

Review

Trauma in Schools: A Review of the Impact of Childhood Trauma and Assessment of a Potential Intervention

Emily Smith Schafer *

University of South Carolina Union 1, 401 East Main Street, Union, SC, USA; E-Mail:
eschafe2@mailbox.sc.edu

* **Correspondence:** Emily Smith Schafer; E-Mail: eschafe2@mailbox.sc.edu

Academic Editor: Brandis Ansley

Collection: [Stress, Burnout, and Trauma in Schools: Coping Strategies for Teachers, Staff, and Students](#)

OBM Integrative and Complementary Medicine
2024, volume 9, issue 2
doi:10.21926/obm.icm.2402030

Received: March 02, 2023

Accepted: May 10, 2024

Published: May 24, 2024

Abstract

According to the National Survey of Children's Health (NSCH), nearly 30 million children in the United States have experienced one or more types of significant childhood trauma. In the average public school, this statistic translates to as many as half of the students in a given teacher's classroom. Children exposed to the toxic stress of trauma often experience negative consequences that affect their academic, psychological, socioemotional, and behavioral health. To aid educators in addressing this reality, trauma-informed care practices have increasingly begun to be translated into professional development opportunities for educators. Using the theoretical frameworks of trauma theory and transformational learning theory, this review of the literature provides a brief overview of trauma theory, the short- and long-term effects on children, the mechanisms involved in how trauma affects developmental outcomes, and the relevance of trauma in an educational setting. It also reviews the implementation of trauma-informed care as professional development in educational settings, examines research on educators' awareness of beliefs and attitudes, and reviews how/whether knowledge and change in attitudes affect behavioral change.



© 2024 by the author. This is an open access article distributed under the conditions of the [Creative Commons by Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium or format, provided the original work is correctly cited.

Keywords

Childhood trauma; trauma-informed care; school; adverse childhood experiences (ACEs); education; professional development

1. Introduction

“Our brains are sculpted by our early experiences. Maltreatment is a chisel that shapes the brain to contend with strife, but at the cost of deep, enduring wounds” [1].

Childhood trauma is both common and profoundly detrimental to the developmental outcomes of youth [2-5]. In a nationally representative survey conducted by Finkelhor and colleagues [6] from December 2002 to February 2003, more than half of children and youth ages 2 to 17 years had experienced a physical assault during the previous year. One out of three had been a witness to violence; one out of eight had experienced abuse or neglect from caregivers; and one out of twelve had been sexually victimized. Only 29% of children and youth had no direct or indirect victimization. In a follow-up study conducted from August 2013 to April 2014, estimates of youth exposure rates to trauma ranged from 57% to 75% depending on the type of trauma [7]. Perfect and colleagues [4] found similar prevalence rates, estimating that two out of three students had experienced at least one traumatic event before the age of 18.

Extensive research on adverse childhood experiences (ACEs) has also confirmed the pervasiveness of childhood trauma. Recent surveys indicate 45% of all children nationally have experienced at least one ACE, with significantly higher rates among black (61%) and Hispanic (51%) children [8]. ACEs are experiences such as physical or sexual abuse, physical or emotional neglect, loss of a parent to death or divorce, or living in a household with an addict or mentally ill caregiver. Blaustein [9] likens childhood trauma to a prevalent, complex virus that has the potential to negatively impact brain development and functioning, well-being, nutrition, risk for other illnesses, and ultimately mortality [3, 5, 10]. In an effort to combat these negative effects, trauma-informed care approaches are being increasingly employed, and recently are being implemented and evaluated as potential school-wide interventions [10-12].

According to a survey by the National Survey of Children’s Health [13], nearly 30 million children in the United States have experienced one or more types of significant childhood trauma. In the average public school, this translates to nearly half of the students in a given teacher’s classroom. Children exposed to the toxic stress of complex trauma often experience negative consequences that affect their academic, psychological, social-emotional, and behavioral health [2-5, 14-17]. To aid educators in addressing this reality, trauma-informed care practices have increasingly begun to be translated into professional development opportunities for educators. This scoping review is intended to provide scientific rationale for the necessity of trauma-informed interventions, examine research on Compassionate Schools and similar interventions, and provide an assessment of professional development as an avenue for assisting trauma impacted students.

Several terms or phrases used in the current review require definition. The terms for childhood trauma, in particular, are varied in the literature. The following section provides explanations for what is meant by each term in this document.

- Adverse childhood experiences (ACEs): abuse, neglect, dysfunctions in the home, and exposure to other traumatic stressors, like witnessing violence, experiencing bullying or racism, or being separated from family, before the age of 18 [18]. ACEs are commonly experienced as traumatic, but in some instances may not be.
- Childhood trauma: an event that is emotionally painful or distressing to someone under 18, which often results in lasting (immediate or delayed) psychological and physical effects [19].
- Compassionate Schools: a training to provide resources to schools aspiring to become trauma-informed environments for students; intended to provide teachers with a basic understanding of ACEs, brain development and function, interpretation of classroom behaviors, compassionate management of said behaviors, resilience, and the mandate for self-care [20, 21].
- Complex trauma: chronic, usually early, exposure to multiple traumatizing experiences, often at the hands of caregivers [19].
- Educator/teacher: For the purposes of this review, these terms are used interchangeably to refer to public school personnel who are the primary teachers in a K-12 classroom.
- Executive function and self-regulation: the mental processes that enable individuals to plan, focus attention, remember instructions, and navigate/prioritize multiple tasks; involving working memory, mental flexibility, and self-control; crucial for learning and healthy development [22, 23].
- Mindfulness: the intentional cultivation of moment-by-moment, calm, non-judgmental focused attention and awareness on the present [24].
- Neuroplasticity: the brain's ability to prune, modify, or reorganize neurons in response to stimulation, or lack thereof, in the environment; malleability is dependent on the stage of development and the area of the brain [5].
- Resilience: the ability to overcome serious hardship; doing well despite adversity; more likely to be developed in children who have at least one caring, committed adult relationship [25].
- Toxic stress: prolonged activation of the stress response in the absence of protective relationships; the result of chronic adversity without adult support. Toxic stress disrupts the development of brain architecture and other organ systems, and increases the risk for stress-related disease and cognitive impairment, well into the adult years [26]. Toxic stress can be caused by ACEs but also any other situation that is experienced as traumatic by the child.
- Trauma-informed care (TIC): a strengths-based framework based on the awareness of the impact of trauma that takes a universal precautions approach, emphasizing safety and reestablishing control; intended to be both preventative and rehabilitative [27].

Two theoretical frameworks provided the foundation for this review: trauma theory and transformational learning theory. Trauma theory provides the foundational understanding of the need for TIC training. Transformational learning theory explains how professional development can change teachers' perceptions of trauma-impacted students and, in turn, their interactions with students.

1.1 Trauma Theory

Trauma theory is based on the preponderance of evidence in scientific research demonstrating the negative effects of adverse experiences and the resulting toxic stress in childhood [28-30]. The

body's response to this traumatic stress affects a child's brain development, influencing her ability to self-regulate, form healthy attachments, control impulses, and focus attention [5, 29, 31]. These negative outcomes directly affect a child's ability to perform in an academic setting, as classroom behavior and learning are impacted by the brain's hyperarousal [31]. When an uninformed educator interacts with a child who is unable to prioritize appropriate behavior, has difficulty with authority, is unable to sustain attention, is impulsive, and is therefore unconcerned with academic performance, that educator may mistake trauma for negative attributes or a lack of morality, i.e., intentional disrespect [12, 32].

1.2 Transformational Learning Theory

In order for educators to have the skills to accurately assess a child impacted by trauma, they must not only be informed about the impact of trauma on students, but also have a subsequent change in mindset. This necessary shift in perspective can be explained by transformational learning theory [33, 34]. Transformational learning is more than a simple acquisition of knowledge or change in a point of view or belief. It is the kind of learning that fundamentally shifts a prior mindless acceptance of available information, resulting in a reflection and a conscious change in worldview [34, 35].

Transformational learning often leads to significant changes in thoughts, feelings, beliefs, and behaviors [36]. A foundational understanding of trauma theory gives educators the essential context required to examine their previous assessments of and interactions with trauma-impacted students. When, upon reflection, educators acknowledge the need for a new perspective, their beliefs about and attitudes toward trauma-impacted students shift. Adopting this new trauma-informed lens through which to view students' 'negative' classroom behavior is an example of adult transformational learning [33]. It has the potential to positively impact student-teacher interactions, classroom management, and discipline policy. Teachers' professional development is often not evaluated rigorously enough to determine whether transformational learning is occurring [37].

This scoping review of the literature includes, as a rationale for trauma-informed care training, a brief overview of trauma theory, the short- and long-term effects on children, the mechanisms involved in how trauma affects developmental outcomes, and the relevance of trauma in an educational setting. It then reviews the implementation of trauma-informed care as professional development in educational settings, examines research on educators' awareness of beliefs and attitudes, and reviews how/whether knowledge and change in attitudes affect behavioral change. Finally, it includes a specific example of how a TIC training program was implemented and assessed.

2. Overview of Trauma Theory

Manageable stress can have a positive effect on a developing child, leading to the development of resilience [31]. However, when stress becomes intense, persistent, and unpredictable, in the absence of a safe and supportive adult, it surpasses a child's coping ability and begins to have negative developmental effects [22, 28, 29, 38]. This chronic stress response can result in trauma. The Diagnostic and Statistics Manual of Mental Disorders (5th ed.: DSM-5; [39]) defines a traumatic event as exposure to actual or threatened death, serious injury, or sexual violation. The exposure results from one of the following: (1) direct experience of the traumatic event, (2) witnessing the

traumatic event, (3) learning that the traumatic event happened to a close friend or family member, or (4) experiencing repeated, extreme exposure to aversive details of the traumatic event.

Research on adverse childhood experiences (ACEs) spanning more than two decades confirms the negative effects toxic stress has on a child in multiple developmental domains: psychological, physical, social, behavioral, cognitive, and emotional [15, 28-30, 38]. The academic and classroom difficulties that arise as a result of childhood trauma can range from inattention and anxiety to explosive outbursts or unexplained illnesses [9, 29]. See Figure 1 below, adapted from Cook and colleagues [29] for more specific impairments in the various domains.

<p>I. Attachment</p> <p>Problems with boundaries Distrust and suspiciousness Social isolation Interpersonal difficulties Difficulty attuning to other people’s emotional states</p> <p>Difficulty with perspective taking</p>	<p>IV. Behavioral control</p> <p>Poor modulation of impulses Self-destructive behavior Aggression toward others Pathological self-soothing behaviors</p> <p>Sleep disturbances Eating disorders Substance abuse Excessive compliance Oppositional behavior Difficulty understanding and complying with rules</p> <p>Reenactment of trauma in behavior or play (e.g., sexual, aggressive)</p>	<p>VI. Cognition</p> <p>Difficulties in attention regulation and executive functioning</p> <p>Lack of sustained curiosity</p> <p>Problems with processing novel information</p> <p>Problems focusing on and completing tasks</p> <p>Problems with object constancy</p> <p>Difficulty planning and anticipating</p> <p>Problems understanding responsibility</p> <p>Learning difficulties Problems with language development</p> <p>Problems with orientation in time and space</p>
<p>II. Biology</p> <p>Sensorimotor developmental problems</p> <p>Problems with coordination, balance, body tone</p> <p>Somatization Increased medical problems across a wide span (e.g., pelvic pain, asthma, skin problems, autoimmune disorders, pseudoseizures)</p>	<p>V. Self-concept</p> <p>Lack of a continuous, predictable sense of self</p> <p>Poor sense of separateness Disturbances of body image</p> <p>Low self-esteem Shame and guilt</p>	
<p>III. Affect regulation</p> <p>Difficulty with emotional self-regulation Difficulty labeling and expressing feelings</p> <p>Problems knowing and describing internal states</p> <p>Difficulty communicating wishes and needs</p>		

Figure 1 Domains of Impairment in Children Exposed to Trauma.

2.1 Prevalence of Trauma

The prevalence of adverse childhood events is frequent. According to the Center for Disease Control and Prevention [18], the following prevalence rates were reported in the original Adverse Childhood Experiences study in the mid-1990s, where over 17,000 adults, who had completed a

standardized medical evaluation at a large HMO, answered a confidential survey about their current health and childhood experiences (see Table 1; [15]). The majority of these participants were white and had at least some post-secondary education.

Table 1 Prevalence of ACEs by Category from 1998 Adverse Childhood Experiences Survey.

ACE Category	Women	Men	Total
	Percent (N = 9,367)	Percent (N = 7,970)	Percent (N = 17,337)
ABUSE			
Emotional Abuse	13.1%	7.6%	10.6%
Physical Abuse	27%	29.9%	28.3%
Sexual Abuse	24.7%	16%	20.7%
HOUSEHOLD CHALLENGES			
Intimate Partner Violence	13.7%	11.5%	12.7%
Household Substance Abuse	29.5%	23.8%	26.9%
Household Mental Illness	23.3%	14.8%	19.4%
Parental Separation or Divorce	24.5%	21.8%	23.3%
Incarcerated Household Member	5.2%	4.1%	4.7%
NEGLECT			
Emotional Neglect ³	16.7%	12.4%	14.8%
Physical Neglect ³	9.2%	10.7%	9.9%

Note: Reprinted from the Center for Disease Control and Prevention, https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/about.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fviolenceprevention%2Facestudy%2Fabout.html.

Of the participants in the ACE study, 36.1% reported zero ACEs, 26% reported one ACE, 15.9% reported two ACEs, 9.5% reported three ACEs, and 12.5% reported four or more ACEs [18].

In 2010, ten states and Washington, DC included an ACE module on their state’s version of the Behavioral Risk Factor Surveillance System survey (BRFSS; [18]). See Table 2 for a summary of the over 50,000 surveyed participants, who were also majority white and with some post-secondary education.

Table 2 Prevalence of ACEs by Category in 2010 from the Behavioral Risk Factor Surveillance System.

ACE Category	Women	Men	Total
	Percent (N = 32,539)	Percent (N = 21,245)	Percent (N = 53,784)
ABUSE			
Emotional Abuse	34.1%	35.9%	35.0%
Physical Abuse	15.8%	15.9%	15.9%
Sexual Abuse	15.2%	6.4%	10.9%

HOUSEHOLD CHALLENGES			
Intimate Partner Violence	15.6%	14.2%	14.9%
Household Substance Abuse	27.2%	22.9%	25.1%
Household Mental Illness	19.3%	13.3%	16.3%
Parental Separation or Divorce	23.1%	22.5%	22.8%
Incarcerated Household Member	5.2%	6.2%	5.7%

Note: Reprinted from the Center for Disease Control and Prevention, <https://www.cdc.gov/violenceprevention/childabuseandneglect/cestudy/ace-brfss.html>.

Of the participants in the BRFSS survey, 40.7% reported zero ACEs, 23.6% reported one ACE, 13.3% reported two ACEs, 8.1% reported three ACEs, and 14.3% reported four or more ACEs [18].

In a nationally representative survey of youth conducted by Finkelhor and colleagues [6], only 29% of children and youth had experienced no direct or indirect victimization. This included first-hand experience of physical assault of any kind, bullying, sexual victimization, or child maltreatment, and witnessing murder, domestic violence, abuse of a sibling, assault, or the violence of a war zone [6]. In a follow-up study, estimates of youth exposure rates to trauma ranged from 57% to 75% depending on the type of trauma [7]. Perfect and colleagues [4] found similar prevalence rates, estimating that two out of three students had experienced at least one traumatic event before the age of 18. Additional research on adverse childhood experiences (ACEs) has also confirmed the pervasiveness of childhood trauma. Recent surveys indicate 45% of all children nationally have experienced at least one ACE, with significantly higher rates among Black (61%) and Hispanic (51%) children [8].

As evidenced by significant and consistent national data, childhood trauma is pervasive. If left untreated, the impact of trauma may persist throughout the lifespan of a victim [28, 30]. The following section will review the literature to explain how this prevalent societal ill impacts students.

2.2 Impact of Trauma

A primary effect of the toxic stress resulting from childhood trauma is abnormal neurodevelopment (i.e. brain dysfunction). The full impact of the effect of abuse or neglect on a child’s developing brain is still being uncovered, but much has already been learned. Prenatal development until the fifth year of life is the most critical period of brain architecture for a child [5]. When traumatic stress or neglect happens during this time of brain development, abnormalities can occur. The brain, in an attempt to cope with the stress, increases production of cortisol or adrenaline. In the short term, this may help a child run from danger or hide from an intruder. However, when the stress is chronic, intense, and in the absence of a supportive adult, a tremendous negative impact can result [5, 30].

A significant region of the brain that has been shown to be affected by stress is the prefrontal cortex, where higher-order skills reside. These skills of executive function and self-regulation are essential in academic success, and their absence makes behavioral regulation in a classroom difficult [22]. When toxic stress disrupts the development of the cortex, it can also affect an individual’s ability to plan, problem solve, and use language, all of which are critical to classroom success [31, 32, 40]. The prefrontal cortex is also where empathic understanding originates, and when under extreme stress, it can go “offline” so that higher-order abilities are inaccessible [30]. When the

functioning of the prefrontal cortex is suspended, “invention and innovation, discovery and wonder all are lacking” ([30], p. 60), making engagement in learning quite challenging for a child.

The limbic system can also be affected by childhood trauma. The limbic system, which regulates memory, emotional reactivity or mood, and attachment, also plays a significant role in the fight or flight response [1, 31]. The fight or flight response is an evolutionarily adaptive reaction to danger, but when this fear response is continually triggered because of abuse or neglect, brain cells can be destroyed, causing memory and attachment difficulties [5]. When the limbic system’s development is disrupted, impulsivity can become problematic and sexual behavior may be affected, leading to an unhealthy increase in number of sexual partners, unprotected sex and increased sexually transmitted infections, or early pregnancy [5, 28].

Less complex areas of the brain, like the brainstem and diencephalon, can also be affected by toxic stress. These areas of the brain regulate sleep, blood pressure, heart rate, body temperature, and appetite/satiety [31]. The brainstem and diencephalon are more likely to become dysfunctional with trauma that occurs in infancy or early childhood and affect a child’s stress-response system in a way that can disrupt future and more complex development [31]. When children struggle with frequent sleep and/or eating issues, their ability to concentrate or even stay awake in class is impaired. They may appear distracted or bored.

In addition to brain development, childhood trauma affects physical health. In the original ACE study, an increase in the number of ACEs correlated with an increase in heart disease, liver disease, depression, risk for sexually transmitted diseases, adolescent pregnancy, and poor academic achievement, among adults who had experienced childhood trauma [15]. Although these results and many replicated versions of this study represent the longer-term impact of childhood abuse or neglect on adult health, research is beginning to show that the negative health impact begins immediately. A large meta-analysis of the biological effects of childhood trauma confirms that children exposed to toxic levels of stress can have increased inflammation, dysregulated (or suppressed) immune systems, impaired growth, or increased likelihood of metabolic syndrome [41].

A more recent study found that abused youth had higher resting blood pressure and blunted blood pressure reactivity, which can put a child on the road to future heart disease [42]. Shenk, Noll, Peugh, Griffin, and Bensman [43] prospectively examined female adolescent health over five years. They found that maltreatment significantly increased the risk for teenage birth and cigarette use as compared to the control group. Traumatized children are also more likely to report unexplained pain and somatic (medically unexplained) symptoms, such as headache, stomachache, fatigue, or other body pain [28, 44]. These illnesses and pains, though medically inexplicable, are real to the children experiencing them and can adversely affect their ability to show up for or engage in school. Physical and mental health are often linked, as can be seen in somatization disorder, when a child’s mental or emotional distress manifests as a physical illness or pain [39, 45]. The increased inflammation that results from the chronic stress of childhood abuse or neglect affects both physical and mental health [30, 41] in ways that impact their education.

Mental health can also be more directly linked to childhood trauma apart from physical effects. Van der Kolk [38, 46] describes how trauma can increase risk for mental health problems, including diagnoses such as post-traumatic stress disorder (PTSD), dissociative identity disorder (DID), major depressive disorder (MDD), reactive attachment disorder (RAD), or generalized anxiety disorder (GAD). Each of these mental illnesses disturb a child’s ability to fully participate in an educational

environment, and each may increase a student's inclination for aggressive or dysfunctional behavior [46].

Mental illness has been identified as a result of childhood trauma in many studies. In a longitudinal study of 1,093 urban, socio-economically disadvantaged high schools seniors, researchers examined the association between ACEs and three mental health outcomes, depression, drug abuse, and anti-social behavior [47]. The young adults were interviewed in-person and then followed up with two years later by phone interview. Most ACEs were strongly associated with all three outcomes and the cumulative effect of ACEs was significant. Parental separation was not associated with depression or anti-social behavior. Interestingly, the adverse mental health impact was consistently greater on white participants than Black or Hispanic [47]. Similarly, in a nationally representative sample of 2,030 youth aged 2-17, sexual assault, child maltreatment, witnessing family violence, and other major violence exposure each made independent contributions to levels of depression and anger/aggression [48].

Edwards and colleagues [49] surveyed nearly 9,000 adults on exposure to ACEs and current mental health, using a subscale of the Medical Outcomes Study. A dose-response relationship was found between the number of ACEs and lower mental health scores. An emotionally abusive family environment amplified the decline in mental health scores as well [49]. Suicidality is a significant behavioral manifestation of severe mental/emotional/psychological distress. In a 2017 meta-analysis, Zatti and colleagues [50] reviewed seven unique studies linking childhood trauma and suicide attempts. Sexual, physical, and emotional abuse, as well as physical neglect were significantly associated with suicide attempts. Emotional neglect and separated parents were not [50].

Because of the brain impairment that occurs as a result of childhood trauma, a child who has been abused or neglected also likely has experienced behavioral effects that can intensify difficulties. As toxic stress interferes with the developing child, brain circuitry and architecture are affected in a way that impairs decision-making, self-control, and emotional regulation. Without the necessary scaffolding from caring adults, abused or neglected children can then struggle with impulsivity, sustaining attention, and working memory [22]. When lack of self-regulation, impulsivity, and poor decision-making intersect, behavioral problems are much more common. For example, the original ACE study found a dose-response relationship between the number of ACEs experienced and drug and alcohol abuse, number of sexual partners, suicide attempts, smoking, and poor academic achievement [15]. Abused or neglected children may also display behaviors that are self-destructive [38]. Children experiencing toxic stress do not intentionally choose maladaptive behaviors, rather they are typically unaware of the motivations resulting from the brain impairment that drive their destructive behaviors.

Many children exposed to abuse or neglect develop extreme reactivity to typically neutral stimulation, resulting in overreaction to frustrations and inability to tolerate anxiety [46]. These children also have a heightened sense of vulnerability because the trauma often occurs at the hands of those who should provide love and protection. Children's own parents are responsible for about 80% of child maltreatment [38]. This maltreatment can increase the incidence of aggressive behavior as a means of communication (temper tantrums), unhealthy coping (self-mutilation), or even dysfunctional connection (provoking) with teachers or peers [46]. These behavioral effects can translate into social difficulties for students at school.

2.3 Potential Intervention

The impact of trauma can be vast, across domains of a child's functioning as well as across the lifespan. Much research has pointed to safe, consistent, caring adults as both inoculation and intervention in the treatment of abused or neglected children [22]. Because school-age children and adolescents spend the majority of their waking hours in an educational environment, the faculty and staff of public schools are positioned to make a significant impact in the lives of their students. Bethell and colleagues [2] found that when teachers taught resiliency strategies to their students such as mindfulness and remaining calm and in control during difficult situations, children (ages six to seventeen) were able to mitigate the negative effect of trauma and increase engagement with academics.

The Substance Abuse and Mental Health Services Administration [51], a branch of the U.S. Department of Health and Human Services, recognized the potential positive impact of TIC and formed the National Center for Trauma-Informed Care (NCTIC) in order to advocate for and support systems in the implementation of trauma-informed care professional development. According to SAMHSA [51], the six key principles of a trauma-informed approach are, 1) safety; 2) trustworthiness and transparency; 3) peer support; 4) collaboration and mutuality; 5) empowerment, voice, and choice; and 6) cultural, historical, and gender issues. A trauma-informed care approach in school would ensure that educators:

- Realize the widespread impact of trauma and understand the potential paths for recovery.
- Recognize the signs and symptoms of trauma in students.
- Respond by fully integrating knowledge about trauma into policies, procedures, and practices.
- Seek to actively resist retraumatization [51].

The next section presents one such school-wide philosophy.

3. Trauma-Informed Schools

Trauma-impacted students may struggle behaviorally, academically, physically, socially, and emotionally in the school setting [5, 28, 46]. ACEs have been shown to be predictive of academic difficulties, conduct problems, delinquency, and increased risk of suspension, expulsion, risky behaviors, low school attendance, and school disengagement [2, 16, 52, 53]. Without an understanding of the effects of toxic stress, trauma-impacted students are at risk of being labeled as 'problems' rather than as children in need of support and empathy [54]. Combining this reality with the fact that many teachers feel less than competent about how to handle traumatized students [55], schools are faced with an important challenge to overcome. Although the evidence for the struggles of trauma-impacted students appears overwhelming, the reality of neuroplasticity, coupled with the significant impact of consistent, caring adults in the life of a student, gives room for much hope [22, 30, 56]. For teachers to feel more competent and to prevent misattribution of trauma-driven behavior, they have expressed a need for more trauma-focused training [55]. Educators and researchers have predicted that with adequate support and understanding of the effects of trauma on students, teachers and administrators will be better equipped to manage challenging classroom behaviors [32]. Many have persuasively argued that trauma-informed school practices and policies targeted to help trauma-impacted children will benefit all children when applied universally [57].

In an effort to combat the significant problem of childhood trauma and its effect on students, researchers and practitioners developed the concept of Compassionate Schools [58]. Compassionate Schools are focused on helping teachers understand “fundamental brain development and function, learning pedagogy, recognize a mandate for self-care, correctly interpret behaviors, manage negative behaviors successfully with compassionate and effective strategies, and engage students, families, and the community” ([58], p. xiii). The first stage of Compassionate Schools training focuses on the basics of trauma theory, ACEs research, and ecological theory [59] and how these impact students and classroom dynamics. During this stage, teachers are encouraged to change their initial response to students’ problematic behavior from, “What is wrong with you?” to “What has happened to you?” [58]. This seemingly minor shift in thinking can begin the process of transformational learning necessary for teachers to change long-held beliefs or attitudes. It can help contextualize students’ behavior, while fostering connection and compassion [54].

Next, educators are instructed on the importance of self-care and the danger of vicarious trauma. Then, skills training is used to help teachers implement compassionate instruction and discipline in their classrooms to create more empathetic, connected environments that allow all students, but especially traumatized students, the opportunity to learn without being disciplined for reactions that are outside of their control. Three primary domains are emphasized: (a) safety, connection, and assurance; (b) emotional and behavioral self-regulation; and (c) competencies of personal agency, social, and academic skills. Teachers learn classroom strategies to minimize triggers, set limits, increase mindfulness and listening practices, implement communication and processing instruction, and increase empathy [58].

Over the last fifteen years, Compassionate Schools trainings have been increasingly implemented in the United States. Federal legislation is influencing the growth of the Compassionate Schools movement. In December 2016, President Obama signed The Every Student Succeeds Act (ESSA; Pub.L. 114-95), which outlines funding for supporting students in high needs districts with trauma-informed, evidence-based practices. ESSA also authorizes grants for in-service training for effective trauma-informed practices in classroom management and assistance recognizing when trauma-affected students need to be referred for additional services [60]. According to Overstreet [61], this movement is present in at least 17 states in the U.S., ranging from small clusters of schools in Louisiana to district-wide programs in California and state-wide implementation in Massachusetts and Wisconsin. A project based in Louisville, Kentucky has been conducted in partnership between the University of Virginia and Jefferson County Public Schools. It has received millions of dollars in grant funding from the Sonima and Hemera Foundations for an eight-year project in Louisville schools (see www.compassionschools.org). It is crucial to remember, professional development is useful only if it affects the participants in a way that changes their knowledge, attitudes, and behavior.

4. Professional Development and Educator Knowledge and Attitudes

In order to increase educators’ knowledge of or change their attitudes toward a salient topic, schools typically rely on professional development. Teachers come to the profession with personal beliefs and experiences that shape their knowledge base and attitude toward students [62]. These ways of understanding the world, or ‘habits of mind,’ are often unconsciously absorbed throughout a teacher’s life, and as previously noted, most teachers have not had the experience or education

to have correct interpretations of the behavior of students who have experienced trauma [55]. According to Mizell [63], professional development is the only strategy school systems have to strengthen the performance of educators and the primary way educators can learn and improve their skills to raise student achievement. Transformational learning theory provides a framework for how professional development can help educators gain new knowledge and change their attitudes [34, 62]. When adult learners engage in an opportunity to reflect on the meaning of what they are learning, they may reevaluate their familiar beliefs and assumptions, developing new understandings and experiencing shifts in their habits of mind [64].

In examining the effect of professional development on 58 educators, ages 21 to 59 years, King [64] found that 36 (62%) indicated they have experienced a shift in perspective as a result of professional development. Participants reported a better understanding of the students they work with, a more reflective orientation to their work, and a more open-minded attitude towards others and themselves [64]. King's [64] findings reflected the kind of transformational learning Mezirow [33, 34] described as a process of revising the interpretation of one's prior experience to guide future action. According to Merriam et al. [35], Mezirow's theory of transformational learning can be broken down into four parts:

1. An experience that does not align to the learner's existing understanding, prompting a dilemma of cognitive dissonance.
2. Critical reflection on how one's beliefs or assumptions created a discrepancy between what was perceived and what was true based on the new information (This can be accompanied by the emotions of guilt or embarrassment).
3. Reflective discussion with colleagues about the conflict to come to a new understanding.
4. Integration of new knowledge into an innovative perspective, culminating in implementing plans for action and behavior changes.

Compassionate Schools training seeks to provide educators the opportunity to experience transformational learning via exposure to a new trauma-informed lens through which to view students. When educators hear how trauma can present in their classroom, they may experience guilt for their previous poor handling of situations or discomfort with the ignorance uncovered by their new awareness. If this dissonance prompts self-reflection, critical analysis and discussion, concluding with a change in perspective, the first three stages of transformational learning have occurred. For example, a teacher may have had many interactions with a withdrawn, seemingly unengaged student. After several attempts to gain his attention, the teacher may conclude the student is uninterested, distracted, and/or lazy. If the student's behavior continues, the teacher may feel justified in confirming her suspicion. When this teacher is confronted with the reality of the student's traumatic history and the science of trauma theory, she may experience the necessary discomfort to question her previously held beliefs about the student and reevaluate his behavior in light of the new knowledge (i.e. that the student is overwhelmed, afraid of failure, or unable to self-regulate).

As Merriam and colleagues [35] suggest, an empathic understanding of other's views is a priority in teacher's interactions with students and with colleagues in order to have the necessary space to learn and dialogue. Transformational learning requires open, vulnerable examination of an educator's practice; a safe environment is necessary for the task of critical reflection on beliefs or behaviors [62].

5. Relationship among Knowledge, Attitude, and Behavioral Change

Mizell [63] argues that professional development is ineffective unless it causes teachers to improve their instruction and implement what they learned by changing their behavior in the classroom. Consistent with this claim, the final step in transformational learning culminates with a new perspective that results in a plan of action and behavior change [34, 35]. Desimone's model [65] presumes that behavioral change follows an increase in knowledge and change in attitudes or beliefs. This is the path that many professional development curriculums assume. Guskey [37], however, proposed an inverted theory of teacher behavior change following professional development. He suggested that behavioral/instructional change that results in improvement in student outcomes will precede true changes in teachers' beliefs and attitudes [37]. For example, if new tools or skills are acquired and implemented as a result of a training, even if the teacher has not assented to their usefulness, positive student outcomes as a result of implementation can serve to solidify changes in attitudes or beliefs.

Kennedy [66], using rigorous inclusion criteria, conducted a meta-analysis of 28 studies evaluating if/how professional development improves teaching. Kennedy [66] found varied results among all types of programs. Programs focused solely on content knowledge, programs with all levels of intensity (three to 80 contact hours), and programs that included or excluded collective participation showed no consistent outcomes of improving teacher effectiveness or student learning [66]. Neither the structure, nor the amount of content, was therefore found to be a significant predictor of successful professional development, rather a more nuanced approach is recommended, considering the motivation and needs of the teachers attending. This finding is contrary to prominent consensus on effective professional development [37, 65], but was previewed by Cranton [67], who pointed out that there are no specific professional development methods that guarantee transformational learning. Rather, Cranton [67] notes that individuals respond differently based on what speaks to their feelings or beliefs. The diversity of histories, cultures, and experiences of educators must be respected by those leading professional development workshops.

A primary conclusion from Kennedy's [66] meta-analysis was that more attention must be paid to the people who provide professional development. Many of the more effective programs were offered by individuals or groups who had extensive histories working with teachers and were very familiar with the problems teachers face [66]. A secondary conclusion by Kennedy [66] related to mandatory versus voluntary participation. Effect sizes were significantly larger for teachers who were motivated to attend (0.16) versus those who were mandated (0.03) [66].

Although trauma-informed care in schools has strong theoretical foundations and increasing implementation across the U.S., to date there is not a significant body of literature evaluating the effectiveness of trauma-informed professional development for educators. The next section details the few relevant studies that have been conducted.

6. Research on Trauma-Informed Care Professional Development

Dorado et al. [54] describe the development and implementation of a multi-tier, trauma-informed school-wide program called Healthy Environments and Response to Trauma in Schools (HEARTS). The San Francisco United School District (SFUSD) initially began the HEARTS program as an intentional response to the 'school to prison pipeline' conversation, because when the program

began in 2009-2010, African-American students were being suspended at six and a half times the rate of white students [54]. Between 2009-2010 and 2013-2014, HEARTS was implemented in four schools in southern San Francisco (three elementary schools and one kindergarten through 8th grade school). The three tier approach involved: (a) school-wide universal supports to change school cultures into safe, supportive, trauma-informed learning environments, (b) capacity building among school staff to facilitate the incorporation of a trauma-informed lens for school-wide concerns, disciplinary procedures, and at-risk students, and (c) intensive interventions for trauma-impacted students [54]. Each tier had an emphasis on supporting students, adults in the system, and the school system as a whole. Across all tiers, HEARTS applies the following core principles: (a) understand trauma and stress, (b) establish safety and predictability, (c) foster compassionate and dependable relationships, (d) promote resilience and social emotional learning, (e) practice cultural humility and responsiveness and (f) facilitate empowerment and collaboration [54].

In conducting a program evaluation of HEARTS, Dorado et al. [54] asked four questions: (a) Was there an increase in school personnel's knowledge about addressing trauma and use of trauma-sensitive practices? (b) Was there an improvement in students' school engagement? (c) Was there a decrease in behavioral problems associated with loss of students' instructional time due to disciplinary measures? and (d) Was there a decrease in trauma-related symptoms in students who received HEARTS therapy? The evaluation team used a retrospective pre-post survey design to assess the learning outcomes of certified employees, with both the "before" and "after" being collected at the same time [54]. Across the four participating schools, 280 school personnel participated in HEARTS training and consultation for each of the 5 years of implementation. Of these 280, 175 (62%) completed the program evaluation survey [54]. Results indicated that significant effect sizes were found within all survey domains of school personnel's perceptions of gains in trauma-related knowledge, adult use of trauma-informed care practices, secondary trauma, and changes in student ability to learn, focus on academics, and school attendance. Secondary trauma refers to the negative impact a child's trauma can have on a teacher indirectly or vicariously. It is one of the primary rationales behind why self-care is included in Compassionate Schools training. T-values ranged from 6.67 to 21.86, with effect sizes ranging from 0.54 (My students' school attendance) to 1.72 (My knowledge about trauma and its effects on children) [54].

In the schools that had implemented the HEARTS program the longest (4-5 years), discipline referrals, violence, and out-of-school suspensions all decreased significantly. School leaders reported that their behavioral responses to problem behaviors had transformed by demonstrating more empathy and allowing students time to regain control of their emotions [54]. Significant student-level gains were also found for traumatized students who received program-related therapy [54].

Anderson, Blitz, and Saastamoinen [68] suggest that university-school partnerships are a promising way to provide up-to-date research to aid in support and implementation of trauma-informed approaches through professional development. Their study first incorporated a needs assessment with classroom staff. Then, a series of professional development workshops based on the needs assessment were developed and implemented. Finally, post-workshop surveys and focus groups were conducted to assess the impact of the workshops and identify areas for continued professional development [68]. Participants were 25 classroom staff from a small elementary school in the Northeastern United States that serves predominantly economically disadvantaged students (90%). Sixteen classroom (one male) staff participated in the workshops, the final meeting, and

completed the post-workshop survey and focus groups. A series of four 45-minute trainings were conducted over four months, including lecture, discussion, videos, role-plays, handouts, and modeling/practice of strategies [68]. The trainings covered four domains: (a) information on the neurohormonal impact of trauma and toxic stress, (b) positive behavioral strategies, (c) stress reductions and relaxation techniques, and (d) cognitive-behavioral strategies for classroom intervention.

Two to four months later, the 16 participants were given an anonymous survey. Eighty percent of participants reported that the training would be useful to their work, and 71% planned to share their learning with others. Almost all (94%) participants understood that students' disruptive behaviors may be linked to physiological changes related to stress. However, although 69% of participants agreed (or strongly agreed) that an adult's loud voice or stern tone can trigger a high stress response in some students, 63% of participants also agreed (or strongly agreed) that an aggressive tone or strong words are often the only way to get a student to stop a negative behavior [68]. In the focus groups, participants shared the following themes: (a) an increased concern about students' exposure to trauma and toxic stress, (b) increased stress for students and staff because of school climate (e.g., overly high expectations; common core standards), (c) unmet social-emotional needs and disruptive behaviors interfere with learning, (d) classroom staff lacked adequate professional support and development to work effectively with trauma-impacted students, (e) classroom staff felt a lack of authority in influencing teachers with the trauma-informed techniques they learned during professional development, and (f) the many benefits of receiving trauma-informed professional development [68].

Goodwin-Glick [69] conducted a retrospective pre-post-test survey of Findlay City Schools (NW Ohio) employees who participated in a trauma-informed care professional development training. Of the 712 employees scheduled to attend, 552 participated in the survey. Most of the participants were teachers ($n = 320$); administrators, counselors, and school psychologists were also present. About half of participants worked in an elementary school ($n = 225$), 103 worked in a middle school, and 141 worked in a high school. Goodwin Glick [69] developed a 52-item measure called Trauma-Informed Care Dispositions Survey (TIC-DS) to evaluate school personnel's perceptions of knowledge, dispositions, and behaviors. TIC-DS contained seven subscales: knowledge, empathetic concern, perspective taking, interpersonal relationship, sense of respect and trust, student-centered dispositions, and behavior [69]. Strong internal reliability was reported, with Cronbach's alpha of 0.96 on both the pretest and the posttest.

The largest significant increase one day to three weeks after participating in the trauma-informed care professional development was on the trauma-related knowledge subscale (*Cohen's d* = 0.65) [69]. Specifically, the greatest gains were made in the familiarity with symptoms traumatized students display and the understanding that the symptoms of trauma may be similar or identical to the symptoms of other diagnoses. The smallest gain in the knowledge items was on the belief that all students can learn, but survey results indicated that the high pretest score left little room for growth [69]. Behaviors toward traumatized students (*Cohen's d* = 0.46) and perspective taking dispositions (*Cohen's d* = 0.43) also had a medium positive effect as a result of participation. Data suggested that the professional development improved participant self-efficacy so that teachers believed they had the ability to help traumatized children. Behaviorally, participants had the greatest increases in self-awareness of interactions with students and using strategies intended to create safe environments. Participants also reported perceived increases in active listening and

positive reinforcement with students [69]. A small effect from the professional development (*Cohen's d* from 0.13 to 0.23) was found for the final four subscales: interpersonal relationship, empathetic concern, student-centered, and sense of respect and trust [69]. Elementary school employees were found to be more positively impacted on five of the seven subscales as compared to secondary school employees.

Due to the dearth of psychometrically validated instruments to evaluate trauma-informed care, Baker et al. [70] conducted a quantitative study on their development of the Attitudes Related to Trauma-Informed Care (ARTIC) scale. The ARTIC was evaluated with a sample of 760 service providers, 595 who worked in human services (78%), and 165 who were school personnel (22%). The majority of participants were white (92%) and female (83%) [70]. The ARTIC scale (in either the 45 or 35 question length) comprises seven subscales regarding respondents' attitudes toward important trauma-informed care components. These include underlying causes of problem behavior and symptoms ($\alpha = 0.78$), responses to problem behavior and symptoms ($\alpha = 0.76$), on-the-job behavior ($\alpha = 0.72$), self-efficacy at work ($\alpha = 0.79$), reactions to the work ($\alpha = 0.71$), personal support of trauma-informed care ($\alpha = 0.80$), and system-wide support for trauma-informed care ($\alpha = 0.81$). Analyses of internal consistency indicated strong internal reliability ($\alpha = 0.93$) and test-retest correlations were strong at 120, 150, and 180 days [70].

MacLochlainn and colleagues [10] used the ARTIC and follow up focus groups to assess 216 school personnel before and after a trauma-informed professional development training. Utilizing a comparison group ($n = 118$), their promising findings demonstrated that school-personnel in the intervention group ($n = 98$) reported significant improvements in attitudes related to trauma-informed care, and a significant decrease in burnout at 6-month follow-up. The ARTIC-35 was also used to conduct a pre-post survey of school personnel who attended Compassionate Schools Spartanburg three-day training [21]. Detailed results are described in the following section.

6.1 Compassionate Schools Spartanburg, SC

In 2016, the Child Protection Training Center (CPTC) in Spartanburg, SC launched a Compassionate Schools initiative. A committee of educators, principals, superintendents, social workers, and community leaders came together to form a model for implementing trauma-informed care [21]. From an ecological systems framework [59], its goal is to improve students' academic and behavioral outcomes by cultivating an empathetic, trauma-informed learning environment [21]. The CPTC used the flexible Compassionate Schools paradigm from Washington [58] in order to create a trauma-informed school environment that does not depend on the identification of individual children who have experienced trauma but seeks to promote resilience in all students.

The primary goals in creating Compassionate Schools Spartanburg were: (a) to make the prevalence and impact of trauma well-known in schools and the community at-large and (b) "to train relevant personnel in appropriate strategies for responding to trauma, fostering resilience, and preventing re-traumatization" ([21], p. 7). Programming was informed by reviewing relevant literature, consulting with other Compassionate Schools initiatives, and conducting an informal needs assessment of the Spartanburg community, including communication with local school representatives about their particular challenges, concerns, and limitations. Trainings began in the summer of 2016 and continued until 2019. They were conducted by CPTC staff and local experts,

including master ACE trainers, pediatricians, forensic interviewers, and SLED [South Carolina Law Enforcement Division] officers [21]. The following components, which are categorized under four primary modules in Figure 2 were included in the training:

Trauma Informed	<ul style="list-style-type: none"> • Presentation of the ACE study and effects of toxic stress. • Experiential activity in a ‘mock house’ with a case example. The house is staged with signs of abuse and significant family issues. • An interactive brain development activity that demonstrates the impact of toxic stress on early brain development. • Presentation of signs of abuse and case examples. • Presentation on mandated reporting and legal responsibility to report. • Presentation on how to handle disclosures from children. • View the documentary “Paper Tigers” and discuss <i>Compassionate Schools</i> initiative. (http://papertigersmovie.com/, a film exploring the impact of ACEs on the lives of students and staff at a particular school.)
Trauma-Sensitive Practices	<ul style="list-style-type: none"> • Recognize disruptive behaviors are a response to stress and learn how to intervene early. • Introduce techniques to help with stress management and self-regulation. • Evaluate necessary environmental change to reduce over-stimulation and create calming spaces. • Examine policies and implement changes related to discipline practices and suspensions. • Recognize and teach methods to manage triggers.
Skills of Resilience	<ul style="list-style-type: none"> • Develop practices that build relationships. • Develop methods to build confidence and self-efficacy. • Discuss issues of race, equity and inclusion.
How Trauma Affects Educators & Self-Care Strategies	<ul style="list-style-type: none"> • Presentation on compassion fatigue, vicarious trauma and burnout. • Presentation of self-care strategies, including the development of healthy boundaries.

Figure 2 Summary of Core Training Modules for Educators [21].

The mock house simulation is an opportunity for educators to experience a first-hand representation of the potential home life of a student who could be in their classroom. The CPTC staff combined data and evidence from multiple Spartanburg DSS/CPS cases to recreate a home ‘scene’ in several rooms. Participants were led through the different areas of the home (front porch, living room, kitchen, bathroom, and bedrooms) with the instruction to note evidence of child maltreatment and trauma.

Parker and colleagues [21] at the CPTC conducted a pre-post-test survey using the ARTIC-35 scale [70] for educators to assess changes in participants’ attitudes toward trauma-informed care as a result of attending the Compassionate Schools Spartanburg three-day training. The authors claim this is the first study of its kind using a psychometrically validated, peer-reviewed measure. Participants completed the ARTIC prior to their training and at the conclusion of the three days. Of the 219 participants, 192 completed both the pre and post ARTIC assessments. Large, significant pre-post effects (i.e., *Cohen’s d* > 0.80) were found for each subscale even though the fact that all

pre-treatment means were above the midpoint of their respective scales (potential for a ceiling effect) [21]. There was no differential impact for significant changes in pre- and post-test score across demographic or vocational variables (i.e., gender, race, years of experience, position). Even though the authors assert the encouraging results of their preliminary investigation of changes in attitudes of participants toward trauma-informed care, they also note the need for more research.

7. Limitations

As recounted, evidence for the impact of trauma in schools is irrefutable, which creates a need for schools to find a way to support these students and prepare their teachers. Recent studies into TIC training as professional development show a great deal of promise as school-wide intervention strategies to support students who have experienced trauma and protect their teachers from burnout and compassion fatigue [10, 21, 54, 71]. There are, however, limitations worth mentioning. Avery and colleagues [11] in a systematic review of school-wide trauma-informed approaches caution that, “although there is a great deal of enthusiasm for trauma-informed schools... [there is a] dearth of robust studies into explicitly trauma-informed whole-of school approaches... [that are not] weak overall in the assessment of risk of bias” (p. 388). Maynard and colleagues [72] went even further to say, “No studies met criteria for [their] review, indicating that there is a lack of evidence of trauma-informed approaches in schools” (p. 1). Future research is needed, particularly studies that examine TIC professional development trainings objectively and with an interdisciplinary lens to minimize bias [73].

8. Conclusions

It is undisputed that the experience of trauma is prevalent among the student body of our schools. As this review has shown, a primary intervention strategy of providing TIC professional development to school faculty, staff, and administration has much promise. Teachers need to be given both the understanding of how trauma impacts their students as well as the relevant tools and skills necessary to help them address it well. TIC professional development provides administration and educators a common language with which to discuss prevention, intervention, and even discipline. Many of the TIC trainings also include sessions devoted to self-care, boundaries, vicarious trauma, and compassion fatigue. These can prove invaluable to schools in the fight to inoculate teachers against increasing burnout. Students who have experienced the uniquely distressing pain of complex trauma deserve to interact with school staff who have an understanding of its impact on them. In turn, educators deserve to be well-prepared for entering the often-difficult journey of teaching survivors of childhood trauma.

Author Contributions

The author did all the research work of this study.

Competing Interests

The author has declared that no competing interests exist.

References

1. Teicher MH. Scars that won't heal: The neurobiology of child abuse. *Sci Am.* 2002; 286: 68-75.
2. Bethell CD, Newacheck P, Hawes E, Halfon N. Adverse childhood experiences: Assessing the impact on health and school engagement and the mitigating role of resilience. *Health Aff.* 2014; 33: 2106-2115.
3. Felitti VJ, Anda RF. The relationship of adverse childhood experiences to adult medical disease, psychiatric disorders, and sexual behavior: Implications for healthcare. In: *The hidden epidemic: The impact of early life trauma on health and disease.* New York, NY: Cambridge University Press; 2010. pp. 77-87.
4. Perfect MM, Turley MR, Carlson JS, Yohanna J, Saint Gilles MP. School-related outcomes of traumatic event exposure and traumatic stress symptoms in students: A systematic review of research from 1990 to 2015. *Sch Ment Health.* 2016; 8: 7-43.
5. Perry BD. The neuroarcheology of childhood maltreatment: The neurodevelopmental costs of adverse childhood events. In: *The cost of maltreatment: Who pays? We all do.* San Diego, CA: Family Violence and Sexual Assault Institute; 2000. pp. 15-37.
6. Finkelhor D, Ormrod R, Turner H, Hamby SL. The victimization of children and youth: A comprehensive, national survey. *Child Maltreat.* 2005; 10: 5-25.
7. Finkelhor D, Turner HA, Shattuck A, Hamby SL. Violence, crime, and abuse exposure in a national sample of children and youth: An update. *JAMA Pediatr.* 2013; 167: 614-621.
8. Sacks V, Murphey D. The prevalence of adverse childhood experiences, nationally, by state, and by race or ethnicity [Internet]. Rockville, MD: ChildTrends; 2018. Available from: <https://www.childtrends.org/publications/prevalence-adverse-childhood-experiences-nationally-state-race-ethnicity>.
9. Blaustein ME. Childhood trauma and a framework for intervention. In: *Supporting and educating traumatized students: A guide for school-based professionals.* New York, NY: Oxford University Press; 2013. pp. 3-21.
10. MacLochlainn J, Kirby K, McFadden P, Mallett J. An evaluation of whole-school trauma-informed training intervention among post-primary school personnel: A mixed methods study. *J Child Adolesc Trauma.* 2022; 15: 925-941.
11. Avery JC, Morris H, Galvin E, Misso M, Savaglio M, Skouteris H. Systematic review of school-wide trauma-informed approaches. *J Child Adolesc Trauma.* 2021; 14: 381-397.
12. Craig SE. *Trauma-sensitive schools: Learning communities transforming children's lives, K-5.* New York, NY: Teachers College Press; 2015.
13. Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health. 2018 National Survey of Children's Health (NSCH) [Internet]. Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health; 2019. Available from: <https://www.childhealthdata.org/>.
14. Child Welfare Information Gateway. Understanding the effects of maltreatment on brain development [Internet]. Washington, D.C.: Child Welfare Information Gateway; 2015. Available from: https://ocfcpacourts.us/wp-content/uploads/2020/06/Understanding_the_effects_of_maltreatment_000938.pdf.
15. Felitti VJ. The relationship of adult health status to childhood abuse and household dysfunction. *Am J Prev Med.* 1998; 14: 245-258.

16. Garrett K. Childhood trauma and its affects on health and learning. *Educ Dig.* 2014; 79: 4-9.
17. Shern DL, Blanch AK, Steverman SM. Toxic stress, behavioral health, and the next major era in public health. *Am J Orthopsychiatry.* 2016; 86: 109-123.
18. Center for Disease Control and Prevention. CDC-Kaiser ACE Study [Internet]. Atlanta, GA: Center for Disease Control and Prevention; 2018. Available from: <https://www.cdc.gov/violenceprevention/aces/about.html>.
19. National Child Traumatic Stress Network. About child trauma [Internet]. Los Angeles, CA: National Child Traumatic Stress Network; 2018. Available from: <https://www.nctsn.org/what-is-child-trauma/about-child-trauma>.
20. Hertel R, Frausto L, Harrington R. The compassionate schools pilot project report. Olympia, WA: Office of the Superintendent of Public Instruction; 2009.
21. Parker J, Olson S, Bunde J. The impact of trauma-based training on educators. *J Child Adolesc Trauma.* 2020; 13: 217-227.
22. Center on the Developing Child at Harvard University. Key Concepts [Internet]. Cambridge, MA: Center on the Developing Child at Harvard University; 2018. Available from: <http://www.developingchild.harvard.edu>.
23. Zelazo PD, Müller U. Executive function in typical and atypical development. In: Blackwell handbook of childhood cognitive development. Hoboken, NJ: Wiley-Blackwell; 2002. pp. 445-469.
24. Meiklejohn J, Phillips C, Freedman ML, Griffin ML, Biegel G, Roach A, et al. Integrating mindfulness training into K-12 education: Fostering the resilience of teachers and students. *Mindfulness.* 2012; 3: 291-307.
25. Goldstein S, Brooks RB. Resilience in children. New York, NY: Springer; 2005.
26. Shonkoff JP, Garner AS, Committee on Psychosocial Aspects of Child, Family Health Committee on Early Childhood Adoption, Dependent Care, Section on Developmental, et al. The lifelong effects of early childhood adversity and toxic stress. *Pediatrics.* 2012; 129: e232-e246.
27. Huckshorn K, LeBel JL. Trauma-informed care. In: Modern community mental health: An interdisciplinary approach. New York, NY: Oxford University Press; 2013. pp. 62-83.
28. Anda RF, Felitti VJ, Bremner JD, Walker JD, Whitfield C, Perry BD, et al. The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *Eur Arch Psychiatry Clin Neurosci.* 2006; 256: 174-186.
29. Cook A, Spinazzola J, Ford J, Lanktree C, Blaustein M, Cloitre M, et al. Complex trauma. *Psychiatr Ann.* 2005; 35: 390-398.
30. Van der Kolk B. The body keeps the score: Brain, mind, and body in the healing of trauma. New York, NY: Viking Press; 2014.
31. Perry BD. Stress, trauma and post-traumatic stress disorders in children: An introduction [Internet]. Houston, TX: The ChildTrauma Academy; 2007. Available from: https://vibrantcouplescounseling.com/wp-content/uploads/2014/03/ptsd_caregivers-3.pdf.
32. Plumb JL, Bush KA, Kersevich SE. Trauma-sensitive schools: An evidence-based approach. *Sch Social Work J.* 2016; 40: 37-60.
33. Mezirow J. Perspective transformation. *Adult Educ Q.* 1978; 28: 100-110.
34. Mezirow J. Transformative dimensions of adult learning. San Francisco, CA: Jossey-Bass; 1991.
35. Merriam SB, Baumgartner LM. Learning in adulthood: A comprehensive guide. 3rd ed. San Francisco, CA: John Wiley & Sons; 2007.

36. Simsek A. Transformational learning. Boston, MA: Springer; 2012.
37. Guskey TR. Professional development and teacher change. *Teach Teach*. 2002; 8: 381-391.
38. Van der Kolk B. Developmental trauma disorder-a more specific diagnosis than posttraumatic stress disorder should be considered for children with complex trauma histories. *Psychiatr Ann*. 2017; 35: 401-408.
39. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Washington, D.C.: American Psychiatric Association; 2013.
40. Teicher MH, Rabi K, Sheu YS, Seraphin SB, Andersen SL, Anderson CM, et al. Neurobiology of childhood trauma and adversity. In: *The impact of early life trauma on health and disease: The hidden epidemic*. Cambridge, UK: Cambridge University Press; 2010. pp. 112-122.
41. De Bellis MD, Zisk A. The biological effects of childhood trauma. *Child Adolesc Psychiatr Clin*. 2014; 23: 185-222.
42. Gooding HC, Milliren CE, Austin SB, Sheridan MA, McLaughlin KA. Child abuse, resting blood pressure, and blood pressure reactivity to psychosocial stress. *J Pediatr Psychol*. 2016; 41: 5-14.
43. Shenk CE, Noll JG, Peugh JL, Griffin AM, Bensman HE. Contamination in the prospective study of child maltreatment and female adolescent health. *J Pediatr Psychol*. 2016; 41: 37-45.
44. Paras ML, Murad MH, Chen LP, Goranson EN, Sattler AL, Colbenson KM, et al. Sexual abuse and lifetime diagnosis of somatic disorders: A systematic review and meta-analysis. *JAMA*. 2009; 302: 550-561.
45. Kroska EB, Roche AI, O'Hara MW. Childhood trauma and somatization: Identifying mechanisms for targeted intervention. *Mindfulness*. 2018; 9: 1845-1856.
46. Van der Kolk BA. Psychological trauma. Washington, D.C.: American Psychiatric Association Publishing; 2003.
47. Schilling EA, Aseltine RH, Gore S. Adverse childhood experiences and mental health in young adults: A longitudinal survey. *BMC Public Health*. 2007; 7: 30.
48. Turner HA, Finkelhor D, Ormrod R. The effect of lifetime victimization on the mental health of children and adolescents. *Soc Sci Med*. 2006; 62: 13-27.
49. Edwards VJ, Holden GW, Felitti VJ, Anda RF. Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: Results from the adverse childhood experiences study. *Am J Psychiatry*. 2003; 160: 1453-1460.
50. Zatti C, Rosa V, Barros A, Valdivia L, Calegaro VC, Freitas LH, et al. Childhood trauma and suicide attempt: A meta-analysis of longitudinal studies from the last decade. *Psychiatry Res*. 2017; 256: 353-358.
51. Substance Abuse and Mental Health Services Administration. National Center for Trauma-Informed Care: The trauma-informed approach [Internet]. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2019. Available from: <https://www.samhsa.gov/nctic/trauma-interventions>.
52. Ford JD, Elhai JD, Connor DF, Frueh BC. Poly-victimization and risk of posttraumatic, depressive, and substance use disorders and involvement in delinquency in a national sample of adolescents. *J Adolesc Health*. 2010; 46: 545-552.
53. Greenwald R. The role of trauma in conduct disorder. *J Aggress Maltreat Trauma*. 2022; 6: 5-23.
54. Dorado JS, Martinez M, McArthur LE, Leibovitz T. Healthy environments and response to trauma in schools (HEARTS): A whole-school, multi-level, prevention and intervention program for creating trauma-informed, safe and supportive schools. *Sch Ment Health*. 2016; 8: 163-176.

55. Alisic E. Teachers' perspectives on providing support to children after trauma: A qualitative study. *Sch Psychol Q.* 2012; 27: 51-59.
56. Davis M, Costigan T, Schubert K. Promoting lifelong health and well-being: Staying the course to promote health and prevent the effects of adverse childhood and community experiences. *Acad Pediatr.* 2017; 17: S4-S6.
57. Cole S, Eisner A, Gregory M, Ristuccia J. Helping traumatized children learn: Safe, supportive learning environments that benefit all children [Internet]. Boston, MA: Massachusetts Advocates for Children Trauma and Learning Policy Initiative; 2013. Available from: <https://traumasensitiveschools.org/>.
58. Wolpov R, Johnson MM, Hertel R, Kincaid SO. The heart of learning and teaching: Compassion, resiliency, and academic success. Olympia, WA: Office of Superintendent of Public Instruction; 2009.
59. Bronfenbrenner U. The ecology of human development: Experiments by nature and design. Cambridge, MA: Harvard University Press; 1979.
60. Prewitt E. New elementary and secondary education law includes specific “trauma-informed practices” provisions [Internet]. PACEsConnection; 2016. Available from: <https://www.pacesconnection.com/g/aces-in-education/blog/new-elementary-and-secondary-education-law-includes-specific-trauma-informed-practices-provisions>.
61. Overstreet S, Chafouleas SM. Trauma-informed schools: Introduction to the special issue. 2016; 8: 1-6.
62. Cranton P, King KP. Transformative learning as a professional development goal. *New Perspect Des Implement Prof Dev Teach.* 2003; 2003: 31-38.
63. Mizell H. Why professional development matters [Internet]. Oxford, OH: Learning Forward; 2010. Available from: <https://learningforward.org/wp-content/uploads/2017/08/professional-development-matters.pdf>.
64. King KP. Both sides now: Examining transformative learning and professional development of educators. *Innov Higher Educ.* 2004; 29: 155-174.
65. Desimone LM. Improving impact studies of teachers’ professional development: Toward better conceptualizations and measures. *Educ Res.* 2009; 38: 181-199.
66. Kennedy MM. How does professional development improve teaching? *Rev Educ Res.* 2016; 86: 945-980.
67. Cranton P. Teaching for transformation. In: *New directions for adult and continuing education.* Hoboken, NJ: Jossey-Bass; 2002. pp. 63-72.
68. Anderson EM, Blitz LV, Saastamoinen M. Exploring a school-university model for professional development with classroom staff: Teaching trauma-informed approaches. *Sch Community J.* 2015; 25: 113-134.
69. Goodwin-Glick KL. Impact of trauma-informed care professional development on school personnel perceptions of knowledge, dispositions, and behaviors toward traumatized students. Bowling Green, OH: Bowling Green State University; 2017.
70. Baker CN, Brown SM, Wilcox PD, Overstreet S, Arora P. Development and psychometric evaluation of the attitudes related to trauma-informed care (ARTIC) scale. *Sch Ment Health.* 2016; 8: 61-76.
71. Chafouleas SM, Johnson AH, Overstreet S, Santos NM. Toward a blueprint for trauma-informed service delivery in schools. *Sch Ment Health.* 2016; 8: 144-162.

72. Maynard BR, Farina A, Dell NA, Kelly MS. Effects of trauma-informed approaches in schools: A systematic review. *Campbell Syst Rev.* 2019; 15: e1018.
73. Thomas MS, Crosby S, Vanderhaar J. Trauma-informed practices in schools across two decades: An interdisciplinary review of research. *Rev Res Educ.* 2019; 43: 422-452.