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## ABSTRACT

This evaluation study of Trauma-Informed Bal-A-Vis-X (TIB) training in Norman Public Schools investigated whether TIB training affected teacher perceptions of student behavior, teacher self-efficacy, and teacher usage of trauma-informed strategies in the classroom. Participants (N=230) were asked to complete a set of three surveys related to teaching students of trauma. The participants were comprised of three groups based on their self-reported background experiences of previous trauma training: those who have had no prior trauma training, those who have had prior trauma training other than TIB training, and those who have had prior TIB training. The mean scores of the three groups were compared. Results showed that those who reported having attended TIB training indicated a greater sensitivity to possible trauma-based motives for student behavior, higher self-efficacy for working with students of trauma, and greater usage of trauma-informed strategies compared with those who had not attended TIB training. Since this study was limited to the context of educators in Norman Public Schools, additional research is needed to determine if these results can be applied to other contexts.

## CHAPTER I: TRAUMA-INFORMED BAL-A-VIS-X

### **Introduction**

The seminal research by Felitti et al. (1988) on Adverse Childhood Experiences (ACEs) has had far-reaching implications for healthcare, social work, education, and other human-service institutions (Felitti, Anda, Nordenberg, Williamson, Spitz, Edwards, Koss & Marks, 1998). The study connected ten types of childhood adversity, such as physical or emotional abuse, neglect, or living with a parent who was mentally ill or an alcoholic, to a higher risk in adulthood of chronic disease, mental illness, violence, and being a victim of violence. In subsequent ACE surveys, additional adversities have been added, including racism, bullying, and community violence (Udesky, 2020).

Subsequent research on ACEs has linked these traumas to long-term physical and emotional effects on adults. Higher ACE scores were strongly associated with higher risk factors for heart disease, liver disease, lung disease, cancer, and skeletal fractures (Felitti et al., 1998). The research team posited that adverse childhood experiences resulted in social, emotional, and cognitive impairment in adults. Impairment in these areas led to the adoption of high-risk behaviors such as smoking, alcoholism, and drug use as ways to cope with the effects of childhood trauma. These risky behaviors led to disease, disability, and social problems, which in turn led to earlier death (Felitti et al., 1998). More research is now identifying clear early repercussions of trauma on children. Higher ACE scores are associated with increased risk for anxiety, depression, behavior problems, difficulty making and keeping friends, and poorer physical health in children (Child and Adolescent Health Measurement Initiative, 2020). In the classroom, trauma can affect children in many ways. Most often, trauma causes students to



dissociate or be hyper-vigilant, both of which are brain states far from optimal for learning since they impair the student's ability to focus and stay engaged with what is happening in the classroom (Perry & Szalavitz, 2008).

According to the Substance Abuse and Mental Health Services Administration, the number of children who experience childhood trauma is significant, with more than two-thirds of children reporting at least one traumatic event by age 16 (2016). The Covid-19 pandemic exacerbated childhood trauma as children suffered the loss of caregivers or experienced the toxic stress of living with ill family members or dealing with high levels of stress or isolation from the pandemic (Mader, 2021). The Centers for Disease Control reported that three in four high school students experienced at least one ACE during that pandemic and were more likely to report poor mental health and suicidal behavior (Anderson, Swedo, Trinh, Ray, Krause, Verlenden, Clayton, Villaveces, Massetti, & Niolon, 2022). Survey data also showed that children in Oklahoma have even higher exposure to trauma, with 23% having at least two or more ACEs (Child and Adolescent Health Measurement Initiative, 2020).

Students need to be regulated in their brains and bodies to do their best learning. They must feel safe, connected, and calm (Cole, O'Brien, Gadd, Ristuccia, Wallace & Gregory, 2005). When children come from traumatic environments or live under toxic stress, they struggle to self-regulate because their brains and bodies have not learned how to respond to what Dr. Bruce Perry calls *tolerable stress*, such as learning a new concept in the classroom (Perry, 2013). Hunter, Gray, and McEwan's study on the neuroscience of resilience found that adverse childhood experiences reduce resilience and increase vulnerability to stressors (2018). When faced with any kind of stressor, children of trauma may go into fight, flight, or freeze mode due

to their damaged stress response system, which can negatively impact attachment, emotional regulation, behavior, and learning (Walkley & Cox, 2013).

Bessel van der Kolk's study of posttraumatic stress disorder and the nature of trauma explains that traumatic experiences can hinder a person's ability to take in new information, integrate it with what is already known, determine what is significant, and filter out what is irrelevant (2013). Trauma also interferes with the ability to focus on an activity for a sustained time without distractions from irrelevant stimuli (van der Kolk, 2013). Difficulties with taking in and remembering new information and struggling with distractibility certainly impact a child's ability to learn. Educators, including teachers, counselors, administrators, and paraprofessionals, need ways to help children learn to respond to tolerable stress in a safe, supportive, relationship-rich environment (van der Kolk, 2013).

In recent years, there has been increased discussion among K-12 educators about how childhood trauma affects student behavior and learning. Teachers and administrators are becoming more aware of the effects of trauma on brain development and student behavior (McIntyre, Baker, & Overstreet, 2019). Behavior that may have once been perceived as student apathy for school or shutting down may now be seen through the lens of trauma (Crosby, Somers, Day & Baroni, 2016). Student defiance or acting out can be attributed to a dysfunctional stress response system that causes a child to have a heightened sense of danger (Henkel, Lott & Griffin, 2010). Teacher responses to student behavior should look very different depending on the underlining roots of a child's behavioral tendencies (Crosby, Somers, Day & Baroni, 2016).

Educators know that student behavior is a key factor for academic achievement (Olivier, Archambault, Clerqc & Galand, 2019). Student behavior, however, is not simply the result of the

willful choices students make. Behavior emerges from a dynamic and complex social-psychological interaction (Cole, O'Brien, Gadd, Ristuccia, Wallace, & Gregory, 2005). Teachers are part of this complexity. How teachers perceive student misbehavior can influence how they respond to it and what teaching strategies they may use with their students (Wolpow, Johnson, Hertel, & Kincaid, 2009). As Perry and Daniels describe, teacher responses to students who shut down or act out can either help students self-regulate or cause further trauma, perpetuating the cycle of dysregulation and misbehavior (2016).

Greater recognition of how trauma affects student learning and development calls for increased development and the use of effective strategies to help students struggling with the effects of past or ongoing childhood stressors (Polou, Reddy, & Dudek, 2019). Such work is starting to occur. More schools are providing training for teachers to build their capacity to respond to students with trauma (Berger, 2019). Like any other school program or initiative, though, not all training results in transformed practices (Thomas, Crosby, & Vanderhaar, 2019). In fact, many teachers report feeling underprepared or ill-equipped to teach or adequately support their students of trauma, which in turn causes teachers to experience emotional exhaustion and burnout (Brunzell, Stokes, & Waters, 2019; Thomas, Crosby & Vanderhaar, 2019; Kim, Crooks, Bax & Shokoohi, 2021).

### **Statement of the Problem**

In the years following the revolutionary ACE study, the field of education has been moving toward more trauma-informed teaching and learning approaches (Cole et al., 2005). To help their students learn, teachers must understand the impact of toxic stress on the brain and be equipped with interventions that help children begin to repair the damage (Alisic, 2012). Teachers see the

effects of trauma in the classroom daily as children living with toxic stress struggle to pay attention, retain new information, and stay engaged. However, teachers may not know how to help these children regain their ability to self-regulate and come out of the states of dissociation or hyper-awareness that keep them from learning (Thomas, Crosby & Vanderhaar, 2019).

Herrenkohl, Hong, and Verbrugge's 2019 study found that although school-based trauma-informed practices have increased, most schools are still ill-equipped to respond to the needs of children of trauma. Many educators continue to misinterpret trauma-induced emotional responses as acts of defiance, giving punitive consequences when students act out or shut down in class (Herrenkohl et al., 2019). The problem with punishing students who act out or shut down in class is that it does not get to the root of the problem, which is that student behavior may be driven by trauma triggers and responses (Crosby, Somers, Day, & Baroni, 2016). Students who struggle with behavior due to trauma need adults at school equipped to understand the impact of childhood trauma, recognize behaviors that may be associated with trauma, and provide interventions that appropriately support these students. This knowledge is foundational to teachers becoming more efficacious in serving students of trauma.

In 2019, Thomas, Crosby, & Vanderhaar conducted a meta-analysis of twenty years worth of trauma informed practices in schools. They found that although the field of education has increased its attention toward trauma-informed training and practices, empirical research on how trauma-informed teacher training is less established. Thomas et al. recommended that further research on the topic of teacher trauma training have a greater emphasis on the "intentional purpose to change teacher practice" (2019). Although a variety of trauma-informed frameworks

and trauma training strategies abound, these professional developments must lead to an actual change in teacher practice and school policies with students of trauma (Thomas et al., 2019).

One approach to supporting dysregulated students of trauma is Trauma-Informed Bal-A-Vis-X, an intervention designed by Bill Hubert that builds upon the Bal-A-Vis-X program he developed. This intervention is a series of exercises that incorporate balance, auditory, and visual senses to help dysregulated individuals regain a state of integration between their mind and body (Hubert, 2019). Hubert designed Trauma-Informed Bal-A-Vis-X (TIB) on Bruce Perry's foundational research on what constitutes a trauma-informed intervention (Hubert, 2019). However, there is a lack of empirical research on the usefulness of TIB as an intervention with students of trauma and whether or not TIB leads to improvements in teacher understanding of trauma and trauma-informed strategies in schools.

### **Statement of Purpose**

This study aims to evaluate the implementation of Trauma-informed Bal-A-Vis-X in Norman Public Schools. Recognizing that teachers needed practical interventions to help students who struggle with behavior, NPS started to provide Bal-A-Vis-X training to teachers and staff. Trauma-informed Bal-A-Vis-X is a series of exercises used to help students develop self-regulation skills and has been a professional development training offered to educators in Norman Public Schools for seven years. The two-day Trauma-informed Bal-A-Vis-X training is intended to support teacher self-efficacy in using trauma-sensitive practices with students. Although a few hundred teachers in Norman Public Schools have attended Bal-A-Vis-X training in the past, no data had been collected and analyzed by the district to determine whether or not this training has any relationship with a teacher's knowledge and practice of how to support

students who experience trauma. To fill this knowledge gap, in 2021, the district collected data on teacher perceptions of students who act out or shut down, teacher responses to students who demonstrate these behaviors, and teacher-reported self-efficacy in supporting students of trauma. This evaluation study will seek to determine if Trauma-informed Bal-A-Vis-X training impacts teacher perceptions of student behavior, self-efficacy in supporting students of trauma, and usage of trauma-informed practices. This study's research questions are as follows:

**EQ1: What learning experiences do teachers receive in TIB training?**

**EQ2: Do teachers who receive TIB training vary in their perceptions of students acting out and shutting down behaviors compared with teachers who had other prior trauma training and those who had no training?**

**EQ3: Do teachers who have received TIB training report higher self-efficacy for working with students of trauma compared to other teachers who had other trauma training or no training?**

**EQ4: Do teachers who received TIB training report higher utilization of trauma-sensitive strategies in their classrooms than other teachers who had other prior trauma training or no training?**

### **Definition of Terms**

**Trauma.** The definition of trauma used by the Substance Abuse and Mental Health Services Administration (SAMHSA) is as follows: "Individual trauma results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally

harmful or life-threatening and that has lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being" (SAMHSA, 2014, p. 7).

**Trauma-informed.** Trauma-informed approaches in schools are the school-wide implementation of "explicit recognition, understanding, and responsiveness to trauma with intentional efforts made in utilizing evidence-based practices to build healthy relationships, restore emotional safety, and create positive opportunities where students can practice self-regulation strategies and prosocial skills" (SAMHSA, 2014, p. 9).

**Self-regulation.** Self-regulation is "the ability to volitionally plan and, as necessary, modulate one's behavior(s) to an adaptive end" and spans various levels of functions including motor, physiological, social-emotional, cognitive, behavioral, and motivational (Montroy, Bowles, Skibbe, McClelland & Morrison, 2016, p. 2).

**Bal-A-Vis-X.** Bal-A-Vis-X is an abbreviation for Balance, Auditory, and Visual Exercises. These rhythmic exercises are performed with small sandbags and racquetballs for the purpose of bringing a person into a state of regulation and brain/body integration (Hubert, 2023).

## CHAPTER II: REVIEW OF LITERATURE

### **Introduction**

The first part of this literature review explores the impact of trauma on children's developing brains, including the social, mental, emotional, and cognitive effects of toxic stress. The second part examines the range of school-based interventions that seek to mitigate trauma damage, particularly sensory, movement, and mindfulness-based interventions. The third section explores how Trauma Informed Bal-A-Vis-X fits within the scope of these efforts to help mitigate the effects of childhood trauma. Trauma-informed Bal-A-Vis-X is an intervention based on the research of psychiatrist Dr. Bruce Perry, one of the nation's leading experts in childhood trauma. Since 1990, Dr. Perry has been conducting and publishing clinical research on PTSD, toxic stress, and traumatic events in children (Perry, 2023). Cited by hundreds of other researchers, Perry's body of work has become foundational to our current understanding of how trauma impacts children's neurological, physical, and emotional development. Perry's extensive research led to his development of the Neurosequential Model of Therapeutics (NME). NME is an evidence-based, developmentally-sensitive, and neuroscience-informed model used worldwide in hundreds of therapeutic clinics (Perry, 2023). Bal-A-Vis-X developer Bill Hubert claims his intervention is aligned with the main tenets of Perry's model (Hubert, 2023). Therefore, this literature review will explore much of Perry's research and how Trauma-informed Bal-A-Vis-X aligns with his Neurosequential Model of Therapeutics.



## Section 1: General Effects of Childhood Trauma

### *Toxic Stress and Neurodevelopment in Children*

Brain development begins from the bottom up in the womb and throughout childhood. When children are exposed to abuse or neglect, also known as toxic stress, the normal patterns of bottom-up brain development are compromised (Hambrick, Brawner, & Perry, 2019). As the brain develops, so do the complexities of what it regulates. Therefore, the timing of the introduction of trauma to a child affects which area of the brain is impaired (Teicher, Samson, Anderson, & Ohashi, 2016). First to develop is the brainstem which controls body temperature, heart rate, and blood pressure. Sleep, appetite, “arousal,” and motor coordination develop next within the midbrain, followed by emotional reactivity and “attachment” within the limbic area (Perry, 2008). Lastly, the cortical brain develops, which allows for understanding affiliation/reward, concrete thought, and abstract thought (Perry, 2008). Toxic stress in utero or early infancy can have a very different developmental impact on a child than if it occurred later in childhood. A 2019 clinical study by Hambrick, Brawner, and Perry examined the effects of abuse, neglect, and other traumas in 2,155 children based on when the child’s trauma began. Researchers looked at children’s functioning in 32 brain-related domains across four main categories: self-regulation, sensory integration, relational, and cognitive functioning. Delays in sensory integration were associated with severe adversities in early infancy (0-2 months), while cognitive delays were associated with traumas that occurred in older childhood. The study also exhibited that neurodevelopmental effects of childhood trauma can be clearly demonstrated in a clinical setting and warrants further study to better inform clinicians and therapists about how to

intervene with children who have experienced traumas at different developmental stages (Hambrick, Brawner, & Perry, 2019).

The brain continually stores, monitors, and acts upon internal and external inputs to keep the body in equilibrium, health, and safety (Perry, 2013). All parts of the brain send signals to each other as these sensory inputs are received. Ideally, the brain's cortical area (also known as the seat of executive functioning) controls the response to the inputs (Perry, 2013). When brain development is interrupted or impeded by acute trauma or chronic toxic stress, the brain's ability to process information in this area is compromised. The child cannot adequately utilize their prefrontal cortex, inhibiting executive functioning (Cole et al., 2005). One study on the psychobiology of neglect showed that children with post-traumatic stress disorder were more likely to have deficits in executive functioning and abstract reasoning (De Bellis, 2005). A lack of executive functioning skills can result in an impaired ability to plan ahead, anticipate consequences, and set goals, all of which are necessary to succeed academically and socially (Mezzacappa, Kindlon, & Earls, 2001).

In addition to the underdevelopment of executive functioning, there are several other ways childhood trauma inhibits children's normal brain and cognitive development. A 2016 study by Teicher, Sampson, Anderson, and Ohashi on the impact of childhood maltreatment on brain structure, function, and connectivity demonstrated numerous adverse effects on different parts of the brain, including the hippocampus, the amygdala, and the corpus callosum. Children of trauma were found to have a smaller hippocampus, which plays an important role in learning and memory (Anand & Dhikiv, 2012). An underdeveloped hippocampus is also associated with slower brain growth, less overall gray matter, structural differences in the frontal cortex, and a

slower shutoff of the cortisol stress response system (Hunter, Gray, & McEwan, 2018). Previous studies of the brain have shown that children who have experienced adversity tend to have accelerated development of the amygdala, “the integrative center for emotions, emotional behavior, and motivation,” (Wright, 1997, p.6), and when the amygdala is stimulated, it can cause intense emotions of aggression or fear. When the amygdala is overdeveloped, it impacts planning and working memory (Hunter et al., 2018). Teicher et al. also found a reduced volume of the corpus callosum in children of trauma, affecting interhemispheric communication, which means that hemispheric activity is less integrated and more lateralized in traumatized children (2018). This lack of brain hemisphere integration is important to note as Bal-A-Vis-X was designed to address lateralization and its effect on brain-body integration. Over 180 original studies demonstrate differences in brain structure and function between children who have been maltreated and those who have not (Teicher et al., 2016). Exposure to abuse and domestic violence in childhood can alter the brain’s structure and physiology, leading to significant behavior changes (Anda et al., 2006), as toxic stress causes the child to develop an unhealthy stress response system.

### **Stress Response System**

Healthy brains develop as a result of patterned activation of stimulation (Perry, 2013). Over time, the brain responds to patterned, predictable input or stimulus by building up a tolerance for that input or stimulus (Perry, 2013). For instance, if an infant cries out of discomfort or hunger, a loving caregiver responds by giving him nourishment or holding him gently, reassuringly. The infant learns by a pattern that someone will meet his physical and emotional needs and that they are safe. This general sense of safety allows the baby’s brain to

develop normally and sequentially from the bottom up (Van de Kolk, 2014). The child's prefrontal cortex can evolve on this foundation of safety and security. The entire brain develops a regular stress response system in which external and internal inputs produce normal reactions to various stress levels (Perry, 2006). Dr. Perry (2006) explains the arousal continuum, which goes from calm to alert to alarm to fear to terror. The response to increased stress in a healthy, non-traumatized brain will move linearly along this continuum (Perry, 2006). The higher the stressor, the higher the response. For instance, a student learning a new math skill at school may be in an alert state as his brain tries to understand the concept. However, if the same student is exposed to a greater stressor, such as being caught outdoors alone in a loud thunderstorm, it would push him into a state of alarm or fear. These are normal stress responses. However, those who have experienced chronic stress have a dysregulated stress response system (Perry, 2006).

Children who grow up in a home with abuse, neglect, or other unpredictable environmental factors do not develop a tolerance to stress (Bruce, 2008). Rather, toxic stress resulting from a childhood void of predictable, patterned input leads to sensitization to stress rather than tolerance (Perry, 2013). A child experiencing neglect, for instance, may never know if their basic needs will be met. An abused child may never know when his parent may decide to hurt him. These unpredictable stressors provide no pattern and undermine a child's sense of safety and security. Perry (2006) explains:

If a child has been exposed to an extreme or pervasive threat or trauma, his stress system may become sensitized, and he may respond to ordinary experiences as though they are threatening. Depending on his individual stress response, he may move primarily along

the dissociative or the arousal continuum. Still, either change will reduce his ability to learn cognitive information, such as schoolwork (p. 296).

In a classroom setting, a child of trauma may appear “normal,” but internally, his brain state is very different from other children. Calm students have a greater ability to utilize their frontal cortex, pay attention to the teacher, and engage in concrete and abstract thinking (Perry, 2006). Children experiencing toxic stress who have developed this over-sensitization to stressors may be in a state of alarm, whether that manifests as a dissociative or hyperaroused response (Perry, 2006). To a child with trauma, presenting a new math concept in class could be internally causing him to be in a state of alarm or fear instead of a calm, alert state, inhibiting his ability to learn. His brain is likely stuck in a flight, fight, or freeze state, and he cannot access his prefrontal cortex to process or learn new information (Van der Kolk, 2014).

### **Hyperarousal and Dissociation**

Hyperarousal is a state in which the child is hyper-aware of his surroundings. They are consistently on the lookout for danger. Since they do not have an underlying sense of safety, they may perceive many non-dangerous stimuli as threats. The National Child Traumatic Stress Network’s *Concepts for Understanding Traumatic Stress Responses for Children and Families* explains that even if a trauma-exposed child is in a physically safe place (such as school), their toxic stress can make them *feel* unsafe (2012). “Exposure to trauma can make it more difficult for children to distinguish between safe and unsafe situations and may lead to significant changes in their own protective and risk-taking behavior” (Henkel, Lott & Griffin, 2012, p. 4). If a child is preoccupied with his need for safety, his brain primarily operates out of the prelimbic brain, and he cannot tap into his executive functioning to make good decisions or think abstractly

(Perry, 2013). The slightest perceived threat stimulates his amygdala, and the stress hormone cortisol pumps through his body (Perry, 2013). Hyperarousal can look a lot like attention-deficit hyperactivity disorder (ADHD) in a student (Perry, 2006). However, the body exercises its natural “fight or flight response” brought on by a stressor. The heart rate increases, and responses become reflexive since the child is operating out of the limbic brain (Perry, 2013).

The opposite of hyperarousal is dissociation. Dissociation is when the child is disconnected from the physical sensations and experiences of reality, and their thoughts and consciousness become completely focused inward (Tobin & Oldfield, 2016). Dissociation is a survival strategy where pain and even fear shut down to cope with traumatic experiences (Perry, 2006). Tobin (2016) argues that “Research suggests childhood trauma exposure and increased symptoms of dissociation may be related to observed problems with behavioral inhibition, auditory attention, working memory, and cognitive processing speed” (p. 10). Children in a dissociation state cannot pay attention to their surroundings, especially the teacher at the board trying to explain that new math concept. Dissociation causes the body to feel numb and the child to behave in either an over-compliant or avoidant manner (Perzow, Petrenko, Garrido, Combs, Culhane & Taussig, 2013). They may appear passive, look like they are daydreaming in class, and struggle with internal confusion (Oehlberg, 2008). Dissociation can look much like attention deficit disorder, and dissociative symptoms can often be misinterpreted for other developmental disorders (Perry, 2013; Tobin, 2016). A study examining the association between dissociative symptoms and academic functioning found that children with dissociative symptoms were likely to have poorer academic functioning as measured by school membership, academic competence,

and standardized tests (Perzow et al., 2013). A child in a dissociative state struggles to engage his prefrontal cortex to learn or retain new information (Perry, 2013).

### ***Behavioral, Emotional, and Academic Effects of Trauma***

Children in an alarmed or fearful state cannot be reflective about their behavior (Perry, 2004). These behaviors, which often manifest as impulsive or aggressive, result from the brain's lack of internal regulating capabilities (Perry, 2020). Rather than acting out of their brains' cortical area, children of trauma may react out of the emotional part, resulting in impulsive or aggressive behaviors (Ethier, Lemelin & Lacharite, 2004). Researchers Shauss, Zetler, and Russell, who studied the effects of a neuroscience-based and trauma-informed treatment program with domestic violence offenders, explain:

Chronic toxic stress leads to impairment of the central nervous system as stress hormones damage developing brain architecture leading to lifelong impairments in interpersonal relationships, behavior problems, learning, psychosocial, physical, and mental health issues. Further, ACE exposure often leads to emotional dysregulation and behavioral issues that affect a child's ability to form and sustain successful relationships across the lifespan." (2019, p. 1-2).

Trauma-exposed students have a harder time focusing on the teacher or may act out or space out more often due to hidden trauma triggers. When presented with stressors at a school, what may be a tolerable stress level for one student may prove to be an intolerable level for the student of trauma (Perry, 2008). The student may not have the coping skills necessary to respond appropriately to the stressor, which causes behavior the teacher may interpret as defiant, aggressive, or shut down (Perry, 2008).

When children struggle to self-regulate their emotions and behavior, they often get labeled with ADHD, ADD, conduct disorder, mood disorder, and oppositional-defiant disorder (Shauss et al., 2019). Ethier, Lemelin, and Lacharite (2004) conducted a longitudinal study on the effects of chronic maltreatment on children's behavior and emotional problems. Their study demonstrated that children who had been chronically maltreated had a higher proportion of emotional problems than peers who had been in transitory maltreatment situations. Additional studies show that children who have experienced maltreatment have more discipline problems in school, show more signs of depression, are more socially withdrawn, are more aggressive with peers, and are more likely to be rejected due to their aggressive behavior (Ethier et al., 2004).

The impact of childhood trauma on academics is significant as well. Children's learning suffers when they cannot focus on lessons or work because of emotional triggers. In a study on violence exposure and trauma with 299 first-grade children, researchers found that violence and trauma-exposed children were associated with significant decrements in IQ and reading achievement (Delaney-Black et al., 2004). Violence exposure is also associated with increased school absences, decreased reading ability, lower grade point averages, and decreased high school graduation rates (Ko et al., 2008). A study of an urban school with high violence exposure found that students with four or more ACEs were more likely to have learning difficulties (Burke et al., 2011). Multiple studies have shown an association between trauma-exposed children and lower reading and math performance compared with control groups (Chafouleas et al., 2019). Children of trauma are also more likely to be retained and repeat a grade, and they are more likely to be suspended from school (Chafouleas et al., 2019).



### ***Self-Regulation and Trauma***

These behavioral and cognitive issues can seriously impact the traumatized child's ability to learn due to his impaired self-regulation ability. The ability to self-regulate is an important predictor of academic and social success in school (Woltering, 2016). "Self-regulation is often defined as an ability to manage thoughts and emotions appropriately and to flexibly adjust internal goals and responses to the changing demands of a situation" (Woltering, 2016, p. 1085). Self-regulation is learned over time due to the child's positive attachment to his parents or caregivers. Children who successfully learn self-regulation have predictable, loving care and a sense of safety, comfort, and mastery (van der Kolk, 2014). Bessel van der Kolk, psychiatrist and trauma researcher, explains:

A secure attachment combined with the cultivation of competency builds an *internal locus of control*, the key factor in healthy coping throughout life. Securely attached children know what makes them feel good; they discover what makes them (and others) feel bad, and they acquire a sense of agency: that their actions can change how they feel and how others respond...In contrast, children with histories of abuse and neglect learn that their terror, pleading, and crying do not register with their caregiver. Nothing they can do or say stops the beating or brings attention and help. In effect, they're being conditioned to give up when they face challenges later in life (2014, p. 115).

Children who suffer abuse or neglect from their primary caregivers, especially in early childhood, are at particular risk of struggling with self-regulation (Tobin, 2016). Helping children of trauma establish competency and a sense of agency over their lives creates the ability to develop self-regulation skills (Tobin, 2016).

## Section 2: School-Based Trauma Interventions

Schools are a natural and common setting to implement trauma interventions. Because trauma exposure can significantly impact student behavior and learning, it is a major barrier to student success, both in academics and social-emotional functioning (Thomas, Crosby & Vanerhaar, 2019). Educators who understand the impact of trauma on the developing brain can help break down this barrier by providing a safe, predictable environment in which children can build positive relationships, learn self-regulation skills, and develop a sense of agency over their lives (Lancaster, 2021; Alisic, 2014; Olivier, Archambault, de Clercq, & Garland, 2019). Researchers Cole et al. explain what educators must do to help traumatized students become successful members of their school communities: “Because we know that mastering both academic and social skills are key to the healing process, the aim is to increase teaching and learning time and reduce time spent on discipline (2005, p. 6). Schools must be able to deliver research-based, trauma-informed interventions within the school setting to help students mitigate the effects of their toxic stress so they can learn and grow to their full potential (Thomas et al., 2019; Lancaster, 2021).

Educators instinctually do many things that students of trauma need, such as providing warm, nurturing relationships, predictable routines and environments, and positive expectations (Cole et al., 2005). Teachers undoubtedly can play a major role in a child’s recovery from the damage from trauma and chronic stress (Lancaster, 2021). However, not all teachers feel equipped or qualified to help their most vulnerable students. In a qualitative study on teachers’ perspectives on helping children after trauma, the researchers discovered that many teachers struggled with finding a balance in addressing different needs in the classroom (Alisic, 2012).

They also expressed a need for more professional knowledge about responding to trauma and spoke to the emotional burden of working with trauma-exposed children (Alisic, 2012). A more recent interdisciplinary overview of the use of trauma-informed interventions in schools found that educators are under-examined in this field of study, meaning there is not enough research to show that teachers are well-informed about trauma-informed practices (Thomas, Crosby & Vanderhaar, 2019).

Historically, schools have relied on behaviorist techniques, such as dispensing punitive consequences such as time out, detention, and suspension for negative behavior and rewarding positive behavior (Woltering, 2016). However, these practices often do not work for children of trauma. In their review of school discipline policies in the United States, researchers Allman & Slate discuss their critiques of zero-tolerance policies, suspensions, and disciplinary alternative education programs based on data that show these types of punitive consequences damage student self-esteem and lead to missed educational opportunities (2011). The isolation from these types of punishments can lead to further trauma to the student by reinforcing feelings of shame, powerlessness, and frustration (Michail, 2011). In fact, these punitive approaches “can have detrimental effects on a population that also experiences higher rates of trauma” (Dutil, 2020, p. 171). Dutil’s research explains how exclusionary disciplinary practices contribute to the “school-to-prison pipeline” and urges schools to replace them with trauma-informed responses that focus on providing social-emotional support to students (2020).

How individual children are impacted by trauma depends on the “timing, severity, pattern, and nature of these developmental insults have...on the developing brain,” each child’s pathway to healing is complex and unique (Perry & Dobson, 2013, p. 249). While numerous

trauma-informed school-based programs seek to help children with trauma, there is no consensus about which programs are best for a diverse population. A 2019 study by Herrenkohl, Hong, and Verbrugge synthesized data on several school-based trauma interventions, including individual and group, classroom, and school-wide approaches. The article reported on the results of many prominent interventions. Some program studies reported reductions in school disciplinary incidents such as fighting, aggressive behaviors, oppositional defiance, and behavior referrals. Other programs demonstrated increased teacher confidence in working with children of trauma, improved student attendance, and improved student functioning and teacher-reported empathy toward children of trauma (Herrenkohl, Hong & Verbrugge, 2019). Although these trauma-informed programs demonstrated success, the researchers did not conclude with one “best” system. Rather, they emphasized the importance of “matching group and classroom interventions to the local contexts of schools; to ensuring programs are accessible and tailored to students based on need; and to determining that services are developmentally and age-appropriate and sensitive to cultural differences” (Herrenkohl et al., 2019, p. 385).

The rest of this section reviews research-based frameworks that establish the foundation for what can be considered an effective trauma-informed intervention. There is a discussion of the importance of relationships in trauma-informed care, the significance of the neurosequential development of a child’s brain, and the importance of integrating the brain and body to bring about a state of regulation. Interventions that provide opportunities for sensory integration, movement, midline crossing, and mindfulness are also explored. Strategies and interventions based on these researched-based theories can be considered trauma-informed.

### *Interventions in the Context of Relationships*

In order to build teacher efficacy around supporting children of trauma, teachers need to understand how chronic stress affects children's developing brains and be trained in interventions that rebuild the underdeveloped brain systems (Polou, Reddy & Dudek, 2019; Lancaster, 2012). While teachers should not be expected to play the role of a therapist, they need to know how to build stable and supportive classrooms where students of trauma can feel safe and connected (Cole et al., 2005). All trauma-informed interventions should be rooted in positive relationships. The most damaging trauma is caused by the lack of safe, nurturing early relationships with caregivers, so it is important for these children to experience positive relationships with safe adults and form healthy, secure attachments (van der Kolk, 2014).

Dr. Perry's extensive research on healing from childhood trauma led to the development of a framework that can serve as a guide for considering developmentally appropriate trauma interventions for children. Perry lists several "P's" critical to creating the relational 'space' for optimal development, learning, and healing. Adults working with traumatized children should be "present, parallel, patient, and persistent in providing patterned, predictable, positive doses of protected (safe) experience" (Perry, 2004, p. 7). Other researchers reinforce this relationship-based approach. Tobin et al. explain that "positive attachment to caregivers and adults acts as a protective factor to help children develop self-regulatory capacities after trauma exposure" (2016). The National Child Traumatic Stress Network (NCTSN) Complex Trauma Task Force presents the "ARC" model for working with traumatized children. The three tenets include 1. building secure Attachments between child and caregivers(s); 2. enhancing self-Regulatory capacities; and 3. increasing Competencies across multiple domains (Cole et al., 2005). When

adults at school can stay calm, attuned, and present while interacting with children predictably, students can form trusting relationships that can be the basis for helping a child heal (Walkley & Cox, 2013). Children who have experienced trauma may benefit from various interventions, but they must be done within secure, positive relationships.

### ***Trauma Interventions and the Neurosequential Model***

Dr. Bruce Perry, a leader in the study of childhood trauma, developed what he calls the Neurosequential Model of Therapeutics (NMT). Perry & Dodson explain NMT:

The NMT is not a specific therapeutic technique; it is a multidimensional assessment ‘lens’ designed to guide clinical problem solving and outcome monitoring by providing a useful ‘picture’ of the client’s current strengths and vulnerabilities in the context of his or her developmental history (2013, p. 250).

From this neurodevelopmental viewpoint, clinicians choose enrichment, educational, and therapeutic interventions that will be the most effective. Under the umbrella of NMT is NME, the Neurosequential Model of Education. Perry supports several school-based interventions to help children who have experienced trauma, but the order in which the interventions are introduced is key (Sori & Schnur, 2014). Since the brain develops from the bottom up, it is important to remember that the brain's lower parts must be engaged before a student can access his prefrontal cortex and engage in more complex cognitive processes (Perry, 2020). Before a child can use reasoning skills within his cortical brain, he must relate emotionally to others within the limbic part of his brain (Perry, 2004). The adult attempting to relate to the child must first be regulated himself because a dysregulated adult cannot regulate a dysregulated child (Perry, 2020).

Educators can help children with trauma repair this damage by focusing on interventions targeting the regulatory system.

### ***Body-Brain Connections***

The impact of trauma extends beyond the brain. It also creates lasting effects on the body, primarily on the nervous system (van der Kolk, 2014). The autonomic nervous system (ANS) is the body's accelerator; it moves blood to the muscles, triggers the release of adrenaline, speeds up the heart, and increases blood pressure (Tobin, 2014; van der Kolk, 2014). On the other hand, the parasympathetic nervous system (PNS) acts as the brakes. It slows the heart rate, relaxes muscles, and returns breathing to normal (Tobin, 2014; van der Kolk, 2014). The vagus nerve, which runs directly from the brain to the internal organs, controls the PNS and is the brainstem regulatory center (Gould, 2019). When the ventral vagal complex (VVC) is engaged, we feel "calm and relaxed, centered, or pleurably aroused" because our nervous system is in sync with our surroundings. However, when we are under extreme stress, the ANS takes over. "The autonomic nervous system regulates three fundamental physiological states" (van der Kolk, 2014, p. 82.) When distressed, we turn instinctually to *social engagement* (the first level) by calling out for help. If no help comes, the autonomic nervous system is triggered and puts us into a fight or flight state. If there is no escape from the danger, the dorsal vagal complex (DVC) becomes activated, and our bodies naturally *freeze or collapse*. The DVC causes a slowdown of body systems, including the digestive system, heart, and even breathing (van der Kolk, 2014). At this point, we can feel intense body sensations. We may feel like we can't breathe, or our heart drops, or we experience stomach pains or nausea (van der Kolk, 2014).

When children are stuck in a state of fight/flight or are chronically shut down, they cannot enjoy life's ordinary pleasures or absorb new experiences. "After trauma, the world is experienced with a different nervous system that has an altered perception of risk and safety...When we try to help people with faulty neuroception, the great challenge is finding ways to reset their physiology so that their survival mechanisms stop working against them" (van der Kolk, 2014, p. 82). The key to helping students with trauma is to engage them in activities that enable them to become more in sync with their environment and more connected through the emotional-engagement system. According to Dr. van der Kolk, activities that allow children to have movement and playful, joyful engagement, such as music, physical education, and recess, help them shift out of fight/flight/freeze modes. These engaging activities should not be removed from the curriculum (2014). Rhythmic activities are especially beneficial for children who have experienced trauma. Just as the brain and heart work together to adjust to changes in circumstance, "regulating heart rate during stress and controlling stress hormones are two critical tasks that require the brain to keep proper time" (Perry, 2005, p. 156). The body's ability to rhythmically regulate hormones, sleep/wake patterns, and other systems is critical to keeping it healthy and balanced (Perry, 2005). Children who experienced trauma, particularly at a very young age, may have poorly developed bodily rhythms due to an unpredictable environment and lack of a safe adult to help them co-regulate as their brains were going through critical developmental phases (Perry, 2005). Dance, martial arts, singing, and drumming are all rhythmic activities that can help children regain their sense of internal rhythm and help their bodies become more in sync with their brains (van der Kolk, 2014).



### *Sensory Integration Interventions*

When a child is in a state of fight, flight, or freeze for a long period of time, it affects their ability to integrate sensory information. Trauma interferes with the child's ability to integrate the internal input of their body sensations and the external input from the environment (Perry, 2005). To counteract this, many sensory integration interventions have been developed. A wide review of sensory-based interventions found them to be "promising and potentially important for treatment with children and adolescents with complex trauma" (Fraser, MacKenzie & Versnel, 2017, p. 199). Their study looked at various sensory-based interventions with children of complex trauma, including direct and indirect intervention and individual and group treatments. The researchers concluded that "sensory-based interventions are only one type of treatment and should be part of an overall treatment program incorporating a multidisciplinary focus" and that further research is needed (Fraser, MacKenzie & Versnel, 2017, p. 199). Primarily carried out by occupational therapists, sensory integration interventions are varied and include play, art, drawing, movement, breathing, and self-awareness activities to help children co-regulate (Fraser et al., 2017). A therapist may use sensory integration interventions to help a child who over- or under-responds to stimuli. This could include the hyper-aroused student or the student who dissociates and lacks response to sensory input (Taggart, 2019). Sensory integration therapies seek to improve a child's proprioception, their awareness of where their body is in space.

Activities that include proprioceptive, vestibular, deep pressure, and visual input are used based on the theory that this type of input affects arousal levels. These types of input have

been used clinically to increase alertness and to produce a calm state, supporting the student's ability to attend and learn (Anderson, 2016, p. 4).

The brain's primary function is integrating sensory information to adapt to its environment's changing needs and challenges. Any activity that integrates the sensory system disrupted by childhood trauma will help restore this integration (Australian Childhood Foundation, 2010).

### ***Movement and Midline Crossing Interventions***

The cognitive benefits of school-based physical activity are well-documented. Centers for Disease Control and Prevention published an analysis of 50 studies of school-based physical activities, including physical education, recess, extracurricular physical activity, and classroom physical activity. They found significant associations between movement and academic achievement (Centers for Disease Control and Prevention, 2010). Physical activity was found to improve “cerebral capillary growth, blood flow, oxygenation, production of neurotrophins, growth of nerve cells in the hippocampus (center of learning and memory), neurotransmitter levels, development of nerve connections, density of neural network, and brain tissue volume” (Centers for Disease Control and Prevention, 2010, p. 9). Additionally, physical activity resulted in improved attention, information processing, storage, and retrieval, as well as enhanced coping and an enhanced positive affect (Centers for Disease Control and Prevention, 2010; Stevens-Smith, 2016). While these studies did not specifically focus on students with toxic stress, the benefits of movement-based interventions for children of trauma are supported by trauma experts Bessel van der Kolk and Bruce Perry because they allow children to play, move, and take on small challenges that allow them to build a sense of self-confidence and agency (van der Kolk, 2014; Perry, 2006).

Movements that require children to cross the midline are of particular importance. The two hemispheres of the brain must be in sync to communicate effectively. Each side of the brain has a different function, responding differently to sensory input. If a traumatized child's brain development has been impeded by toxic stress, the hemispheres may not share information accurately (Melillo, 2009). Melillo explains, "when one side of the brain is too slow, the faster, or stronger side takes over and begins to ignore the other, underactive side. When this happens, a child's interpretations of and reactions to the world around him will be 'off' so to speak, and his behavior will appear abnormal" (2009, p. 21). Children whose brain hemispheres are not communicating well may walk oddly or be quite clumsy because they "don't feel their bodies very well" and have proprioception issues (Melillo, 2009, p. 29). They truly do not have a sense of where their bodies are in space. Children of trauma have a disordered stress response system and struggle with proprioception. Midline crossing movements require both brain hemispheres to engage in neural processing, whereas ipsilateral (one-sided) movements only utilize one hemisphere (Pedersen, 2014). When children engage in deliberate midline crossing exercises, communication between the brain's two hemispheres is strengthened (Surburg & Eason, 1999; Woodard & Surburg, 1999). A study of elementary students who were given coordinated bilateral physical activity interventions demonstrated a significant increase in concentration and attention span (Buchele Harris, Cortina, Templin, Colabianchi, & Chen, 2017).

### ***Mindfulness-Based Interventions***

Mindfulness-based interventions seek to help a person practice awareness of being in the moment and allowing themselves to have a non-judgemental attitude of acceptance to cultivate a sense of balance and emotional well-being (Young, van der Velden, Craske, Pallesen, Fjorback,

Roepstorff & Parsons, 2018). Researchers who studied fMRI brain images before and after mindfulness interventions discovered increased activity in the insular cortex, the part of the brain that connects sensory experience and emotions (Young et al., 2018). A study of mindfulness interventions in a school setting found that engaging in mindfulness activities led to lower depressive symptoms, reduced stress, and greater well-being (Kuyken, Weare, Ukuomunne & Vicary, 2013). Mindfulness interventions can include activities such as breathing exercises, yoga, meditation, walking, and body scans, seeking to be aware of “bodily sensations, emotions, and thoughts while accepting a non-judgmental, accepting attitude toward whatever arises until it passes” (Shapiro et al., 2018, p. 32). Mindfulness interventions aim to build the capacity for self-awareness and self-regulation in the traumatized child. Studies have found “mindfulness-based stress reduction and meditation increase functional connectivity within the brain and benefit fluid intelligence” (Hunter, Gray & McEwen, 2018, p.310). Increased cognitive flexibility and overall cognitive functioning are associated with mindfulness-based interventions (Shapiro et al., 2018).

### **Section 3: Trauma-informed Bal-A-Vis-X**

There are two types of Bal-A-Vis-X: regular (BAVX) and trauma-informed (TIB). According to Bill Hubert, the original developer of the exercises, regular BAVX is comprised of a series of exercises using racquetballs and sandbags to rhythmically bounce, clap, or pass these items to the mid-line in various planes (2019). Movements include bouncing one or more balls, tossing the sandbag up and down, and clapping or moving the ball/bag across the body or behind the back. Participants are taught the proper way to bounce and catch the racquetballs or toss the sandbags in a patterned, rhythmic way (Hubert, 2019). These exercises can be done individually, with a partner, or with a larger group. Like regular Bal-A-Vis-X, Trauma-informed Bal-A-Vis-X

(TIB) is a series of rhythmic exercise clusters using racquetballs and sandbags designed to cross the midline (Hubert, 2023). The exercises are always done in counts of six, each exercise building upon the previous one. The pace of the TIB exercises should be done in an “unhurried, steady, rhythmic, repetitive” manner “so that each move is predictable” (Norsworthy, 2020, p. 1). The Bal-A-Vis-X exercises were designed to help the participant engage in mindfulness, quieting the brain. “It provides respite from relentless sensory awareness and intrusion by random or racing thoughts. It self-regulates attention” (Norsworthy, 2020, p. 1). Regular Bal-A-Vis-X practitioners must attend an in-person 17-hour training with a certified trainer. The TIB exercise can be learned at additional training that can be done in person or by watching a training video (Hubert, 2023).

### ***History of Bal-A-Vis-X and TIB***

The creation of Bal-A-Vis-X and, more recently, TIB came about as Hubert’s response to his experience as a public school teacher. His 2007 book, *Resonance: Elise and other Bal-A-Vis-X Stories*, explains the history of the intervention. Hubert noticed that many of the first graders in his class who struggled with academics also struggled with basic motor skills, including standing on one foot, skipping, and even walking with a smooth gait. Hubert felt it was critical to intervene with these students to overcome their physical limitations and seek ways to become more physically coordinated. Having been involved in athletics his whole life, particularly martial arts, Hubert used his knowledge to experiment with exercises that might help his students move with a more balanced, rhythmic, natural flow. As his students began moving in more fluid ways, Hubert noticed that they were also improving academically and making social-emotional gains as well. Hubert continued developing these bag and ball exercises with middle and special

needs students. Over time, the exercises were clearly defined and organized into what is now known as Bal-A-Vis-X (Hubert, 2007). Incorporating multiple internal and external sensory inputs, Bal-A-Vis-X stands for Balance, Auditory, and Visual Exercises. Many exercises are performed while standing on a wooden balance board, stimulating the vestibular system. The auditory system is engaged as the ears hear the steady beat of the bags being passed or the balls being bounced. The child's sense of vision is stimulated and strengthened by visually tracking the balls or bags' predictable, patterned movements. The exercises are also designed to allow for thousands of midline crossings in three planes, forcing the brain's two hemispheres to communicate as the participant moves their arms or feet across the body or back and forth (Hubert, 2019).

Hubert began training therapists and educators on utilizing Bal-A-Vis-X with struggling students to build their physical, cognitive, social, and emotional capacities. Today, over 15,000 adults have been trained across three continents (Hubert, 2023). Bal-A-Vis-X is used with people of all ages, from young children to the elderly, in various settings, including preschools, K12 schools, rehabilitation centers, and nursing homes (Hubert, 2019). Hubert insists on any Bal-A-Vis-X practitioner attending a required 17-hour training with him or one of his few sanctioned trainers. Hubert believes strongly that the practitioner should be well versed in and understand the "why" behind the precise techniques of Bal-A-Vis-X to implement them correctly to maximize its effectiveness. The tempo of the bounces, the particular manner in which the participants release and catch the ball, and the visual tracking of the bags or balls are all important to maximize the Bal-A-Vis-X exercises' benefits. However, since the only people who could teach Bal-A-Vis-X to children were the ones who had attended this 17-hour training, the

number of children who could benefit from it was limited to these trained adults. Hubert realized these interventions needed to become more available to children in need, particularly those whose developing brains and bodies had been negatively impacted by trauma and toxic stress. Without losing the integrity of the exercises, Hubert modified the program to be less dependent on specific techniques to allow educators or therapists to learn the exercises from a DVD and booklet, calling it Trauma-Informed Bal-A-Vis-X, or TIB (Hubert, 2020). He designed TIB series of exercises to align with Dr. Perry's Neurosequential Model of Therapeutics to help participants engage in mindfulness and develop self-regulation skills, the foundation of the healing journey from trauma (Hubert, 2019).

### ***Using Trauma-Informed Bal-A-Vis-X (TIB) to Regain Brain-Body Connection***

Dr. van der Kolk details how traumatic events and toxic stress can significantly affect the body and brain and explains how trauma can cause people to feel a loss of control over their lives and an unhealthy disconnection from their bodies. Regaining a sense of agency over their lives and their bodies helps children recover from trauma. Dr. Van der Kolk writes, "Agency starts with what scientists call interoception, our awareness of our subtle sensory, body-based feelings: the greater that awareness, the greater our potential to control our lives (van der Kolk, 2014, p. 97). The rhythmic, repetitive TIB exercises done in the context of a trusting relationship are designed to help children restore their brain-body connections and repair what Dr. van der Kolk calls "damaged attunement systems through training in rhythmicity and reciprocity" (2014, p. 124). He goes on to say, "Being in sync with oneself and with others requires the integration of our body-based senses - vision, hearing, touch, and balance" (van der Kolk, 2014, p. 124). Bal-A-Vis-X integrates all these systems - balance, auditory, and vision, as well as rhythm. When

exercises are done with a partner or when a student teaches someone else the TIB exercises they have learned, this presents an opportunity for reciprocity and builds the student's social and relational network. Dr. Perry's Neurosequential Model of Therapy (NMT) advises implementing interventions that target the regulatory system's problems before intervening at the cognitive level. "The neurological approach to helping traumatized and maltreated children first examines which regions and functions are underdeveloped or poorly functioning and then works to provide the missing stimulation to help the brain resume a more normal development" (Perry, 2017). Bal-A-Vis-X exercises are meant to provide this "missing stimulation." The exercises in TIB are designed to help children reconnect with their bodies by simultaneously stimulating the vestibular, auditory, and visual systems in a way that feels safe, predictable, and calm, allowing them to have positive sensory experiences to combat the negative neural pathways caused by trauma (Hubert, 2023).

### ***The Six R's***

Dr. Perry identifies six "Rs" as key elements of positive developmental and educational settings (Perry, 2004). Interventions that seek to improve a child's ability to self-regulate should be: 1) Relevant (developmentally matched), 2) Rhythmic (resonant with neural patterns), 3) Repetitive (patterned), 4) Relational (safe), 5) Rewarding (pleasurable), 6) Respectful (child, family, culture) (Perry, 2020). According to Hubert, TIB exercises meet all of these criteria (2023). TIB is a series of engaging ball-bouncing exercises that are fun and developmentally appropriate for children. The exercises are rhythmic as children bounce the ball to a steady beat. It is repetitive in that each exercise has a certain number of repetitions to complete before going on to the next level. Taught one on one by a safe adult the child knows and trusts, TIB is



relational. This relational attachment is further strengthened by the shared experience of doing the exercises together. Children find the ball bouncing rewarding since it is fun, and they are provided with a sense of competency when they complete increasingly complicated exercises. Lastly, TIB is respectful of the child since it allows them to have a way to self-regulate when they feel dysregulated. The teacher works with the child to know how and when to self-select the TIB intervention when he needs it. Hubert says that the gradual progression of the exercises in TIB allows a student to regain resilience after trauma (2023). “Regaining resilience requires desensitization: gradually reducing the power of toxic stress triggers by repetitive, predictable, tolerable stress, so anxiety becomes manageable, no longer toxic. (2023).

### ***TIB as a Sensory, Midline Crossing, Movement Based, Mindfulness-Based Intervention***

TIB is an intervention that aligns with several trauma-informed interventions such as Dr. Perry’s NMT and The National Child Traumatic “ARC” model. Additionally, it combines several key elements of several heavily researched school-based interventions. TIB is a sensory integration intervention. It attunes children to the visual, auditory, and vestibular senses. It exposes them to this sensory input repetitively and predictably, allowing their brains and nervous systems to respond to the sensations and movement in an organized way. TIB is also a midline crossing intervention as it allows for numerous midline crossings from side to side, back to front, and top to bottom. These midline crossings strengthen communication between the brain hemispheres and corpus callosum, helping foster balance and coordination (Hubert, 2001). While TIB exercises are not cardiovascular activities, they involve purposeful movements of the arms and feet, making it a movement-based intervention. Finally, TIB is a mindfulness-based intervention. While a participant is engaging in TIB, he is focused on the exercises' rhythm,

pattern, and count. Much like yoga and meditation, Hubert says, TIB allows the child to exert a calm focus, blocking out the trauma triggers that may cause him to go into a state of hyperarousal or dissociation (Hubert, 2020). It is an escape from the onslaught of toxic stress and his dysfunctional stress response system. Over time, the TIB participant learns to self-regulate as his brain and central nervous system create new response patterns to the rhythmic, predictable sights, sounds, and sensations (Hubert, 2001). Additionally, TIB may foster a sense of agency within a child as he has positive experiences with tolerable stress. As he learns and masters new, increasingly complex exercises, he gains a sense of competency, which could lead to a belief that he has the potential to control his life (Hubert, 2007) (van der Kolk, 2014).

### ***Previous Studies of Bal-A-Vis-X and TIB***

Being a relatively new intervention, TIB has not been formally studied. Therefore, this section of the literature review will focus on the original intervention, Bal-A-Vis-X. Bal-A-Vis-X has been around for over 30 years but has not been extensively studied, and therefore the literature to support its effectiveness is extremely limited. Most existing Bal-A-Vis-X studies have been conducted as master's theses or doctoral dissertations. Dana Oswald conducted a thesis study of rhythmic ball bouncing exercises (based on, but not strictly, Bal-A-Vis-X) and their impact on student stress and academic growth. She found that the exercises reduced student stress, lowered student interruptions during class time, and increased students' reading growth (Oswald, 2007). Another thesis completed by Heather Hert in 2016 studied the impact of Bal-A-Vis-X on ADHD, ASD, and SLD. She looked at whether or not antecedent physical activity in the form of Bal-a-vis-x made a difference in student engagement during math instruction. Her

results showed that Bal-A-Vis-X users significantly decreased negative behaviors and increased student engagement (Hert, 2016).

Susan DeSchiffart conducted a thesis study to determine if Bal-A-Vis-X was an “effective strategy to help support students with academics as well as focus and attention” (2017). Her findings showed that Bal-A-Vis-X did have a positive impact on focus and academic progress. A quasi-experimental study of 24 first and second-graders showed students who had participated in Bal-A-Vis-X had higher scores on the DIBELS reading assessment (Cosgrove & Ryan, 2005). Jennifer Richardson conducted a dissertation research study of tenth-grade public school students to compare communication arts scores between those who had participated in physical activities that engaged both sides of the brain and those who didn’t. Her study found those who had participated in the exercises did have higher test scores than those who did not. These studies examined the impact of Bal-A-Vis-X on students within one classroom or one school. The time devoted to these studies ranged from six weeks to one school year. There have not been any long-term, district-wide (or broader) studies on the effectiveness of Bal-A-Vis-X. Previous studies have measured the impact of Bal-A-Vis-X on reading or math test scores by counting classroom disruptions or office referrals or administering tests designed to measure memory function. A survey has obtained another measurement to determine student stress levels.

There has only been one peer-reviewed, published study of Bal-A-Vis-X, conducted by Watson-Grace and Provident in 2020. The mixed-methods study, involving a class of 28 6th-grade students, measured the impact of twice-weekly, 10-minute Bal-A-Vis-X sessions on the students’ attention spans. Attention spans were measured using the d2 Test of Attention. The

researchers found statistically significant gains in processing speed, concentration, focused attention, and students accuracy. Qualitative data were also collected from the students to gather information about student perception of the Bal-A-Vis-X. Analysis of this data revealed that most students enjoyed the Bal-A-Vis-X breaks, felt the intervention helped them focus better, and wanted the sessions to be longer or more frequent. This single study provides promising information about the possible effectiveness of Bal-A-Vis-X as an intervention for students who struggle with attention and focus (Watson-Grace & Provident, 2020).

However, some issues may keep the study from demonstrating that Bal-A-Vis-X helped students improve their focus and attention. This study took place in a charter school with high academic expectations and minimal opportunities for non-academic activities. Students at this school abide by strict rules and procedures that provide very few physical movement opportunities throughout the school day. Students do not even get up to change classes, so they are sedentary most of the day. One could argue that any sort of coordinated physical activity could have produced the same improvements in focus and attention due to the numerous studies proving that physical activity improves student performance (Centers for Disease Control & Prevention, 2010). If the study had one class of 6th graders doing Bal-A-Vis-X and another class had done a different coordinated movement activity such as yoga, the impact of the two interventions could have been compared to one another to see if Bal-A-Vis-X had an advantage over the other intervention.

### **Teacher Trauma Training and Trauma-informed Practices**

Recognizing the deep impact that adverse childhood experienced can have on students, education leaders have responded by providing teachers with trauma training in hopes of creating

more trauma-sensitive schools (Thomas, Crosby & Vanderhaar, 2019). There are a number of models and training methods used for delivering trauma training in schools from one-time, isolated training sessions to whole-school systems of care approach (Thomas, et al., 2019). A number of studies have explored the different components of various trauma education approaches (Thomas, et al., 2019). A qualitative study by Cummings, Addante, Swindell, and Meadan (2017) explored what early childhood teachers should know about teaching students of trauma, including student trauma experiences, their emotional and behavioral patterns, and supporting students social and emotional well-being in the classroom. The study revealed that several components were essential for supporting students of trauma, including “being attuned, showing positive regard, and collaborating with parents and other professionals (Cummings et al., 2017, p. 2736). Offering positive social and emotional communicative responses, engaging in proper reactions to children, and actively avoiding the re-traumatization of students in the classroom were also critical to supporting students of varying experiences with and manifestations of trauma (Cummings et al., 2017). Brunzell, Stokes, and Waters (2019) conducted a study of their TIPE (Trauma-informed Positive Education) model, which aims to increase teacher capacity to help students of trauma overcome adversity in school and improve learning. They discovered that the two most important components of utilizing trauma-informed practices with struggling students were first to repair the child’s self-regulatory abilities and then increase their relational capacities (Brunzell et al., 2019).

The goal of any trauma training is to help educators use their new knowledge of the impact of childhood trauma to create trauma-sensitive classrooms and schools. Robertson, Goodall, and Kay (2021) studied whether teacher attitudes toward the acceptance or usage of

trauma-informed practice were influenced by the teacher's attachment style and personal experiences with adverse childhood experiences. They found that teacher attitudes toward trauma-informed practices are negatively influenced if the teacher has an avoidance or anxiety attachment style but were not influenced by the teacher's own personal ACE score (Robertson, Goodall, & Kay, 2021). However, they also found that teachers who had received trauma awareness training had significantly more positive attitudes towards trauma-informed care than those who had not and they found that "trauma awareness training is not only positively associated with knowledge about ACEs, but is also positively associated with the motivation to implement trauma-informed practice" (Robertson, et al., 2021, p. 69). Negative behaviors associated with student trauma can have a significant impact on the school environment, interfere with student learning, and lead to teacher exhaustion and burnout, so it is imperative that schools and districts provide ongoing trauma training, coaching, and support to teachers who are continually managing student behaviors associated with trauma (Berger, Beardsley & Lever, 2021).

## CHAPTER III: CONCEPTUAL FRAMEWORK

### Introduction

Although there have not been any experimental studies on TIB, it is an intervention that meets the criteria for possibly being effective with trauma students. While this study does not seek to evaluate the effectiveness of the intervention itself, it does attempt to determine if teachers who have attended TIB training report a greater understanding of students of trauma and greater usage of trauma-informed strategies than other teachers. Educators who are more informed about how trauma affects students and how they can provide appropriate interventions and support are more likely to have a greater sense of self-efficacy when teaching students of trauma in their classrooms (Lancaster, 2021; Poulou et al., 2019). This chapter will explore the conceptual framework for this evaluation study of TIB in Norman Public Schools: teacher self-efficacy. The first section explains how self-efficacy theory supports the idea that teacher training on trauma-based interventions can lead to greater self-efficacy among teachers for teaching students of trauma, while the second section details the theory of action behind TIB training.

### Teacher Self-Efficacy

Self-efficacy is one's beliefs about their ability to control their own behavior and functioning. A person's self-efficacy can influence their sense of well-being, motivation, and feelings of accomplishment (Bandura, 1977). Bandura theorized that although a person may *know* what achievements will result in particular outcomes, if they do not *believe* that they have the abilities to carry out these achievements, the knowledge is useless (1977). Self-efficacy is not just knowledge of what one should do; it is the belief in one's capability to do it. Teacher self-efficacy "is an important motivational construct that shapes teachers' thoughts, behaviors, and

emotions” (Poulou, Reddy, & Dudeck, 2019, p. 27). If teachers do not believe in their own capability to implement effective teaching strategies, this lack of self-efficacy will impact their teaching practices.

Decades of research going back to the 1970s demonstrate the connection between teacher self-efficacy and a number of teaching constructs, including student achievement outcomes, teacher motivation, teacher behavior in the classroom, burnout, quality of teaching, and passion for teaching (Poulou, Reddy, & Dudeck, 2019). Teachers with high self-efficacy can create positive learning environments, have effective classroom management, design high-quality lesson plans, and deliver meaningful instruction. (Woolfolk, Rosoff, & Hoy, 1990). Greater teacher efficacy also results in closer student relationships and more effective student interactions that enable positive student behavior (Hamre, Pianta, Downer, & Mashburn, 2008). A meta-analysis of 165 studies of teacher-self efficacy across 40 years found that “studies imply that teachers with an assured sense of self-efficacy set the tone for a high-quality classroom environment by planning lessons that advance students’ abilities, making efforts to involve them in a meaningful way, and effectively managing student misbehavior” (Zee & Koomen, 2016). If teacher self-efficacy has such a strong impact on a teacher’s ability to plan instruction and manage behavior, it stands to reason that a teacher’s level of self-efficacy in supporting students of trauma will also influence the degree to which they create trauma-sensitive classrooms.

The body of research on teacher self-efficacy supports the concept that training and equipping teachers to respond to students with trauma-based behaviors increase teachers’ confidence and belief in their own ability to support these students in the classroom appropriately. “Building teacher’s sense of self-efficacy by helping them develop positive beliefs



about their ability to effectively teach all students is a necessary component of teacher education programs and teacher learning in the school context” (Lancaster, 2021, p. 1). Increasing teachers’ beliefs that they can effectively support their students with traumatic backgrounds and behaviors begins with providing training on how trauma affects students and how to intervene or respond when a student acts out or shuts down in the classroom (Rahimi, Liston, Adkins, & Nourzad, 2021). However, studies show that pre-service teachers receive little training in classroom management, let alone how to support children from trauma (Begeny & Martin, 2006).

Rahimi, Liston, Adkins & Nourzad (2021) outlined a study of 500 teachers in southeast Georgia to measure educators’ knowledge of trauma-informed practices and their awareness of students who had experienced trauma. In their review of the literature, “three overarching themes emerged: teachers lack knowledge related to the impact of trauma and trauma-informed practice; they are not prepared to implement trauma-informed classroom management; and they affirm a need for trauma-informed professional development” (Rahimi, Liston, Adkins & Nourzad, 2021, p. 75). The finding of these authors’ study showed that teachers felt “woefully unprepared to deal with the social and emotional needs” of many of their students (p. 81). The authors conclude that to combat the crisis of student trauma, it is imperative to ensure that pre-service and established teachers are equipped necessary knowledge and information. “We need to be sure that teachers master a repertoire of classroom strategies and trauma-sensitive interventions that address students’ emotional, social, and educational needs” (Rahimi et al., 2021, p. 82).

A lack of understanding about the root of student misbehavior in traumatized students can have serious negative consequences. Sometimes, traditional, punitive measures taken by schools can exacerbate symptoms of trauma and impede student learning (Wolpov, Johnson, Hertel, &

Kincaid, 2009). “Individual perceptions, including biased thinking, and lack of knowledge and awareness, can impact teachers’ responses to students, and their subsequent student outcomes (Crosby, Somers, Day & Nash, 2016, p. 66). When teachers misinterpret student misbehavior as defiance or disrespect or make wrong assumptions about the student, it can lead to poor, ineffective responses to students, thus diminishing teacher self-efficacy even further. Helping teachers understand why students of trauma act out or shut down can lead to self-efficacy as teacher perceptions of students directly impact teacher responses to students (Crosby et al., 2016). When teachers know how to respond effectively to students acting out or shutting down, it builds their confidence in themselves to work with students of trauma.

Sarah Lancaster of Fort Hays State University examined several recent studies of the effect of trauma-informed training. A 2019 study compared emotional support, classroom organization, and instructional support in classrooms where teachers had received comprehensive trauma-informed services training with teachers who had not. Schools in this study were part of Trauma Informed Elementary Schools (TIES), “a program designed to bring early intervention and trauma-informed services to children who display symptoms of chronic stress or trauma in the classroom setting” (Lancaster, 2021, p. 1). In addition to teacher training, these schools were paired with a licensed therapist available to consult with teachers, observe students, and model caregiver management. Classrooms that participated in TIES showed significant improvements in emotional support, classroom organization, and instructional support than classrooms that did not participate (Lancaster, 2021). The other studies in Lancaster’s analysis included the STRIVE model (Supportive Trauma Interventions for Educators) and the TIPE model (Trauma-Informed Positive Education). While these models varied in approach, all three focused on teacher training

and embedded teacher support, and all three showed significant positive effects on teachers' ability to care for and teach students of trauma. Lancaster's analysis of these studies concluded that teacher efficacy (through appropriate training and ongoing support) is the missing piece to trauma-informed classroom interventions (2021). Though the research is promising, Lancaster believes that future research on the subject "should consider measuring educator's self-efficacy to deliver trauma-informed practices, at baseline and post-intervention. Relevant interventions should include a variety of trauma informed education and concrete strategies aimed at increasing educator self-efficacy (Lancaster, 2021, p. 4). If teacher self-efficacy is the basis for implementing appropriate, research-based trauma interventions, leaders in education must provide teacher training and ongoing, embedded support in schools that would lead to an increase in teacher efficacy.

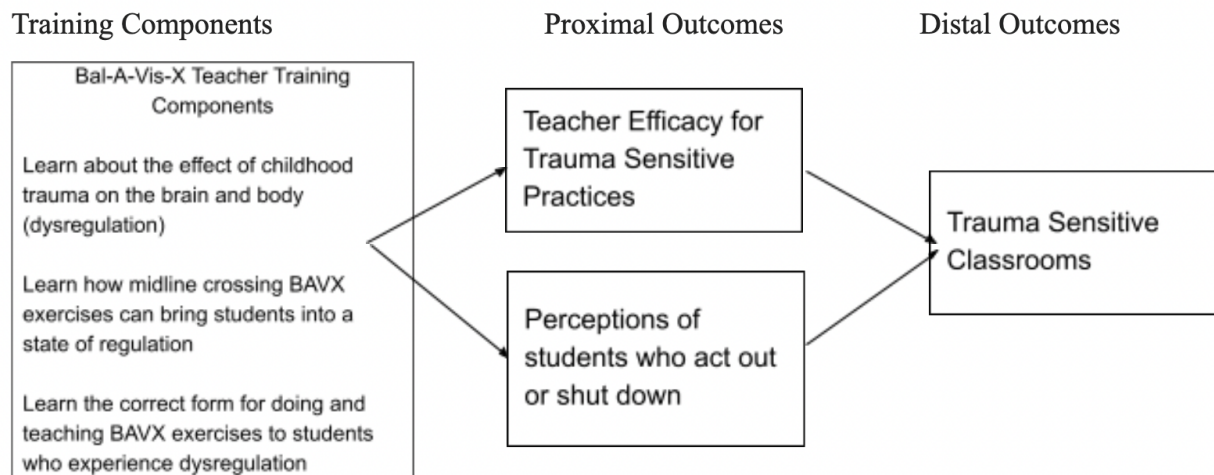
### **Trauma-Informed Bal-A-Vis-X Training Theory of Action**

In TIB training, educators are provided a basic understanding of how childhood trauma affects the developing brain and body and causes various states of dysregulation. Participants learn how midline crossing exercises can help students regain a state of regulation and body/brain integration. Finally, they learn how to properly execute and teach TIB exercises to help students experiencing dysregulation in school. There are two proximal outcomes of TIB training. The first one is that TIB training would increase teacher efficacy by helping teachers establish a knowledge base about childhood trauma and to give them practical exercises they can do with students or teach students to do when dysregulated. TIB aims to equip educators to implement trauma-sensitive practices in their classrooms so students can acquire the self-regulation skills to manage their emotions and behaviors. This knowledge base and practical interventions are

foundational components of teachers' increasing confidence in themselves to provide appropriate support for students in their classroom who have suffered trauma.

**Figure 1**

***Theory of Action for Trauma-Informed Bal-A-Vis-X Training***



The second proximal outcome of TIB training is its effect on teacher perceptions of student behavior. Understanding how trauma can manifest in children in the form of “acting out” or “shutting down” behaviors can help teachers change their perception of why students engage in these types of conduct. Teacher perceptions of student behavior can have a direct effect on how they respond to a student who is acting out or shutting down, so it is important for them to understand how the traumatized brain responds with a flight, fight or freeze response. When teachers recognize these negative behaviors as possibly stemming from childhood trauma, the hope is that their responses to students will change from punitive to supportive.

If TIB can help teachers change their perceptions of students of trauma and increase teacher self-efficacy in helping these students, it will lead to the distal outcome of creating trauma-sensitive classrooms. Instead of only punishing students for acting out or shutting down

behaviors, schools would offer appropriate support and interventions, creating trauma-sensitive schools and classrooms where students can learn the self-regulation skills they need to focus in the classroom, build healthy relationships, and learn.

It should be stated that while the research on Hubert's Bal-A-Vis-X has been promising, it is not clear whether or not Bal-A-Vis-X is as effective as it purports to be. Further studies are needed to determine the behavioral and academic benefits of TIB. As stated before, there are no published studies on TIB. If this study of TIB indicates possible positive behavioral and academic effects on children of trauma, it could suggest that it is a useful school-based intervention for children experiencing dysregulation due to toxic stress. While leading childhood trauma experts have not directly endorsed TIB, it is aligned with the fundamental principles of research-based trauma-informed practices and is worth further study. Due to the complexities of how toxic stress may impact children differently, TIB is unlikely to be a simple and quick fix for children of trauma. However, within a greater framework of trauma-informed support within a school setting, TIB may be an intervention that helps children develop the ability to reintegrate their brains and bodies, creating space to learn self-regulation skills and regain a sense of self-efficacy necessary to overcome the effects of trauma. While this study does not seek to measure the effectiveness of TIB on student behavior or academics, it does attempt to determine how TIB training impacts teacher efficacy and teacher perceptions of students to create trauma-informed classrooms.

## CHAPTER IV: METHODS

### **Introduction**

This evaluation study was conducted in Norman Public Schools, a 6A school district in central Oklahoma. Participants were comprised of NPS educators, including classroom teachers, resource teachers, specials teachers, paraprofessionals, and administrators. The participants were asked to complete a survey to gather their perceptions of student behavior, their responses to student behavior, and their self-reported level of understanding of how to teach students who have experienced trauma. The study explored the learning experiences of teachers who attended TIB training and teacher perceptions of students who act out or shut down in the classroom. It also investigated whether teachers who had attended TIB training reported greater self-efficacy and used more trauma-informed strategies compared to other teachers who had not attended this training or had attended a different trauma training.

### **General Description of the Design**

To answer the first research question “What learning experiences do teachers receive in TIB training?” the researcher collected qualitative data during TIB training. Observational notes were taken about what was taught over the two days of training sessions and synthesized into a narrative. Understanding what trainees specifically learned about trauma was helpful to the interpretation of the survey data collected from these teachers, especially when comparing their responses to those who had not had the training or attended a different trauma training.

To answer the remaining research questions (EQ3-EQ5), this evaluation study was set up as an ex post facto design to compare the group means of those who had attended TIB training with those who had no previous training or those who had other types of trauma training. It was

not a true experiment where participants were randomly assigned to attend TIB training or not, but rather an evaluation of TIB training in the context of Norman Public Schools. The independent variable in this study was teacher self-reported trauma training history, whereas the dependent measures involved teacher responses to several scales: Teacher Perceptions of Student Behavior (TPSB), Teaching Traumatized Students (TTS), and Teacher Response to Student Behavior (TRSB).

### **Samples**

Two groups of educators completed the survey used in this study. The first group was a cohort of educators who attended TIB training in the summer of 2021. A total of 16 participants completed the survey after receiving TIB training. Most of the participants worked with early childhood or elementary students, although one worked at the middle school level and one worked across all levels. This demographic information tells us that of those to attended TIB training, most were special education or classroom teachers, most were caucasian, and all of them were women. All participants held a bachelor's or master's degree.

The survey was also sent out to all NPS educators in the early Fall, of 2021. A total of 214 NPS educators participated in the survey. This survey was identical to the one given to the TIB trainees, except it also asked whether or not the participant had ever received trauma training (of any kind) in the past. Of these 214 participants, 173 had received some kind of trauma training either in pre-service experience, within or outside of the district. 41 of the 214 had not had any previous trauma training. 54 participants worked with early childhood children, 104 worked with elementary students, 49 worked at the middle school level, and 50 worked with high schoolers. Some educators worked with multiple levels, so they fell into more than one

category. Over half of the participants were classroom teachers. A large majority were Caucasian, female, and had a bachelor's or master's degree. See Appendix A for additional demographic information.

### **Procedure for Qualitative Study**

The purpose of this study was to evaluate the impact of Trauma-informed Bal-A-Vis-X in Norman Public Schools. Therefore, it was important to understand the components of the TIB training that the district provided, especially since a comparison was being made between the TIB-trained group and the group that had received any other prior trauma training. The researcher attended the two-day TIB in July of 2021, collecting qualitative information in the form of detailed observational notes. These notes included all the information that the TIB trainer shared with the participants, including the impact of trauma on childhood development, current research on trauma-informed interventions, and Dr. Bruce Perry's neurosequential model of intervention, as well as how TIB aligns with the Perry's NME model. Observational notes were also collected on how the trainer taught participants to correctly execute Bal-A-Vis-X exercises to help students regain a state of regulation.

### **Procedure for Quantitative Study**

The survey given to all the participants was derived from a 2016 study conducted by Crosby, Sommers, Day, and Baroni. The aim of these researchers was to develop a tool that could measure the comfort level of educators in dealing first-hand with students of trauma. The study resulted in three instruments: the Teacher Perceptions of Student Behavior scale (TPSB), which assesses educator perceptions of student behavior; the Teaching Traumatized Students scale (TTS), which measures teacher awareness of trauma; and the Teacher Response to Student



Behavior (TRSB), which gauges teacher responses to student behavior. Citing a lack of measurement tools to assess educator readiness in working with students of trauma, the research team created these three complementary scales to fill that gap (Crosby et al., 2016). They initially developed these assessment tools for use with academic staff who work with students in juvenile residential facilities, residential treatment programs, and therapeutic schools, where there is a high percentage of students who have experienced trauma (Crosby et al., 2016). However, these scales can also be used to measure teacher efficacy in working with students of trauma in a regular school setting.

To develop the scales, Crosby et al. conducted a rigorous review of literature on childhood trauma and collaborated with trauma-trained experts and school administrators to create a list of concepts “related to the target constructs of school staff perceptions of, awareness of, and responses to student trauma” (2016). The research team differentiated questions related to students who “act out” or externalize behaviors and students who “shut down” or internalize behavior. “Acting out” behaviors include being disruptive, argumentative, loud, threatening, etc., while “shutting down” behaviors include not responding when prompted, withdrawing, putting head down, etc. (Crosby et al., 2016). They found that teachers reported different perceptions of and responses to these behavior sets, which led to the creation of the two independent subscales. The team then took those concepts and created scales for school staff perceptions, awareness, and instructional responses (Crosby et al., 2016). The team administered the survey to the participants and analyzed the results in SPSS using frequencies and descriptive statistics. They conducted an exploratory factor analysis to analyze the survey data. Crosby et al. explain that the “findings demonstrate adequate psychometric properties, indicating that these measures may be

potentially useful for helping researchers, program directors, and academic personnel gain greater understanding of the school environment for traumatized students” (2016, p. 69.) The following is a description of each scale.

The TPSB or Teacher Perceptions of Student Behavior scale (see Appendix B) is designed to collect data on “school staff assumptions about student behavior and student motives” (Crosby et al., 2016). Participants answered questions to report how often they perceived particular student motives for shutting down and acting out using a five-point scale, 1=never, 2=sometime/less than half of the time, 3=often/about half of the time, 4=most of the time/more than half of the time, 5=always. To interpret the scores, Crosby and the research team considered “higher scores on each subscale represent greater sensitivity to trauma in staff perception of students, where staff were more likely to attribute student behavior to trauma-related factors” (2016, p. 67). Lower scores may indicate a lower sensitivity to student trauma. TPSB scale included two subscales, one for students who act out and one for students who shut down. Cronbach’s alpha for the 8-item TPSB acting out subscale was .842, while alpha for the 8-item TPSB shutting down subscale was .834. Both of these subscale reliabilities were greater than the commonly used threshold of .70 for ‘acceptable’ reliability.

The TTS, or Teaching Traumatized Students scale, (see Appendix B), was used to measure teacher self-efficacy for working with children with trauma in the current study. This measure is comprised of statements that focus on “actions of school staff that display overall knowledge and efficacy with traumatized youth” (Crosby, 2016, p. 67). Participants are asked to indicate their level of agreement with statements of belief about The same five-point scale was used: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree. The research team

considered teachers with “higher scores representing greater overall awareness of student trauma and trauma-related educational needs” (Crosby, 2016, p. 67). Higher scores on the TTS scale indicate that the teacher has a greater understanding of and/or awareness of trauma effects on students since greater levels of understanding and awareness are foundational to building teacher efficacy in working with students of trauma. Cronbach’s alpha for the TTS scale was .906, indicating very good reliability.

The TRSB or Teacher Response to Student Behavior scale (see Appendix B) collects data on how teachers and staff respond to students who are demonstrating “acting out” and “shutting down” behaviors. It is comprised of two sets of 8 questions similar to the student behaviors as defined in the TPSB scale. “Participants reported how often they utilize particular responses to students acting out and shutting down behavior using a five-point scale, 1=never, 2=sometime/less than half of the time, 3=often/about half of the time, 4=most of the time/more than half of the time, 5=always. Higher scores on this scale represent greater usage of trauma-sensitive instructional practices with students, while lower scores indicate less usage (Crosby, 2016, p. 67). Underutilization of trauma-informed strategies may indicate that the teacher lacks knowledge, skills, or self-efficacy for supporting students of trauma. The TRSB included two subscales, one for responding to students who act out and one for students who shut down. For the TRSB acting out subscale, Cronbach’s alpha was .857; for the TRSB shutting down subscale, it was .882.

## **Procedure and Survey Administration**

The survey was administered to a cohort of Norman Public School educators who had volunteered to attend a two-day summer training over TIB in the summer of 2021. Participants completed the survey prior to training to obtain pre-training results. The same participants were asked to complete the survey a few weeks after training was completed to obtain post-training results. The same survey was sent to all Norman Public Schools educators at the beginning of the 2021 school year. The survey was identical to the one given to the Bal-A-Vis-X training participants, except it asked whether the educator had previously attended any type of trauma training. Participants could indicate if they received trauma training in pre-service, at the site level, at the district level, or outside of the district. These indicators were used to distinguish between those with prior trauma training and those without.

## **Data analyses**

To address EQ 1 (“What learning experiences do teachers receive in trauma-informed BAVX training?”), I used the observational notes collected from the TIB training and organized them linearly to create a narrative account of the training experience of the participants. To address EQ 2-4, I performed a series of one-way ANOVA’s aimed at comparing the teacher groups varying in trauma training experience (i.e., no prior training, prior training but non-TIB, TIB) on the abovementioned measures of self-efficacy (for working with traumatized students), productive attributions for students exhibiting acting out and shutting down behaviors, and productive responses to students exhibiting acting out and shutting down. Each time a significant omnibus main effect of training experience was observed, I followed up that analysis to identify

possible pairwise mean differences using Tukey's post hoc tests. All significance tests were computed assuming  $\alpha=.05$ . All statistical analyses were performed using IBM SPSS Version 28.

## CHAPTER V: RESULTS

The qualitative data collected during TIB training sessions and quantitative data collected in the survey were analyzed to answer the four research questions in this study. This chapter is an explanation of the data points, tests, and results for each research question. I begin with an overview of my qualitative findings based on my sample of n=16 participants who participated in the summer 2021 training. Next, I proceed to analyze teacher differences in self-efficacy and perceptions and responses to students who ‘shut down’ or ‘act out.’ Each set of results provided below is organized by evaluation question, with only the first question being addressed based on the qualitative data.

### **Qualitative findings**

The first question (What learning experiences do teachers receive in trauma-informed BAVX training?) was answered using observational notes during Trauma-Informed Bal-A-Vis-X training that took place over two days in the summer of 2021. The training was open to and optional for all NPS educators. This section will detail what was taught in that training and how it may be useful to the educators who attended. It was led by a certified Bal-A-Vis-X trainer affiliated with Bal-A-Vis-X, Inc. In this training, participants were introduced to the history of how Bal-A-Vis-X. They learned that Bill Hubert developed it as a response to students who were struggling with fine and gross motor coordination, emotional regulation, and academic learning.

The trainer provided an overview of how childhood trauma affects brain development and how impeded brain development affects the ability to process information. All Bal-A-Vis-X training greatly emphasizes how sensory processing, such as visual and auditory input, can be shut down when students are under stress, depending on how well their brain hemispheres work

together. They explain that trauma students can have even greater impedance due to dysfunctional stress response systems. When students struggle to take in visual or auditory information, they can get lost and seem not to understand or seem non-compliant. Participants learned about Dr. Bruce Perry's research and his neurosequential model of trauma intervention. They heard how patterned, predictable, rhythmic movement could help bring the brain and body into an integrated state and help the brain hemispheres better communicate.

Trainees were then taught about Nadine Burke-Harris's research on childhood toxic stress (Burke Harris, 2018; Burke Harris, 2020). They learn that in addition to the original ACE study, other traumatic events are now part of the ACEs: discrimination, neighborhood violence, homelessness, foster care, recurring bullying, recurrent medical procedures, loss of a critical caregiver, deportation, juvenile detention, and physical or emotional abuse from a boyfriend or girlfriend. This expands a teacher's understanding of the many root causes of trauma response in students. They learned that students with four or more ACEs are 32 times more likely to struggle behaviorally or academically.

Educators in TIB training learned that stress is necessary for any type of learning; however, it has to be *tolerable* stress. When children experience tolerable stress, they learn resilience. The trainer explained that Bal-A-Vis-X and TIB exercises allow children to experience tolerable stress in a safe, relational context. As children learn the exercises, their brains are challenged with something new. The adult working with the child on these TIB exercises provides structure and direction with nurture and support. As students progress through increasingly complex exercises, they get to experience working through tolerable stress, helping them bring healing to their dysregulated stress response systems. Participants learned about

mindfulness as a proven intervention for trauma. They were taught that mindfulness provides a respite from trauma triggers and toxic stress since it focuses on the process, not the action or experience. The trainer explained that when you are doing TIB exercises, you cannot drift your focus away from the exercises, and when you are that focused, you can block out trauma triggers.

Once these foundational components were taught, the trainer began to teach participants how to execute the TIB exercises. The TIB exercises consist of specific ball-bouncing patterns that are clustered in sets of six. The sets become progressively challenging and require greater concentration. The exercises consist of bouncing the ball in front of you, to the left, to the right, to the left and right, and from left to middle to right and right to the middle to the left. Counting the number of repetitions is critical, and if you miscount or do not catch the ball, you start over with the exercise from the top. The trainer explained that students who learn this sequence of exercises could continue to progress to more complex exercises. Once learned, it can be done independently. A teacher could allow a student to step into the hall or in a quiet spot in the room and do the exercises as a brain break or when the student feels emotionally dysregulated. The goal is that after completing these exercises, the student would be able to return to the lesson or activity, regulated and ready to learn.

Overall, TIB training participants received strong foundational knowledge of how trauma affects brain development in children and how trauma may impact student behavior and ability to focus and learn. Teachers and staff were provided with training on how to facilitate midline-crossing Bal-A-Vis-X exercises that would help a dysregulated student regain a state of calm, reintegrating their brain and body.



## Quantitative Findings

Means and standard deviations for each group on each of the dependent measures are provided in Table 1 below. Throughout the remainder of the discussion of my findings, I will be referencing the means in this table.

**Table 1**

Dependent variable	No prior training N=41		Prior training (non-TIB) N=173		TIB training N=16	
	Mean	SD	Mean	SD	Mean	SD
Teacher perceptions (positive attributions) for acting out	2.93	0.91	2.96	0.84	3.2	0.83
Teacher perceptions (positive attributions) for shutting down	2.87	0.94	2.94	0.86	3.29	0.86
Teacher self-efficacy	3.23	0.91	3.85	0.86	3.92	0.71
Positive responses toward acting out	3.19	1.2	3.57	1.11	3.9	1.02
Positive responses towards shutting down	3.02	1.22	3.62	1.14	3.88	0.95

**EQ2: Do teachers who receive TIB training vary in their perceptions of students acting out and shutting down behaviors compared with teachers who had other prior trauma training and those who had no training?**

This question was answered using data collected in the Teacher Perception of Student Behavior (TPSB) Scale, designed to capture information about motives teachers assign to acting out and shutting down behaviors in students. I performed a one-way ANOVA comparing the three groups of teachers varying in amount/type of prior trauma training on the measures of their

perceptions of acting out and shutting down. With respect to the acting out dependent measure, the mean for the TIB-training group (Mean = 3.2) was the largest, followed by the prior-training group (Mean = 2.96), followed by the no-training group (Mean = 2.93). Based on the one way ANOVA, there were significant between-group differences in perceptions of acting out as a function of prior trauma training  $F(2,227)=16.32, p<.001$ . Using Cohen's (1988) standards for judging effect size [0.01 (small); 0.06 (medium); 0.14 (large)], the magnitude of the observed effect ( $\eta^2=.126$ ) can be described as moderate to large. Tukey's post hoc tests revealed significant pairwise mean differences in their perceptions of students who act out between those in the no-training group and the TIB-trained group ( $p<.001$ ). This finding indicates that teachers who had received TIB training scored significantly higher on perceptions of acting out than those who had received no training. There was no significant difference between teachers in the no-training group and prior-training group ( $p=.913$ ).

With respect to the shutting down dependent measure, the mean for the TIB-trained group (Mean = 3.29) was the largest, followed by the prior-training group (Mean = 2.94), followed by the no-training group (Mean = 2.87). The one-way ANOVA revealed a significant effect of training on teacher perceptions of students who shut down [ $F(2,227)=17.79, p <.001$ ]. The effect size for this analysis can be described as large ( $\eta^2=.14$ ). Tukey's post hoc tests revealed significant pairwise mean differences in their perceptions of students who shut down between those in the no-training group and the TIB-trained group ( $p<.001$ ). This finding indicates that teachers who had received TIB scored significantly higher on perceptions of acting out than those who had received no training. There was no significant difference between teachers in the no-training group and prior-training group ( $p=.453$ ). To see the mean scores and standard

deviations for each measure in the TPSB scales, see Appendix C.

**EQ3: Do teachers who have received TIB training report higher self-efficacy for working with students of trauma compared to other teachers who had other trauma training or no training?**

This question was answered by analyzing results from the Teaching Traumatized Students (TTS) scale. This scale asked participants to rate their level of agreement with statements of belief about their own knowledge of the trauma effects and awareness of students of trauma-sensitive school supports. Higher ratings of agreement with the statements in this scale would indicate a greater understanding of the effects of childhood trauma as well as a greater understanding of the impact of the school environment on traumatized students. I performed a one-way ANOVA comparing the three groups of teachers varying in amount/type of prior trauma training on the measures of their self-efficacy for supporting students of trauma. With respect to the acting out dependent measure, the mean for the TIB-training group (Mean = 3.92) was the largest, followed by the prior-training group (Mean = 3.85), followed by the no-training group (Mean = 3.23). Based on the one way ANOVA, there were significant between-group differences on perceptions of acting out as a function of prior trauma training [ $F(2, 227) = 17.11, p < .001$ ]. The effect size for this analysis can be described as fairly large ( $\eta^2 = .131$ ). Tukey's post hoc tests revealed significant pairwise mean self-efficacy for supporting students of trauma between those in the no-training group and the TIB-trained group ( $p < .001$ ). This finding indicates that teachers who had received TIB training scored significantly higher on self-efficacy than those who had received no training. There was no significant difference between teachers in the prior-training group and TIB-trained group ( $p = .95$ ). To see the mean scores and standard

deviations for each measure in the TTS scales, see Appendix C.

**EQ4: Do teachers who received trauma-informed BAVX training report higher utilization of trauma-sensitive strategies in their classrooms than other teachers who had other prior trauma training or no training?**

To evaluate the usage of trauma-sensitive strategies, data were analyzed from the Teacher Response to Student Behavior (TRSB) Scale. Survey participants were asked to measure the frequency with which they used trauma-informed practices in their classrooms when students demonstrated acting out and shutting down behaviors. Higher scores indicate greater usage. I performed a one-way ANOVA comparing the three groups of teachers varying in amount/type of prior trauma training on the measures of their usage of strategies with students who were acting out and shutting down. With respect to the acting out dependent measure, the mean for the TIB-training group (Mean = 3.9) was the largest, followed by the prior-training group (Mean = 3.57), followed by the no-training group (Mean = 3.19). Based on the one way ANOVA, there were significant between-group differences in strategy usage with students who act out as a function of prior trauma training [ $F(2, 227) = 7.54, p < .001$ ]. The effect size for this analysis can be described as medium ( $\eta^2 = .062$ ). Tukey's post hoc tests revealed significant pairwise mean differences in their usage of trauma-informed strategies with students who act out between those in the no-training group and the TIB-trained group ( $p = .003$ ). This finding indicates that teachers who had received TIB training scored significantly higher on strategy usage with students who were acting out than those who had received no training. There was no significant difference between teachers in the prior-training group and the TIB-trained group ( $p = .286$ ).

With respect to the shutting down dependent measure, the mean for the TIB-trained group

(Mean = 3.88) was the largest, followed by the prior-training group (Mean = 3.62), followed by the no-training group (Mean = 3.02). The one-way ANOVA revealed a significant effect of training on teacher usage of strategies with students who shut down,  $[F(2, 227) = 3.13, p=.046]$ . The effect size for this analysis can be described as small ( $\eta^2=.032$ ). Tukey's post hoc tests revealed no significant pairwise mean differences in their perceptions of students who shut down between those in the no-training group and the TIB-trained group ( $p=.071$ ). There was no significant difference between teachers in the no-training group and the prior-training group ( $p=.078$ ). This finding indicates that for strategy usage with students who shut down, there was not a wide variety in the scores of those who attended TIB training and the other groups. To see the mean scores and standard deviations for each measure in the TRSB scales, see Appendix C.

## CHAPTER VI: DISCUSSION

### **Introduction**

Trauma-Informed Bal-A-Vis-X training was provided by Norman Public Schools as an opportunity for educators to gain knowledge and understanding about students of trauma and equip them with practical strategies that could help mitigate the effects of trauma with students in the classroom. While the primary focus of the training was to teach participants how to properly complete the mid-line crossing exercises of Bal-A-Vis-X and use these exercises with students, a good portion of the training was dedicated to laying a foundational understanding of how trauma affects the developing brains of children, what constitutes trauma, and the importance of providing trauma-informed supports when these students act out or shut down at school. Although the district had invested time and money into providing this optional training for several years, no evaluation study had been conducted to determine whether TIB training resulted in more trauma-informed classrooms and was worth the continued investment. The data gathered from this evaluation study provided insight into how TIB training affected teacher perceptions of student behavior, teacher beliefs, self-efficacy in teaching students of trauma, and teacher responses (or strategies used) with students of trauma. Although limited in scope, the results of this study indicate that TIB had a positive influence on these three areas.

### **Teacher Perceptions of Student Behavior**

The TPSB scale measured the frequency with which teachers attributed certain motives for students acting out and shutting down in the classroom. It can be assumed that the more a teacher attributes student behavior to a possible trauma-related origin, the more sensitive they are to the effects of trauma on a student (Crosby et al., 2016). Those who had no trauma training

were less likely to consider student trauma experiences as reasons for student misbehavior than those who had TIB training. This makes sense because if a teacher lacks knowledge about how trauma triggers can put a student into a fight, flight, or freeze state, they may assume the student is simply being defiant, non-compliant, lazy, or uncaring. TIB trainees reported higher scores than those with prior trauma training, indicating that TIB training may be more effective at shifting teacher perspectives on student behavior than other district or school-provided trauma training.

It is worth noting some specific items in the TPSB scale that had greater differences in mean scores. TIB trainees were more likely to attribute acting out and shutting down to *reacting to something from the past* than those who had not done TIB training. This may indicate that TIB training influenced teacher understanding that past or early childhood trauma may continue to have an effect on student behavior, even if it took place a long time ago. TIB trainees reported higher scores for *reacting from a parental or other family visit* than non-trained teachers. A teacher would have to know their students well and be familiar with their living situations or home environments to attribute their behavior to this, indicating that TIB training may help teachers understand the importance of developing trusting relationships with students and families so they would feel comfortable sharing relevant, personal background information with the teacher. Those who attended TIB training also reported higher mean scores for *seeking attention* than those who had not. This may demonstrate that TIB-trained educators are more likely to see students of trauma as needing relationship, connection, and safety. If teachers only view acting out and shutting down behaviors as acts of defiance or purposeful disruption, they are likely to respond with punitive rather than supportive measures. This is why teacher

perceptions of student behavior matter and why it is important for educators to understand possible trauma-related motives for student misbehavior.

### **Teacher Beliefs and Self-Efficacy for Teaching Students of Trauma**

The TTS, or Teaching Traumatized Students scale, was designed to measure teachers' levels of agreement with statements of beliefs about their personal knowledge, understanding, and self-perceived capacity to teach students of trauma. The results from the TTS scale showed that there was a significant difference between teachers who had not received any trauma training and those who had been trained. However, there was not as much of a difference between the composite scores of those who had prior trauma training and those who attended TIB. The item analysis provided more detailed information. In the first six of the eight items, the TIB-trained teachers reported higher levels of self-efficacy than the group that had received other trauma training, indicating that the TIB trainees were more knowledgeable about how trauma affects behavior and more able to recognize trauma responses in students. TIB-trained teachers self-reported being more considerate of trauma effects as they designed strategies for student learning, and they had higher scores for knowing how to handle difficult behavior related to traumatic responses.

The fact that teachers who attended TIB training rated higher levels of agreement tells us that they felt more knowledgeable, confident, and equipped to teach students of trauma than their peers who had not attended. Those with prior trauma training reported higher ratings than those with no training, but in this particular study, it appears that TIB training was the most effective at helping teachers gain greater self-efficacy for teaching students of trauma. Since we do not know what type or quality of trauma training other teachers might have had, it is difficult to speculate



why TIB-trained teachers reported higher levels of self-efficacy. Previous trauma training provided by Norman Public Schools (with the exception of TIB) has been mostly informational, giving an overview of the mental health needs of children and some ideas on how to support students who may be struggling as a result of trauma. One possible theory for why TIB may be more effective is that in addition to learning about the effects of trauma on behavior, teachers learn a specific intervention (TIB) that they can use with students who are dysregulated. Being equipped with a strategy that meets the criteria for being a trauma-informed intervention could be a key difference in helping teachers feel a greater sense of self-efficacy for working with these students.

### **Teacher Responses to Student Behavior**

The TRSB scale measured how often teachers self-report usage of certain trauma-informed strategies. Those with no training reported lower scores than those with prior trauma training and TIB training, but there was less of a difference between the prior training group and the TIB-trained group. It makes sense that teachers who have received some kind of trauma training would be better equipped to respond to students who struggle with behavior. Allowing students to have breaks, providing wait time, and having sensory outlets and safety zones are all ways to support students who are dysregulated. Trauma-trained teachers were also more likely to use structured, interactive, and interpersonal games and adjust lessons to accommodate students, either most of the time or always. High usage of these types of strategies indicates that these teachers are more willing to be flexible and adaptive to student needs, providing ways for students to be successful by putting in needed support. It shows an understanding that when students are dysregulated and either acting out or shutting down, it may mean that they are

experiencing a trauma response and are in need of a caring adult to help them regain a sense of calm and regulation. Although TIB training provides a specific set of midline-crossing exercises that can aid in bringing about regulation, it is clear that other types of trauma training can result in greater usage of trauma-informed strategies in the classroom.

### **Impact of TIB Training**

The literature on childhood trauma tells us that adverse childhood experiences disrupt brain development and emotional regulation, which in turn affect student behavior which affects learning (Perry, 2013; van der Kolk, 2013). When teachers do not understand that trauma can cause students to demonstrate acting out and shutting down behaviors in the classroom, they may attribute these behaviors to defiance and respond with punishments, possibly resulting in the retraumatization of the child (Dutil, 2020; Michail, 2011). The results of this study show that when teachers were provided with TIB training, their perceptions of the motives behind student behaviors shifted, causing them to attribute negative behaviors to possible trauma origins more often than those who have not received trauma training and those who had prior trauma training. This is a significant result because it shows that TIB was more effective at impacting teacher perceptions of student behaviors than other trauma training teachers received either in or out of the Norman Public Schools district. If shifting teacher perspectives of students is a key component of creating trauma-sensitive schools (Thomas et al., 2019), TIB training appears to have been an effective tool for altering teacher perceptions of student motives for behavior.

In regards to teacher self-efficacy for teaching students of trauma, the literature is clear that teacher capacity for supporting students of trauma is enhanced when they are equipped with knowledge of how trauma affects student behavior and learning and provided with practical

interventions and strategies to support students (Alsic, 2012; Berger, 2019; Brunzell, 2019; Herrenkohl, 2019). The results of this study showed that the TIB-trained teachers indicated greater levels of self-efficacy than non-trained teachers. However, there was not a significant difference between the self-efficacy scores of those who attended TIB training and those who had other prior trauma training, indicating that TIB training may not stand out as being any more or less effective than other trauma training in Norman Public Schools. Trauma-informed teachers are more likely to have positive attitudes toward trauma-informed care and are more motivated to implement strategies that support struggling students (Robertson et al., 2021). It appears that a variety of trauma training approaches can positively impact teacher self-efficacy, and TIB in Norman Public Schools was one of these effective trauma training experiences.

In the literature on trauma-informed practices in schools, we find that many trauma-informed approaches are based on helping students learn self-regulation skills so they can manage their emotions, reactions to stimuli, and behaviors (Brunzell et al., 2019). It takes deliberate practice to teach students how to develop these missing self-regulatory skills, and various trauma-informed interventions include ones that are sensory-based, involve movement or midline crossing, or are mindfulness-based (Fraser et al., 2017; Melillo, 2009; Shapero et al., 2018). TIB exercises involve all of these components, but this study did not seek to determine whether or not TIB-trained teachers were actually utilizing the TIB exercises or if the TIB exercises helped students gain self-regulation skills. Rather, it sought to determine if TIB training resulted in greater overall usage of trauma-informed strategies. Teachers who attended TIB training in Norman did not report significantly more usage of trauma-informed strategies than teachers who had other prior trauma training, indicating that TIB is as effective as other training

at increasing teacher usage of supportive strategies. Overall, TIB training in Norman Public Schools did significantly improve teacher perceptions of students who act out or shut down and was just as effective as other non-specific trauma training on increasing teacher self-efficacy and teacher usage of trauma-informed strategies.

This study sought to understand the impact of TIB training on Norman Public School teachers. The theory of action for TIB training posited that NPS teachers would learn about the effects of childhood trauma, learn how midline crossing exercises help students with self-regulation, and how to teach students to perform these exercises correctly. The qualitative data collected during the TIB training showed that these were indeed the key components of the training. Having learned these components, the expected proximal outcomes for TIB-trained teachers were that they would have an increased sensitivity to understanding why students act out or shut down, and that they would have a greater sense of self-efficacy for working with students of trauma. The findings of this study showed that these proximal outcomes were met. TIB-trained teachers showed higher mean scores in self-efficacy and teacher perceptions than those who had other prior trauma training or no training. The distal outcome in the theory of action was that an increase in teacher perceptions and teacher self-efficacy would lead to more trauma-sensitive classrooms as measured by the usage of trauma-informed interventions. It is unclear whether the distal outcome was met since there was not much of a difference between the mean scores of those who had prior training and those who attended TIB.

It is worth exploring why TIB trained teachers did not show a greater usage of trauma-informed strategies than those who had had other trauma training. The data clearly show that some trauma training, whether it was preservice, inservice, or TIB training, does have an impact

of the usage of trauma interventions in the classroom. While the TIB group reported higher usage of structured, interactive, and interpersonal games than the other groups, their usage of other strategies was not higher than those with other trauma training. I expected to see higher usage scores across the board among the TIB-trained group. This could be attributed to a couple of things. First of all, the TIB-trained group (N=16) was relatively small compared to the no-training group (N=41) and the prior-training group (N=173). A larger sample size may have provided more reliable results. Another possible reason for the similar scores between the TIB group and the prior training group could be that NPS has done a relatively good job of providing adequate trauma training to its teachers. NPS requires principals and counselors to provide yearly training on the mental health needs of students. The presentation slides are provided to principals and counselors, and it is their job to deliver this yearly training to all faculty and staff. It may be that this yearly training does provide NPS teachers with a solid foundational knowledge of trauma and how to support students who struggle with behavioral issues as a result of chronic or acute stress. Since the survey was sent out to teachers early in the school year of 2021, it could be that the teachers who reported that they had not received any trauma training were new to the district and had not yet received this training from their principal or counselor.

### **Implications**

The results of this evaluation study show that in Norman Public Schools, teachers who attended TIB were more sensitive to possible trauma-related motives for student behavior, had greater self-efficacy for teaching students of trauma, and reported using more trauma-informed strategies to help students. These findings indicate that TIB was effective at promoting trauma-informed classroom practices in NPS and would be worthy of continued investment by the

district. Although no evaluation study had been previously conducted by the district to determine the effectiveness of Bal-A-Vis-X, NPS had collected data on usage of Bal-A-Vis-X and found that despite having trained a few hundred people over the years, implementation of the intervention was relatively low. District leaders were unsure whether they should continue to pay for this training due to low usage. This evaluation study, however, sheds light on the fact that even though not all teachers who attended TIB or Bal-A-Vis-X training use the intervention consistently, it appears that attending this training leads to more trauma-sensitive classrooms. These findings should be taken into consideration by district leaders as they continue to develop their approach to helping schools become more trauma-informed and trauma-sensitive.

The district would also benefit from exploring how TIB training fits in with the existing structures for delivering trauma training to faculty and staff. Norman Public Schools offers yearly training for all staff on the mental health needs of students, yet 41 of the participants who completed the surveys indicated they had never received trauma training. These could be newly-hired teachers who had not yet had the training prior to taking the survey, but it could also indicate a gap between what the district is trying to accomplish with trauma training and the actual outcomes. Since TIB training yielded overall higher mean scores on teacher perceptions, teacher self-efficacy, and teacher responses to students of trauma, the district should consider how TIB training could be utilized to provide faculty and staff with a deeper understanding of trauma effects and practical interventions to utilize with students.

Crosby, Thomas, and Vanderhaar's (2019) study of trauma-informed practices in schools over the past twenty years revealed three key features among the frameworks that they researched. Their meta-analysis showed that overall, trauma-informed practices in schools

emphasized building knowledge and understanding of the nature and impacts of trauma, shifting perspectives and building emotionally healthy school cultures, and self-care for educators (Crosby et al., 2019). TIB does not focus on self-care for educators, but it does build knowledge and understanding of trauma effects (as evidenced by the data from the TTS survey), and it does shift teacher perspectives (as evidenced by the TPSB survey data). The increase of knowledge about how trauma affects the brain and shift in perspective on why a student may be struggling with behavior can lead to increased use of trauma-informed practices among staff, especially if they are equipped with practical interventions and strategies they can use with their students.

The purpose of this study was to evaluate TIB training in Norman Public Schools and provide data that could be used to inform future decisions about offering TIB training in the district. Since TIB training appears to be more effective than other trauma training at changing teacher perceptions of students and is least equally effective at increasing teacher self-efficacy and usage of trauma-informed strategies, it is recommended that the district continue to offer TIB training. The teachers who participated in this study came from varying backgrounds and pre-existing knowledge about childhood trauma. Norman Public Schools has made a dedicated effort to provide yearly trauma training to teachers in all of its schools, but the quality of this training is often dependent on the expertise of the person presenting the information. On the other hand, TIB training is delivered by a certified Bal-A-Vis-X trainer who has extensive knowledge of the program and can provide a consistent training experience. Other teachers who indicated they had prior trauma training could have received training outside of the district or in preservice training, or they could have had a combination of these prior training experiences. While we cannot control for a person's prior trauma training experience, we can conclude that trauma

training does make a positive difference in creating trauma-sensitive schools. This study shows that TIB should continue to be a component of NPS's overall approach to being a trauma-informed, trauma-sensitive district.

As part of NPS's multi-tiered systems of support framework, I recommend that TIB training be offered regularly. TIB is different from other trauma training because it does offer a very practical intervention that teachers can utilize to help students self-regulate when they become angry, upset, or shut down. While other trauma training may also offer various options for interventions, TIB exercises provide a sensory-integrated, movement-based, midline crossing mindfulness intervention that aligns with Perry and van der Kolk's research on effective trauma healing strategies (Perry, 2013; van der Kolk, 2013). However, it is important to remember that if teachers only learn the TIB exercises in isolation without receiving the foundational instruction on how adverse childhood experiences affect students, the training will likely not be as effective. It is the combination of foundational knowledge and practical intervention that will positively impact teachers to create trauma-sensitive schools.

### **Limitations**

There were limitations to the study. Since it was meant to be an evaluation study of TIB training, it only applies to the specific context of educators in Norman Public Schools. These study findings are not meant to generalize to greater contexts or populations. Selection bias is a threat to the external validity of this study. Teachers who chose to attend a 2-day trauma training in the summertime are likely to have already a sensitivity to students of trauma (or at least a desire to improve their efficacy) and may have already been implementing some trauma-informed practices in their classrooms prior to this training. Selection bias could also play a part



in the survey sent to teachers at large. The survey title, “Teaching Students of Trauma,” could have influenced who chose to complete it. Those who already perceived themselves as equipped to teach students of trauma may have participated in the survey at a greater rate than those who did not. A threat to the internal validity of this study is the possibility of confounding variables. The population of teachers who attended TIB training could have previously received other trauma training that influenced their perceptions of and responses to students of trauma who demonstrate misbehavior. It is very likely that a teacher who would chose to attend a summer trauma intervention training would have previously attended one or more trauma trainings due to their interest in the subject. Despite these limitations, the data show a clear trend that teachers who attended TIB training in Norman Public Schools report more trauma-sensitive perceptions of students who act out or shut down and greater utilization of trauma-sensitive practices in the classroom. An experimental study on the impact of TIB on teacher perceptions, strategies, and self-efficacy with students of trauma would likely yield results that could be generalized to other populations and contexts. Another topic for further research would be to run an experiment to determine if TIB usage improves self-regulatory abilities in students.

### **Conclusion**

The mission of Norman Public Schools is “To prepare and inspire all students to achieve their full potential” ([www.normanpublicschools.org](http://www.normanpublicschools.org)). There is no question that in order to achieve this mission, all NPS schools must be equipped with the knowledge and skills needed to meet the diverse needs of their students, including a great many of them who have suffered early childhood, acute, or ongoing trauma, and toxic stress. They are in every classroom; students who have had their brains and nervous systems impacted by traumatic experiences need caring adults

who are able to help them learn how to self-regulate their emotions (van der Kolk, 2014). The ability to self-regulate improves executive functioning skills, which in turn helps students be more successful in school (Perry, 2013).

Teaching is already a complex job, and when students in the classroom are acting out or shutting down due to trauma triggers, it makes the job of a teacher even more difficult, especially if they lack the self-efficacy to teach these children (Rahimi, Liston, Adkins, & Nourzad, 2021). By providing high-quality trauma training to teachers that includes information about how trauma affects brain development, how trauma can manifest in student behavior, and how to respond to students with appropriate support and interventions, school districts can improve teacher-self efficacy for teaching students of trauma. If schools simply punish students who struggle with self-regulation, they will continue to compound the trauma these students have already suffered (Dutil, 2020). When schools provide meaningful, appropriate support and interventions and safe, nurturing relationships with adults, students of trauma can start to learn the self-regulation and executive functioning skills necessary to reach their full potential.

## References

- Alisic, E. (2012). Teachers' perspectives on providing support to children after trauma: A qualitative study. *School Psychology Quarterly*, 27(1), 51–59.
- Allman, K. L., & Slate, J. R. (2011). School discipline in public education: A brief review of current practices. *International Journal of Educational Leadership Preparation*, 6(2), 1–8. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ973838>
- Anand, K. S., & Dhikav, V. (2012). Hippocampus in health and disease: An overview. *Annals of Indian Academy of Neurology*, 15(4), 239–246. <https://doi.org/10.4103/0972-2327.104323>
- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B.D., Dube, S. 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>
- Anderson, J. (2016). The impact of sensory-based movement activities on students in general education. *School of Occupational Doctoral Theses*, 2, 1–62. Retrieved from: [http://soundideas.pugetsound.edu/drot\\_theses/2](http://soundideas.pugetsound.edu/drot_theses/2)
- Anderson, K.N., Swedo, E.A., Trinh, E., Ray, C., Krause, K.H., Verlenden, J.V., Clayton, H.B., Villaveces, A., Massetti, G.M., Niolon, P.H. (2022). Adverse childhood experiences during the COVID-19 pandemic and associations with poor mental Health and suicidal

behaviors among high school students — Adolescent behaviors and experiences survey, United States, January–June 2021. *MMWR Morb Mortal Wkly Rep* 2022;71, 1301–1305.

DOI:

Australian Childhood Foundation (2010). *Trauma Informed Practice in Schools*. Retrieved from:

[www.childhood.org.au](http://www.childhood.org.au)

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>

Begeny, J. C., & Martens, B. K. (2006). Assessing pre-service teachers' training in empirically-validated behavioral instruction practices. *School Psychology Quarterly*, 21(3), 262–285.

<https://doi.org/10.1521/scpq.2006.21.3.262>

Berger, E. (2019). Multi-tiered approaches to trauma-informed care in schools: A systematic review. *School Mental Health*, 11(4), 650-664.

Berger, E., Bearsley, A., & Lever, M. (2021). Qualitative evaluation of teacher trauma knowledge and response in schools. *Journal of Aggression, Maltreatment & Trauma*, 30(8), 1041-1057.

Bruce, J. (2008). Early adverse care, stress neurobiology, and prevention science: Lessons learned. *Prevention Science*, 14(3), 247–256. <https://doi.org/10.1007/s11121-012-0354-6>

- Brunzell, T., Stokes, H., & Waters, L. (2019). Shifting teacher practice in trauma-affected classrooms: Practice pedagogy strategies within a trauma-informed positive education model. *School Mental Health, 11*(3), 600-614.
- Buchele Harris, H., Cortina, K. S., Templin, T., Colabianchi, N., & Chen, W. (2018). Impact of coordinated-bilateral physical activities on attention and concentration in school-aged children. *BioMed Research International, 2018*. <https://doi.org/10.1155/2018/2539748>
- Burke, N. J., Hellman, J. L., Scott, B. G., Weems, C. F., & Carrion, V. G. (2011). The impact of adverse childhood experiences on an urban pediatric population. *Child Abuse and Neglect, 35*, 408– 413. <https://doi.org/10.1016/j.chiabu.2011.02.006>
- Burke Harris, N. (2020). A conversation with CA Surgeon General Nadine Burke Harris, M.D., about ACEs and toxic stress. Retrieved from:  
<https://www.cmadoes.org/newsroom/news/view/ArticleId/48955/A-conversation-with-C-A-Surgeon-General-Nadine-Burke-Harris-M-D-about-ACEs-and-toxic-stress>
- Burke Harris, N. (2018). *The deepest well: Healing the long term effects of childhood adversity*. Houghton Mifflin Publishing.
- Centers for Disease Control and Prevention. *The association between school based physical activity, including physical education, and academic performance*. Atlanta, GA: U.S. Department of Health and Human Services; 2010.

- Chafouleas, S. M., Koriakin, T. A., Roundfield, K. D., & Overstreet, S. (2019). Addressing childhood trauma in school settings: A framework for evidence-based practice. *School Mental Health, 11*(1), 40–53. <https://doi.org/10.1007/s12310-018-9256-5>
- Child and Adolescent Health Measurement Initiative (2020). *Adverse childhood experiences 2017-2018*. Data Resource Center for Child and Adolescent Health supported by the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau (MCHB). Retrieved from <https://mchb.hrsa.gov/data/national-surveys>
- Cole, S., O'Brien, J., Gadd, M., Ristuccia, J., Wallace, D., Gregory, M. (2005). *Helping Traumatized Children Learn: Supportive school environments for children traumatized by family violence*. (2005). Retrieved from: [www.massadvocates.org](http://www.massadvocates.org).
- Crosby, S., Sommers, C., Day, A., Baroni, B. (2016), Working with traumatized students: A preliminary study of measures to assess school staff perceptions, awareness, and instructional responses. *Journal of Therapeutic Schools and Programs, 1*(8), 59-70. DOI: 10.19157/jtsp.issue.08.01.08
- Cummings, K., Addante, S., Swindell, J., & Meadan, H. (2017). Creating supportive environments for children who have had exposure to traumatic events. *Journal of Child and Family Studies 26*(10), 2728-2741.
- De Bellis, M. D. (2005). The psychobiology of neglect. *Child Maltreatment, 10*(2), 150–172. <https://doi.org/10.1177/1077559505275116>

- Delaney-Black, V., Covington, C., Ondersma, S., Kordstrom-Klee, B., Templin, T., Ager, J., Janisse, J., & Sokol, R. (2002). Violence exposure, trauma and IQ and/or reading deficits among urban children. *Journal of Developmental and Behavioral Pediatrics*, 23(4), 291. <https://doi.org/10.1097/00004703-200208000-00040>
- DeSchiffart, S. (2017). *Supporting struggling learners through bal-a-vis-x exercises* (master's thesis). Vancouver Island University, Nanaimo, Canada.
- Dutil, S. (2020). Dismantling the school-to-prison pipeline: A trauma-informed, critical race perspective on school discipline. *Children and Schools*, 42(3), 171–178. <https://doi.org/10.1093/cs/cdaa016>
- Fraser, K., MacKenzie, D., & Versnel, J. (2017). Complex trauma in children and youth: A scoping review of sensory-based interventions. *Occupational Therapy in Mental Health*, 33(3), 199–216. <https://doi.org/10.1080/0164212X.2016.1265475>
- Gould, K. (2019). The vagus nerve: Your body's communication superhighway. *LiveScience*. Retrieved from: <https://www.livescience.com/vagus-nerve.html>
- Hamre, B. K., Pianta, R. C., Downer, J. T., & Mashburn, A. (2008). Teachers' perceptions of conflict with young students: Looking beyond problem behaviors. *Social Development*, 17(1), 115–136.
- Henkel, G., Lott, D., & Griffin, D. (2010). *The 12 Core Concepts for Understanding Traumatic Stress Responses in Children and Families*. Retrieved from: <http://learn.nctsn.org/>.

- Herrenkohl, T. I., Hong, S., & Verbrugge, B. (2019). Trauma-informed programs based in schools: Linking concepts to practices and assessing the evidence. *American Journal of Community Psychology*, 64(3–4), 373–388. <https://doi.org/10.1002/ajcp.12362>
- Hert, H. (2016). *Effects of using antecedent physical activity with disabled students on their engaged behaviors during an academic task* (master's thesis). Eastern Oregon University, La Grande, Oregon.
- Hubert, B. (2023). *About Bal-a-vis-X*. Retrieved from <https://www.bal-a-vis-x.com/about.htm>
- Hubert, B. *Bal-A-Vis-X: Rhythmic balance/auditory/vision/eXercises for brain and brain-body integration*. Bal-A-Vis-X, Inc., Wichita, KS: 2001.
- Hubert, B. (2007). *Resonance: Elise and other Bal-A-Vis-X Stories*. Wichita, Kansas, Bal-A-Vis-X, Inc.
- Hunter, R. G., Gray, J. D., & McEwen, B. S. (2018). The neuroscience of resilience. *Journal of the Society for Social Work and Research*, 9(2), 305–339. <https://doi.org/10.1086/697956>
- Ko, S. J., Ford, J. D., Kassam-Adams, N., Berkowitz, S. J., Wilson, C., Wong, M., Brymer, M. J., & Layne, C. M. (2008). Creating trauma-informed systems: Child welfare, education, first responders, health care, juvenile justice. *Professional Psychology: Research and Practice*, 39(4), 396–404. <https://doi.org/10.1037/0735-7028.39.4.396>
- Kuyken, W., Weare, K., Ukoumunne, O. C., Vicary, R., Motton, N., Burnett, R., Cullen, C., Hennelly, S., & Huppert, F. (2013). Effectiveness of the mindfulness in schools programme: Non-randomised controlled feasibility study. *British Journal of Psychiatry*, 203(2), 126–131. <https://doi.org/10.1192/bjp.bp.113.126649>



Mader, J. (2021). We know how to help young kids cope with the trauma of last year, but will we do it? The Hechinger Report, October 25, 2021. <https://hechingerreport.org/we-know-how-to-help-young-kids-cope-with-the-trauma-of-the-last-year-but-will-we-do-it/>

McIntyre, E.M., Baker, C.N., Overstreet, S. (2019). Evaluating foundational professional development training for trauma-informed approaches in schools. *Psychological Services*, 16(1), 95-102.

Mezzacappa, E., Kindlon, D., & Earls, F. (2001). Child abuse and performance task assessments of executive functions in boys. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 42(8), 1041–1048. <https://doi.org/10.1111/1469-7610.00803>

Michail, S. (2011). Understanding school responses to students' challenging behaviour: A review of literature. *Improving Schools*, 14(2), 156–171. <https://doi.org/10.1177/1365480211407764>

Montroy, J. J., Bowles, R. P., Skibbe, L. E., McClelland, M. M., & Morrison, F. J. (2016). The development of self-regulation across early childhood. *Developmental psychology*, 52(11), 1744.

Norsworthy, F. (2020). *Trauma informed Bal-A-Vis-X: An illustrated booklet*. Bal-A-Vis-X Inc.

Olivier, E., Archambault, I., De Clercq, M. *et al.* Student self-efficacy, classroom engagement, and academic achievement: Comparing three theoretical frameworks. *J Youth Adolescence* 48, 326–340 (2019). <https://doi.org/10.1007/s10964-018-0952-0>

Perry, B.D. (2023). *Bruce D. Perry, M.D., Ph.D.* Retrieved February 20, 2023 from <https://www.bdperry.com/about>.

Perry, B.D., & Dobson, C. L. (2013). The neurosequential model of therapeutics as evidence-based practice. *Treating Complex Traumatic Stress Disorders in Children and Adolescents*, 249–260.

Perry, B.D., & Szalavitz, M. (2008). *The boy who was raised as a dog: And other stories from a child psychiatrist's notebook: What traumatized children can teach us about loss, love, and healing*. New York: Basic Books.

Perry, B.D., (2004). *NN core slides deck, 2020 best hits*. Retrieved from: [https://www.bdperry.com/\\_files/ugd/5cebf2\\_dd3a3ce4aef34d6794519f2418c9f043.pdf](https://www.bdperry.com/_files/ugd/5cebf2_dd3a3ce4aef34d6794519f2418c9f043.pdf)

Perry, B.D., (2009). *Intro to NMT, NN*. Retrieved from: [https://8888cf92-fc69-4812-b8a8-1049afbcc7cf.filesusr.com/ugd/5cebf2\\_f944e4b6a17e4ab0b48810163ef3e964.pdf](https://8888cf92-fc69-4812-b8a8-1049afbcc7cf.filesusr.com/ugd/5cebf2_f944e4b6a17e4ab0b48810163ef3e964.pdf)

Perry, B.D., (The ChildTrauma Academy). (2013) 1: *The Human Brain*, 2: *Sensitization and Tolerance*, 3: *Threat Response Patterns* [Video webcast]. In Seven Slide Series. Retrieved from <https://www.youtube.com/watch?v=uOsgDkeH52o>

Perry, B.D. (2020). *Neurosequential model core slides*. Retrieved from: [https://8888cf92-fc69-4812-b8a8-1049afbcc7cf.filesusr.com/ugd/5cebf2\\_6b9a260d654f4e3dbf0118dcbd971742.pdf](https://8888cf92-fc69-4812-b8a8-1049afbcc7cf.filesusr.com/ugd/5cebf2_6b9a260d654f4e3dbf0118dcbd971742.pdf)

- Perry, B.D. (2020). *Regulate, relate, reason (sequence of engagement): Neurosequential network stress & trauma series*. Retrieved from: <https://www.youtube.com/watch?v=LNUxy7FxEVk>
- Perzow, S. E. D., Petrenko, C. L. M., Garrido, E. F., Combs, M. D., Culhane, S. E., & Taussig, H. N. (2013). Dissociative symptoms and academic functioning in maltreated Children: A preliminary study. *Journal of Trauma and Dissociation*, 14(3), 302–311. <https://doi.org/10.1080/15299732.2012.736928>
- National Childhood Traumatic Stress Network, The. *About childhood trauma*. Retrieved February 10, 2023 from <https://www.nctsn.org/what-is-child-trauma/about-child-trauma>.
- Oehlberg, B. (2008). Why schools need to be trauma informed. *Trauma and Loss: Research and Interventions*, 8(2), Retrieved from [www.tlcinstitute.org](http://www.tlcinstitute.org)
- Oswald, D.R. (2010). *Effects of rhythmic behaviors on students' behaviors, emotions, and academic growth*, (master's thesis). Wichita State University, Wichita, Kansas.
- Robertson, H., Goodall, K., & Kay, D. (2021). Teachers' attitudes toward trauma-informed practice: Associations with attachment and adverse childhood experiences (ACEs). *The Psychology of Education Review*, 45(2), 62-75.
- Shapiro, B.G., Greenberg, J., Pedrelli, P., de Jong, M., Desbordes, G. (2018). Mindfulness-based interventions in psychiatry. *Focus (Am Psychiatr Publ)*, 16(1), 32-39.
- Sori, C. F., & Schnur, S. (2014). Integrating a neurosequential approach in the treatment of traumatized children: An interview with Eliana Gil, Part II. *The Family Journal*, 22(2),

251–257. <https://doi.org/10.1177/1066480713514945>

Stevens-Smith, D. A. (2016). Active bodies/active brains: Practical applications using physical engagement to enhance brain development. *Strategies*, 29(6), 3–7.

Surburg, P.R. & Eason, B. (1999). Midline crossing inhibition: An indicator of developmental delay. *Laterality*, 4(4), p. 333-343.

Taggart, L. (2019). *Proprioceptive Activities to Lower Stress Program*. (Dissertation). Arizona State University.

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. doi:10.1038/nrn.2016.111

Thomas, M. S., Crosby, S., & Vanderhaar, J. (2019). Trauma-Informed practices in schools across two decades: An interdisciplinary review of research. In *Review of Research in Education* (Vol. 43, Issue 1, pp. 422–452). SAGE Publications Inc. <https://doi.org/10.3102/0091732X18821123>

Tobin, M., Oldfield, J. (ed), & Australian Council for Educational Research (ACER). (n.d.). *Childhood trauma : developmental pathways and implications for the classroom*.

Udesky, L. (2020). *Lesson learned integrating ACEs science into health clinics: Staff first, then patients*. Retrieved from: <https://acestoohigh.com/2020/02/16/lesson-learned-integrating-aces-science-into-health-clinics-staff-first-then-patients/>

- van der Kolk, B. (2000). Posttraumatic stress disorder and the nature of trauma. *In Dialogues in Clinical Neuroscience* (Vol. 2, Issue 1, pp. 7–22). <https://doi.org/10.31887/dcms.2000.2.1/bvdkolk>
- van der Kolk, B. A. (2014). *The body keeps the score: Brain, mind, and body in the healing of trauma*. New York: Viking.
- Walkley, M.L., & Cox, L. (2013). Building trauma-informed schools and communities. *Children and Schools*, 35(2), 123-126.
- Watson-Grace, A., & Provident, I. (2020). Improving selective attention for all students with coordinative Bal-A-Vis-X movement breaks: A pilot study. *Journal of Occupational Therapy, Schools, and Early Intervention*. <https://doi.org/10.1080/19411243.2020.1769000>
- Woltering, S., & Shi, Q. (2016). On the neuroscience of self-regulation in children with disruptive behavior problems: Implications for education. *Review of Educational Research*, 86(4), 1085–1110. <https://doi.org/10.3102/0034654316673722>
- Woodard, R.J. & Surburg, P.R. (1999). Midline crossing behavior in children with disabilities. *Adapted Physical Activity Quarterly*, 16, p. 155-166.
- Woolfolk, A. E., & Hoy, W. K. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology*, 82, 81–91.
- Woolfolk, A. E., Rosoff, B., & Hoy, W. (1990). Teachers' sense of efficacy and their beliefs about managing student. *Teaching and Teacher Education*, 6(3), 137–148.

Wolpov, R., Johnson, M.M., Hertel, R., & Kincaid, S.O. (2009). The heart of learning and teaching: Compassion, resiliency, and academic success. Washington State: Office of Superintendent of Public Instruction (OSPI) Compassionate Schools.

Wright, A. (1997). *Neuroscience online: An electronic textbook for the neurosciences*. The University of Texas, McGovern Medical School.

Young, K. S., van der Velden, A. M., Craske, M. G., Pallesen, K. J., Fjorback, L., Roepstorff, A., & Parsons, C. E. (2018). The impact of mindfulness-based interventions on brain activity: A systematic review of functional magnetic resonance imaging studies. *Neuroscience and Biobehavioral Reviews*, 84 (2018), 424–433. <https://doi.org/10.1016/j.neubiorev.2017.08.003>

Zee, M. & Koomen, H. (2016). Teacher self-efficacy and Its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research*, 86(4), 981-1015. DOI: 10.3102/0034654315626801

## Appendix A

Figure A1. Demographic data of participants who attended Trauma-Informed Bal-A-Vis-X training

<b>Role</b>	<b>Percentage</b>
Classroom teacher	37.5%
Specialist	12.5%
Special Education	50.0%
Paraprofessional	0.0%
Adminstrator	0.0%

<b>Ethnicity</b>	<b>Percentage</b>
Caucasian	93.8%
Native American	0.0%
African American	6.3%
Hispanic	0.0%
Asian	0.0%
Multiple ethnicities	0.0%

<b>Gender</b>	<b>Percentage</b>
Female	100.0%
Male	0.0%
Nonbinary	0.0%

<b>Years of Experience</b>	<b>Percentage</b>
20 +	31.25%
15-19 years	12.5%
10-14 years	12.5%
5-9 years	18.8%
< 5 years	25.0%

<b>Education</b>	<b>Percentage</b>
High school	0.0%
Bachelor's	43.8%
Master's	56.3%
Ph.D or Ed.D	0.0%

Figure A2. Demographic data of participants from Norman Public Schools who did not attend TIB training

<b>Role</b>	<b>Percentage</b>
Classroom teacher	52.6%
Specialist	17.1%
Special Education	15.2%
Paraprofessional	10.0%
Adminstrator	5.2%



<b>Ethnicity</b>	<b>Percentage</b>
Caucasian	83.6%
Native American	4.7%
African American	2.8%
Hispanic	1.9%
Asian	0.50%
Multiple ethnicities	6.5%

<b>Gender</b>	<b>Percentage</b>
Female	88.8%
Male	9.8%
Nonbinary	1.4%

<b>Years of Experience</b>	<b>Percentage</b>
20 +	31.3%
15-19 years	14.0%
10-14 years	9.8%
5-9 years	21.5%
< 5 years	23.4%

<b>Education</b>	<b>Percentage</b>
High school	7.9%
Bachelor's	48.6%
Master's	41.1%
Ph.D or Ed.D	2.3%

## Appendix B

Figure B1. Teacher Perceptions of Student Behavior scale (*identical scale was used for teacher perceptions of students who shut down*)

<p><b>Acting Out refers to when students engage in behaviors such as the following: loud, argumentative, disruptive, threatening, etc. Students who ACT OUT in class are:</b></p>
<p><i>1=Never, 2=Sometimes/less than half of the time, 3=Often/half of the time, 4=Most of the time/more than half of the time, 5=Always</i></p>
<p>responding to change or transition</p>
<p>seeking attention</p>
<p>not feeling well physically (i.e. stomach ache, headache)</p>
<p>reacting to something from their past</p>
<p>feeling like the work is too difficult for them</p>
<p>fearing failure</p>
<p>reacting from a parental or other family visit</p>
<p>reacting to something that happened in their current living environment</p>

Figure B2. Teaching Traumatized Students scale

<b>Please indicate the level to which you agree/disagree with the following statements.</b>
<i>1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree</i>
Rewarding students helps change problematic behavior
I am aware of the effects of trauma on student behavior
I consider my students' experiences with trauma as I design strategies to engage students in learning]
I can identify traumatic responses in students
I am aware of aspects of the school environment that may affect students of trauma
I know how to handle difficult behavior related to traumatic responses in students
I understand how the brain is affected by trauma
I am mindful on how my verbal expressions (tone, language, sarcasm) impact a traumatized child
I am mindful of the way my body language and nonverbal expression impact a traumatized child

Figure B3. Teacher Responses to Student Behavior Scale (*identical scale was used for teacher response to students who shut down*).

<b>How much do you use the following teaching strategies for students who ACT OUT? 1=Never, 2=Sometimes, 3=Often, 4=Most of the time, 5=Always</b>
<i>1=Never, 2=Sometimes, 3=Often, 4=Most of the time, 5=Always</i>
I use frequent breaks
I deliberately use wait time (pauses) after giving a direction
I have sensory outlets available in the classroom (i.e. stress balls, play dough, etc.)
I use repetition and compromises in my interactions with students
I use structured, interactive, and interpersonal games in the classroom setting (music, ball toss, etc.)
I provide students access to a safety zone when needed
I adjust lessons in ways to accommodate students
I have physically rearranged the classroom as a method to address student behaviors

### Appendix C

Table C1. Mean Scores and Standard Deviations of Teacher Perceptions of Student Behavior

scale: Acting Out

<b>Acting Out refers to when students engage in behaviors such as the following: loud, argumentative, disruptive, threatening, etc. Students who ACT OUT in class are:</b>	<b>N=41</b>	<b>N=17 3</b>	<b>N=16</b>	<b>N=41</b>	<b>N=17 3</b>	<b>N=16</b>
<i>1=Never, 2=Sometimes/less than half of the time, 3=Often/half of the time, 4=Most of the time/more than half of the time, 5=Always</i>	<b>No Trainin g Mean</b>	<b>Trauma Trainin g Mean</b>	<b>TIB Trainin g Mean</b>	<b>No Trainin g SD</b>	<b>Trauma Trainin g SD</b>	<b>TIB Trainin g SD</b>
responding to change or transition	3.05	3.17	2.69	0.80	0.79	0.87
seeking attention	2.34	2.38	3.50	0.79	0.78	0.73
not feeling well physically (i.e. stomach ache, headache)	2.98	3.03	2.94	0.85	0.82	0.93
reacting to something from their past	2.80	2.78	3.13	0.87	0.85	0.81
feeling like the work is too difficult for them	2.95	3.01	3.19	1.00	0.88	0.91
fearing failure	2.90	2.98	3.19	0.94	0.85	0.75
reacting from a parental or other family visit	3.15	3.05	3.63	1.09	0.95	0.81
reacting to something that happened in their current living environment	3.27	3.26	3.31	0.90	0.82	0.80

Table C2. Mean Scores and Standard Deviations for Teacher Perceptions of Student

Behavior scale: Shutting Down

<b>Shutting Down refers to when students engage in behaviors such as the following: head on the desk, withdrawn, non-responsive to teacher prompting, etc. Students who SHUT DOWN are:</b>	<b>N=41</b>	<b>N=17 3</b>	<b>N=16</b>	<b>N=41</b>	<b>N=17 3</b>	<b>N=16</b>
<i>1=Never, 2=Sometimes/less than half of the time, 3=Often/half of the time, 4=Most of the time/more than half of the time, 5=Always</i>	<b>No Trainin g Mean</b>	<b>Trauma Trainin g Mean</b>	<b>TIB Trainin g Mean</b>	<b>No Trainin g SD</b>	<b>Trauma Trainin g SD</b>	<b>TIB Trainin g SD</b>
responding to change or transition	2.73	2.79	2.62	0.87	0.86	0.89
seeking attention	2.20	2.35	3.25	0.98	0.87	0.86
not feeling well physically (i.e. stomach ache, headache)	2.90	2.91	3.38	0.98	0.83	0.81
reacting to something from their past	2.90	3.00	3.56	0.98	0.82	0.73
feeling like the work is too difficult for them	3.20	3.30	3.38	0.78	0.83	0.62
fearing failure	3.10	3.20	3.00	0.97	0.96	0.97
reacting from a parental or other family visit	2.80	2.80	3.50	1.05	0.87	0.82
reacting to something that happened in their current living environment	3.10	3.20	3.63	0.88	0.82	1.15

Table C3. Mean Scores and Standard Deviations for Teaching Traumatized Students scale

Please indicate the level to which you agree/disagree with the following statements.	N=41	N=173	N=16	N=41	N=173	N=16
	No Training Mean	Trauma Training Mean	TIB Training Mean	No Training SD	Trauma Training SD	TIB Training SD
<i>1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree</i>						
1. Rewarding students helps change problematic behavior	3.24	3.52	4.19	0.97	0.87	0.66
2. I am aware of the effects of trauma on student behavior	3.37	3.99	4.06	0.73	0.83	0.57
3. I consider my students' experiences with trauma as I design strategies to engage students in learning]	3.15	3.88	4.13	0.96	0.83	0.62
4. I can identify traumatic responses in students	2.90	3.83	4.25	0.97	0.95	0.77
5. I know how to handle difficult behavior related to traumatic responses in students	2.83	3.46	4.25	0.87	0.86	0.77
6. I understand how the brain is affected by trauma	2.95	3.81	4.25	0.95	0.95	0.78
7. I am mindful on how my verbal expressions (tone, language, sarcasm) impact a traumatized child	3.75	4.19	3.50	0.77	0.75	0.63
8. I am mindful of the way my body language and nonverbal expression impact a traumatized child	3.63	4.15	2.69	1.02	0.8	0.87