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Critically Appraised Topic: The Use of Occupation-Based Sensory Intervention and Environmental Modification with School-Aged Children who have Experienced Trauma

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Focused Question

How does occupation-based sensory intervention, implemented with environmental modification, influence engagement in school activities for children (ages 5 to 18 years) who have experienced an adverse childhood experience (ACE)?

Case Scenario

There is a high and growing prevalence of adverse childhood experiences (ACEs) among school-aged children in the United States (Goddard, 2021; Herringa, 2017; Whiting, 2018; Willburn et al., 2022). In a survey conducted by the Center for Disease Control and Prevention (CDC), one in six adults reported experiencing four or more ACEs in their youth (CDC, 2019). ACEs encompass all types of childhood trauma and are defined as "potentially traumatic events that occur between the ages of 0 and 17 years that can have a lasting impact on the child" (CDC, 2019, p.1). For the purpose of this critically appraised topic paper, childhood trauma and ACEs will be used interchangeably, and school-aged children are defined as ages 5 to 18 years. School-aged children's experiences of trauma can occur in a variety of ways, including abuse, neglect, household dysfunction, and environmental stressors, among others (Goddard, 2021; Oey et al., 2019; Telman et al., 2016; Whiting, 2018; Wilburn et al., 2022). Across groups of children who experienced trauma, the exposure is higher among Black and Latinx children than white children, although income and socioeconomic status are higher risk factors than race or ethnicity (Lankford, 2019; Wilburn et al., 2022). Gender has also been identified as a factor in the number and types of ACEs experienced by a child (Haahr-Pedersen et al., 2020).

Stress responses caused by ACEs affect the child's brain development, which is associated with long-term difficulties involving physical, emotional, behavioral health, and cognitive functioning (Martin et al., 2017). Among these difficulties include challenges with "emotional regulation" and "threat reactivity" (Herringa, 2017, p. 69). Sensory deficits have also been commonly associated with experiences of trauma due to changes in brain development that impact sensory sensitivity, processing, and response (Goddard, 2021; Hiles Howard et al., 2020; Joseph et al., 2022; Oey et al., 2019; Whiting, 2018; Wilburn et al., 2022). Each of these trauma symptoms can lead to challenges in school-based occupations, such as education, social participation, and play (Lynch et al., 2020; Oey et al., 2019; Whiting, 2018). These challenges may go unnoticed due to the inconsistency of behaviors between the child's school and home environment, which poses the need to implement trauma-informed occupational therapy within the school system. Without addressing these sensory deficits experienced by school-aged children who have experienced trauma, the child's behaviors may continue to influence them and their occupational engagement throughout their lives.

When considering a theory, the model known as the Ecological Human Performance (EHP), founded by Winnie Dunn (2017), best aligns with the focused question. The EHP model is a multidisciplinary model that refers to tasks as behaviors that are utilized to complete a goal (Dunn, 2017). For the purpose of this critically appraised topic paper, the language of the occupational therapy profession will be utilized meaning that anything relating to a task will be referred to as an occupation. From the perspective of EHP, the child's performance range (Dunn, 2017) is influenced by their sensory processing and regulation in response to environmental factors (Dunn, 2017), which can either facilitate or hinder their engagement in school-based

occupations. Sensory-based approaches in occupational therapy utilize an "establish/restore" intervention strategy to enhance the child's sensory regulation and processing allowing for a wider range of activities they can engage in within the environment (Dunn, 2017). Through the "modify/adapt", "alter", and "create/promote" intervention strategies, the environmental factors can be adjusted based on the child's sensory needs (Dunn, 2017).

For the purpose of this critically appraised topic paper, the environmental aspects of the EHP model that will be discussed include the physical, social, and cultural contexts due to their role in producing and interpreting sensory stimuli the child interacts with in the school environment (Dunn, 2017). Within the physical environment, occupational therapists work with the child and interprofessional team members to adapt the school environments, such as the classroom, playground, and lunchroom based on the child's sensory needs. This interprofessional collaboration between team members is also essential for creating a consistent social environment to establish a routine and build a foundation for trusting relationships (Smith, 2022; Whiting, 2018). In terms of the cultural context, it is also important to take into consideration how the child's family culture, beliefs, and region of residence, among other factors, influence their perception of trauma as well as their behavioral responses to trauma such as how they express distress (Healthcare Toolbox, n.d.). These considerations are important in understanding the child's sensory needs and creating physical and social environments that are sensitive to their culture (Healthcare Toolbox, n.d.).

Purpose Statement

Children who have been exposed to trauma may develop sensory impairments, such as inadequate sensory processing and regulation when engaging in occupations within the school setting. Currently, there is a lack of evidence demonstrating the efficacy of sensory-based occupational therapy intervention with children who have experienced trauma. The purpose of this critically appraised topic paper is to describe the current evidence for utilizing sensory-based interventions, in combination with environmental modifications, to influence occupational engagement among school-aged children who have experienced adverse childhood experiences.

Methodology

An initial literature search was conducted from March 3, 2022, to March 8, 2022. Searches occurred on education, occupational therapy, and multidisciplinary databases. The databases searched included the Public/Publisher MEDLINE (PubMed), the Cumulative Index to Nursing and Allied Health Literature (CINAHL), American Journal of Occupational Therapy (AJOT), and Education Resources Information Center (ERIC). The following key terms were implemented to search the databases: "school-aged children," "children," "pediatric," "youth," "kids," "adolescents," "trauma," "abuse," "abused children," "mistreatment," "childhood trauma," " trauma informed care," "intervention," "occupational therapy," "occupation-based," " occupational performance," "therapy interventions," "sensory," "school-based interventions" and "sensory integration." To create a more defined search "AND" or "OR" were added between key terms to create search phrases. While searching for literature, articles that were not published in English and did not fit the population of school-aged children who had experienced trauma were excluded. The search was also limited to articles published between the years 2017 and 2022.

Types of Articles Reviewed

There were 34 articles reviewed in total and 17 were selected for further review. Of the 17 articles reviewed further, one article was a level I systematic and meta-analysis study (Hughes et al., 2017). The rest were level N/A (Fraser et al., 2017; Fraser et al., 2019; Goddard, 2021; Herringa, 2017; Hiles Howard et al., 2020; Holland et al., 2018; Joseph et al., 2021; Lankford, 2019; LeBel et al., 2010; Lynch et al., 2020; Martin et al., 2017; Ryan & Lane, 2017; Smith, 2020; Telman et al., 2016; Whiting, 2018; Wilburn et al., 2020). The articles reviewed were primarily theoretical and were written based on models and theories rather than published studies due to the limited number of experimental studies conducted on this topic. For this critically appraised topic paper, the theoretical articles were thoroughly reviewed and utilized to express the current evidence for sensory-based interventions and the effectiveness of implementing occupational therapy services for children with trauma in the school systems. Other resources reviewed included textbooks and government websites (CDC, 2019; Dunn, 2017). Supplemental searches were completed after the initial draft of the paper to expand on the cultural influences of trauma as well as specific intervention programs, resulting in 5 additional articles that were not factored into the total of the 17 articles originally selected for further review.

Synthesis

Impact of Trauma on Occupational Performance

Impact of Trauma on Child Brain Development

From a neurological perspective, adverse childhood experiences can have a significant impact on the development of the brain. Goddard (2021) and Whiting (2018) described how chronic stress in a developing brain impacts the ability to adequately regulate cortisol levels, leading to a state of constant elevation, also known as "trauma-related hyperarousal" (Whiting, 2018, p. 2). Increased amygdala reactivity has also been associated with exposure to trauma (Herringa, 2017). This is critical because the amygdala is the "emotional processing center" of the brain (Goddard, 2021, p. 147). Through the hyper-arousal state, caused by trauma and stress, the nervous system becomes overly sensitive to everyday experiences leading the amygdala to react and unnecessarily perceive environmental stimuli as threats (Goddard, 2021; Whiting, 2018). Herringa (2017) described these implications of trauma as part of the frontolimbic circuitry of the brain, leading to sensory and emotional regulation deficits. From a sensory integration and modulation perspective, Joseph et al. (2021) further elaborated on the impact of inadequate interpretations and responses to external stimuli within the child's physical environment, and their impact on engagement in social participation, education, and other school-based occupations. In terms of school-based occupations, it is also important to note the effects of trauma on other regions of the brain such as the hippocampus. It has been found that elevated cortisol levels have been associated with a reduction of gray matter in the hippocampus, leading to problems with memory storage and retrieval, which can negatively influence the child's general ability to learn (Goddard, 2021; Herringa, 2017; LeBel et al., 2010).

Long-Term Impact

If left untreated, trauma-related symptoms may have damaging impacts on occupational performance and overall health later in life (Hughes et al., 2017). Holland et al. (2018) described how childhood trauma symptoms can increase over time and dramatically alter the

developmental pathways throughout late adolescence and young adulthood. Some long-term health implications in individuals that had been exposed to multiple ACEs include obesity, diabetes, increased risk of alcohol abuse, mental health issues, and violence (Hughes et al., 2017). In addition to these health risks, Holland et al. (2018) described common sensory impairments among this population, such as impairments in sensory regulation and modulation. Chronic traumatic stress can pose implications for a child's sensory modulation as a result of their constant state of hyperarousal, delaying areas of neural development, and decreased ability to respond appropriately to sensory stimuli (Holland et al, 2018). In addition, research has identified difficulty developing productive relationships as a life-long implication of individuals who experienced childhood trauma (Smith, 2022). Studies of people who experienced childhood trauma have also recognized a correlation between multiple ACEs and negative impacts on their education and employment, often leading to poverty in adulthood (Hughes et al., 2017; Smith, 2022). Overall, the long-term effects of trauma emphasize the need for occupational therapy within the school system to prevent future negative health outcomes and promote engagement in occupations.

Impact on School Occupations

Even when in a safe physical environment, such as school, individuals may experience trauma-related symptoms or barriers that could impact the performance of school occupations (Lynch et al., 2020; Martin et al., 2017). Students exposed to traumatic experiences often have delays in sensory processing and regulation, which may produce deficits in academic performance, social participation, play, and overall school engagement (Lynch et al., 2020). Children who have experienced trauma can show deficits in "executive functions, including working memory, cognitive flexibility, and inhibitory control" (Smith, 2022, p. 2), which are all necessary skills to participate in the occupation of education. Goddard (2020) and Ryan and Lane (2017) addressed similar concerns such as difficulty with skill acquisition, memory, and disruptive and maladaptive behaviors in the classroom.

In addition to the impact of trauma on education, trauma-related symptoms due to atypical brain development are associated with a lack of social skills (Lynch et al., 2020; Whiting, 2018). These social deficits may be seen in the child's inability to regulate their anger and aggressive behavior (Whiting, 2018). Social interaction skills are important to possess during this stage of life to ensure optimal peer interaction during structured and unstructured classroom time (Whiting, 2018). Social interaction deficits also affect a child's ability to efficiently utilize peer interaction during the occupation of play, which is an essential aspect of social, emotional, and cognitive development in children (Smith, 2022).

These behavioral concerns in relation to engagement in school activities may interfere with a child's learning if overlooked by school faculty or misdiagnosed by healthcare professionals (Goddard, 2020; Ryan & Lane 2017). To prevent misdiagnosis, it is important for school faculty and caregivers to accurately recognize these behavioral concerns as they may be symptoms of a sensory deficit in response to trauma.

Current Interventions for Childhood Trauma

Sensory-Based Intervention

While there is little evidence of the efficacy of sensory-based interventions for children who have experienced trauma, this approach is emerging in the field of occupational therapy. Sensory-based approaches are also supported by evidence of the impacts trauma has on brain development and related sensory processing and sensory regulation issues (Herringa, 2017; Hiles; Holland et al., 2018; Howard et al., 2020; Joseph et al., 2021; LeBel et al., 2010). Much of the support for sensory-based approaches in occupational therapy comes from theoretical research. In a qualitative study utilizing interviews of experienced occupational therapists, two of the top three primary intervention approaches identified by the therapists involved sensory-based approaches: sensory integrative frames of reference, and a sensory modulation framework were chosen as primary interventions to discuss (Fraser et al., 2019). The other top approach focused on a developmental framework (Fraser et al., 2019). Similar to the interventions the therapists in this study identified, the majority of literature about sensory-based approaches to trauma-informed care take on a bottom-up approach (Fraser et al., 2017; Fraser et al., 2019; Joseph et al., 2021). The reason for this theoretical approach to intervention is due to the way in which trauma is processed on a somatosensory level, which needs to be addressed to help "the child tolerate and process sensory information" (p. 210) before utilizing a top-down approach that integrates these senses (Fraser et al., 2017).

Two specific programs have gained attention among scoping reviews of sensory-based approaches to trauma-informed care with children: the Sensory Motor Arousal Regulation Treatment (SMART) program and the Alert program (Fraser et al., 2017; Joseph et al., 2021). Both of these models are based on principles of Ayres sensory integration and can be used by occupational therapists to address the sensory challenges in the pediatric population who have experienced trauma (Fraser et al., 2017). The SMART program was designed to utilize sensorimotor activities and sensory integration to help children learn to regulate their emotions and states of arousal as well as process sensory information (Fraser et al., 2017; Joseph et al., 2021). In a quasi-experimental study conducted at two residential facilities serving youth who had experienced trauma, the SMART program was implemented with a control group receiving their usual treatment (Warner et al., 2014). Results of this efficacy study demonstrated that the SMART program could be particularly useful for youth who experience somatic problems, anxiousness, depressed mood, and hyperarousal associated with post-traumatic stress disorder as a result of the trauma they have experienced (Warner et al., 2014).

The Alert program is another sensory modulation program focusing on assisting children in learning how to manage their "alertness level" to fit the tasks or occupations they are engaging in (Whiting, 2018, p. 8). Joseph et al. (2021) described the three stages of the Alert program ("how does your engine run", "experimenting with methods to change engage speed", and "regulating engine speeds") through which children progress using sensorimotor activities to learn to regulate their emotions (p. 457). A pilot study of the effectiveness of the Alert program was conducted through occupational therapy implementation of the program with children ages 12-13 years old (Mac Cobb, 2014). The occupational therapists also trained teachers to utilize the language of the engine analogy in their classroom to further facilitate the program (Mac Cobb,

2014). Questionnaires completed by the participating students and teachers indicated that the activities to promote self-management strategies were considered to be relevant to the classroom and enjoyable to the students (Mac Cobb, 2014). The majority of the students also reported that they intended to continue using the strategies they learned from the program in the future (Mac Cobb, 2014). Through self and sensory regulation interventions, such as the Alert and SMART programs, children can learn to identify and understand their emotions and internal experiences (Holland et al., 2018). Overall, this understanding helps children learn how to regulate their behaviors as they cope with these experiences leading to greater occupational participation (Holland et al., 2018).

In addition to sensory-based interventions, the Virtual Hope Box is another resource that could potentially be utilized to facilitate coping strategies for children who have experienced trauma. It was initially created for veterans struggling with mental illness and suicidal ideation but has since been expanded to help any population who is at a higher risk for mental illness (Bush et al., 2017). The Virtual Hope Box aims to provide access to coping and stress management strategies for people of all ages (Bush et al., 2017). Due to the higher risk for developing mental health complications as a result of ACEs, the Virtual Hope Box could be a great resource for children who have experienced trauma (Hughes et al., 2017). While the use of this resource specifically for children who have experienced trauma has not been studied, it was identified as a potential resource in a session named "Conversations That Matter: Perceptions & Reflections on Trauma Sensitive Practices in OT" presented at the 2022 American Occupational Therapy Association INSPIRE Conference (Taggart, 2022).

Interprofessional Collaboration

Due to the complexities of childhood trauma, an interprofessional collaboration approach should be utilized. An interprofessional team within the school typically includes an occupational therapist, school psychologist, school counselor, social workers, school nurse, classroom teachers, caregivers, and administrators (Fraser et al., 2017; Joseph et al., 2021; Lynch et al., 2020; Ryan & Lane, 2017; Whiting, 2018). Each team member holds a key role in ensuring positive outcomes in the child's ability to engage in their occupations successfully. The occupational therapist provides direct intervention for sensory processing, as well as consults with the teacher to make appropriate recommendations for social and physical modifications and adaptations to the classroom environment (Lynch et al., 2020; Whiting, 2018). The teacher is often responsible for monitoring the progress of the child, implementing any environmental changes in the classroom, and reporting back to the therapist on how the sensory and environmental interventions are impacting the child's performance within the classroom setting (Lynch et al., 2020; Whiting, 2018). The teacher is also a key communicator between the caregiver and therapist in reporting any progress or difficulties the child is having (Lynch et al., 2020; Whiting, 2018).

Collaboration between interprofessional team members is a vital component in helping the child achieve their goals and reach their desired outcomes (Lynch et al., 2020; Whiting, 2018). This collaboration helps team members to implement comprehensive and cohesive approaches to intervention (Ryan & Lane, 2017). Consistency between professionals working with the child is especially important when using sensory-integration approaches in order to

implement consistent patterns of communication with the child to foster their development of new, more adaptive response patterns (Ryan & Lane, 2017). Children who have experienced trauma often have trouble trusting the people in their lives, and collaboration between interprofessional team members can help create cohesive routines for the child to promote feelings of safety and trust to build a foundation for the development of meaningful relationships (Lynch et al., 2020; Ryan & Lane, 201; Whiting, 2018). Understanding of the cultural implications on the child's communication style, perception of experiences, and self-expression should also be considered by the interprofessional team to determine how best to interact with the child and their family to foster a therapeutic relationship that will be most successful for the individual child (Healthcare Toolbox, n.d.).

Summary

Out of the 34 articles searched, 17 articles were chosen for further review. The articles included topics on children who have experienced trauma or ACEs, the impacts of trauma on brain development, sensory-based interventions, multidisciplinary approaches, and the impact of childhood trauma on school-based occupations. Supplemental searches were completed after the initial draft of the paper to expand on cultural factors of trauma as well as specific intervention programs, resulting in five additional articles. The following key points were found:

- Trauma has a significant impact on the brain development of a child. Some significant areas of abnormal development include the brain's inability to regulate cortisol levels, leading to a constant state of stress and hyperarousal (Whiting, 2018), and over-reactivity of the amygdala contributing to sensory processing and sensory regulation dysfunctions (Fraser et al., 2017; Fraser et al., 2019; Goddard, 2021; Herringa, 2017; Hiles Howard et al., 2020; Holland et al, 2018; Joseph et al., 2021; LeBel et al., 2010; Whiting, 2018; Wilburn et al., 2021).
- Changes in brain development as a result of trauma can have a great impact on engagement in school occupations. Children who have abnormal brain development due to trauma often show deficits in social skills, executive functions, memory, learning, and inhibitory control, all of which are necessary skills to obtain in a school environment (LeBel et al., 2010; Lynch et al., 2020; Smith, 2022; Whiting, 2018).
- Due to the impact of trauma on brain development leading to sensory processing and regulation deficits, the use of sensory-based intervention approaches has been supported to address these challenges to increase occupational engagement (Fraser et al., 2017; Fraser et al., 2019; Holland et al., 2018; Joseph et al., 2021; LeBel et al., 2010; Whiting, 2018).
- Interprofessional team collaboration is essential when working with children who have experienced trauma (Fraser, MacKenzie & Versnel, 2017; Joseph et al., 2021; Lynch et al., 2020; Ryan & Lane, 2017; Whiting, 2018). Effective communication between team members allows for the successful and positive implementation of environmental modifications and social support for the child (Fraser et al., 2017; Smith, 2022; Whiting, 2018).

In conclusion, this critically appraised topic paper aimed to review the existing literature regarding the use of occupation-based sensory intervention, implemented with environmental

modification, to promote occupational engagement for school-aged children who have experienced ACEs. It was found that sensory-based intervention and environmental modifications could be useful in promoting occupational engagement within the school system for children who have experienced trauma. While these findings were strongly supported by theoretical evidence, there remains a need for experimental research on this topic to determine the efficacy of these interventions.

Clinical Bottom Line

How does occupation-based sensory intervention, implemented with environmental modification, influence engagement in school activities for children (ages five to 18 years) who have experienced an adverse childhood experience (ACE)?

While there is literature that identifies the high and growing prevalence of adverse childhood experiences (ACEs) among school-aged children in the United States (CDC, 2019; Goddard, 2021; Hughes et al., 2017; Wilburn et al., 2022), there is little research evidence to support the efficacy of occupational therapy intervention among this population. ACEs encompass all types of childhood trauma and are defined as "potentially traumatic events that occur between the ages of zero and 17 that can have a lasting impact on the child" (CDC, 2019, p.1). For the purpose of this critically appraised topic paper, ACEs were used interchangeably with the term trauma, and the population was defined as school-aged children (ages 5 to 18 years) who have experienced some type of ACE.

It is important to recognize that adverse childhood experiences can have an impact on the physiological development of the brain and central nervous system (Goddard, 2021; Herringa, 2017; LeBel et al., 2010; Whiting, 2018). These developmental changes resulting from childhood trauma often lead to sensory deficits including inadequate responses to external stimuli due to inefficient sensory modulation. (Heringa, 2017; Joseph et al., 2021). Trauma-related sensory processing and regulation deficits cause barriers to a child's occupational performance of education, play, and social participation within the school setting as a result of inappropriate responses to sensory stimuli (Lynch et al. 2020).

While there is little evidence of the efficacy of sensory-based interventions with children who have experienced trauma, this is an emerging approach within occupational therapy that has sufficient theoretical evidence to support it. Currently, sensory-based interventions in occupational therapy utilize a bottom-up approach to address the child's sensory processing before integrating these senses through strategies to regulate their responses within occupations (Fraser et al., 2017). Two programs have been identified for potential use in occupational therapy intervention with children who have experienced trauma: the Sensory Motor Arousal Regulation Treatment (SMART) and the Alert programs (Fraser et al., 2017; Joseph et al, 2021). Each program focused on strategies for sensory regulation and understanding their own responses (Fraser et al., 2017; Holland et al., 2018; Joseph et al., 2021; Whiting, 2018).

To further analyze the impact that sensory-based interventions have on school-aged children who have experienced trauma, the model known as the EHP was utilized to explore the environmental factors that influence the child's performance in school-based occupations (Dunn, 2017). By taking into account the physical, social, and cultural environmental components of the EHP model within the school setting, occupational therapists can work with the student and

interprofessional team members to create an environment that increases the child's performance range in education, social participation, and play (Dunn, 2017).

In terms of the cultural context, studies have shown that childhood trauma is more prevalent among Black and Latinx minority groups when compared to White Americans (Lankford, 2019; Rodriquez et al., 2019; Wilburn et al., 2022). Although the prevalence is higher in minority groups, income and socioeconomic status tend to be greater risk factors than race or ethnicity regarding exposure to trauma (Lankford, 2019; Wilburn et al., 2022). Modifications to the physical and social environment can be made by using intervention strategies derived from the EHP model to modify/adapt and alter the context as well as create/promote facilitating contexts (Dunn, 2017). These modifications could provide a more diverse environment with opportunities for the child to engage in these occupations within their sensory needs. Using the intervention strategy of establish/restore derived from the EHP model, sensory-based interventions can be utilized along with environmental modifications to create opportunities to enhance the child's sensory regulation and processing, allowing for a wider performance range within the school environment (Dunn, 2017). Culture should also be considered in order to understand the child's perceptions of trauma as well as their communication style and expressions of emotions (Healthcare Toolbox, n.d.). Through this cultural understanding, professionals working with the child can use more effective communication styles to foster a trusting and safe social environment for the child to develop meaningful relationships (Healthcare Toolbox, n.d.).

Practical implications

The theoretical evidence that has been analyzed will be useful for identifying areas of further research and guiding the practice of occupational therapists in the school system. Some practical implications for occupational therapists to consider are described here:

- Whiting (2018) recommends incorporating interprofessional collaboration when utilizing a sensory-based approach in the school system. This promotes a consistent environment for the child to build a routine and establish positive relationships that will enhance the child's engagement in occupations of education, social interaction, and play (Whiting, 2018). Collaboration to modify the environment can also lead to positive outcomes in sensory modulation and integration (Whiting, 2018).
- Emphasizing the need for trauma-informed approaches within the school system may minimize triggers and help develop coping strategies for children who exhibit trauma-related symptoms. (Martin et al, 2017). To implement trauma-informed care, faculty within the school system should be trained to recognize the impact of trauma and when it may influence students' behavior throughout the day (Martin et al., 2017).
- The SMART program is an intervention strategy that utilizes sensorimotor activities and sensory integration to help children learn to regulate their emotions and process sensory information (Fraser et al., 2017; Joseph et al., 2021). In a study conducted by Warner et al. (2014), results demonstrated that the program could be particularly useful for children who are experiencing somatic problems, anxiousness, depressed mood, and hyperarousal associated with post-traumatic stress as a result of trauma.

- The Alert Program is an intervention program focused on sensory modulation and facilitates the child in managing their "alertness level" to fit the task or occupation they are engaging in (Whiting, 2018, p. 8). This program has 3 stages of learning to self-regulate, and utilizes an engine analogy to engage the children with a language they will understand and can apply to their everyday occupations (Joseph et al., 2021; Mac Cobb, 2014).
- The Virtual Hope Box is an app intended to help with self and emotional regulation that was initially designed for patients who are at risk for self-harm (Bush et al., 2017). The Virtual Hope Box has since been used in other populations, including children who have experienced trauma (Tagart, 2022). The app is available for free on any smart device to download (Bush et al., 2017). Once downloaded, a person can create a personalized hope box that contains different self-regulation and calming strategies, using personal photos and other artifacts (Bush et al., 2017).

The practical implications of incorporating interprofessional collaboration, emphasizing the need for trauma-informed approaches, utilizing the SMART and Alert programs, and utilizing the Virtual Hope Box app are all recommendations to improve the occupational participation of children who have experienced trauma.

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