasi & de Galarce, 2017). Students who have a history of ACEs are more likely to demonstrate hypervigilance, difficulty focusing, trouble building relationships, aggression, withdrawal, difficulty recalling information, inability to form new memories, difficulty controlling impulses, and reduced intelligence quotient and problem-solving abilities (Danese & Baldwin, 2017; Minahan, 2019; Morton, 2022; Rawson, 2020; Teicher et al., 2016). All of these effects of ACEs become barriers to a student's ability to learn and behave appropriately in the classroom setting (Minahan, 2019; Rawson, 2020; Von Dohlen et al., 2019).

School, specifically the classroom, is where a student spends a large amount of their time. This makes schools and classrooms natural places for students with ACEs to be identified



and supported with strategies and interventions that will help them be successful (Maddox et al., 2022; Tabone et al., 2020; Von Dohlen et al., 2019). Teachers are uniquely positioned to support all students, especially those with ACEs as those students often do not have a safe and reliable adult in their life (Bath, 2008; Cavanaugh, 2016; Minahan, 2019). Teachers have the ability to provide a positive and welcoming environment in their classroom, provide consistency and structure in their management strategies, and provide a feeling of choice and control to students who tend to feel powerless to the people and events in their environment (Brunzell et al., 2016; Cavanaugh, 2016; Milheim, 2012; Minahan, 2019; Morton, 2022; Von Dohlen et al., 2019).

### **Purpose**

As a teacher in an alternative high school setting with most of my students having experienced one or more ACEs, it is my responsibility to discover ways to make a positive impact in their lives so that they can learn and grow. The purpose of this research is to determine what the literature says about how ACEs affect a student's ability to perform behaviorally and academically in the classroom, and to synthesize highly effective, easily applied classroom strategies for supporting students with ACEs. Working in a variety of educational settings for vastly different districts and principals, using specified curriculum and assessments, I've learned that the two factors I can most control are my classroom management strategies and my relationships with students. For this project, I set out with the purpose of finding trauma-informed strategies that teachers can start implementing right away without funding, specific materials, counselor assistance, or school-wide initiatives. As I continue to learn and grow as a teacher, and share what I've learned with my colleagues, I will

use research-based information and strategies to help my students grow into academically and socially successful young people.

### **Research Questions**

This research project was guided by the following questions:

1. What does the literature tell us about how adverse childhood experiences affect the brain and ability to learn?
2. What are 3 categories of proactive, trauma-informed strategies that teachers can implement in their classroom teaching to support students with trauma?

### **Methodology**

For this project, I chose a semi-systematic literature review. The process consisted of research, evaluation, and synthesis of multiple peer-reviewed articles and books. Articles and books were included or excluded based on the degree of relevance to the topics – effects of trauma on the brain and trauma-informed strategies for teachers and schools – and their publication date. Aside from articles and books sourced specifically for the theoretical framework, all peer-reviewed journal articles and books were published between 2002-2022. This range was chosen to focus the selected literature to the most current research in the field while providing adequate breadth of information. To find current and valid information, I conducted numerous keyword searches using a variety of databases such as ERIC, Psycinfo, and Education Source. Keywords included: *ACEs, effects of trauma on the brain, trauma and brain development, trauma and student behavior, childhood trauma and learning, trauma-informed teaching strategies, and supporting students with adverse childhood experiences*. Initial journal articles provided reference lists of cited sources that I used to further my research into specific

topics. I then synthesized and organized the information into categories to address the research questions. For example, how ACEs effect the brain and a student's ability to learn in the classroom, and strategies that educators can use to support students. These categories became the sections of this semi-systematic literature review.

## Chapter 2

### Literature Review

The following literature review includes the theoretical framework as a lens through which this research was conducted, a discussion of trauma and ACEs, and the effects of trauma on the developing brain. Next, it explores human needs and their connection to ACEs, behaviors as a communication, and the important role of schools. Finally, this review presents 15 classroom strategies, organized into three categories, for teachers to use to support students with a history of ACEs.

#### Theoretical Framework

Maslow's holistic-dynamic theory of human motivation describes people as being motivated by constantly changing needs that serve the whole-being (Maslow, 1954). A holistic view posits that "an individual functions as a totality and that each aspect of the structures and processes takes meaning from the role it plays in the total functioning of the individual" (Magnusson & Torestad, 1993, p. 436). In this view, emotions, motivations, and behaviors are pieces of a bigger picture that only have meaning when considered all together. Maslow describes an "individual as an integrated whole" by which they cannot experience a feeling such as hunger isolated to the stomach because that sensation is also noticed by the brain. In this way, it is also affecting the person's thoughts, perceptions, memories, and emotions (Maslow, 1954, p. 19). Maslow (1954) points out that while these needs have a pre-requisite nature, food and physical safety taking priority over esteem and recognition, they are connected. A person can be motivated by more than one need at a time or may seek fulfillment of a higher need even if their more basic needs are not fully met. The dynamic nature of this theory suggests

that once basic needs are met to some degree, then the individual could shift their energy to satisfying more complex needs, and that the individual's needs fluctuate over their lifetime (Maslow, 1954). Furthermore, Maslow's theory of human motivation contends that people are motivated by satisfying needs which require the individual to interact with their environment to gain food and water, physical and emotional safety, love and connectedness, esteem and recognition, and self-actualization (Maslow, 1954).

Much like Maslow's theory, Bronfenbrenner (1979) proposed the ecological systems theory which suggests that human development occurs in social layers, concentric rings of progressively larger and more complex environments and increasing in number of people and interactions. Bronfenbrenner's ecological systems theory furthers Maslow's theory, emphasizing the importance of the reciprocal interactions between an individual and their environment, including the people within each social layer. At the center of the ecological systems theory is the developing person. The person is surrounded by their microsystem, the first and closest layer, which includes direct influences such as family, school, peers, and health services resources. Just outside the microsystem, the second layer is the mesosystem, which demonstrates all the interactions between the elements in the child's microsystems including relationships between the child's teacher and their parents or between the child's peers and the child's siblings. The next layer is the exosystem which includes the child's neighborhood or their parent's friends or workplace. The interactions in these outer layers do not directly include the child but can have impacts on the child. The macrosystem includes the cultural dynamics in which the child lives, including socio-economic status, geographic location, ethnicity, and ideologies. The outermost layer of the ecological systems theory is the

chronosystem, which refers to the environmental changes over the child's lifetime. These changes range from starting school to divorcing parents living in separate homes (Guy-Evans, 2020). Bronfenbrenner's theory posits that human development is influenced by the relationships and interactions that the person has with their environment and the people in it. It also asserts that the interactions between the child's environments and between the people in those environments indirectly affect the child's development (Boxer et al., 2013; Bronfenbrenner, 1979).

With its roots in ecological frameworks, resiliency theory posits that "multiple systems (e.g., individual, family, neighborhoods, schools, etc.) interact to affect the course of development" of a child (Crandall et al., 2019, p. 2). Masten (2011) defines resilience as "a dynamic process" by which people present "positive adaptation" and outcomes despite having experienced trauma (p. 494). Like other ecological systems theories such as Bronfenbrenner's, resiliency theory includes the interactions between individuals and the people in their environments (Masten, 2011). The protective factor model of resiliency theory suggests that the negative outcomes of adverse experiences can be reduced by promotive resources in the child's environment (Zimmerman, 2013). Resiliency theory focuses on improving developmental outcomes by promoting positive influences, supports, and interventions that serve to buffer negative effects (Masten, 2011).

Together, these frameworks provide a lens through which this literature review was researched and written. Motivational theory states that people experience basic needs that affect their whole-being, physically and mentally, and that needs are affected by the changing environment, and they change over the lifetime (Maslow, 1954). Building on this, ecological

systems and resilience frameworks suggest that people rely on and are directly and indirectly impacted by the positive and negative experiences with the people in their environments (Bronfenbrenner, 1979; Masten, 2011). Taken together they provide a viewpoint to examine, using the literature, how a student is physically, mentally, and emotionally shaped by adverse experiences in their environment, and how teachers can support students with trauma within their environment.

### **Trauma and Adverse Childhood Experiences**

Trauma is an emotional response to a physically or an emotionally harmful event or series of events. Traumatic experiences have lasting effects on the victim's mental, physical, social, and/or emotional well-being. Some examples of traumatic experiences include: physical violence, witnessing domestic violence, sexual abuse, physical or emotional neglect, community or school violence, acts of terrorism, natural disasters, or traumatic loss (Cavanaugh, 2016; Sitler, 2009; Von Dohlen et al., 2019). Specifically, adverse childhood experiences, ACEs, are traumatic experiences occurring early in a person's life that continue to affect their daily life, even after the event has ended (Von Dohlen et al., 2019). ACEs can result from simple or complex trauma. Simple trauma involves only one occurrence but threatens the individual's physical safety. Complex trauma, also called relationship trauma, involves multiple exposures usually over the span of months or years (Brunzell et al., 2016). ACEs are grouped into three broad categories: (a) abuse – physical, mental, or social; (b) neglect – physical or emotional; and (c) household dysfunction including domestic violence and drug use in the home (Cavanaugh, 2016).

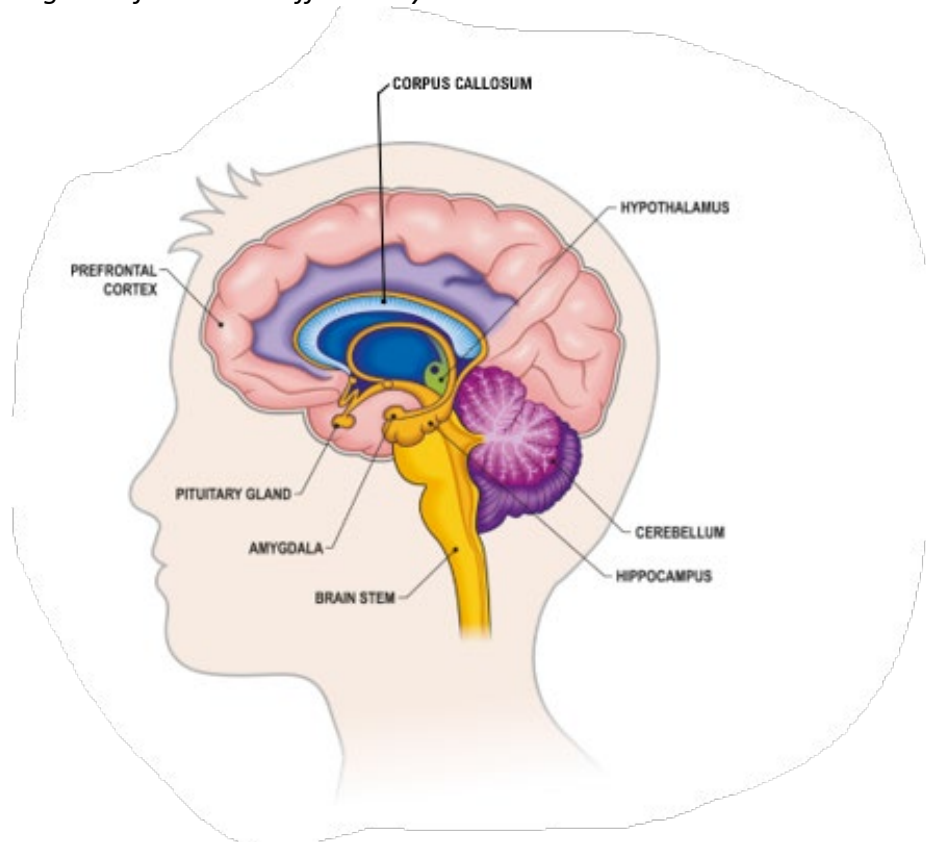
A study of adverse childhood experiences, conducted by the CDC at Kaiser Permanente, found that about 64% of people experience at least one adverse childhood experience and more than 20% of people experience three or more ACEs (Cavanaugh, 2016). Another 2016 National Survey of Children's Health study found that 45% of children in the United States have suffered at least one ACE, and about 10% have suffered three or more (Murphey & Sacks, 2019). ACEs can result in difficulty regulating one's emotions and trouble maintaining positive relationships or focusing on schoolwork (Brunzell et al., 2016; Cavanaugh, 2016). The greater the number of ACEs a student has, the greater the likelihood of the student manifesting academic and behavioral challenges. This may include delays in developing receptive and expressive language, poor attendance, anxiety, depression, withdrawal, inattention or shortened attention span, aggression, and delayed development of problem solving skills (Brunzell et al., 2016; Cavanaugh, 2016; Navalta et al., 2018; Stokes, 2022).

### **Effects of Adverse Childhood Experiences on the Brain**

Teicher (2016) stated, "there are few early experiences as consequential as abuse and neglect" (p. 652). The brain is a malleable organ that is continuously changing as it senses, processes, and stores incoming information from events and experiences in a person's life (Lim et al., 2014; Perry, 2005). The flexibility of the brain is also vulnerable to extreme or chronic stressful experiences during childhood development (Anda et al., 2006). Research on the effects of ACEs shows that regions of the brain are structurally and functionally changed by traumatic events and the release of hormones associated with those events (Von Dohlen et al., 2019). People react to trauma, such as ACEs, with a stress response that causes lasting damage to neurological and psychological systems (Brunzell et al., 2016; van der Kolk, 2003). According



to Thomason et al., “trauma and stress injure the brain” and “precipitate cognitive-behavioral and emotional problems” (p. 1460). While there are several regions of the brain, including specific neural pathways, that are affected by adverse experiences, this paper will focus on four areas that directly cause challenges for students in the school setting, specifically middle and high school students. Those four areas, represented in Figure 1, are: the amygdala, the hippocampus, the pre-frontal cortex, and the corpus callosum. All of these areas are affected by hormones that are released in response to adverse experiences. Cortisol is a hormone released as part of the body’s normal response to stress. The amygdala, hippocampus, pre-frontal cortex, and corpus callosum can all be damaged when cortisol levels become dysregulated by adverse experiences in a child’s life (Rawson, 2020).

**Figure 1***Regions of the Brain Affected by Trauma*

*Note.* Photo adapted from National Centre for Mental Health website (Lewis, 2019).

**The Lions Analogy**

In an interview, DeDiego (2022), a National Certified Counselor and Associate Professor of Counseling drew a connection between the stress response associated with survival in the outdoors and the stress responses of students in the classroom. In the wild, one must scan their environment for potential dangers such as mountain lions. In the event of a threat, the brain releases cortisol which tells the body to respond to the threat with increased heart rate and rapid breathing as it prepares to fight or flee. Once the mountain lion is no longer a threat, the body and brain recover from the stress and begin to calm down. Chronic stress and high levels of cortisol can disrupt brain development and cause the calming response to stop

working. This can leave the person feeling anxious and hypervigilant, constantly fearing a lion around the corner. For students with ACEs, adverse experiences function as their mountain lions. ACEs create an unpredictable and threatening environment which triggers a stress response in students. Chronic stress from a repeated or prolonged exposure to ACEs can inhibit their ability to recover from their stressors, leaving the student feeling anxious about the people and events in their home and classroom, even after the event is over and the mountain lion is gone (A. DeDiego, personal communication, September 30, 2022).

### **Amygdala**

The amygdala is the region in the brain responsible for a student's emotions, fear response, and ability to perceive threats in their environment. When the amygdala is overwhelmed by chronic or repeated stressors, such as ACEs, it can be difficult for a student to regulate their emotions in response to classroom events or interactions with their teachers and peers (Danese & Baldwin, 2017; Teicher et al., 2016; Thomason et al., 2015). When cortisol becomes dysregulated by repeated or prolonged traumatic events, the fight-or-flight response of the amygdala can become like a switch stuck in the "on" position causing students to become increasingly focused on negative thoughts and perceived threats (Danese & McEwen, 2012; Rawson, 2020). Students can become hyperaware of emotional- or angry-looking faces in the classroom and tend to overrespond to mildly stressful situations. When a student is in a high-alert state at school it can prove challenging for them to form and maintain positive relationships because they may view others as threats to their safety (Danese & Baldwin, 2017; Morton, 2022; Rawson, 2020).

### **Hippocampus**

The hippocampus is responsible for creating and storing memories, both long- and short-term (Rawson, 2020). Like the amygdala, the hippocampus is negatively affected by the stress of adverse childhood experiences. According to Danese and Baldwin (2017), Anda et al. (2006) and van der Kolk (2003), childhood trauma is associated with abnormalities of the hippocampus, including reduced hippocampal volume. One developmental study, using neuroimaging scans of children's brains over a 15 year period, found that the volume of the amygdala and hippocampus of children who had experienced ACEs during pre-school age was reduced (Luby et al., 2019). Similarly, when the amygdala stimulates the fight-or-flight response due to a stressor, the hippocampus is switched off, diverting energy to survival rather than memory creation (Danese & Baldwin, 2017; Rawson, 2020). When their hippocampus has been damaged, students with ACEs struggle to recall learned information or create memories with new information. The stress of ACEs can cause a student's hippocampus to be smaller, leading to "deficits in declarative, contextual, and spatial memory" (Danese & McEwen, 2012). Anda et al. (2006) finds that a chronically stressed hippocampus may not become activated when presented with memory tasks. In the classroom, it can be impossible for a student to store new information or access previously learned information. These students can be forgetful and have gaps in their learning due to periods of stress that result in hippocampal dysfunction (Danese & Baldwin, 2017).

### **Pre-Frontal Cortex**

Increased cortisol levels brought on by the stress of ACEs also hinders the development of the brain's most evolved region, responsible for critical thinking and decision-making, the pre-frontal cortex (Rawson, 2020). The pre-frontal cortex is in the front of the brain, just behind

the forehead, and it allows us to plan ahead, make judgments, learn from past experiences, and understand cause-and-effect. Studies show that the pre-frontal cortex goes through a critical period of development during adolescence, and that it is especially sensitive to the effects of stress during childhood and adolescence. Prolonged periods of stress during this time can impair the development of connections between neurons, effectively stopping the maturation of the pre-frontal cortex (Brunzell et al., 2016; de Araújo Costa Folha et al., 2017). The chronic stress brought on by ACEs causes the dendrites of the brain cells to become shortened, leading to impaired attention span (Danese & McEwen, 2012). Students with ACEs struggle to think critically about a situation or their behavior and are likely to make erratic, impulsive decisions without regard for future consequences. These students also struggle to distinguish between relevant and irrelevant information in their environment, leading to difficulties paying attention or focusing on classroom tasks (Rawson, 2020; van der Kolk, 2003).

### **Corpus Callosum**

The corpus callosum is a network of approximately 200 million nerve fibers that connect the two hemispheres of the brain. The transmission of information from one area of the brain to another allows the brain to take in and process visual and auditory information. It is also important for language acquisition and integration of information perceived on the right and left sides of the body and brain (Baynes, 2002). Teicher et al. (2016) and Anda et al. (2006) found that the corpus callosum of children who've experienced ACEs are of a smaller size and/or reduced integrity compared to those without ACEs. Two studies found that boys who had experienced severe neglect or abuse also had smaller mid-portions of the corpus callosum compared to boys without such trauma (van der Kolk, 2003). Studies showed that the thickness

of four segments of the corpus callosum correlated to higher IQ measures and increased problem-solving abilities (Teicher et al., 2016). Baynes (2002) found that students with a history of ACEs showed signs of less hemisphere integration, leading to behaviors that shifted between avoidance and aggression. Damage to the corpus callosum leads to both behavioral and academic challenges for students, of which they have no control (Teicher et al., 2016). Table 1 summarizes how different regions of the brain are affected by trauma and ACEs and how those effects present as learning difficulties in the classroom.

**Table 1***Effects of Trauma on Four Regions of the Brain and Implications for the Classroom*

| Brain Region       | Function  | Effects of Trauma   | Classroom Implications for Students   |
|--------------------|---|---|---|
| Amygdala           | Regulates emotions, responds to fear, and perceives threats <sup>a, b</sup>   | The fight-or-flight response can become like a switch stuck in the “on” position <sup>c</sup>                           | Hypervigilance, over-identification of threats, difficulty focusing, trouble building relationships with teachers and peers, respond with aggression or withdrawal <sup>a, c, d</sup>   |
| Hippocampus        | Creates and stores long- and short-term memories <sup>c</sup>   | Reduced hippocampal volume leading to declarative memory deficits <sup>a</sup>  | Difficulty recalling facts and figures, trouble storing new information or accessing previously learned information <sup>a</sup>  |
| Pre-frontal Cortex | Critical thinking, problem-solving, decision-making <sup>c</sup> , and understanding cause-and-effect <sup>e, f</sup> | Impaired development in the connections between neurons leading to stunted maturation <sup>e, f</sup>                   | Inability to anticipate consequences of behaviors, difficulty controlling emotions and impulses, struggle to distinguish between relevant and extraneous information leading to trouble focusing on classroom activities <sup>c</sup> |
| Corpus Callosum    | Connects and transmits information between the two hemispheres of the brain <sup>g</sup>                              | Reduced volume and/or integrity of the corpus callosum <sup>b</sup> leading to less hemisphere integration <sup>g</sup> | Reduced IQ measures and problem-solving abilities, and behaviors that shift between avoidance and aggression <sup>b</sup>   |

*Note.* Data are from: <sup>a</sup> Danese & Baldwin (2017), <sup>b</sup> Teicher et al. (2016), <sup>c</sup> Rawson (2020), <sup>d</sup> Morton (2020), <sup>e</sup> Brunzell et al. (2016), <sup>f</sup> de Araújo Costa Folha et al. (2017), <sup>g</sup> Baynes (2002).

## Human Needs

“Neurobiologically, students can’t learn if they don’t feel safe, known, and cared for within their schools” (Minahan, 2019, p. 31). Shifting from the neuroscientific implications of ACEs to the psychological ones, it is important to understand students as people with needs. Maslow’s hierarchy of needs suggests that all humans share a set of needs that motivates their behaviors, but that some needs are more fundamental and must be met before other needs can be addressed (Maslow, 1954). Maslow’s hierarchy, shown in Figure 2, includes basic needs: food, water, shelter, and safety; psychological needs: love, friendship, belonging, recognition, and self-esteem; and self-fulfillment needs: realizing one’s potential and seeking personal growth (McLeod, 2022). When a student’s need for food or safety is not met, it can be very difficult for them to focus on classroom activities and expectations because all their energy is channeled toward their more basic needs (Rawson, 2020; Sitler, 2009).

**Figure 2**

*Maslow’s Hierarchy of Needs*



*Note:* Photo adapted from Simply Psychology website (McLeod, 2022).



ACEs are directly related to unmet needs such as a parent neglecting to feed a child, or physical or sexual abuse threatening the child's safety. Parents or caregivers who emotionally neglect a child fail to meet the child's needs for love, belonging, and esteem (Cavanaugh, 2016). "Feeling connected and having a sense of belonging are important protective factors for children" (Stokes, 2022, p. 2). Protective factors in a student's environment foster resilience and meet one or many needs (Zimmerman, 2013). Unmet needs are typically easier to identify than damage done to a student's brain by stressful childhood experiences, especially if we as educators are paying attention and/or asking the right questions. However, awareness is paramount.

### **Behaviors Through a Trauma Lens**

When presented with challenging behaviors, it is easy for educators to label the student with negative descriptors – lazy, careless, or bad – blaming the student for their own shortcomings as if the student is choosing to struggle. Teachers may explain a student's lack of focus as misbehavior, resulting in disciplinary action for behavior that is simply outside the student's control (Morton, 2022; Terrasi & de Galarce, 2017). According to Terrasi and de Galarce (2017), the manner in which a teacher responds to a student's behavior can compound the problem for a traumatized student. Interpreting a student's difficulty with the material as laziness or lack of motivation, or avoidance behaviors as a rejection of the teacher's efforts, can result in disciplinary action for a student who is simply misunderstood (Terrasi & de Galarce, 2017). Silter (2009) indicates that teachers must reframe their judgements of students' behaviors and view them as a communication of an unmet need or a manifestation of a stressful, adverse experience. It is important for teachers to remember that trauma often masks itself as

disruptive classroom behaviors (Sitler, 2009). Rawson (2020) says, “ACEs explain many behaviors and poor educational outcomes we see in our students” (p. 11). Students with a history of ACEs are more likely to exhibit poor self-regulation, negative thinking, hypervigilance, mistrust of teachers and other adults, and irresponsible interactions with peers (Minahan, 2019). When educators are able to view the behavior through a trauma-sensitive lens and determine the cause of the behavior, they can then take steps to meet the student’s needs or provide strategies and opportunities for them to be successful in the classroom (Minahan, 2019; Von Dohlen et al., 2019).

### **The Role of Schools in Recognizing Trauma and Supporting Students**

Schools play a crucial role in the support and well-being of children with ACEs. They offer children a safe environment to learn and connections with caring adults, helping to meet their needs of safety and belonging (Von Dohlen et al., 2019). According to Maddox et al. (2022), it is common for ordinary interactions between a student and their teachers or peers to elicit symptoms of ACEs, such as irritability, frustration, or withdrawal. For this reason, according to Tabone et al. (2020), teachers and counselors are often the first to identify and provide services and interventions for students who’ve experienced trauma. Schools also serve as a natural setting for students to receive such services because it is where they already spend a large part of their day (Tabone et al., 2020). Just as schools serve as a safe place to support students’ needs, teachers serve as natural sources of that support through classroom strategies. Maddox et al. suggests that to proactively respond to the needs of their students, teachers should implement classroom strategies that promote “the principles of safety, trustworthiness, choice, collaboration, and empowerment for students” (p. 7).

## **Trauma-Informed Strategies for Teachers**

“Witnessing or experiencing trauma can affect children’s development, impacting their social skill development, self-control, and cognition” (Maddox et al., 2022, p. 2). Students who have experienced trauma tend to not feel safe in relationships or their environment. Their trauma may “significantly inhibit both self-regulatory and relational capacities required for learning” (Stokes, 2022, p. 2). When a student’s trauma, or ACEs, presents as disruptive classroom behaviors, teachers need to be equipped with trauma-informed strategies to support the student’s physical, mental, and emotional well-being (Cavanaugh, 2016). A nearly universal experience of students with ACEs is feeling unsafe in their home or environment (Bath, 2008). For this reason, Bath (2008) suggests creating a safe, consistent, and predictable environment in which students have developmentally appropriate control over their learning circumstances. Using trauma-informed strategies helps to establish the safe and supportive learning environment for students with ACEs and promotes the academic and social success of all students in the classroom (Cavanaugh, 2016). For this research, I focused primarily on proactive strategies to minimize classroom behaviors but also included some responsive interventions. Specific strategies are presented in three categories: (a) positive interactions and environment; (b) consistency, structure, and routine; and (c) voice, choice, and control. I discuss specifics of each strategy in the text and summarize with a table at the end of each section.

### **Strategies for Positive Interactions and Environment**

#### ***Positive Interactions***

The first category, “positive interactions and environment”, may seem self-evident to educators and school staff. However, a positive environment starts with an awareness that

when an adult intentionally engages in simple, positive interactions with a student with ACEs, it can make a difference in how the student engages with classroom activities, teachers, and peers (Cavanaugh, 2016). According to Cavanaugh (2016), the more positive interactions a student has at school, the more likely they are to engage in learning activities with fewer behavioral struggles. Positive interactions between teachers and students foster an emotionally safe environment and help meet their needs for safety and belonging (Bath, 2008; Maddox et al., 2022; Morton, 2022; Tabone et al., 2020). These positive interactions may include specific praise for meeting behavior expectations or general greetings that create a friendly environment where the student feels welcome (Cavanaugh, 2016). Brunzell et al. (2016) emphasizes small-group or one-to-one interactions with a consistent and caring adult as ways of fostering positive relationships as students feel as though they're seen and heard in the classroom.

### ***Leveraging Strengths***

All students have strengths (Stokes, 2022). Thus, another way to create a positive classroom environment for students is to leverage their individual strengths. Teachers can foster a sense of worthiness and empowerment for students by encouraging them to do more of what they are good at and pushing them for more, making small improvements visible (Sitler, 2009). Students can be empowered by opportunities to showcase their strengths and interests to their peers and teachers in a safe environment (Cavanaugh, 2016; Tabone et al., 2020). Teachers can help all students, especially those with ACEs, “experience competence” by asking a student to help a peer with a concept or skill that is one of the student’s strengths. This

strategy serves to benefit the peer as they learn from a classmate and encourages a positive self-concept for the student in the mentoring position (Minahan, 2019, p. 32).

### ***Building Trust***

To promote a positive and safe environment for students to learn, it is important to build trust between students and between the teacher and their students. Minahan (2019) recommends giving students “private, nonverbal directions” for minor behaviors, such as pencil tapping, using a quick note on the student’s desk to avoid a confrontation or power struggle (p. 32). Teachers can also create a welcoming environment and promote a positive relationship with a student by employing the “two by ten rule”. This strategy involves talking to the student “two minutes a day for ten days in a row” about non-academic subjects. Showing an interest in the student’s life, hobbies, and interests fosters a trusting relationship between the teacher and their student (Minahan, 2019, p. 32). Due to previous negative experiences, students with ACEs have difficulty trusting adults (Tabone et al., 2020). Showing a genuine interest in a student as a unique individual and refraining from redirecting behaviors in a public manner help to build trust within the classroom.

### ***Change the Channel***

Another strategy that Minahan (2019) suggests involves teaching students that they can change the channel in their minds, away from negative thoughts, by engaging in an activity that requires their brain to think about something else. This technique promotes safety and helps students self-regulate by switching the focus of their thoughts away from the negative experience or feelings that may cause disruptive or aggressive behaviors. Movement breaks, a commonly used and well-intended strategy, don’t redirect the student’s thoughts, but can

allow a student to persevere on the upsetting incident. Activities such as crossword puzzles, trivia, or saying the alphabet in reverse order causes the student to focus their thoughts on something else, helping to calm their brain and emotions (Minahan, 2019).

### ***Provide Positive Feedback***

Students with a history of ACEs tend to perceive negativity more strongly, due to a heightened fight-or-flight response (Rawson, 2020). Minahan (2019) suggests providing negative feedback between two pieces of positive feedback. With this strategy, a teacher would start the conversation with a piece of feedback such as a student's strengths, then deliver the negative feedback in a kind manner, and finishing with another positive comment. Brunzell et al. (2016) recommends that teachers be aware of and purposefully use positive and reinforcing statements. These strategies help to maintain a positive relationship with the student and reduces the student's negative thinking.

### ***Promote Hope and Growth***

Another strategy for creating a positive relationship and learning environment for students is to teach in ways that promote hope and growth (Brunzell et al., 2016). Brunzell et al. define hope as expecting the best in the future and working toward achieving it. Teachers can support students by helping them set goals for themselves and the things they wish to accomplish and discuss alternate paths that the student might take when they encounter adversity in their pursuit of their goals. Teachers can also promote a culture of hope in their classroom by "teaching with stories of hope" (Brunzell et al., 2016, p. 73). Morton (2022) supports this idea saying that teachers should share their struggles and ways that they overcame the difficulties they encountered. Similarly, promoting a growth mindset can help

students learn that their current struggles are just that, current. Their struggles will not last forever and that they can choose to persist and improve. Brunzell et al. (2016) state that praise feedback should be focused on growth, process, and effort, rather than on the result, to increase motivation by recognizing a student's engagement, perseverance, or strategies used to solve a problem.

In summary, increasing positive interactions with students, especially those with ACEs, in a thoughtful way can calm a student's amygdala by reducing their stress response. Reducing the stress response, and cortisol levels associated, serves to reduce the student's emotional response, allowing them to relax, take in new information, and access previously learned information (Minahan, 2019). Positive interactions and trusting relationships between teachers and students foster a safe classroom environment that helps meet the students' needs for safety and connection, creating a learning environment that is conducive to engaging in learning activities (Sitler, 2009). As noted in Table 2, leveraging students' strengths, providing positive feedback, and promoting hope and growth in the classroom are all strategies that support a student's needs for connectedness, esteem, and self-actualization by recognizing their strengths, promoting a positive self-concept, and helping them look into the future and set goals to reach their potential (Brunzell et al., 2016; Minahan, 2019).

**Table 2***Summary of Classroom Strategies for Teachers: Positive Interactions and Environment*

| Strategy                     | Function  | Classroom  |
|------------------------------|---|--|
| Positive Interactions        | Foster an emotionally safe environment for students to connect with a caring adult <sup>a, b, c, d</sup>  | Specific praise for meeting behavior expectations, general greetings <sup>e</sup> , small group or one-on-one interactions with a supportive adult <sup>f</sup>  |
| Leverage Students' Strengths | Promote a sense of worthiness and empowerment <sup>g</sup> , encourage a positive self-concept, and help a student "experience competence" <sup>h</sup> | Make small improvements visible, verbally recognize students' strengths, encourage them to do what they are good at while pushing them for more <sup>g</sup> , provide opportunities for students to showcase their strengths <sup>e</sup> , ask a student to help a peer with a concept or skill that is a strength of the student's <sup>h</sup> |
| Build Trust                  | Preserve dignity, avoid confrontation or power struggles, create a welcoming environment and a trusting relationship <sup>h</sup>                       | Place a note on the student's desk with private, non-verbal directions as reminder of the task or to address minor behaviors; the 2-by-10 rule of talking to a student about non-academic topics "two minutes a day for 10 days in a row" <sup>h, p.32</sup>   |
| Change the Channel           | Promote safety in the classroom and encourage self-regulation <sup>h</sup>  | When a student experiences a negative incident, teach them to shift their thoughts away from the negative by engaging the brain in another cognitive activity such as a crossword puzzle or saying the alphabet in reverse order <sup>h</sup>  |
| Provide Positive Feedback    | Reduce a student's negative thinking, maintain a positive relationship <sup>h</sup> , increase on-task behavior <sup>f</sup>                            | Be aware of and purposefully use positive and reinforcing statements <sup>f</sup> , provide negative feedback between two pieces of positive feedback <sup>h</sup>   |
| Promote Hope and Growth      | Foster a feeling of hope for the future and a growth mindset to help them reach their goals, increase motivation <sup>f</sup>                           | Teach with stories of hope; support students in individual goal setting; help students generate alternate pathways when they encounter adversity; focus positive feedback on growth and effort by recognizing a student's engagement and perseverance <sup>f</sup>   |

*Note:* Strategies from: <sup>a</sup> Maddox et al. (2022), <sup>b</sup> Morton (2022), <sup>c</sup> Tabone et al. (2020), <sup>d</sup> Bath (2008), <sup>e</sup> Cavanaugh (2016), <sup>f</sup> Brunzell et al. (2016), <sup>g</sup> Sitler (2009), <sup>h</sup> Minahan (2019).



## **Strategies for Consistency, Structure, and Routine**

### ***Minimize Surprises***

Next, “consistency, structure, and routine” is an important category of strategies for proactively mitigating stressful classroom situations. “Not knowing what is coming next would put anyone on high alert, especially traumatized students” (Minahan, 2019, p. 33). Students with a history of ACEs often do not experience consistency in a chaotic or dysfunctional home. Creating predictability with classroom expectations and routines, visual schedules or agendas, warnings before transitions, and visual and auditory reminders about upcoming changes to the routine can serve to establish a safe and reliable environment in which students can relax (Cavanaugh, 2016; Minahan, 2019; Morton, 2022; Von Dohlen et al., 2019). In an article about the application of Maslow’s hierarchy of needs to students in online courses, Milheim (2012) argues that students feel stressed by an unfamiliar learning environment. Students must be given time and guidance to become familiar with a new course structure. Teachers should also provide grading requirements and rubrics in advance to alleviate students’ anxiety and help them feel safe in the classroom or other learning environment (Milheim, 2012).

### ***Avoid and Manage Triggers***

Students with a history of ACEs may respond to stressful situations in an immediate and uninterrupted manner because their brain has been conditioned by their previous experiences. Seemingly inconsequential events can trigger a student to have a stress response and exhibit disruptive behaviors (Perry, 2005). Teachers can proactively manage behavior by identifying and then advising the student about situations that may be triggering for them. For example, a teacher could warn a student of an upcoming fire drill if they know that loud noises are a

trigger, or allow for short breaks so that students can relax and refocus to alleviate pressure from schoolwork (Cavanaugh, 2016; Morton, 2022). Morton (2022) found that deep breathing and stretching exercises help students learn to self-regulate by providing physical and mental breaks and helping remove tension from the muscles. Removing tension and resetting their focus allows students to participate in classroom activities without become overwhelmed or triggered by the pressure of classwork, thereby avoiding disruptive behaviors (Morton, 2022).

### ***Structured Transitions***

According to Minahan (2014), transitions can be one of the most challenging events during the school day for students with ACEs. Within an otherwise structured school day, transitions can be more chaotic and therefore challenging for anxious students. To alleviate their anxiety and get ahead of student's negative responses, teachers can take steps to build structure into transitions. First, inform students of an upcoming transition with a concrete stopping point for the current activity. This also works by providing a "countdown warning" for the next activity. This first step takes the surprise out of the transition (Minahan, 2014, p. 42). Second, use a visual agenda or other visual aid to help students shift their focus to the next activity. Minahan (2014) suggests helping students make a "cognitive shift" to the next activity by reminding them of the posted class agenda, showing a video of a successful transition, and/or helping students visualize what the next activity requires so that they are physically and mentally prepared (Minahan, 2014, p. 42). Finally, support the students as they begin the next activity. Students often struggle to initiate a new activity, but with the teacher's support at the start of the activity, they begin to feel less anxious and develop confidence to initiate activities independently in the future (Minahan, 2014).

### ***Check-In / Check-Out***

Check-in/check-out (CICO) is an intervention that provides a student with additional structure and support with scheduled meeting times at the start and end of the school day. The student receives prompts and encouragement toward meeting their behavioral or academic goal and builds a positive relationship with a caring adult (Cavanaugh, 2016). The check-in should be a planning period to prepare the student for their day, discuss anticipated struggles, and create a plan for dealing with those struggles. During the check-out, the student should reflect on their day - how they handled difficult situations and how they can make the next day better. CICO is not intended to be used with every student, but as an additional support for students who struggle to meet the behavioral or academic expectations (Cavanaugh, 2016; Minahan, 2014).

As summarized in Table 3, creating a safe and reliable learning environment by minimizing surprises, avoiding triggers, structuring transitions, and using CICO are all strategies that serve to lower stress levels for students (Cavanaugh, 2016; Minahan, 2019; Morton, 2022; Von Dohlen et al., 2019). When their stress levels are lower, students are better able to manage emotions, respond appropriately, and engage in classroom learning (Sitler, 2009; Stokes, 2022). Students' need for safety is met by providing them with a safe and predictable environment, which students with ACEs may not have if the people or events in their home are dysfunctional (Cavanaugh, 2016).

**Table 3***Summary of Classroom Strategies for Teachers: Consistency, Structure, and Routine*

| Strategy                  | Function  | Classroom   |
|---------------------------|---|---|
| Minimize Surprises        | Create predictability and establish a safe and reliable environment <sup>a, b, c, d</sup>   | Set and post clear behavior expectations, establish routines and classroom procedures, post visual schedules and daily agendas, warn students of upcoming transitions, and give visual and auditory reminders of changes to normal routine <sup>a, b, c, d</sup> . Provide grading rubrics in advance <sup>e</sup> .  |
| Avoid and Manage Triggers | Proactively manage challenging behaviors and help students relax in the classroom <sup>a, c</sup>   | Advise students of an upcoming, potentially triggering situations (i.e., fire drills with loud noises or events with large crowds) and provide short breaks to avoid overwhelm <sup>a, c</sup> , deep breathing and stretching after a period of focused classwork <sup>c</sup>   |
| Structured Transitions    | Alleviate students' anxiety and avoid challenging behaviors around activity changes with gentle, structured transitions <sup>b</sup>                      | Inform students of an upcoming transition with a concrete stopping point for the current activity, use a visual agenda or other visual aid to help students shift their focus to the next activity, support students as they begin the next activity <sup>b</sup>   |
| Check-In/Check-Out        | Provide targeted support and structure toward meeting academic and behavioral goals, and fosters a positive relationship with a caring adult <sup>a</sup> | The student is assigned a mentor teacher or staff member to check in with each morning to review goal and receive encouragement. Throughout the day, the student uses a tracker to keep track behaviors in each class period. At the end of the school day, the student checks out with the mentor to reflect and receive coaching and encouragement <sup>a</sup> |

*Note:* Strategies from: <sup>a</sup> Cavanaugh (2016), <sup>b</sup> Minahan (2019), <sup>c</sup> Morton (2022), <sup>d</sup> Von Dohlen et al. (2019), <sup>e</sup> Milheim (2012).

### **Strategies for Providing Voice, Choice, and Control**

Traumatic childhood experiences commonly cause a child to feel a lack of control over their own life and the decisions made about it (Cavanaugh, 2016). The third category, “voice, choice, and control”, is a group of strategies that teachers can use to empower students and give them some control in their learning.

#### ***Students Prioritize Their Needs***

Sitler (2009) suggests teachers allowing a small number of assignments to be turned in late without any explanation. This gives students agency to make decisions and manage the responsibilities of their schoolwork. If the student, for example, has a paper due, but also needs to study for an exam, they may choose to prioritize the exam and turn the paper in a day or two late if they have that option. This flexibility empowers the student to prioritize tasks and complete all of their schoolwork, rather than feeling overwhelmed by trying to get it all done at once, consequently not completing either or any task well (Sitler, 2009).

#### ***Democratic Classrooms***

Von Dohlen et al. (2019) point out two classroom practices that support student voice and choice – democratic classrooms and project-based learning. Democratic classrooms are classrooms in which the students are continuously involved in making decisions regarding classroom rules, procedures, and expectations, as well as creating goals and learning objectives for the class (Von Dohlen et al., 2019). In an example, Von Dohlen et al. (2019) discuss a middle school classroom that starts with the students creating a list of classroom jobs and apply for those jobs based on their individual skills and interests. This system creates a classroom culture

that empowers students to make decisions, practice accountability, and build their autonomy in a supported environment.

### ***Project-based Learning***

Similarly, project-based learning (PBL) puts students in the driver's seat in the classroom. After the teacher gives the students the driving question and expectations for the project, students work together and establish project goals and roles for each group member. Then they conduct their research and present their final findings and artifacts to an authentic audience (Von Dohlen et al., 2019). For example, students in a meteorology class studying weather patterns might decide to track temperature and humidity data and compare it to daily precipitation then present their collection of data to a local weather service or contribute to an online repository of weather data. According to Von Dohlen et al. (2019), the classroom teacher facilitates the learning and provides support, but the students get to choose the methods they will use to address the driving question. Both democratic classrooms and PBL allow students to be decision-makers in the classroom, building their autonomy and empowering them with opportunities to make choices about their environment and their learning, and practice responsibility and accountability for their role in the classroom or project.

### ***Embedding Choice into the Desired Outcome***

Minahan (2019) suggests "avoiding authoritative directives" which place the teacher in a position of power over the student's actions, leading to an outburst or withdrawal by the student (p. 32). A teacher could also build choices into their directions for a student with ACEs, such as, "Would you like to read the article about falcons or the one about astronauts?" when the learning goal includes reading articles about scientific subjects (Minahan, 2019). Minahan

(2019) points out that the student still reads an article, as directed by the curriculum, but they have more agency in their learning when presented with options and the opportunity to decide which article topic is most interesting to them. Similarly, Downey (2007) suggests offering choices that meet the needs of the teacher and the students with “humor and creativity” as a means of “defusing the child’s desire to fight” (p. 21).

### ***Embrace Students’ Individual Learning Styles***

In addition to their individual strengths, each student has learning preferences that allow them to access content easier (Cavanaugh, 2016; Peterson, 2014). Presenting curriculum content, or allowing students to access the content, in a variety of ways helps to meet the learning needs of all students, but especially those with ACEs. According to Peterson (2014), some students may find certain learning modalities triggering. For example, an auditory learner who experiences loud, aggressive language in the home may find loud classroom events to be overwhelming, causing a stress response and undesired behaviors (Peterson, 2014). To further foster a culture of voice and choice, teachers can provide opportunities for students to demonstrate their learning according to their learning preferences. This strategy allows the teacher to evaluate the student’s learning without creating additional barriers for the student and “validates a child’s identity and capabilities” (Peterson, 2014, p. 65).

In summary, all of these practices encourage all students, with or without ACEs, to engage in the learning activities in a positive manner. Strategies such as allowing students to prioritize their needs, democratic classrooms, PBL, embedding choice and individual strengths within the learning activities can provide students with opportunities to develop independence by allowing them to make choices about their learning (Von Dohlen et al., 2019). As noted in

Table 4, these strategies can support students' needs for belonging by giving them an active role in the classroom, and esteem by allowing them to demonstrate their strengths and contribute to a group project. They also provide for agency to make choices about events that impact them at school (Cavanaugh, 2016; Von Dohlen et al., 2019).



**Table 4***Summary of Classroom Strategies for Teachers: Voice, Choice, and Control*

| Strategy                                     | Function   | Classroom  |
|--|--|--|
| Students Prioritize Their Needs              | Gives students the freedom and responsibility to make decisions about priorities, helps develop independence and self-esteem <sup>a, b</sup> | Allow a small, reasonable number of assignments to be turned in late, without any explanation or penalty <sup>b</sup>  |
| Democratic Classrooms                        | Helps students build autonomy, and empowers students with a voice among their peers <sup>a</sup>   | Students are involved in the decision-making regarding rules, routines, expectations, and goals and objectives; students take an active role in running the classroom with specific responsibilities <sup>a</sup>  |
| Project-based Learning                       | Helps students build autonomy as they “lead their own learning” and practice responsibility and accountability <sup>a, p. 13</sup>           | Teachers present students with a driving question and project expectations, then students determine the methods their group will use to address the driving question, set goals for the group, and assign roles to the individuals in the group. Students present their findings to an appropriate audience <sup>a</sup> |
| Embedding Choice into the Desired Outcome    | Gives students agency in their learning and engages students in learning in a positive manner <sup>c</sup>                                   | Avoid “authoritative directives” <sup>c, p. 32</sup> , build choices into the directions and classroom activities <sup>c</sup>   |
| Embrace Students’ Individual Learning Styles | Fosters a supportive environment where students can build confidence and resilience <sup>d, e</sup>  | Provide opportunities for students to demonstrate their strengths, present content in a variety of methods to reach students with different preferred learning styles, allow students to demonstrate their learning using methods that suit their learning preferences <sup>d, e</sup>                                   |

*Note:* Strategies from: <sup>a</sup>Von Dohlen et al. (2019), <sup>b</sup>Sitler (2009), <sup>c</sup>Minahan (2019), <sup>d</sup>Peterson (2014), <sup>e</sup>Cavanaugh (2016).

## Chapter 3

### Discussion

This chapter outlines my conclusions drawn from the literature. I make connections to multi-tiered system of supports and to my own work. I also discuss the limitations of this research project and recommendations for future research into this topic. I finish with a short section for fellow educators including a graphic of the strategies discussed in the literature review. As a reminder, the research questions that guided this project were:

1. What does the literature tell us about how adverse childhood experiences affect the brain and ability to learn?
2. What are 3 categories of proactive, trauma-informed strategies that teachers can implement in their classroom teaching to support students with trauma?

### Implications

#### ***Connections to Multi-tiered System of Supports***

Across the United States, many schools have implemented, or are implementing, a leveled framework for supporting students called multi-tier system of supports, or MTSS. In this framework, schools and their teachers are providing supports and interventions to students, based on behavior and academic data, at increasing intensity “until the barriers to learning are addressed” (Averill & Rinaldi, 2013, p. 1). According to Averill and Rinaldi (2013), the MTSS framework consists of three tiers designed to address students’ learning needs. Tier 1 contains the curriculum, instruction, and behavior management tools provided to all students in the classroom. Tiers 2 and 3 provide targeted interventions for students who need additional, individualized instructional and/or behavioral support, possibly including special education

services (Averill & Rinaldi, 2013). The ACEs-informed strategies laid out in this project are classroom strategies that teachers can provide to all students at the tier 1 level, apart from CICO. Check-in/check-out is a more targeted intervention to provide additional structure for select students, a tier 2 strategy. In this we see that the research about ACEs, learning, and how to help students with trauma connects with an MTSS approach to provide a variety of strategies that differ in audience and intensity based on student needs.

### ***Connections to Classroom Practice***

Most of the students who attend my school do so because they were unable to find academic and/or social success at the other secondary schools in the district. Whether dealing with adult matters, like working to support themselves or their family, or being bullied by their peers because of physical or behavioral differences, many students have reasons to not attend school on a regular basis. Poor attendance hinders my students' ability to be successful in the classroom. However, family and social pressures are not the only obstacles that many of my students face. Each of them comes to school with a unique set of experiences that influences the way they will behave and how, or even whether, they will learn what I am providing instruction for in the classroom. Most of my students have experienced trauma that presents challenges for them in and out of the classroom through adverse childhood experiences, or ACEs. They are not able to focus their energy or attention on classwork because they are distracted by unmet needs brought on by adverse experiences such as abuse, neglect, or household dysfunction (Cavanaugh, 2016).

As an educator, I cannot fix my students' past, nor stop their current, adverse experiences. However, it is my professional responsibility to assist in meeting their needs and

lead a classroom that encourages positive outcomes for all my students. I can achieve this goal by using positive interactions with my students and their families, supporting students' needs for consistency and structure, and employing classroom strategies that encourage students' voice and choice.

### **Limitations**

As the sole researcher for this Plan B project, I worked to acquire many sources with a wide range of topics and viewpoints containing the most relevant and up-to-date information. I selected articles that contained information that was applicable to my research questions and that fit my theoretical frameworks – Maslow's theory of motivation, Bronfenbrenner's ecological systems theory, and resiliency theory. As such, I was able to link trauma and ACEs to theory of motivation and human needs. I was also able to show the connections between the theoretical frameworks and the importance of the teacher and their role in a student's environment to positively support students and promote resilience. Through this research, I was unable to discuss the long-term physical and mental health outcomes of prolonged traumatic stress, especially in older adults.

### **Recommendations for Future Research**

Due to the limitations of this research project, there are other areas in which I would recommend further, more extensive research. Some of the questions that still need to be investigated would be: (a) what are the physical health outcomes of prolonged trauma in adults? (b) what are the mental health conditions associated with prolonged trauma in adults? (c) in what ways can mental health professionals support students with ACEs in the school or classroom setting? Using a semi-systematic literature review, I was also unable to collect direct

quantitative or qualitative data from current students. This data could be collected using other methodologies such as surveys or interviews with students who have experienced trauma.

## **Conclusions**

The literature makes it clear that students' educational outcomes are affected by their experiences outside of school, and when those experiences are traumatic and stressful the outcomes can be poor. Abuse, neglect, and household dysfunction are broad categories that encompass a wide array of traumatic experiences that students may encounter and may hinder their abilities to perform in the classroom.

Educators must recognize that a student's misbehavior, inability to focus, or difficulties with content can be a result of the effects their trauma has on their brain. The student's amygdala may be causing them to focus on scanning the classroom for threats rather than focusing on learning activities (Danese & Baldwin, 2017; Teicher et al., 2016). Their hippocampus may be impaired due to repeated trauma, causing the student to have trouble recalling information presented the day before (Danese & McEwen, 2012; Rawson, 2020). Chronic stress may have caused the connections in the students pre-frontal cortex to be underdeveloped, rendering the student unable to think critically about the consequences of their behavior (Brunzell et al., 2016; Danese & McEwen, 2012; de Araújo Costa Folha et al., 2017; Rawson, 2020; van der Kolk, 2003). The student's corpus callosum may be compromised due to their ACEs, reducing their problem-solving skills or causing sudden behavioral shifts. Whatever the problem may be, it is not that the student is "bad" or "lazy", but that they physically, mentally, or emotionally can not meet the social or academic expectation, without understanding and support from caring adults (Morton, 2022).

The human brain is flexible and children are resilient. Because of this, “given the right environmental conditions and appropriate interventions, the severity of trauma symptoms can be reduced” (Terrasi & de Galarce, 2017, p. 27). Within the school and classroom settings, teachers are well-positioned to support students by providing a physically and emotionally safe place where their brains can make new connections. In a sense, though trauma can negatively impact learning, learning in trauma-sensitive environments can positively affect the traumatized brain (Terrasi & de Galarce, 2017). Educators need to recognize their role in each student’s social ecosystems and the impact of their interactions within them (Bronfenbrenner, 1979; Masten, 2011). Once cognizant of this position, educators must then work to be constructive resources for students and promote positive outcomes for them to build resilience (Zimmerman, 2013).

Classroom teachers are often not aware of the specific ACEs that their students carry into school with them, but that does not mean that there is not anything they can do. This project examines 15 strategies, organized into three categories, that teachers can integrate into their classroom teaching to support all students, especially those with trauma. These proactive approaches serve to support students by minimizing their stress response in the classroom so that they can focus on learning activities (Cavanaugh, 2016; Rawson, 2020).

To address the needs of all students, especially those with a history of ACEs, classroom teachers should implement trauma-informed practices. This implementation might start with district- or school-wide professional development opportunities for teachers to learn about the impact of ACEs on their students and strategies to support students in a proactive manner. Teachers should reflect on their past or current students and how the variety of ACEs-informed

strategies might meet the needs of those students. They can also determine which strategies would be easiest for them to implement right away and which they may need to implement over time. Whether provided specific professional development or learning independently, teachers should seek information about how best to support their trauma-affected students to promote positive outcomes for all their students.

Most of the strategies discussed in this Plan B project require little more than a change in the way a teacher reacts to situations in the classroom. Others, such as project-based learning and minimizing surprises, will require some planning on the teacher's part. As they are on the frontlines of education, educators must be equipped with the tools to combat negative outcomes for our students. All of the strategies in this project are intended to be implemented by the classroom teacher as a basis on which to build a trauma-sensitive classroom culture, without the need for assistance from a guidance counselor or school-wide initiative.

### **Final Thoughts for Educators**

This research project was designed to synthesize what current literature says about ACEs and their effects on students' brains and identify trauma-informed strategies for teachers to support students. It showed that the effects of ACEs can be detrimental to students' ability to focus and learn, and that students' behaviors should be interpreted as a communication of trauma rather than laziness. For a summary of the effects of ACEs on students' brains and their abilities to learn, please refer to Table 1: *Effects of Trauma on Four Regions of the Brain and Implications for the Classroom*.

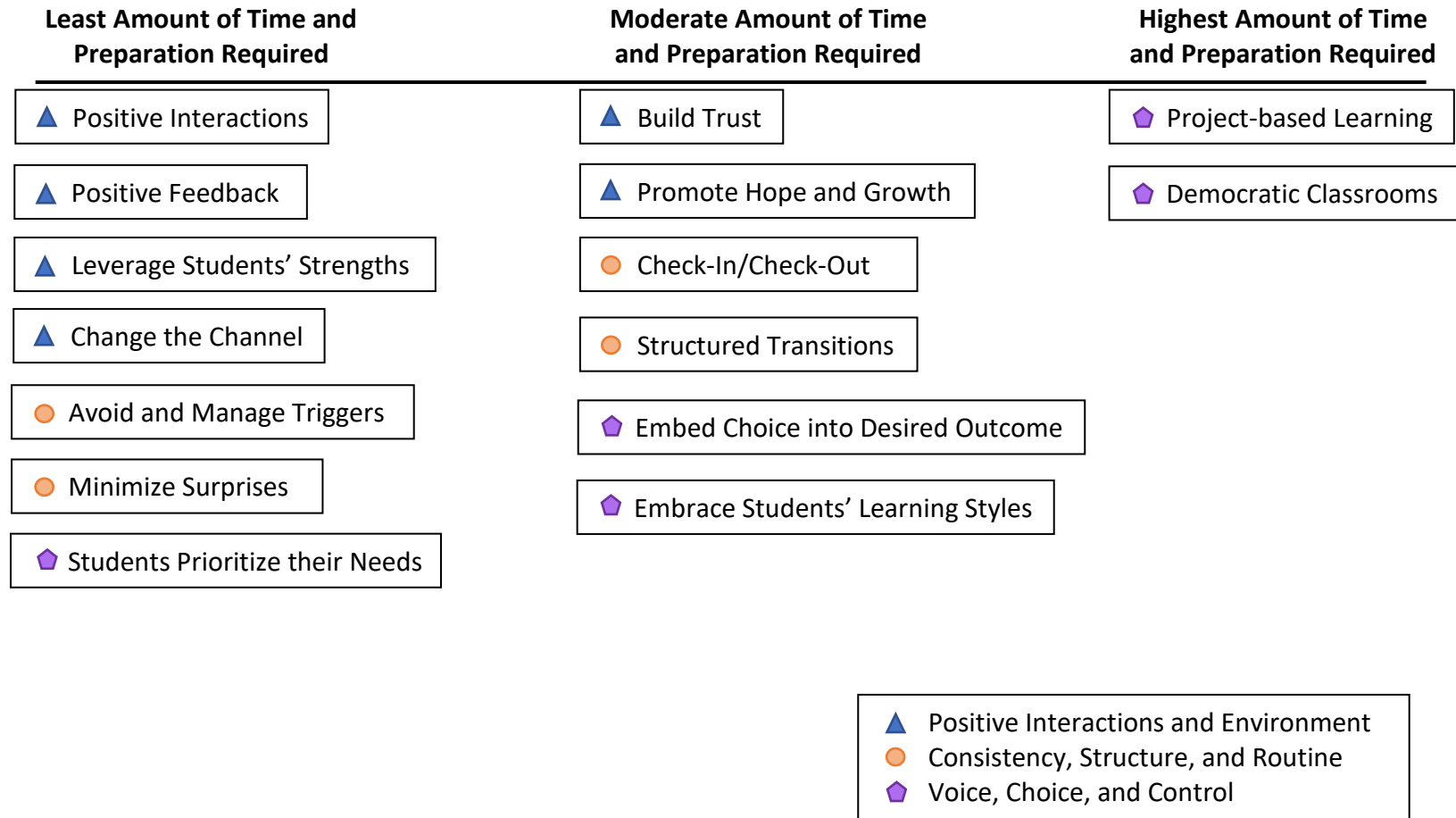
The literature also illuminated a variety of ways that teachers can support students' needs in the classroom. Most of these strategies can be implemented in the classroom with

minimal prior planning or preparation. Other strategies require more time to implement, planning on the teacher's part, or include a bigger adjustment to classroom practice. Figure 3 is intended as a broad overview of the categories and names of specific strategies aligned with the amount of preparation needed. I hope it provides a concrete place for teachers to start using these ideas and strategies in their own settings.



**Figure 3**

*Classroom Strategies for Teachers Arranged by Time and Preparation Required*



## References

- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, Ch., Perry, B. D., Dube, Sh. R., & Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience*, *256*(3), 174–186.  
<https://doi.org/10.1007/s00406-005-0624-4>
- Averill, O. H., & Rinaldi, C. (2013). Multi-tier System of Supports (MTSS). *Urban Special Education Leadership Collaborative*.
- Bath, H. (2008). The Three Pillars of Trauma-Informed Care. *Reclaiming Children and Youth*, *17*(3), 17–21.
- Baynes, K. (2002). Corpus Callosum. In V. S. Ramachandran (Ed.), *Encyclopedia of the Human Brain* (Vol. 2, pp. 51–64). Academic Press. <https://doi.org/10.1016/B0-12-227210-2/00107-2>
- Boxer, P., Rowell Huesmann, L., Dubow, E. F., Landau, S. F., Gvirsman, S. D., Shikaki, K., & Ginges, J. (2013). Exposure to Violence Across the Social Ecosystem and the Development of Aggression: A Test of Ecological Theory in the Israeli-Palestinian Conflict: Violence Across the Social Ecosystem. *Child Development*, *84*(1), 163–177.  
<https://doi.org/10.1111/j.1467-8624.2012.01848.x>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

- Brunzell, T., Stokes, H., & Waters, L. (2016). Trauma-Informed Positive Education: Using Positive Psychology to Strengthen Vulnerable Students. *Contemporary School Psychology, 20*(1), 63–83. <https://doi.org/10.1007/s40688-015-0070-x>
- Cavanaugh, B. (2016). Trauma-Informed Classrooms and Schools. *Beyond Behavior, 25*(2), 41–46. <https://doi.org/10.1177/107429561602500206>
- Crandall, A., Miller, J. R., Cheung, A., Novilla, L. K., Glade, R., Novilla, M. L. B., Magnusson, B. M., Leavitt, B. L., Barnes, M. D., & Hanson, C. L. (2019). ACEs and counter-ACEs: How positive and negative childhood experiences influence adult health. *Child Abuse & Neglect, 96*, 104089. <https://doi.org/10.1016/j.chiabu.2019.104089>
- Danese, A., & Baldwin, J. R. (2017). Hidden Wounds? Inflammatory Links Between Childhood Trauma and Psychopathology. *Annual Review of Psychology, 68*(1), 517–544. <https://doi.org/10.1146/annurev-psych-010416-044208>
- Danese, A., & McEwen, B. S. (2012). Adverse childhood experiences, allostasis, allostatic load, and age-related disease. *Physiology & Behavior, 106*(1), 29–39. <https://doi.org/10.1016/j.physbeh.2011.08.019>
- de Araújo Costa Folha, O. A., Bahia, C. P., de Aguiar, G. P. S., Herculano, A. M., Coelho, N. L. G., de Sousa, M. B. C., Shiramizu, V. K. M., de Menezes Galvão, A. C., de Carvalho, W. A., & Pereira, A. (2017). Effect of chronic stress during adolescence in prefrontal cortex structure and function. *Behavioural Brain Research, 326*, 44–51. <https://doi.org/10.1016/j.bbr.2017.02.033>
- DeDiego, A. (2022, September 30). *ACEs Research Project* [Personal communication].

- Downey, L. (2007). *Calmer Classrooms: A guide to working with traumatised children*. Child Safety Commissioner.
- Guy-Evans, O. (2020). *Bronfenbrenner's Ecological Systems Theory*. Simply Psychology.  
<https://www.simplypsychology.org/Bronfenbrenner.html>
- Lewis, E. (2019, August 22). National Centre for Mental Health. *Adverse Childhood Experiences and the Developing Brain*. <https://www.ncmh.info/2019/08/22/adverse-childhood-experiences-and-the-developing-brain/>
- Lim, L., Radua, J., & Rubia, K. (2014). Gray Matter Abnormalities in Childhood Maltreatment: A Voxel-Wise Meta-Analysis. *American Journal of Psychiatry*, *171*(8), 854–863.  
<https://doi.org/10.1176/appi.ajp.2014.13101427>
- Luby, J. L., Tillman, R., & Barch, D. M. (2019). Association of Timing of Adverse Childhood Experiences and Caregiver Support With Regionally Specific Brain Development in Adolescents. *JAMA Network Open*, *2*(9), e1911426.  
<https://doi.org/10.1001/jamanetworkopen.2019.11426>
- Maddox, R. P., Rujimora, J., Nichols, L. M., Williams, M. K., Hunt, T., & Carter, R. A. (2022). Trauma-Informed Schools: Implications for Special Education and School Counseling. *TEACHING Exceptional Children*, 004005992211071.  
<https://doi.org/10.1177/00400599221107142>
- Magnusson, D., & Torestad, B. (1993). A holistic view of personality: A model revisited. *Annual Review of Psychology*, *44*, 427. <https://doi.org/10.1146/annurev.ps.44.020193.002235>
- Maslow, A. H. (1954). *Motivation and personality* (First edition). Harper & Row, Publishers.  
<http://swbplus.bsz-bw.de/bsz000741604inh.htm>

- Masten, A. S. (2011). Resilience in children threatened by extreme adversity: Frameworks for research, practice, and translational synergy. *Development and Psychopathology, 23*(2), 493–506. <https://doi.org/10.1017/S0954579411000198>
- McLeod, S. (2022). *Maslow's Hierarchy of Needs*. 16. <https://www.simplypsychology.org/maslow.html>
- Milheim, K. L. (2012). Towards a Better Experience: Examining Student Needs in the Online Classroom through Maslow's Hierarchy of Needs Model. *Journal of Online Learning and Teaching, 8*(2), 159. <http://www.proquest.com/docview/1499824204/abstract/12E10F24C4CA41CEPQ/1>
- Minahan, J. (2014). *The Behavior Code Companion: Strategies, Tools, and Interventions for Supporting Students with Anxiety-Related or Oppositional Behaviors*. Harvard Education Press.
- Minahan, J. (2019). Trauma-Informed Teaching Strategies. *Educational Leadership, 30–35*.
- Morton, B. M. (2022). Trauma-Informed school practices: Creating positive classroom culture. *Middle School Journal, 53*(4), 20–27. <https://doi.org/10.1080/00940771.2022.2096817>
- Murphey, D., & Sacks, V. (2019). Supporting Students with Adverse Childhood Experiences: How Educators and Schools Can Help. *American Educator, 43*(2), 8–13. <http://go.gale.com/ps/i.do?p=AONE&sw=w&issn=0148432X&v=2.1&it=r&id=GALE%7CA588342160&sid=googleScholar&linkaccess=abs>
- Navalta, C. P., McGee, L., & Underwood, J. (2018). Adverse Childhood Experiences, Brain Development, and Mental Health: A Call for Neurocounseling. *Journal of Mental Health Counseling, 40*(3), 266–278. <https://doi.org/10.17744/mehc.40.3.07>

- Perry, B. D. (2005). Applying Principles of Neurodevelopment to Clinical Work with Maltreated and Traumatized Children. In *Working with Traumatized Youth in Child Welfare* (p. 26). Guilford Publications.
- Peterson, K. (2014). *Helping Them Heal: How Teachers Can Support Young Children Who Experience Stress and Trauma*. Gryphon House, Inc.
- Rawson, S. (2020). *Applying Trauma-Sensitive Practices in School Counseling: Interventions for Achieving Change*. Routledge. <https://doi.org/10.4324/9780429281402>
- Sitler, H. C. (2009). Teaching with Awareness: The Hidden Effects of Trauma on Learning. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 82(3), 119–124. <https://doi.org/10.3200/TCHS.82.3.119-124>
- Stokes, H. (2022). Leading Trauma-Informed Education Practice as an Instructional Model for Teaching and Learning. *Frontiers in Education*, 7. <https://www.frontiersin.org/articles/10.3389/educ.2022.911328>
- Tabone, J. K., Rishel, C. W., Hartnett, H. P., & Szafran, K. F. (2020). Examining the effectiveness of early intervention to create trauma-informed school environments. *Children and Youth Services Review*, 113, 104998. <https://doi.org/10.1016/j.childyouth.2020.104998>
- Teicher, M. H., Samson, J. A., Anderson, C. M., & Ohashi, K. (2016). The effects of childhood maltreatment on brain structure, function and connectivity. *Nature Reviews Neuroscience*, 17(10), 652–666. <https://doi.org/10.1038/nrn.2016.111>
- Terrasi, S., & de Galarce, P. C. (2017). Trauma and learning in America's classrooms. *Phi Delta Kappan*, 98(6), 35–41. <https://doi.org/10.1177/0031721717696476>

Thomason, M. E., Marusak, H. A., Tocco, M. A., Vila, A. M., McGarragle, O., & Rosenberg, D. R.

(2015). Altered amygdala connectivity in urban youth exposed to trauma. *Social Cognitive and Affective Neuroscience*, *10*(11), 1460–1468.

<https://doi.org/10.1093/scan/nsv030>

van der Kolk, B. A. (2003). The neurobiology of childhood trauma and abuse. *Child and*

*Adolescent Psychiatric Clinics of North America*, *12*(2), 293–317.

[https://doi.org/10.1016/S1056-4993\(03\)00003-8](https://doi.org/10.1016/S1056-4993(03)00003-8)

Von Dohlen, H. B., Pinter, H. H., Winter, K. K., Ward, S., & Cody, C. (2019). Trauma-informed

practices in a laboratory middle school. *Middle School Journal*, *50*(4), 6–15.

<https://doi.org/10.1080/00940771.2019.1650549>

Zimmerman, M. A. (2013). Resiliency Theory: A Strengths-Based Approach to Research and

Practice for Adolescent Health. *Health Education & Behavior*, *40*(4), 381–383.

<https://doi.org/10.1177/1090198113493782>