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Addressing the Occupational Needs of Children with Post Traumatic Brain Injury in the School Setting

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Addressing the Occupational Needs of Children with Post Traumatic Brain Injury in the
School Setting

by

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A Scholarly Project

Submitted to the Occupational Therapy Department

of the

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in partial fulfillment of the requirements

for the degree of

Master's of Occupational Therapy

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Approval Page

This Scholarly Project Paper, submitted by Reghan Boldt and Madisyn Rick in partial fulfillment of the requirements for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and hereby approved.

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Faculty Advisor

4/09/2020

Date

PERMISSION

Title: Addressing the Occupational Needs of Children with Post Traumatic Brain Injury
in the School Setting

Department: Occupational Therapy

Degree: Master's of Occupational Therapy

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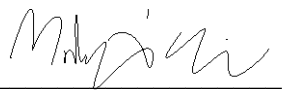
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-Reghan Boldt & Madisyn Rick

ABSTRACT

Introduction: The purpose of this project was to develop a guide for occupational therapy practitioners to use in the school setting for elementary-age children with mild traumatic brain injuries (mTBI), to increase services for these children, and to improve their back to school transition process.

Methodology: A literature review was conducted to understand the needs and barriers of elementary-age children who transition back to the school setting after experiencing a mTBI. Sources used in the process include online databases, textbooks, and government websites. The Person, Occupation, and Environment (PEO) model by Law and colleagues (1996) was selected to direct the development of the guide. The PEO model provides a unique transactive dynamic relationship that occurs when people engage in a given occupation over a period of time, which are important for these students (Law et al., 1996).

Results: Through the literature review the need for: (a) children to receive services, (b) education for professional involved, and (c) interventions for elementary-age children with mTBIs were emphasized children with a mTBI often to do not receive services when transitioning back to school (Gioia, Glang, Hooper, & Brown, 2016; McAvoy & Haarbauer-Krupa, 2019; Rivara et al., 2012). They are additionally faced with the barriers of inconsistent approaches with the transition process, limited information regarding their

injury is shared with the school, their teachers have limited knowledge on mTBIs, and they receive a lack of support with their educational demands (Gioia, Glang, Hooper, & Brown, 2016; McAvoy & Haarbauer-Krupa, 2019; Rivara et al., 2012). *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners* was developed to address the specific needs of elementary-age children with mTBIs in the academic setting. The guide provides direct intervention recommendations, consultation recommendations for teachers, and additional resources to use with the targeted population.

Conclusions: Following a student's transition back to school after a mTBI, it is important for these children to receive services to assist with the demands of education. By implementing the guide *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners*, elementary-age children with mTBIs will be able to engage in the occupation of education with the level of support they require.

CHAPTER I

Introduction

Traumatic brain injuries (TBI) are the leading cause of disability among children, affecting 100-300/100,000 of the childhood population each year (Jones et al., 2018). Children who experience a TBI may present with various impairments in physical, cognitive, neurological, visual, or psychological domains which can influence their occupational performance. Their development can also be impacted as a pediatric TBIs take place within the period of a child's developing nervous system (Ciccia, Lundine, & Coreno, 2016). Research shows that 15-30% of mild traumatic brain injuries (mTBI) do not resolve in a three to four-week span and that children may still have difficulty with attention, memory, executive functions, word retrieval, balance, and vestibular and visual issues past that time frame (D'Angelo, 2019; McAvoy & Haarbauer-Krupa, 2019). In fact, this population is not likely to return to their prior level of functioning until at least 12 months post injury and services can be needed for up to seven years post-injury (Haarbauer-Krupa, Lundine, DePompei, & King, 2018; Jones et al., 2018). This can result in entire school years and multiple grade levels where children may be at risk for not receiving the proper services that they need to be successful due to not receiving academic services (Haarbauer-Krupa, Lundine, DePompei, & King, 2018; Jones et al., 2018).

The population of children with TBIs are not receiving services in the school system regardless of their TBI level. When looking within the school system, 76% of children with TBIs were not on an individualized education plan (IEP) and 67% of the children were not utilizing 504 services (Todis, McCart, & Glang, 2018). This results in children having several challenges transitioning back to the academic setting following a TBI. Many students with a TBI may experience any of the following after injury: (a) inconsistent approaches with the hospital to school transition, (b) lack of information shared with their school regarding their TBI, (c) provided with insufficient educational services, (d) work with educators with limited knowledge regarding TBI symptoms, and (e) transition back to school with little to no support with their educational demands (Gioia, Glang, Hooper, & Brown, 2016; McAvoy & Haarbauer-Krupa, 2019; Rivara et al., 2012).

Model Guiding Project

The created project was based on the Person Environment Occupation Model (PEO) by Law and colleagues (1996). The model was selected due to its unique way of organizing and addressing the individual aspects of the person, environment, and occupation, then synthesizing how each aspect influences occupational performance (Cole & Tufano, 2008). The PEO model directed the Author's analyses of education and related occupations that occur in the school setting, as well as the components transactions (PxE, PxO, and OxE). After obtaining a mTBI, physical, cognitive, sensory, and affective person factors are impacted. This can effect a child's learning, participation, and socialization in the academic setting. Physical, social, institutional, cultural, and virtual are all areas where the PEO transactions can occur in the child's environment.

Additionally, occupations such as self-care, productivity (education), leisure, and rest are heavily influenced by the symptoms of a mTBI. To further outline this concept, the PEO transaction of a common academic activity is described in the following. A child may have difficulty with completion of a homework assignment due to (a) reduced motor dexterity impacting writing, (b) cognitive impairments effecting comprehension of material, (c) difficulty attending to the information, (d) decreased processing speed, (e) and challenges with sensory processing that can influence difficulty reading. As highlighted above, the person, environment, and occupation components all influence each other through their transactions. This combined with literature findings and a foundation in occupational performance were the basis for the creation of tools and resources included in the guide.

Occupational Therapy Guide

Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners was created with a focus on providing a tool for occupational therapy practitioners to utilize when working with school systems, educational professionals, and elementary-age children with mTBIs transitioning back to the occupation of education. The guide targets educators with limited knowledge of teaching children with mTBIs. The guide serves as a tool for occupational therapy practitioners to consult with educators who teach children with mTBIs and also provides occupational therapy practitioners with resources for interventions and assessments to use in the academic setting. Additional resources are also provided to enhance the transition process for this population and for increased convenience for the consumers of our product.

Key Terminology

The following terms and concepts are used throughout the literature review and *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners*. They are listed below for clarification of meaning.

Elementary-age children: Students in kindergarten through sixth grades.

Mild Traumatic Brain Injury: A mild brain injury (mTBI) has a GCS score of 13 to 15 and occurs with a brief (few seconds or minutes) loss of consciousness, but may also happen without loss of consciousness, and the person may be confused (National Institute of Neurological Disorders and Stroke [NINDS], 2015). Physical, cognitive, and emotional symptoms, as well as sleep disturbances often occur (Gioia, Hooper, & Brown, 2016). When undergoing brain scans, the brain may appear normal, but this does not eliminate the possibility of a mTBI (NINDS, 2015).

Transition: For the purpose of this project, transition is defined as the process of changing from the medical environment to the academic environment.

Overview

Chapter II show cases the results of a comprehensive literature review that highlights the lack of supports and need for services from the mTBI population in regards to the occupation of education. Chapter III outlines the methodology and reasoning for the research topic, synthesis of the results and information, description of PEO model choice, and discussion of the formulation for occupational performance issues that influence the creation of the occupational therapy guide. *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for*

Occupational Therapy Practitioners is introduced in Chapter IV and further discusses the transition processes, occupational therapy evaluations and assessments, as well as resources and interventions to implement in the academic setting. The entire guide can be located in the Appendix. Lastly, Chapter V summarizes the entirety of the guide and highlights the recommendations and limitations of *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners*.

CHAPTER II

Literature Review

A traumatic brain injury (TBI) is an injury to the head and brain generally caused by a physical impact. Traumatic brain injuries cause damage and dysfunction of the brain, which may become permanent in more severe cases (Lindsay et al., 2015). Traumatic brain injuries are the leading cause of disability among children affecting 100-300/100,000 of the childhood population each year (Jones et al., 2018). In 2014, over 837,000 children were admitted to the emergency department for TBI (Centers for Disease Control and Prevention [CDC], 2019). Of the number of children admitted to the emergency department, 23,000 children were hospitalized because of their traumatic brain injuries (CDC, 2019). Children who experience a TBI may present with various impairments in physical, cognitive, neurological, visual, or psychological domains which can influence occupational performance.

For children a pediatric TBI takes place within the time frame of a child's developing nervous system which may show problems that can appear later on in their development (Ciccia et al., 2016). When children have cognitive impairments post-TBI, it is referred to as cognitive stall or neuropsychological lag (Ciccia et al., 2016). Children can present with deficits in both previously acquired skills or yet-to-be-acquired skills affecting the developmental process (Ciccia et al., 2016). Developmental and cognitive gain and lack of age developmental gain can last a ten-year continuum after a child

experiences a TBI, indicating that recovery is ongoing (Jonsson, Catroppa, Godfrey, Smelder, & Anderson, 2013).

The severity of a TBI is determined by the Glasgow Coma Scale (GCS), a scale focusing on three aspects of responsiveness: eye-opening, motor, and verbal responses. The GCS breaks down the brain injury on a scale of 1-15 (Teasdale & Jennett, 1976). Using this scale, a traumatic brain injury is broken into three different categories: mild, moderate, and severe (Teasdale & Jennett, 1976). A mild brain injury (mTBI) has a GCS score of 13 to 15 (National Institute of Neurological Disorders and Stroke [NINDS], 2015). A mild TBI occurs with a brief (few seconds or minutes) loss of consciousness, but may also happen without loss of consciousness and the person may be confused (NINDS, 2015). When undergoing brain scans, the brain may appear normal but this does not eliminate the possibility of a child experiencing a mTBI (NINDS, 2015). A mild traumatic brain injury is typically diagnosed when there is a change in the mental state of a person at the time of injury that may include confusion, daze, or loss of consciousness (NINDS, 2015). Mild TBIs are typically followed by physical, cognitive, and emotional symptoms, and sleep disturbances (Gioia, Hooper, & Brown, 2016).

A moderate brain injury has a GCS score of 9 to 12 (NINDS, 2015). A moderate TBI can result from a non-penetrating blow to the head and or violent shaking of the head (NINDS, 2015). A person with a moderate TBI experiences a loss of consciousness that lasts from a few minutes to a few hours, confusion for a few days to weeks, and physical, cognitive, and/or behavioral impairments (NINDS, 2015).

A severe head injury, the most life-threatening, has a GCS score of eight or less (NINDS, 2015). Severe head injuries generally result from crushing blows or penetrating

wounds to the head in which the brain tissue is crushed, ripped, and/or sheared (NINDS, 2015). It should be noted that closed head injuries can also result in a severe brain injury (NINDS, 2015). Frequently, severe TBIs are open injuries, one in which the skull has been crushed or significantly fractured (NINDS, 2015). The endpoint of recovery following a TBI is defined as the return of neuropsychological functions, balance, and sleep to pre-injury levels, and the absence of exertional effects upon physical or cognitive activity (Gioia et al., 2016).

The authors of this literature are focusing on the reintegration of elementary-age children (kindergarten-6th grades) with mild traumatic brain injuries into the education system. This population was selected because many of these children do not receive services when transitioning from the hospital back to school. After a child experiences a mTBI the child and their family must navigate the two models of care, medical and educational. Children are initially provided intervention while in the acute state for symptoms such as vision and cognition which can impact performance in the school setting. This is a concern given the time spent in acute medical care is short when compared to the time spent in school, ultimately meaning it is more critical for those in the school environment to be aware of the child's mTBI (McAvoy & Haarbauer-Krupa, 2019). Children with mTBIs can be hard to identify physically, communicably, cognitively, and may experience invisible cognitive-linguistic deficits (D'Angelo, 2019; McAvoy & Haarbauer-Krupa, 2019). Many students with TBI may experience any of the following after injury: (a) inconsistent approaches with the hospital to school transition, (b) lack of information shared with their school regarding their TBI, (c) provided with insufficient educational services, (d) work with educators with limited knowledge

regarding TBI symptoms, and (e) transition back to school with little to no support with their educational demands (Gioia, Glang, Hooper, & Brown, 2016; McAvoy & Haarbauer-Krupa, 2019; Rivara et al., 2012).

Although mTBIs have a generally quick initial recovery time of one to six weeks, these students can have academic, social, and quality of life implications for more extended periods of time (Barlow, Crawford, Brooks, Turley, & Mikrogianakis, 2015; Barlow, Crawford, Stevenson & Sandhu, 2010; Purcell, Harvey, & Seabrook, 2016; Zemek, Barrowman, Freedman & Gravel, 2017). Research shows that 15-30% of mTBI/concussions do not resolve in a three to four-week span and that children may still have difficulty with attention, memory, executive functions, word retrieval, balance, and vestibular and visual issues (D'Angelo, 2019; McAvoy & Haarbauer-Krupa, 2019). They are not likely to return to their prior level of functioning until at least 12 months post injury and services can be needed for up to seven years post-injury (Haarbauer-Krupa, Lundine, DePompei, & King, 2018; Jones et al., 2018). This can leave entire school years where children may be at risk for not receiving the proper services that they need to be successful (Haarbauer-Krupa et al., 2018; Jones et al., 2018). According to Fuentes et al. (2018), 31% of children hospitalized with a TBI have unmet or unrecognized needs for health services one year after injury. This emphasizes why ongoing monitoring is crucial as seen by 69% of children having potential educational service needs, on average, 6.8 years after injury (Fuentes et al., 2018). With this being said, there are still low rates of follow up visits (37-40%) with a child's primary healthcare provider in the first year after a TBI (Haarbauer-Krupa et al., 2018).

The hospital to school transition is currently considered a restrictive factor in the provision of educational services to children with TBIs (Dettmer, Ettl, Glang, & McAvoy, 2014). Weak transitional links between medical and educational settings increase the misidentification of students with TBI (Todis, McCart, & Glang, 2018). Furthermore, decreased educational services can lead to the continual diminished awareness amongst educators and the student TBI population (Todis, McCart, & Glang, 2018). Children with TBIs are not receiving services in the school system regardless of their TBI level. When looking within the school system, 76% of children with TBIs were not on an individualized education plan (IEP) and 67% of the children were not utilizing 504 services (Todis et al., 2018). If the children did receive transitional services, they were minimal, short term, and focused on medical opposed to educational factors (Todis et al., 2018). According to Haarbauer-Krupa et al. (2018), if a child does not receive services approximately at the time of injury, it is unlikely that they will be evaluated for services after the first year.

Occupational Impacts Following Mild TBI

Occupations

Because the focus population is elementary-age children, their main occupation is education. However, within schooling, there are several additional occupations and subjects. These include, but are not limited to, educational activities such as math, reading, writing, and social participation including socializing skills, self-help skills, recess, lunch, sports, band, and dance (American Occupational Therapy Association [AOTA], 2014). Additionally, behavioral challenges can negatively impact a child's ability to socialize with peers in school (Babcock et al., 2013; Yeates, 2010). All of the

occupations a child will be required to participate in while at school will be affected including client factors, performance skills, and performance pattern deficits brought on by a TBI (AOTA, 2014).

Client Factors and Performance Skills Impacted by TBI

This population can experience long-term impairments and disability across a variety of functional domains, including; memory, intellectual functioning, behavior, executive functioning, attention, social interaction, and academic performance (Kingery et al., 2017). Children with a TBI undergo daily performance variability, difficulty learning new information, knowledge gaps, motor challenges, and cognitive deficits (Gioia et al., 2016). These difficulties can make academic work more challenging post-TBI (Gioia et al., 2016). Children may additionally experience physical symptoms such as; headache, fatigue, blurry vision, partial or total vision loss, visual field cuts, impaired visual tracking, visual blurring or double vision, unusual sensitivity to light, partial or complete hearing loss in one or both ears, difficulty understanding spoken language in a noisy environment, and light and noise sensitivity that can disrupt their ability to maintain attention in a classroom (Gioia et al., 2016).

Furthermore, physical symptoms involving gross and fine motor can affect a child's education (Kanchan et al., 2018). These can include reduced motor dexterity and tremors that can impact: (a) cutting, drawing, or writing skills, (b) motor planning difficulties such as dyspraxia, (c) impaired dressing or assembly skills, (d) and challenges with written work such as dysgraphia which can affect written communication (Kanchan et al., 2018). Changes in a child's motor system such as balance or postural instability can affect motor performance that is important for return to physical activities (Barlow et al.,

2010; Stephens, Salorio, Denckla, Mostofsky, & Suskaurer, 2017). Problems associated with motor impairments can lead to difficulties with development and age-appropriate function. This can include walking and self-care skills, along with the ability to participate in higher-level sports and recreational activities (Stephens et al., 2017).

Lastly, a child's voice and speech functioning may be affected including; oral motor dysfunction, articulation, swallowing, comprehension problems, inefficient language processing, dysfluent speech, problems retrieving words from memory, and pragmatic language deficits in conversation, turn-taking, and social rules (Turkstra, Williams, Tonks & Frampton, 2008; Mei, Anderson, Waugh, Cahill, & Morgan, 2018). Additionally, children with TBIs are at high risk of having impairments in social and emotional cue interpretation and response generation (Turkstra et al., 2008). These subtle difficulties bring challenges for students to negotiate the complexities of social relationships and social skills involved in communication (Turkstra et al., 2008). School systems need assistance with identifying which of their students require assessments of social and emotional communication skills (Turkstra et al., 2008).

After a child sustains a TBI, cognitive impairments can include but are not limited to: attention, memory affecting encoding, retention and retrieval of information, processing speed, cognitive flexibility, working memory, self-monitoring, self-regulation, planning, organization, distractibility, judgement, conceptual reasoning, organizational skills, concentration, impulse control and decision making (Babikian et al., 2015; Gioia et al., 2016). This population is also at risk of losing already mastered skills and having difficulties with developing new ones (Kingery et al., 2017). The cognitive impairments a child experiences after a TBI underly the student's ability to (a) comprehend written

materials, (b) complete math calculations and application, (c) remember facts in content of subjects, (d) fluently express written work, (e) integrate and apply new information, (f) and interact with other classmates and the environment (Bedell & Dumas, 2004; Gioia et al., 2016; Lindsay et al., 2015).

Lastly, Behavioral or psychological symptoms can develop in up to one-third of children with mTBIs and can persist beyond the initial injury recovery period (Taylor et al., 2015). The subsequent social effects of childhood TBI across the spectrum of severity can significantly affect a child's ability to participate in their education (Lindsay et al., 2015; Bedell & Dumas, 2004). Behavioral difficulties a child may experience can include but are not limited to, reduced qualities of life, educational under achievements, and social exclusion (Li & Liu, 2013). Children with mTBI can also develop poor conduct and problems with empathy, peer relationships, emotional perceptions, social skills, social problem solving, and social language use (Ryan et al., 2014; Rosema, Crowe, & Anderson, 2012; Yeates, 2010). Furthermore, after a brain injury, children are at an increased risk of adverse behavioral outcomes (Liu and Li, 2013). Children may experience an increase in behaviors such as aggression, impulsivity, hyperactivity, withdrawal, social isolation, obsessions and compulsions, lack of emotion, loss of self-control, anxiety, and depression (Kirk, Fallon, Fraser, Robinson, & Vassallo, 2015).

Performance Patterns

Habits, routines, roles, and rituals are critical factors in engaging in occupations that can support a child's performance (AOTA, 2014). Students with mTBIs require additional support to promote their habits, routines, roles, and rituals (AOTA, 2014; Gioia, 2016). Common symptoms of mTBI, such as headache, dizziness, and difficulty

with thinking, can affect a child's role as a student (Hung et al., 2014). To be successful in the role of a student, a child must be able to attend to classroom instructions, understand and retain information, reason and express ideas, problem solve, and engage in self-control (Semrub-Clikeman, 2010). Slower inhibition speed, impaired visuospatial memory, and impaired verbal working memory were associated with significantly reduced participation in a student role (Lambregts et al., 2018).

Not only is the child's role of being a student compromised, but also the role of a parent/caregiver (Liu & Li, 2013). Parents/caregivers can require more significant support in managing their child's behavioral and psychological challenges after a TBI (Liu & Li, 2013). As behavioral problems become increasingly difficult to control, parents/caregivers may become more permissive in their parenting approaches (Liu & Li, 2013). The role of the parent shifts during this period in time where the parent now needs to plan for current and future treatment/rehabilitation plans, learn how to help their child manage behaviors, and access services for their own support throughout the process (Kirk et al., 2015).

According to Gioia (2016), the plan for a child to return to their school routine is dictated by the student's symptoms status and tolerance for activity. A child's transition back into the school routine should begin with a steady increase in time and support. After time off from school, there are typically gradual advancements to partial school days with maximal support, to full days with maximal support, then decreased to moderate support, followed by minimal support, and then returning to a typical school day (Gioia, 2016). Other supports a child may receive can include services provided in a traditional classroom, pull-out services, self-contained classrooms, or tutoring

incorporated into the school day routine (Prasad, Swank, & Ewing-Cobbs, 2017). When returning to the school system after a mTBI, children may have accommodations which disrupt the typical school day/week routine (Gioia, 2016; Rose, McNally, & Heyer, 2015). These can include: (a) having rest breaks during class and between class periods, (b) excused missed examinations and assignments, (c) postponed exams, (d) extended deadlines for assignments, (e) excuses from sports or physical activities, and (f) excuses from activities such as field trips, all of which have an impact on a student's typical school routine (Gioia, 2016; Rose, McNally, & Heyer, 2015). Apart from routines, special school rituals may also be impacted or missed such as homecoming, school assemblies, pep rallies, or attending school sporting events (AOTA, 2014). Rituals contribute to a child's identity and reinforce their values and beliefs (AOTA, 2014).

School Context

In the year 2007, researchers were estimating that 2.5 million students with TBIs had been in the US educational system each year (Ciccia et al., 2016). For a school-age child, three months of missed school equates to 1/3 of an academic school year (Ciccia et al., 2016). Missing several school days can create difficulties for a child when making up the lost time (Kingery et al., 2017). Also, with increasing age in school, support from teachers decreases, which can make the transition back even more challenging (Kingery et al., 2017). On a positive note, if a child is identified to have school-related deficits, he/she can qualify for services which can be addressed in school therapy (D'Angelo, 2019).

Laws

There are currently no legal mandates in place that address transitions throughout K-12 grades, so a child's transition may not be addressed as carefully as needed (Orentlicher et al., 2017). In the United States during 1990, Public Law 101-476 amended the Public Law 94-142 to ensure special education services were available to provide fair and appropriate services, establish standards for special education, and to provide federal funds to states for students with disabilities. As time progressed, the law also progressed to the title of Individuals with Disabilities Education Act (IDEA) and added in traumatic brain injury as a category (P.L. 101-476). The federal law defined traumatic brain injury as a brain injury caused by an external force resulting in physical and or psychosocial impairments, which ultimately affect a child's educational performance (Connery, Peterson, Baker, & Kirkwood, 2016). The category for TBI has existed under IDEA since 1990, however, the census for this category is low when compared to rates of injury in children overall (Connery, Peterson, Baker, & Kirkwood, 2016). Children with an identified health condition are eligible for an assessment through Part C of the Grants for Infants and Families program of IDEA (Haarbauer-Krupa et al., 2018). Suggested by Grandinett (2014), children who have experienced a brain injury should be considered to have an interim 504 accommodation plan, the plan developed, and then implemented. This 504 plan allows for students to have accommodations and services while determination for an IEP for special education is in place, as opposed to not receiving services during the transition back to school (Grandinett, 2014).

In the 25 years of TBI being added to the list of diagnoses under IDEA, awareness of students' needs in their transitions from the healthcare to the school system has

increased (McAvoy & Haarbauer-Krupa, 2019). However, limited measurable action regarding the monitoring and execution of individualized programs in the school setting have been made (McAvoy & Haarbauer-Krupa, 2019). Even with national mandates for supports, agencies that have focus on pediatric TBI, and websites with evidenced based documentation regarding instructional material, many of the challenges identified in the 1990s still exist today (McAvoy & Haarbauer-Krupa, 2019).

Intervention Services for Mild TBI

After leaving the hospital, children can receive therapy services at either an inpatient or outpatient facility. This may include a transitional care unit, post-acute intensive rehabilitation, outpatient clinic, home therapy, or school therapy (Fuentes et al., 2018). Physical therapy, occupational therapy, speech therapy, mental health services, education services, and physiatry (physical medicine and rehab physician) are among the team members involved in the transition for these children (Fuentes et al., 2018). The occupational therapy, physical therapy, and speech-language pathology evaluations are vital components of the screening process to determine the child's rehabilitation needs, which includes the need for ongoing treatment and admission to inpatient rehabilitation facilities (Bennett Niedzwecki, Korgenski, & Bratton, 2013).

It is imperative to identify needs, refer to services, and reach out for guidance or training. According to Jacobs-Nzuzi Khuabi, Swart, and Soeker (2019), occupational therapy practitioners may further foster relationships with crucial school personnel to collaborate in the planning of support the child may need, including academic recommendations for the 504 plan. Collaboration with teachers and other relevant school personnel may include professional development courses that seek to build educator

knowledge, skills, and provide specific adaptive strategies to increase a teacher's confidence (Jacobs-Nzuzi Khuabi et al., 2019). Collaboration should include a teacher who actively teaches the student in order to use their expertise and experience of working with the child for input on strategies (Jacobs-Nzuzi Khuabi et al., 2019). Suggested academic adjustments include but are not limited to: (a) having temporary access to school personnel who may be able to provide assistance such as a school counselor, reader, scribe, or tutor, (b) modifying schedules with increasing the amount of time a student is at school as symptoms dissipate, (c) modifying assignments including postponing assignments and projects or completing shortened assignments, (d) alternating periods of mental rest with mental exertion, (e) avoiding noisy and over stimulating environments or minimizing distractions such as taking tests in a quiet room, (f) providing written instructions or other supports for memory including notes or fact sheets, (g) limiting technology, and (h) limiting physical activity to levels of tolerance (J. Boseck, personal communication, November 25, 2019; Davies, 2016). Occupational therapy practitioners have a critical role in further building relationships to collaborate in the planning of support for this student population.

Occupational therapy practitioners can prepare the family for changes in roles and routines, educate the family and school staff on the diverse needs of the student, evaluate ways to support the child, facilitate skills required for school participation, help children and families develop advocacy skills, enhance social skills for school and community environments, and collaborate with the transition team (Orentlicher et al., 2017). Examples of interventions that occupational therapy practitioners can provide include: (a) education about the transition, (b) problem solving solutions for child and family

concerns, (c) providing coaching, (d) managing clothing for toileting, (e) increasing independence in school-related activities, (f) eating (snacks in the classroom), (g) dressing (putting on a jacket), (h) school routines, (i) participating in circle time/group activities, (j) using/adapting technology, (k) and drinking from the water fountain (Orentlicher et al., 2017).

Occupational therapy practitioners additionally have the role of an advocator. The role of an advocator can include; fostering the view of a child with a TBI as capable and having potential, empowering the child's support base, advocating for the adolescent to self-advocate for inclusive school participation, develop communication skills, and more (Jacobs-Nzuzi Khuabi et al., 2019). Occupational therapy practitioners have the background, training, experience, and awareness to identify needs, refer for needed services, and reach out for additional guidance if needed (Jacobs-Nzuzi Khuabi et al., 2019).

Rehab services help improve functional outcomes for children with TBIs. Occupational therapy practitioners working in transition services aim to prepare, plan, and support children and families as the child transitions between stages (AOTA, 2014). They also use task analysis and environmental adaptations to assist the family and children in making choices, identifying preferences, and participating in meaningful activities (Orentlicher et al., 2017). Although awareness for children to receive services within the school system has significantly increased, qualification under the TBI category has remained extremely low, with a 0-0.1% enrollment rate and several studies have found low service utilization for school-age children (5-18 years) (Haarbauer-Krupa et al., 2018; Snyder, DeBrey, & Dillow, 2018).

Areas Occupational Therapy may Address

Occupational therapy practitioners are vital providers within transitions teams as they can promote students' functional abilities in their educational routines. Transitioning throughout the school system requires frequent monitoring, and occupational therapy may be the only profession to follow a student throughout their entire career (Orentlicher et al., 2017). Occupational therapy practitioners focus on both the cognitive and physical deficits while following a client and family-centered model, which fits well with the transitioning stage. Other therapeutic approaches that occupational therapy practitioners can do indirectly to assist with the transition process may include: (a) becoming familiar with current transition research and the language used in education, (b) becoming up to date on mental health, assistive technology, and health care aspects that relate to transitions, (c) and use the above information to effectively participate as an interdisciplinary transition team member (Orentlicher et al., 2017).

Within the occupational therapy scope of practice, there is moderate evidence to support activity-based interventions focusing on client-centered goals that are delivered in a familiar environmental context to improve overall occupational performance within the school setting (Doig, Fleming, Kuipers, Cornwell, & Khan, 2011). Occupational therapy practitioners should incorporate intervention approaches utilizing structured compensatory strategy training in a group and/or individual setting to enhance clients' abilities to include specific strategies in daily life occupations (Cantor et al., 2013; Huckans et al., 2010). Additionally, interventions focusing on attention and/or executive function in the following areas: attention regulation, attention processing, dual-task

training, and problem solving have strong evidentiary support (Cicerone et al., 2011; Couillet et al., 2010). Executive function strategy training, such as goal management and metacognition, are also effective interventions for managing cognitive deficits and have substantial evidence to support occupational therapy practitioners' performance of these (Kennedy et al., 2008).

Trends with Transitioning back to School

Students would be better served if there were consistent and precise communications between the hospitals and schools, as well as a well-monitored gradual return to school (Gioia et al., 2016; Todis et al., 2018). Todis et al. (2018) found that even with an increase in the communication regarding a student's TBI, schools were not consistently aware of the student's needs. The authors also discovered that children with varying community settings, such as rural and suburban, as well as varying levels of TBIs, had inconsistent delivery of information about TBIs (Todis et al., 2018). The disconnect between healthcare and the educational systems can influence whether a student receives additional services in school or not (Hartman, Duncanson, Farahat, & Lindsay, 2015; Roscigno, Fleig, & Knafl, 2015). Best practice suggests that schools or educational regions should have a TBI management team that can create and implement an appropriate transition and education plan for students with TBIs (Halstead et al., 2013). Although it is best practice to have a hospital-school transition plan, the services for these students are inconsistent (Todis et al., 2018).

When information was shared between the hospital and school, students continued to not have smooth transitions (Todis et al., 2018). Often because the schools did not follow through with the recommendations suggested by the medical team for the

student's educational needs (Todis et al., 2018). Due to the diminished follow through of communication, unique challenges with returning to school may occur such as; increased school absences, decrease in school performance, and a decrease in social interaction (Gioia et al., 2016). Communication of medical information between the healthcare and educational settings are also considerably inconsistent and can result in the school's unawareness of the injury occurrence and the learning challenges that can come with it (McAvoy & Haarbauer-Krupa, 2019; Todis et al., 2018). All in all, there are no clinical points of contact such as a social worker or healthcare professional who can facilitate interdisciplinary communication between various services and connect families with medical and/or school services (Haarbauer-Krupa et al., 2018).

Although awareness for children to receive services within the school system has significantly increased, qualification under the TBI category has remained extremely low with a 0-0.1% enrollment rate (Snyder, DeBrey, & Dillow, 2018). Few children are identified for TBI-related school services, due to the limited hospital to school transitional services and the lack of educator and school awareness of the effects of TBI on educational performance (Glang et al., 2015; Haarbauer-Krupa et al., 2018). If the school is not aware of the child's TBI or lacks understanding of the long term effects, the educational challenges are unlikely to be attributed to the TBI resulting in insufficient support and services for the child (Glang et al., 2015; Haarbauer-Krupa et al., 2018).

In the educational system, teachers have insufficient training in their academic programs regarding TBIs and receive little to no information regarding a students' TBI recovery (McKinlay & Buck, 2019; Todis et al., 2018). Limited training revolving around a kid's TBI can result in misconceptions and knowledge gaps about TBIs and the effects

they have on students. Due to receiving minimal information regarding the students' TBI, educators may assume students have fully recovered (McKinlay & Buck, 2019). Of the teachers in the study completed by McKinlay and Buck (2019), 32.0% reported having prior training in TBI. With educators having limited knowledge and experience working with a student who has a TBI, few children are referred to in-school services by teachers (Haarbauer-Krupa et al., 2018; Glang et al., 2015; Glang, Tyler, Todis, Morvant, & Pearson, 2004). All in all, educators need better training on methods that are effective for students with TBIs (Dettmer et al., 2014; Todis et al., 2018).

Currently, there are no formal systems or guidelines to track the health or monitor the progress of children with TBI, and most children are discharged from home following the initial TBI care at the emergency department (Greene, Kernic, Vavilala, & Rivara, 2014; Haarbauer-Krupa et al., 2018). In the United States, only two states, Oregon and Pennsylvania, have a regional TBI consultant team which provides a linkage from hospital to the school setting (Schuchat, Houry, & Baldwin, 2018). Only a small percent of TBI patients will receive outpatient services (Haarbauer-Krupa et al., 2018). Those who do not receive rehabilitation services may not have a formal return to the school process, resulting in another example of miscommunication between the healthcare and the education teams (Haarbauer-Krupa et al., 2018).

A caregiver's opinion and understanding of TBI affects can be a direct factor in the child receiving services or not (Haarbauer-Krupa et al., 2018). Both caregivers and students should be educated at the time of injury and given specific recommendations and a list of what to monitor in regards to transitioning back to school (McAvoy & Haarbauer-Krupa, 2019). Todis et al. (2018), found that 30% of information regarding a

child's TBI came to the school only through the parents/caregivers. When transition services were provided, most children received short-term, medical focused assistance rather than educational services, and these services were often handled by parents rather than healthcare personnel (Todis et al., 2018). Establishing collaboration between healthcare providers, educators, and families will facilitate the improvement of the delivery of care for children with TBIs.

After the initial transition from healthcare to school, achieving academic success can become progressively more strenuous as a child ages (Haarbauer-Krupa et al., 2018; Glang et al., 2015). The increase in academic challenges a child undergoes are results of long-term cognitive deficits paired with environmental expectations that place an increased demand on executive functioning (Haarbauer-Krupa et al., 2018; Glang et al., 2015). Additionally, parents reported a low utilization of medical rehabilitation and educational services that were provided (Haarbauer-Krupa et al., 2018). According to a study completed by Todis et al. (2018), only 43% of the children in the study received transition services with a rehabilitation facility. When transition services are provided, most cases are minimal, short-term, and focused on medical factors opposed to educational factors (Todis et al., 2018). There is often a failure to identify and utilize TBI-related services for education (Haarbauer-Krupa et al., 2018). The levels of children with TBIs and mTBI are increasing, and there has been little change in the school educational system providing services to these students (Taylor, Bell, Breiding, & Likang, 2017). Appropriate identification and education training on how TBIs affect a child in school can improve how school systems identify children who are requiring services (Dettmer et al., 2014).

There should be a system-wide concussion management policy for school personnel that requires staff to understand the academic effects of mTBI, a gradual process for assisting students to return to school life, and guidelines for when students can safely return to full physical and cognitive activities (Gioia et al., 2016). Gioia et al. (2016) identified five categories of supports, which included; screening, identification and assessment, medical care to school transition, tracking of a child's progress over time, professional development, and data collection. The authors also discussed five categories of student supports such as interdisciplinary team members, professional development, monitoring protocols, academic accommodations, and coordinated medical-school communication (Gioia et al., 2016). The above changes would be beneficial additions for the transition back to school in children with a traumatic brain injury.

In a study by Bennett et al. (2013), the authors found that there is not a set standard for children to receive therapy when admitted to the hospital for a TBI. There is also a low number of children being evaluated by OT or PT in the hospital, only 41% (Bennett et al., 2013). These low statistics support the need for therapy to be involved not only in the hospital but also with the school system after children leave the hospital (Kingery et al., 2017). There is a significant proportion of students who are not receiving academic services that they may require, around 46-63% (Kingery et al., 2017). Children are not receiving needed services in the hospital, school, or in the transition between the two (Kingery et al., 2017). This disconnect needs to be bridged.

CHAPTER III

Methodology

At the initial development of this project, the authors were interested in creating a product that would assist elementary-age children who had experienced a mild traumatic brain injury (mTBI) and the impact it had on their occupation of education when returning to school. Upon further research, it was evident that when a child transitions back to school after acquiring a mTBI they experienced several barriers with the transition process and received limited services at school. This negatively impacts their educational performance. Once these barriers were identified, a literature review was conducted to enhance the understanding of the issue. Multiple online databases, textbooks, and creditable websites were used to investigate the literature.

With a comprehensive understanding of the barriers, a review of the literature was completed. Professional literature articles were obtained through a search of CINAHL database, PubMed, Google Scholar, OT Search, and AJOT. Key terms used to conduct the research included: “mild traumatic brain injury,” “acquired brain injury,” “concussion,” “school,” “transitioning,” “pediatric,” “educators,” “teachers,” “occupational therapy,” “impact of injury,” “cognition,” “social skills,” “accommodations,” “learning,” “education,” and “school interventions.” Lastly, government websites such as the Center for Disease Control and Prevention were also utilized.

There were gaps in the existing literature related to the needs of children with mTBIs when transitioning back to school. The gaps included: (a) inconsistent approaches with the hospital to school transition, (b) lack of information shared with their school regarding their TBI, (c) provided with insufficient educational services, (d) work with educators with limited knowledge regarding TBI symptoms, and (e) transitioning back to school with little to no support with their educational demands (Gioia, Glang, Hooper, & Brown, 2016; McAvoy & Haarbauer-Krupa, 2019; Rivara et al., 2012). The gaps found in the literature assisted in the development of a guide, *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners*, to use as a resource for occupational therapy practitioners in the school setting to implement services in relation to the needs of elementary-age children with mTBIs.

Information from the literature review was analyzed and synthesized using the Person, Occupation, and Environment (PEO) model (Law et al., 1996). The PEO model was chosen for a variety of reasons, one of which was due to the unique transactive dynamic relationship that occurs when people engage in a given occupation over a period of time (Law et al., 1996). In addition, the PEO model can be viewed as an assessment tool to understand and examine problematic areas that influence a child's occupational performance or as an intervention tool to enhance a child's occupational performance by identifying options for improving the PEO fit (Brown, 2019).

The findings from the literature review were organized into categories of the person (P), environment (E), and occupation (O). Then the PEO components were examined systematically by reflecting on the elements that influence the fit and lack of fit

between the PxO, OxE, and PxE (Brown, 2019). The analysis of the transactions involved exploring multiple layers of the relationships and synthesized a comprehensive understanding of identifying interventions for improving the PEO fit (Brown, 2019). An occupational performance analysis of a child with a mTBI in the school setting reflecting the PEO model is located in Table 1.

This guide was intended to be a resource for occupational therapist to use directly with assessments and interventions as well as a consultation tool when working with teachers. Additionally, resources and suggested occupational therapy evaluations were provided regarding the direct correlation between the student and the transition process upon returning to school as analyzed by the PEO model. Next, recommendations regarding direct occupational therapy interventions were presented. Lastly, the product included consultation recommendations for education staff who teach students with mTBIs in their classrooms.

The main purpose of the guide was to assist occupational therapists when working with children who had experienced a mTBI. Another purpose of the guide was to provide teachers with tools when educating children with mTBI through modifications and adaptation strategies focusing on the person, environment, and occupation. Lastly, the guide was intended to promote collaboration between teachers and occupational therapists, as both professions are key components in aiding a child's learning experience after a mTBI. All of the key elements of the guide were intended to aid in a child's transition back to school after a mTBI.

Table 1

Systematic Analysis of Occupational Performance of Education in the School Environment for Elementary-Age Children with mTBIs.

Occupational Performance		
Education and related occupations that occur in the school context.		
Assessment of Main Components		
Person	Environment	Occupations: Each of which have their own demands
<p>Physical:</p> <ul style="list-style-type: none"> • Children can experience physical symptoms involving gross and fine motor after a mTBI (Kanchan et al., 2018). 	<p>Physical:</p> <ul style="list-style-type: none"> • Classroom • Lunchroom • Recess/playground • Gymnasium • Music classroom 	<p>Self-care:</p> <ul style="list-style-type: none"> • Eating • Drinking water from the fountain (Orentlicher et al., 2017). • Toileting

<ul style="list-style-type: none"> • A child’s voice and speech functioning may be affected including oral motor dysfunction, articulation, and swallowing (Turkstra, Williams, Tonks & Frampton, 2008; Mei, Anderson, Waugh, Cahill, & Morgan, 2018). • Children may experience common symptoms of mTBI, such as headache, dizziness, and difficulty focusing (Hung et al., 2014). • Children may experience changes in sleep patterns (e.g., insomnia or hypersomnia), excessive 	<ul style="list-style-type: none"> • Art classroom • Restrooms • Computer room <p>Social:</p> <ul style="list-style-type: none"> • Teachers • Peers • Staff • Occupational therapists • Rehabilitation team • IEP/504 team <p>Institutional:</p> <ul style="list-style-type: none"> • The overall school building, classes, and classroom. 	<ul style="list-style-type: none"> • Dressing (putting on a jacket or shoes) (Orentlicher et al., 2017). <p>Productivity/Work (Education):</p> <ul style="list-style-type: none"> • Assignments (math, English, social studies, science, health/physical education, art, and music). • Taking tests (American Occupational Therapy Association [AOTA], 2014). <p>Leisure:</p> <ul style="list-style-type: none"> • Play • Recess • Extracurricular activities • Physical education
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<p>drowsiness, or feelings of disorientation or "fogginess" (ASHA, 2019).</p> <p>Cognitive:</p> <ul style="list-style-type: none"> • <i>Attention:</i> A child may have, deficits in shifting attention between tasks, difficulty with selective attention, impaired sustained attention for task completion or conversational engagement, automatic processing, control processing, reduced attention span, or vigilance (ASHA, 2019; Brown, 2019). 	<ul style="list-style-type: none"> • Individuals with Disabilities Education Act (IDEA) added in traumatic brain injury as a category (P.L. 101-476). • There are currently no legal mandates in place that address transitions throughout K-12 grades, meaning a child's transition may not be addressed as carefully as needed (Orentlicher et al., 2017). • 504 plans • IEP plans • Healthcare systems that acutely treated the child's mTBI. • School district policies 	<ul style="list-style-type: none"> • Art • Lunch • School assemblies (AOTA, 2014) <p>Rest/Sleep:</p> <ul style="list-style-type: none"> • Nap time
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<ul style="list-style-type: none"> • <i>Executive Function:</i> A child may have difficulties with cognitive flexibility, impulse control, decision making, judgement, conceptual reasoning, problem solving, reasoning, goal setting, initiation, strategy selection, self-monitoring concept formulation, categorization, schemas, scripts, or metacognition (Babikian, Merkle, Savage, Giza, & Levin, 2015; Gioia et al., 2016; ASHA, 2019; Brown, 2019). 	<ul style="list-style-type: none"> • State and federal policies • The hospital to school transition is currently considered a restrictive factor in the provision of educational services to children with TBIs (Dettmer, Ettl, Glang, & McAvoy, 2014). • Weak transitional links between medical and educational settings increase the misidentification of students with TBI (Todis, McCart, & Glang, 2018). • When transition services were provided, most children received short-term, medical focused assistance rather 	
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<ul style="list-style-type: none"> • <i>Memory</i>: Impairments can include difficulty with semantic memory, episodic memory, procedural memory, short term memory, deep processing, long term memory, or working memory (Turkstra, Williams, Tonks & Frampton, 2008; Mei, Anderson, Waugh, Cahill, & Morgan, 2018; Brown, 2019). • <i>Visual Perceptual</i>: A child may experience changes in perception of color, shape, size, depth or distance, as well as discriminating 	<p>than educational services, and these services were often handled by parents rather than healthcare personnel (Todis et al., 2018).</p> <p>Cultural:</p> <ul style="list-style-type: none"> • Religious school settings • Sunday school classes • Clubs such as Christian Athletes Association. • Variance of race, ethnicity, and culture among peers and school staff. <p>Virtual:</p> <ul style="list-style-type: none"> • Screen time such as using tablets or computers. 	
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<p>between two objects or locating visual targets. (ASHA, 2019; Toglia, Golisz, Goverover, 2014).</p> <p>Sensory:</p> <ul style="list-style-type: none">• Children may experience hypervigilance or heightened sensory sensitivity with exaggerated reactions to perceived threats (ASHA, 2019).• <i>Hearing:</i> Auditory dysfunction from injury to the outer ear, middle ear, inner ear, and/or temporal lobe, resulting in central auditory dysfunction; difficulty		
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<p>hearing speech in noise; dizziness, vertigo, and/or imbalance; hypersensitivity to sounds (hyperacusis); loss of postural stability/control; or tinnitus (ASHA, 2019).</p> <ul style="list-style-type: none">• <i>Sight</i>: Changes in visual acuity; double vision; problems with visual convergence and accommodation, sensitivity to light, visual field deficits/visual neglect (ASHA, 2019). <p>Affective:</p>		
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<ul style="list-style-type: none">• <i>Emotion/ Mood:</i> Children may experience an increase in behaviors such as aggression, impulsivity, hyperactivity, withdrawal, obsessions and compulsions, lack of emotion, over emotional, emotional lability, mood swings, loss of self-control, anxiety, depression, emotional perception, apathy or lack of motivation, or reduced frustration tolerance (ASHA, 2019; Kirk, Fallon, Fraser, Robinson, & Vassallo, 2015).		
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<ul style="list-style-type: none"> • <i>Social:</i> Children with mTBI can also develop poor conduct and problems with empathy, peer relationships, social skills, self-regulation, turn taking, social rules, social problem solving, social isolation, or social language use (Ryan et al., 2014; Rosema, Crowe, & Anderson, 2012; Yeates, 2010). 		
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PEO Transactions

Table 2

P x E	P x O	O x E
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<ul style="list-style-type: none"> • Light and noise sensitivity can disrupt a child’s ability to maintain attention in school environments (Gioia, Hopper, & Brown, 2016). • Students with mTBI, using technology, anything visually stimulating, or at a loud volume, may exacerbate symptoms (Davies, 2016). • Due to sensory stimulation within the environment a child may appear overwhelmed or overly excited in stimulating or crowded environments such as the 	<ul style="list-style-type: none"> • Reduced motor dexterity and tremors can impact a child’s success with: (a) cutting, drawing, or writing skills, (b) motor planning difficulties such as dyspraxia, (c) impaired dressing or assembly skills, (d) challenges with written work such as dysgraphia which can affect written communication, (e) shaky hands during fine motor tasks, (f) difficulty eating, (g) holding a pencil with a nontraditional grasp, (h) difficulty shifting from the workbook or board to writing answers on paper, (i) difficulty with or avoiding recess and physical 	<ul style="list-style-type: none"> • Eating lunch takes place in the cafeteria. • Eating during snack break typically takes place in the classroom. • Using the restroom can occur in single or multi-stall restrooms. • Assignments, homework, tests, or educational activities can be completed in the classroom, hallway, small room, or in the home environment. • Playing with peers can take place in different classrooms within the
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<p>lunchroom, gym, or assemblies (Dettmer et al., 2018).</p> <ul style="list-style-type: none"> • Behavioral challenges can negatively impact a child’s ability to socialize with peers in school (B Babcock et al., 2013; Yeates, 2010). • Difficulties such as social and emotional cue interpretation, response generation, turn taking, and following social norms are difficult for students with mTBI when building social relationships and using social skills involved in 	<p>education class (Kanchan et al., 2018; Dettmer et al., 2018).</p> <ul style="list-style-type: none"> • Changes in a child’s motor system such as balance or postural instability can affect motor performance that is important for return to physical activities such as gym class or extracurricular activities (Barlow, 2010; Stephens, Salorio, Denckla, Mostofsky, & Suskaurer, 2017). • The cognitive impairments a child may experience after a TBI underly the student’s ability to (a) comprehend written materials, (b) complete math 	<p>school building or outside on the playground.</p> <ul style="list-style-type: none"> • Leisure or educational activities can be completed virtually. • Leisure or educational activities can be completed with peers or school faculty from different races or ethnicities. • When transition services are provided, most cases are minimal, short-term, and focused on medical factors opposed to educational factors resulting in a less education
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<p>communication (Turkstra, Williams, Tonks & Frampton, 2008).</p> <ul style="list-style-type: none"> • There is a significant proportion of students, 46-63% (Kingery et al., 2017) who are not receiving academic services that they may require. • The disconnect between healthcare and education systems can influence whether a student receives additional services in school or not (Hartman, Duncanson, Farahat, & Lindsay, 	<p>calculations and application, (c) remember facts in content of subjects, (d) fluently express written work, (e) integrate and apply new information, (f) and interact with other classmates and the environment (Bedell & Dumas, 2004; Gioia et al., 2016; Lindsay et al., 2015).</p> <ul style="list-style-type: none"> • Behavioral difficulties a child may experience can include but are not limited to, reduced quality of life, educational under achievements, and social exclusion resulting in decreased social participation (Li & Liu, 2013). 	<p>focused approached (Todis et al., 2018).</p>
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<p>2015; Roscigno, Fleig, & Knafl, 2015).</p> <ul style="list-style-type: none"> • In the educational system, teachers have insufficient training in their academic programs regarding TBIs and receive little to no information regarding a students' TBI recovery which overall impacts the students transition back to the academic environment (McKinlay & Buck, 2019; Todis et al., 2018). • When looking within the school system, 76% of children with TBIs were not on an individualized 	<ul style="list-style-type: none"> • Due to a child's difficulties in attention and concentration a child may: (a) jump from one task to another, (b) give up on completing a homework task, (c) not complete their homework, (d) make careless mistakes with schoolwork, (e) easily misplaces homework or school items, (f) shift attention from one task to another or, (g) take poor notes (Dettmer et al., 2018). • Due to decreased function in processing speed a child may: (a) not follow instructions or discussions, (b) have delayed responses or is slow to complete 	
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<p>education plan (IEP) and 67% of the children were not utilizing 504 services (Todis et al., 2018).</p>	<p>homework, (c) difficulty following lectures, (d) difficulty taking timed tests, (e) difficulty doing more than one activity at a time, (f) unwilling to engage in conversation or, (g) have inconsistent learning of new information (Dettmer et al., 2018).</p> <ul style="list-style-type: none"> • Cognitive and physical activities such as completing classwork or participating in gym class can cause symptoms to flare and increase recovery time (Davies, 2016). • Challenges with memory a child may experience can include: (a) remembering 	
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	<p>more than one task at a time, (b) failing tests in spite of studying, (c) repeatedly asking the same question, (d) splintered learning or inconsistent educational performance, (e) comprehending only part of the instructions resulting in difficulty with completing homework or participating in class (Dettmer et al., 2018).</p> <ul style="list-style-type: none">• Due to challenges with sensory processing, a child may experience: (a) increased distraction during classroom activities, (b) difficulty reading, (c) difficulty with seatwork, (d) struggle	
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	<p>with classroom transitions, (e) picky about clothing, (f) difficulty completing worksheets with too many items, (g) excessive erasing or crossing out words, (h) difficulty with large group discussion or working in groups or, (i) difficulty keeping hands to themselves in class (Dettmer et al., 2018).</p>	
<p>Formulation of Occupational Performance Issues P x E x O</p>		
<p>When evaluating a child with a mTBI there are many areas in the academic setting in which they are required to engage in. Transitional services are limited and medically focused opposed to focusing on the occupation of education. Varying occupations in differing environments can inhibit or facilitate a child’s ability to learn. A child with a mTBI may experience physical, cognitive, or</p>		

sensory challenges that can impact occupations that are required to be completed in the school setting. With difficulties being influenced by the symptoms of a mTBI, elementary-age children require additional supports when interacting with the school environment which may exacerbate symptoms, impact sensory processing abilities, and increase challenges socializing with their peers. Furthermore, when exploring the institutional aspects of the environment, school professionals have limited training and knowledge in working with children who have sustained a mTBI leading to the impediment of a child's learning in their academic environment.

CHAPTER IV

Product

Overview of the Guide

The purpose of this guide will focus on providing a tool for occupational therapy practitioners to utilize when working with school systems, teachers, and elementary-age children with mild traumatic brain injuries (mTBI) transitioning back to the occupation of education in the academic environment. More specifically the guide will target educators with limited knowledge of teaching children with mTBIs and provide interventions for occupational therapy practitioners who work with this population in the school systems. This product will also provide occupational therapy practitioners with resources for interventions, assessments, as well as consulting tools to use with teachers who interact with children with mTBIs.

Included in this guide is: (a) a systematic analysis of education in the elementary school environment for children with mTBIs, (b) a collection of additional resources for teachers, families, and healthcare providers, (c) a description of occupational therapy assessments analyzed through the lens of PEO, (d) an occupational performance evaluation chart and a description of how to use the chart based, (e) a case study and evaluation example, (f) direct occupational therapy interventions broken into four approaches based on PEO, (g) and indirect occupational therapy approaches in the form

of Educational Support Cards for children with mTBIs. A complete copy of the guide can be found in Appendix 1.

CHAPTER V

Summary

The purpose of this project was to gain knowledge regarding the needs of elementary-age children transitioning back to the school system after experiencing a mild traumatic brain injury (mTBI). This information was gathered through a comprehensive literature review of research gathered through databases and other credible resources. There were gaps in the existing literature related to the needs of children with mTBIs when transitioning back to school. The gaps included: (a) inconsistent approaches with the hospital to school transition, (b) lack of information shared with their school regarding their TBI, (c) insufficient educational services, (d) educators with limited knowledge regarding TBI symptoms, and (e) transitioning back to school with little to no support with their educational demands (Gioia, Glang, Hooper, & Brown, 2016; McAvoy & Haarbauer-Krupa, 2019; Rivara et al., 2012). Based on the literature, occupational therapy practitioners play an important role in collaborating with school personnel who work with children in this population to provide recommendations and modifications for educational activities.

After completing the literature review, the guide *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners*, was developed as a resource for occupational

therapy practitioners to collaborate with academic staff when working with elementary-age children with mTBIs in the school setting. This project was created based on the Person Environment Occupation Model (PEO) by Law and colleagues (1996). The PEO model directed the author's analyses of education and related occupations that occur in the school setting, as well as the components transactions (PxE, PxO, and OxE). After experiencing a mTBI, an elementary-age child may have challenges with physical, cognitive, sensory, and affective person factors which can impact a child's learning, participation, and socialization in the academic setting. The purpose of the guide is to provide occupational therapy practitioners with resources for interventions, assessments, as well as consultation tools to use with teachers who interact with these children.

Implementation

The creators of this guide hope that it will be used in elementary schools across the nation to support effective collaboration between teachers and occupational therapy practitioners while offering direct and indirect interventions. The intent is for the product to be used across the United States by occupational therapy practitioners, but a first step will include a pilot and review by occupational therapy practitioners. The information in the guide will benefit not only elementary students with mTBIs, but also occupational therapy practitioners and teachers working with the population. The creators of the guide hope that there is a continued attempt to increase the services for elementary-age children returning back to school after acquiring a mTBI.

Limitations and Recommendations

There are a number of limitations and recommendations following the creation of the program guide. First, a limitation to the guide *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners*, consists of limited consultation cards for collaboration between the teachers and occupational therapy practitioners due to time constraints. A recommendation would be to further develop additional collaboration cards for the guide. In doing this, it may be beneficial to work specifically with a child who has transitioned back to elementary school after experiencing a mTBI in order to best determine which occupations the cards may aid in completing. The last recommendation to improve the guide, would be to expand the guide for all school ages opposed to only elementary-age children. This would require additional time and resources.

The second limitation to the guide *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational Therapy Practitioners*, is that it has not yet been used by occupational therapy practitioners that work with children with mTBIs in the elementary setting. To understand the strengths and areas of growth of the guide, implementation of the guide is necessary before taking in feedback and making edits. Following the implementation of the guide, the developers of the guide hope outcomes will show the benefits for not only the elementary student returning to school after a mTBI, but also teachers and occupational therapy practitioners who work with the population.

Conclusion

Overall, the guide *Supporting Educational Performance for Elementary Children with Mild Traumatic Brain Injury: A Guide for Occupational* has effective approaches and was created with evidence-based research and created through the lens of the PEO model (Law et al., 1996). This guide facilitates collaboration with occupational therapy practitioners, elementary teachers, and essential academic staff to provide evidence-based interventions to use with elementary-age children who have experienced a mTBI. Occupational therapy practitioners have the unique skill set to provide recommendations and modifications for this population. Additionally, occupational therapy practitioners can collaborate with teachers and essential staff to implement the recommendations in order to meet the needs of the children. Through the development of the guide, the creators hope there will be an increase in the amount of services for elementary-age children with mTBIs when transitioning back to the school setting.

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APPENDIX



**SUPPORTING EDUCATIONAL
PERFORMANCE FOR ELEMENTARY
CHILDREN WITH MILD TRAUMATIC BRAIN
INJURY: A GUIDE FOR OCCUPATIONAL
THERAPY PRACTITIONERS**

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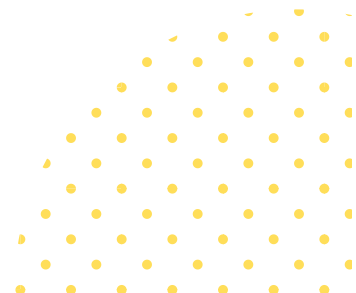


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Introduction

Overview of the Guide

The purpose of this guide will focus on providing a tool for occupational therapy practitioners to utilize when working with school systems, teachers, and elementary-age children with mild traumatic brain injuries (mTBI) transitioning back to the occupation of education in the academic environment. More specifically the guide will target educators with limited knowledge of teaching children with mTBIs and provide interventions for occupational therapy practitioners who work with this population in the school systems. This product will also provide occupational therapy practitioners with resources for interventions, assessments, as well as consulting tools to use with teachers who interact with children with mTBIs.

Included in this guide is: (a) a systematic analysis of education in the elementary school environment for children with mTBIs, (b) a collection of additional resources for teachers, families, and healthcare providers, (c) a description of occupational therapy assessments analyzed through the lens of PEO, (d) an occupational performance evaluation chart and a description of how to use the chart based, (e) a case study and evaluation example, (f) direct occupational therapy interventions broken into four approaches based on PEO, (g) and indirect occupational therapy approaches in the form of Educational Support Cards for children with mTBIs.

Defining Mild Traumatic Brain Injury

Traumatic brain injuries are the leading cause of disability among children affecting 100-300/100,000 of the childhood population each year (Jones et al., 2018). The

severity of a TBI is determined by the Glasgow Coma Scale (GCS), a scale focusing on three aspects of responsiveness: eye-opening, motor, and verbal responses. The GCS breaks down the brain injury on a scale of 1-15 (Teasdale & Jennett, 1976). A mild brain injury has a GCS score of 13 to 15 (National Institute of Neurological Disorders and Stroke [NINDS], 2015). A mTBI occurs with a brief (few seconds or minutes) loss of consciousness, but may also happen without loss of consciousness and the person may be confused (NINDS, 2015). When undergoing brain scans, the brain may appear normal, but symptoms typically occur including physical, cognitive, emotional, and sleep disturbances (Gioia, Hooper, & Brown, 2016).

Elementary-age children who have experienced mTBI receive minimal to no educational services and supports upon returning to school. Many students with mTBI may experience any of the following after injury: (a) inconsistent approaches with the hospital to school transition, (b) lack of information shared with their school regarding their TBI, (c) provided with insufficient educational services, (d) work with educators with limited knowledge regarding TBI symptoms, and (e) transition back to school with little to no support regarding their educational demands (Gioia, Glang, Hooper, & Brown, 2016; McAvoy & Haarbauer-Krupa, 2019; Rivara et al., 2012).

Section I

Theoretical Background

Information obtained from the literature review was organized using the Person Environment Occupation (PEO) model by Law and colleagues (1996) and was used to guide the development of this product. The PEO model was selected to guide the development of this product to enhance the transition of elementary-age children returning to school after experiencing a mTBI. The model was selected due to its unique way of organizing and addressing the individual aspects of the person, environment, and occupations, then synthesizing how each aspect influences occupational performance (Cole & Tufano, 2008). The PEO model defines ‘person’ as a unique being with a variety of roles who is viewed holistically-mind, body, and spirit ever-developing who constantly interacts with their environment (Law et al., 1996). How ‘person’ is defined will influence their interactions with the environment and how they carry out occupational performance (Law et al., 1996). ‘Environment’ is defined as the context that surrounds the person (Law et al., 1996). For this guide, the overarching environment will include the academic setting and several areas within the school building. ‘Occupations’ are considered activities and tasks done to accomplish a purpose (Law et al., 1996). Occupational performance is shaped by the transactions between the person, environment, and occupation (Law et al., 1996). The PEO model assumes that person, environment, and occupation have an overlap or ‘fit’ in which the area of occupational performance can be changed based on maximizing the fit or lack of fit (Law et al., 1996).

Objectives of the Guide

The objectives of this product were developed following the PEO model and are outlined by the PEO concepts.

1. Understand the effects of mTBI on the physical, cognitive, sensory, affective and spiritual aspects of an elementary-age child.
2. Understand how the school's physical, social, institutional, cultural, and virtual environments play a role in addressing occupational performance.
3. Understand how occupations occurring in the school setting may be impacted by mTBI.
4. Understand the impact of mTBI and apply it to the intervention process in the academic setting.
5. Understand the evaluation process for returning to and participating in the academic setting for elementary students with mTBI.

Performance Issues

A systematic analysis of occupational performance was completed to determine overarching transactions between the person, environment, and occupation as shown in Table 1. areas of need were identified using the PEO model. First each component, the person, environment, and occupation were assessed individually. Then the transactions between the person and the occupation, the occupation and the environment, and the person and the environment were assessed. From this systematic analysis and the literature, interventions were created, and additional resources were collected to improve the occupational performance of education for elementary children transitioning from the hospital back to the school setting following a mTBI.

Table 1

Systematic Analysis of Occupational Performance of Education in the School Environment for Elementary-Age Children with mTBIs.

Occupational Performance Education and related occupations that occur in the school context.		
Assessment of Main Components		
Person	Environment	Occupations: Each of which have their own demands
<p>Physical:</p> <ul style="list-style-type: none"> • Children can experience physical symptoms involving gross and fine motor after a mTBI (Kanchan et al., 2018). • A child’s voice and speech functioning may be affected including oral motor dysfunction, articulation, and swallowing (Turkstra, Williams, Tonks & Frampton, 2008; Mei, Anderson, Waugh, Cahill, & Morgan, 2018). • Children may experience common symptoms of mTBI, such as headache, dizziness, and difficulty focusing (Hung et al., 2014). • Children may experience changes in sleep patterns (e.g., insomnia or hypersomnia), excessive drowsiness, or feelings of disorientation or "fogginess" (ASHA, 2019). 	<p>Physical:</p> <ul style="list-style-type: none"> • Classroom • Lunchroom • Recess/playground • Gymnasium • Music classroom • Art classroom • Restrooms • Computer room <p>Social:</p> <ul style="list-style-type: none"> • Teachers • Peers • Staff • Occupational therapists • Rehabilitation team • IEP/504 team <p>Institutional:</p> <ul style="list-style-type: none"> • The overall school building, classes, and classroom. 	<p>Self-care:</p> <ul style="list-style-type: none"> • Eating • Drinking water from the fountain (Orentlicher et al., 2017). • Toileting • Dressing (putting on a jacket or shoes) (Orentlicher et al., 2017). <p>Productivity/Work (Education):</p> <ul style="list-style-type: none"> • Assignments (math, English, social studies, science, health/physical education, art, and music). • Taking tests (American Occupational Therapy Association [AOTA], 2014). <p>Leisure:</p> <ul style="list-style-type: none"> • Play • Recess • Extracurricular activities • Physical education • Art • Lunch • School assemblies (AOTA, 2014)

<p>Cognitive:</p> <ul style="list-style-type: none"> • <i>Attention:</i> A child may have, deficits in shifting attention between tasks, difficulty with selective attention, impaired sustained attention for task completion or conversational engagement, automatic processing, control processing, reduced attention span, or vigilance (ASHA, 2019; Brown, 2019). • <i>Executive Function:</i> A child may have difficulties with cognitive flexibility, impulse control, decision making, judgement, conceptual reasoning, problem solving, reasoning, goal setting, initiation, strategy selection, self-monitoring concept formulation, categorization, schemas, scripts, or metacognition (Babikian, Merkley, Savage, Giza, & Levin, 2015; Gioia et al., 2016; ASHA, 2019; Brown, 2019). • <i>Memory:</i> Impairments can include difficulty with semantic memory, episodic memory, procedural memory, short term memory, deep processing, long term memory, or working memory (Turkstra, Williams, Tonks & Frampton, 2008; 	<ul style="list-style-type: none"> • Individuals with Disabilities Education Act (IDEA) added in traumatic brain injury as a category (P.L. 101-476). • There are currently no legal mandates in place that address transitions throughout K-12 grades, meaning a child’s transition may not be addressed as carefully as needed (Orentlicher et al., 2017). • 504 plans • IEP plans • Healthcare systems that acutely treated the child’s mTBI. • School district policies • State and federal policies • The hospital to school transition is currently considered a restrictive factor in the provision of educational services to children with TBIs (Dettmer, Ettel, Glang, & McAvoy, 2014). • Weak transitional links between medical and educational settings increase the misidentification of students with TBI (Todis, McCart, & Glang, 2018). • When transition services were provided, most children received short-term, medical focused assistance rather than educational services, and these services were often handled by parents rather than healthcare personnel (Todis et al., 2018). 	<p>Rest/Sleep:</p> <ul style="list-style-type: none"> • Nap time
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<p>Mei, Anderson, Waugh, Cahill, & Morgan, 2018; Brown, 2019).</p> <ul style="list-style-type: none"> • <i>Visual Perceptual</i>: A child may experience changes in perception of color, shape, size, depth or distance, as well as discriminating between two objects or locating visual targets. (ASHA, 2019; Toglia, Golisz, Goverover, 2014). <p>Sensory:</p> <ul style="list-style-type: none"> • Children may experience hypervigilance or heightened sensory sensitivity with exaggerated reactions to perceived threats (ASHA, 2019). • <i>Hearing</i>: Auditory dysfunction from injury to the outer ear, middle ear, inner ear, and/or temporal lobe, resulting in central auditory dysfunction; difficulty hearing speech in noise; dizziness, vertigo, and/or imbalance; hypersensitivity to sounds (hyperacusis); loss of postural stability/control; or tinnitus (ASHA, 2019). • <i>Sight</i>: Changes in visual acuity; double vision; problems with visual convergence and accommodation, sensitivity to light, visual field 	<p>Cultural:</p> <ul style="list-style-type: none"> • Religious school settings • Sunday school classes • Clubs such as Christian Athletes Association. • Variance of race, ethnicity, and culture among peers and school staff. <p>Virtual:</p> <ul style="list-style-type: none"> • Screen time such as using tablets or computers. 	
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<p>deficits/visual neglect (ASHA, 2019).</p> <p>Affective:</p> <ul style="list-style-type: none"> • <i>Emotion/ Mood:</i> Children may experience an increase in behaviors such as aggression, impulsivity, hyperactivity, withdrawal, obsessions and compulsions, lack of emotion, over emotional, emotional lability, mood swings, loss of self-control, anxiety, depression, emotional perception, apathy or lack of motivation, or reduced frustration tolerance (ASHA, 2019; Kirk, Fallon, Fraser, Robinson, & Vassallo, 2015). • <i>Social:</i> Children with mTBI can also develop poor conduct and problems with empathy, peer relationships, social skills, self-regulation, turn taking, social rules, social problem solving, social isolation, or social language use (Ryan et al., 2014; Rosema, Crowe, & Anderson, 2012; Yeates, 2010). 		
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Table 2
PEO Transactions

P x E	P x O	O x E
<ul style="list-style-type: none"> • Light and noise sensitivity can disrupt a child’s ability to maintain attention in school environments (Gioia, Hopper, & Brown, 2016). • Students with mTBI, using technology, anything visually stimulating, or at a loud volume, may exacerbate symptoms (Davies, 2016). • Due to sensory stimulation within the environment a child may appear overwhelmed or overly excited in stimulating or crowded environments such as the lunchroom, gym, or assemblies (Dettmer et al., 2018). • Behavioral challenges can negatively impact a child’s ability to socialize with peers in school (B Babcock et al., 2013; Yeates, 2010). • Difficulties such as social and emotional cue interpretation, response generation, turn taking, and following social norms are difficult for students with mTBI when 	<ul style="list-style-type: none"> • Reduced motor dexterity and tremors can impact a child’s success with: (a) cutting, drawing, or writing skills, (b) motor planning difficulties such as dyspraxia, (c) impaired dressing or assembly skills, (d) challenges with written work such as dysgraphia which can affect written communication, (e) shaky hands during fine motor tasks, (f) difficulty eating, (g) holding a pencil with a nontraditional grasp, (h) difficulty shifting from the workbook or board to writing answers on paper, (i) difficulty with or avoiding recess and physical education class (Kanchan et al., 2018; Dettmer, et al., 2018). • Changes in a child’s motor system such as balance or postural instability can affect motor performance that is important for return to physical activities such as gym class or extracurricular activities (Barlow, 2010; Stephens, Salorio, Denckla, Mostofsky, & Suskaurer, 2017). 	<ul style="list-style-type: none"> • Eating lunch takes place in the cafeteria. • Eating during snack break typically takes place in the classroom. • Using the restroom can occur in single or multi-stall restrooms. • Assignments, homework, tests, or educational activities can be completed in the classroom, hallway, small room, or in the home environment. • Playing with peers can take place in different classrooms within the school building or outside on the playground. • Leisure or educational activities can be completed virtually. • Leisure or educational activities can be completed with peers or school faculty from different races or ethnicities. • When transition services are provided, most cases are minimal, short-term, and focused on medical factors opposed to educational factors

<p>building social relationships and using social skills involved in communication (Turkstra, Williams, Tonks & Frampton, 2008).</p> <ul style="list-style-type: none"> • There is a significant proportion of students, 46-63% (Kingery et al., 2017) who are not receiving academic services that they may require. • The disconnect between healthcare and education systems can influence whether a student receives additional services in school or not (Hartman, Duncanson, Farahat, & Lindsay, 2015; Roscigno, Fleig, & Knafl, 2015). • In the educational system, teachers have insufficient training in their academic programs regarding TBIs and receive little to no information regarding a students' TBI recovery which overall impacts the students transition back to the academic environment (McKinlay & Buck, 2019; Todis et al., 2018). • When looking within the school system, 76% of children with TBIs were not on an individualized education plan (IEP) and 67% of the 	<ul style="list-style-type: none"> • The cognitive impairments a child may experience after a TBI underly the student's ability to (a) comprehend written materials, (b) complete math calculations and application, (c) remember facts in content of subjects, (d) fluently express written work, (e) integrate and apply new information, (f) and interact with other classmates and the environment (Bedell & Dumas, 2004; Gioia et al., 2016; Lindsay et al., 2015). • Behavioral difficulties a child may experience can include but are not limited to, reduced quality of life, educational under achievements, and social exclusion resulting in decreased social participation (Li & Liu, 2013). • Due to a child's difficulties in attention and concentration a child may: (a) jump from one task to another, (b) give up on completing a homework task, (c) not complete their homework, (d) make careless mistakes with schoolwork, (e) easily misplaces homework or school items, (f) shift attention from one task to another or, (g) take poor notes (Dettmer et al., 2018). • Due to decreased function in processing speed a child may: (a) not follow instructions or discussions, (b) have 	<p>resulting in a less education focused approached (Todis et al., 2018).</p>
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<p>children were not utilizing 504 services (Todis et al., 2018).</p>	<p>delayed responses or is slow to complete homework, (c) difficulty following lectures, (d) difficulty taking timed tests, (e) difficulty doing more than one activity at a time, (f) unwilling to engage in conversation or, (g) have inconsistent learning of new information (Dettmer et al., 2018).</p> <ul style="list-style-type: none"> • Cognitive and physical activities such as completing classwork or participating in gym class can cause symptoms to flare and increase recovery time (Davies, 2016). • Challenges with memory a child may experience can include: (a) remembering more than one task at a time, (b) failing tests in spite of studying, (c) repeatedly asking the same question, (d) splintered learning or inconsistent educational performance, (e) comprehending only part of the instructions resulting in difficulty with completing homework or participating in class (Dettmer et al., 2018). • Due to challenges with sensory processing, a child may experience: (a) increased distraction during classroom activities, (b) difficulty reading, (c) difficulty with seatwork, (d) struggle with classroom transitions, (e) picky about 	
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	<p>clothing, (f) difficulty completing worksheets with too many items, (g) excessive erasing or crossing out words, (h) difficulty with large group discussion or working in groups or, (i) difficulty keeping hands to themselves in class (Dettmer et al., 2018).</p>	
<p>Formulation of Occupational Performance Issues P x E x O</p>		
<p>When evaluating a child with a mTBI there are many areas in the academic setting in which they are required to engage in. Transitional services are limited and medically focused opposed to focusing on the occupation of education. Varying occupations in differing environments can inhibit or facilitate a child’s ability to learn. A child with a mTBI may experience physical, cognitive, or sensory challenges that can impact occupations that are required to be completed in the school setting. With difficulties being influenced by the symptoms of a mTBI, elementary-age children require additional supports when interacting with the school environment which may exacerbate symptoms, impact sensory processing abilities, and increase challenges socializing with their peers. Furthermore, when exploring the institutional aspects of the environment, school professionals have limited training and knowledge in working with children who have sustained a mTBI leading to the impediment of a child’s learning in their academic environment.</p>		

Section II

School Service Process

In order for children with mTBI to receive services a referral or request for evaluation by the school team, medical provider, or parent is needed... School districts have standardized pre-referral and referral processes, which differ from state to state, that are overseen by the committee. Discussion of special educational services are completed with the school district liaison who arranges team meetings. This team may consist of the family, child, director of special education, principal, special education teacher, school nurse, rehabilitation professionals, primary care physician, psychologists, or social workers (Frey, 2019).

Federal Legislation

In the United States during 1990, Public Law 101-476 amended the Public Law 94-142 to ensure special education services were available to provide fair and appropriate services, establish standards for special education, and to provide federal funds to states for students with disabilities. As time progressed, the law also progressed to the title of Individuals with Disabilities Education Act (IDEA) and added in traumatic brain injury as a category (P.L. 101-476). The federal law defined traumatic brain injury as a brain injury caused by an external force resulting in physical and or psychosocial impairments, which ultimately affect a child's educational performance (Connery, Peterson, Baker, & Kirkwood, 2016). The category for TBI has existed under IDEA since 1990; however, the census for this category is low when compared to rates of injury in children overall (Connery, Peterson, Baker, & Kirkwood, 2016).

Early intervening services are provided to students who may require support with general education. If a child is not screened for early intervening services, they may be referred for services by any source including parents, school staff, or other individuals. A child will then be evaluated in all areas related to the suspected disability for example, mTBI. Results from the evaluation will determine if a child will receive special education or related services. Within 30 days after a child is determined eligible for special education and related services, and IEP team must develop an IEP. The child will receive services as soon as parental consent is confirmed. The school ensures the child's IEP is being implemented as written. The IEP is reviewed by the IEP team annually or more often if the parents request a review (Cahill & Bazyk, 2019). At least every three years, a child is required to be re-evaluated to determine if the child still needs services defined by IDEA.

A child with a disability who is not eligible for special education under IDEA may qualify for services under Section 504 of the Rehabilitation Act of 1973 (Cahill & Bazyk, 2019). Under this section disability is defined as “a physical or mental impairment that substantially limits one or more major life activities, who has a record of such impairment, or is regarded as having such impairment” (34. C.F.R. 104.3(j) (2) (i)). It is not required for school personnel to develop IEPs for students served under the Rehabilitation Act, however, a team should still develop a written plan that states goals, services, and accommodations needed to meet those goals (Cahill & Bazyk, 2019). Evaluation procedures are individual to each student and the specific areas of educational need. They ensure children are not misclassified, unnecessarily labeled, or incorrectly placed (Office for Civil Rights (OCR, 2020). While determination for an IEP for special

education is ongoing, a student with a 504 plan in place is allowed accommodations and services, as opposed to not receiving services during the transition back to school (Grandinett, 2014).

Barriers to Transition

Children are initially provided intervention while in the acute state for symptoms such as vision and cognition which can impact performance in the school setting. Following leaving the medical system, children and families are faced with the difficulty of navigating the transition to the education system with limited guidance (McAvoy & Haarbauer-Krupa, 2019). Many students with TBI may experience any of the following after injury: (a) inconsistent approaches with the hospital to school transition, (b) lack of information shared with their school regarding their TBI, (c) provided with insufficient educational services, (d) work with educators with limited knowledge regarding TBI symptoms, and (e) transition back to school with little to no support with their educational demands (Gioia, Glang, Hooper, & Brown, 2016; Rivara et al., 2012; McAvoy & Haarbauer-Krupa, 2019). Even though a child may have received services in the medical setting, they spend the majority of their recovery in the academic setting, emphasizing the need for those in the school environment to be aware of the child's mTBI and what services should be provided (McAvoy & Haarbauer-Krupa, 2019). The following resources are intended to assist families, schools, and providers in navigating the transition between the medical and educational settings.

Additional Resources

School Letter: Returning to School After a Concussion

- This letter offers input from a healthcare provider with experience in treating concussion, a type of traumatic brain injury. This letter was created to help school professionals and parents support students returning to school after a concussion.
 - https://www.cdc.gov/traumaticbraininjury/pdf/pediatricmtbiguidelineeducationaltools/mTBI_ReturntoSchool_FactSheet-Pin.pdf

Help Children Return to School After a TBI

- Informational flyer for parents regarding a TBI. Provides information on how a TBI may impact a child's ability to participate in school. Discusses the importance of coordination between the medical and educational settings. Lastly, provides brief information regarding services a child may qualify for upon transitioning back to school.
 - <https://www.cdc.gov/traumaticbraininjury/pdf/reportstocongress/managementoftbiinchildren/factsheets/TBIRTCFS-Schools-508.pdf>

Section III

Occupational Therapy Process

When a child is deemed eligible for 504 or IEP services, an occupational therapy practitioner will be a part of the process to determine the best fit recommendations for the child. The occupational therapy practitioner will follow the PEO model (Law et al., 1996) process to determine appropriate interventions. The first step in evaluation according to the PEO model is to identify the occupational performance challenges. After occupational performance challenge are identified, the occupational therapy practitioner will assess the main components impacting occupational performance looking at the person, environment, and occupation elements. After all elements of the person, occupation, and environment are identified, an assessment between the PxO, PxE, and OxE transaction will occur. The transactions will determine which occupational performance issues will be targeted in interventions. Then using theoretical approaches, interventions and recommendations will be formed to improve the PEO fit.

Provided below are recommended assessments to use when evaluating an elementary-age child with a mTBI while using the PEO model. Each assessment should be selected after verifying the occupational performance challenges of the child. When selecting an assessment guided by PEO, the occupational therapy practitioner should refer to the PEO Process Chart that is provided below. Following the PEO process chart, is a case study example.

Table 3

Assessments for Occupational Therapy Practitioners to use in the School Setting

Assessment	PxExO Factors
Behavioral Assessment of the Dysexecutive Syndrome in Children (BADS-C) (Emslie, Wilson, Burden, & Nimmo-Smith, 2003)	
<ul style="list-style-type: none"> • This is an instrument that predicts the presence and severity of executive problems in everyday life. The assessment measures inflexibility, perseveration, problem solving, planning, judgement, estimation, and behavioral regulation of children with neurodevelopmental disorders • 35-45 minutes • 7-16 years old • https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Cognition-%26-Neuro/Behavioural-Assessment-of-the-Dysexecutive-Syndrome-in-Children/p/100000707.html?tab=product-details 	PxO
Behavior Rating Index of Executive Function 2 (BRIEF) (Gioia, Isquith, Steven, Guy, & Kenworthy, 2015)	
<ul style="list-style-type: none"> • Assesses the executive function and behaviors a child is experiencing in the school and home environments. The assessment is based on three indexes– Inhibitory Self-Control, Flexibility, and Emergent Metacognition. • 10-15 minutes • 5 to 18 years old • https://www.parinc.com/Products/Pkey/23 	PxExO
Beery-Buktenica Developmental Test of Visual-Motor Integration Sixth Edition (Beery, Buktenica, & Beery, 2010)	
<ul style="list-style-type: none"> • Explores difficulties a child may be having with visual perception and motor coordination. VMI identifies significant difficulties in integrating or coordinating visual perceptual and motor (finger and hand movement) abilities. • 10-15 minutes • 2 years old and up • https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Academic-Learning/Brief/Beery-Buktenica-Developmental-Test-of-Visual-Motor-Integration-%7C-Sixth-Edition/p/100000663.html 	PxO

Bruininks-Oseretsky Test of Motor Proficiency (BOT-2) (Bruininks & Bruininks, 2005)	
<ul style="list-style-type: none"> • Explores a comprehensive measure of gross and fine motor skills. Areas of assessment include fine motor precision, fine motor integration, manual dexterity, bilateral coordination, balance, running speed and agility, upper limb coordination, and strength. • 45-60 minutes (short form available 15-20 minutes) • 4-21 years old • https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Motor-Sensory/Bruininks-Oseretsky-Test-of-Motor-Proficiency-%7C-Second-Edition/p/100000648.html 	PxO
Childhood Executive Functioning Inventory (Catele, Meulemans, & Thorell, 2008)	
<ul style="list-style-type: none"> • Assesses the executive functions of working memory, planning, regulation, and inhibition through a behavior rating scale. This assessment can be given to either the parents or teachers to fill out on a student. • 15 minutes • 8-11 years old • https://www.chexi.se 	PxO
Child Occupational Self-Assessment (COSA) (Keller, Kafkes, Basu, Feerico, & Kielhofner, 2005)	
<ul style="list-style-type: none"> • Looks at children’s perception of occupational competence and importance of everyday activities. The COSA consists of a series of statements pertaining to everyday occupational participation, and includes tasks related to school, home, and in the community. • 25 minutes • 8-13 years old • https://www.moho.uic.edu/productDetails.aspx?aid=3 	PxExO
Children’s Kitchen Task Assessment (Rocke, Edwards, Hays, & Berg, 2008)	
<ul style="list-style-type: none"> • Assess executive function (initiation, sequencing, safety judgment, organization, working memory) in a child through the child’s performance of the novel task of making play dough. • 20 minutes • 8-12 years old 	PxO

<ul style="list-style-type: none"> • https://www.ot.wustl.edu/about/resources/childrens-kitchen-task-assessment-367 	
Developmental Test of Visual Perception-3 (Hammill, Pearson, & Voress, 2014)	
<ul style="list-style-type: none"> • Determines whether a child demonstrates age-appropriate visual-motor integration skills. Areas of assessment include cognition, coordination, developmental, dexterity, infant/child development, and vision/perception. This tool assists children to obtain needed services. • 30 minutes • 4-12 years old • https://www.proedinc.com/Products/13700/dtvp3-developmental-test-of-visual-perception--third-edition.aspx 	PxO
Dynamic Occupational Therapy Cognitive Assessment for Children (DOTCA-Ch) (Katz & Parush, 2007)	
<ul style="list-style-type: none"> • Provides baseline measure for interventions cognition and learning with a focus on orientation, spatial perception, praxis, visual motor, and thinking operation. Also identifies potential areas of cognitive strengths were a child may benefit from medicated learning. It also estimates learning potential by determining thinking strategies and use of dynamic procedures. • 60-90 minutes • 6-12 years old • https://www.maddak.com/dotcach-battery-p-27813.html 	PxO
Miller Function and Participation Scales (M-FUN) (Miller, 2006)	
<ul style="list-style-type: none"> • Assess a child’s performance related to school and home participate with an emphasis on motor skill performance. Areas of assessment include occupational performance, processing speed, reasoning/problem solving, self-efficacy, social relationships, strength, touch, upper extremity function, vestibular, and vision/perception. • 45-60 minutes • 2.6-7.11 years old • https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Developmental-Early-Childhood/Miller-Function-and-Participation-Scales/p/100000557.html 	PxExO
Participation and Environment Measure— Children and Youth (PEM-CY) (Coster, Law, Bedell, Anaby, Khetani, & Teplicky, 2014)	

<ul style="list-style-type: none"> Assesses participation in the home, school, and community to understand environmental factors of participation. This assessment is a parent-report survey measure. 25-40 minutes 5-17 years old Coster, Law, Bedell, Anaby, Khetani, & Teplicky (2014) https://canchild.ca/en/shop/2-pem-cy-participation-and-environment-measure-children-and-youth 	PxExO
Pediatric Test of Brain Injury (PTBI) (Hotz, Helm-Estabrooks, Wolf Nelson, & Plante, 2007)	
<ul style="list-style-type: none"> Assesses children’s curriculum-relevant neurocognitive, language, and literacy abilities. This assessment identifies strengths and weaknesses, targets effective interventions, makes sound decisions about school reintegration, monitors functional changes, and tracks recovery patterns over time. 30 minutes 6 to 16 years old https://www.parinc.com/Products/Pkey/340 	PxO
Pediatric Volitional Questionnaire (PVQ) (Basu, Kafkes, Schatz, Kiraly, & Kielhofner, 2008)	
<ul style="list-style-type: none"> Play-based assessment exploring a child’s weakness and strengths in a variety of settings. This assessment is completed through observation of the child’s daily behaviors and occupations to assess volition. 10-30 minutes 2-7 years old https://www.moho.uic.edu/productDetails.aspx?aid=7 	PxExO
Perceived Efficacy and Goal-Setting System (PEGS) (Missiuna, Pollock, & Law, 2004)	
<ul style="list-style-type: none"> Enables children with a disability to self-report their perceived competencies in everyday occupations and set goals for interventions. Areas of assessment include activities of daily living, life participation, occupational performance, and self-efficacy. 40-60 minutes 5-9 years old https://www.canchild.ca/en/resources/48-perceived-efficacy-and-goal-setting-pegs 	PxO

School Setting Interview (Hemmingsson, Egilson, Hoffman, & Kielhofner, 2005)	
<ul style="list-style-type: none"> • Considers the student's occupational performance in all environments in which she or he assumes the student role, including the classroom, playground, gymnasium, hallways and fieldtrips. Within each of those environments life participation, social relationships, quality of life, attention/working memory, assertiveness, and patient satisfaction is addressed. • 30 minutes • 8-16 years old • https://www.moho.uic.edu/productDetails.aspx?aid=10 	PxExO
Sensory Processing Measure (Parham, Ecker, Miller Kuhaneck, Henry, & Glennon (2007)	
<ul style="list-style-type: none"> • An assessment of sensory integration/sensory processing that gathers information about a child's behavior, coordination, and participation at home, in the community, and/or at school. Separate scores are provided for social participation, five sensory systems, and motor planning in the home and in the child's main classroom at school. Additional scores may be obtained for six different school settings, including art class, music class, physical education class, the playground, the cafeteria, and the school bus. • 15-20 minutes • 5-12 years old • https://www.wpspublish.com/spm-sensory-processing-measure 	PxExO
Sensory Profile 2 (Dunn, 2014)	
<ul style="list-style-type: none"> • The Sensory Profile is a measure of a child's responses to sensory events in their environment. It provides an overall picture of the child's sensory processing patterns contributing to or creating barriers to a child's performance in daily activities. Eight areas of sensory input asses: auditory, visual, activity level, taste/smell, body position, movement, touch, and emotional/social. • 5-20 minutes • Birth-14 years, 11 months old • https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Motor-Sensory/Sensory-Profile-2/p/100000822.html 	PxExO

*It should be noted there are limited assessments that evaluations specifically the occupation and environment. Assessments for the OxE can be completed through skilled observation of the classroom.

How to use the PEO Process Chart (Strong & Rebeiro-Gruhl, 2019)

1. Occupational Performance Challenges

- Identify the occupational performance challenges by developing the occupational profile.
 - Asking the client what they are currently struggling with or use an appropriate occupational profile assessment, such as the Child Occupational Self-Assessment.

2. For each of the occupational performance challenges: Identify pertinent aspects of the Occupation, Person, and Environment

- **Occupation:** Activities a child needs to engage in while at school. They can be classified into selfcare, leisure and productivity.
- **Person:** This area refers to what the person is feeling, thinking, and doing. Additionally, aspect of spirituality is included in this section such as values and beliefs. Person can be classified into physical, cognitive, sensory, and affective.
- **Environment:** This is the context in which the occupation is performed. Environment can be classified into physical, social, institutional, cultural, and virtual.

3. Assess the transactional process between the PxO, PxE, and ExO transactions

- Assessing the transactional relationship between the factors that support or constrain occupational performance in a given environment.

4. Construction of Occupational Performance Challenge(s)

- Synthesize the information between the PxExO to identify barriers and supports.

5. Approaches to Guide Intervention

- In this section, selection of therapeutic approaches to guide interventions is completed. Approaches include neurocognitive, sensory, social/emotional/behavioral, and visual-perceptual.

6. Recommendations for PEO Fit

- Provide recommendations and develop a plan to improve the occupational performance aka PEO fit.

Why use the PEO Process Chart:

The PEO model supports occupational practice through a systematic analysis of occupational performance. The PEO model represents the occupational therapy lens, while articulating practice and advocating for the role and value of occupational therapy. In this manner, the PEO model facilitates communication within and outside of the profession which is critical when working in the school systems and supporting children with mTBIs (Strong & Rebeiro-Gruhl, 2019).

Table 4

Occupational Performance Challenge(s)		
<ul style="list-style-type: none"> • • • • 		
Assessment of Main Components Impacting Occupational Performance		
Occupation	Person	Environment
Assessment of Transactions: PxExO		
PxO	PxE	OxE

Construction of Occupational Performance Challenge(s)

Approaches to Guide Intervention

Recommendations for PEO Fit

*The chart was modified and adapted from Strong & Rebeiro-Gruhl (2019).

Case study

At age 10, Sara fell off the swing set from a height of 17 feet. She broke her arm and was diagnosed with a mTBI. She stayed at home for several days before returning to school. Prior to her accident she was a model student and had done well in her previous grade levels. She enjoyed playing games on the computer and reading. Upon returning to school, her parents informed her teachers and essential school staff regarding the accident. The first months back at school were hectic for both Sara's parents and teachers. Sara appeared irritable, got very little sleep, reported having headaches often, and could only attend to tasks for a few seconds at a time. She had spelling deficits, difficulty with word-finding, and challenges in remembering what she had read. Sara's teacher reported she appears to be more distracted when several kids are in the classroom. Sara additionally reported it was hard for her to make friend since she had been back to school and before the accident, she had a lot of friends. Sara complained of feeling "dumb" and left out by her peers who no longer include her in activities. Sara's teacher reported noticing Sara having a hard time interacting with her peers and would often have abnormal behaviors when interacting with them. Sara is from a small town in Minnesota with small class sizes.

Table 5
Overall Analysis of Occupational Challenges of Sara

Occupational Performance Challenge(s)		
<ul style="list-style-type: none"> • Participation in the occupation of education. 		
Assessment of Main Components Impacting Occupational Performance		
Occupation	Person	Environment
<ul style="list-style-type: none"> • Productivity/Work (Education): Assignments in multiple subjects, taking tests, and participating in classes such as: English, math, and art. • Leisure: Engaging in recess, unstructured free time, and play with peers. Sara enjoys playing games on the computer and reading. • Rest/Sleep: Sara reports difficulty sleeping and feeling tired more often than not. 	<ul style="list-style-type: none"> • Affective <ul style="list-style-type: none"> ○ <i>Emotion/Mood:</i> Sara experiences increased behaviors such as aggression, impulsivity, feels withdrawn, and has a reduced frustration tolerance. ○ <i>Social:</i> Sara has a hard time with peer relationships, social skills, turn taking, social rules, and is feeling socially isolated. • Sensory: Sara experiences increased hypervigilance to loud noises. • Cognitive <ul style="list-style-type: none"> ○ <i>Attention:</i> Sara is having difficulty with her selective attention, sustained attention, automatic processing, control processing, and over all attention span skills. ○ <i>Executive Function:</i> Sara struggles with impulse control, decision making, judgment, conceptual reasoning, and problem solving. ○ <i>Memory:</i> Sara has challenges with memory processing and working memory skills. 	<ul style="list-style-type: none"> • Physical: <ul style="list-style-type: none"> ○ Classroom ○ Lunchroom ○ Playground ○ Gymnasium ○ Music room ○ Art room • Social: <ul style="list-style-type: none"> ○ Teachers: Sara has a primary teacher, a physical education teacher, and an art teacher. ○ Peers: 25 students in her class and 5 reported close friendships. ○ Staff: Lunchroom faculty, recess faculty, and classroom aids. • Institutional: Sara attends a public school that is K-6th grades. The school consists of 250 students but Sara has only 25 students in her classroom. • Cultural: Sara’s school is located in northern Minnesota in a smaller town. The school is supportive of Sara receiving services. Due to the small town community, there is excellent

	<ul style="list-style-type: none"> • Physical: Sara is experiencing frequent headaches and difficulty focusing in class. Sara also reports feelings of increased fatigue. 	<p>communication between the school and Sara’s parents.</p> <ul style="list-style-type: none"> • Virtual: Computers and other electronic reading aids are used during a portion of the classroom activities.
Assessment of Transactions: PxExO		
PxO	PxE	OxE
<ul style="list-style-type: none"> • Sara’s attention skills have negatively impacted her ability to complete assignments and take tests. • When completing homework Sara struggles with word finding, remembering what she had read, and challenges with spelling. • Prior to her mTBI Sara excelled in her education and did not require assistance. • Sara’s decreased ability to problem solve interrupts her ability to complete her homework tasks and learn new concepts in class. • When working with peers on homework tasks, Sara tends to be impulsive and experiences increased behaviors. • Sara’s behavioral challenges have impacted her ability to socialize with her teacher, peers, and parents. 	<ul style="list-style-type: none"> • The social environment makes Sara feel “dumb” and left out. • Loud environments are distracting for Sara which include when she is in the classrooms for music, physical education, and outside for recess. • Sara’s teachers and parents are supportive of her education and receiving services. • Sara is eligible for a 504 plan due to her mTBI. • Loud environments tend to increase the effects of her headaches. • When socializing with her peers, Sara often repeats herself in conversation due to memory challenges. • Sara’s decreased executive functioning skills, such as impulse control, has negatively impacted her ability to communicate and interact with her peers. 	<ul style="list-style-type: none"> • The school supports individuals requiring services for the occupation of education. • When eating lunch or participating in physical education the rooms are loud and full of distractions. • Due to the size of the school, an occupational therapist is not able to meet with students frequently, but the teachers involved with Sara are willing to implement strategies.
Construction of Occupational Performance Challenge(s)		
<ul style="list-style-type: none"> • The challenges impacted by Sara’s mTBI have obstructed her occupational performance in education including a variety of educational tasks such as playing with friends, completing assignments, sitting in a learning environment, participating in physical education, eating in the lunchroom, communicating to friends and teachers, taking tests, and completing simple education tasks. Sara needs a supportive, flexible educational environment 		

to build on her strengths, experience success, and develop a sense of self-efficacy to improve her skills regarding education and social participation with peers.

Approaches to Guide Intervention

- Neurocognitive: To understand the impact of mTBI on learning and performing the occupations required to complete education: Cognitive-Functional (Cog-Fun) and Cognitive skill training.
- Social/Emotional/Behavioral: To understand the needs for social supports and interactions: ALERT Program and social interventions (role playing).
- Sensory: To understand the impact noise has on Sara's ability to participate in loud environments: Sensory Processing Framework by Dunn (1997).

Recommendations for PEO Fit

- Weekly occupational therapy sessions to support problem solving, action planning, and long-term planning of educational supports to increase the PEO fit.
- Environmental supports and modifications to enhance the occupation of education.

*The chart was modified and adapted from Strong & Rebeiro-Gruhl (2019)

Table 6

Sara's Specific Goal PEO Analysis: Social Participation

Occupational Performance Challenge(s)		
<ul style="list-style-type: none"> Engaging in social participation with peers/educational staff. 		
Assessment of Main Components Impacting Occupational Performance		
Occupation	Person	Environment
<ul style="list-style-type: none"> Productivity/Work (Education): <ul style="list-style-type: none"> Sara is required to complete educational group activities in her classroom with peers. Leisure: <ul style="list-style-type: none"> <i>Play:</i> During free time in the classroom, Sara likes to play games with her peers. <i>Recess:</i> During recess, Sara plays the game four corners with her peers. <i>Physical education:</i> In physical education class, Sara is required to collaborate with peers during exercise games. <i>Lunch:</i> Sara used to eat lunch with her friend Jess but Jess no longer sits with Sara at the lunch table. 	<ul style="list-style-type: none"> Affective <ul style="list-style-type: none"> <i>Emotion/Mood:</i> Sara experiences increased behaviors such as aggression, impulsivity, feels withdrawn, and has a reduced frustration tolerance. <i>Social:</i> Sara has a hard time with peer relationships, social skills, turn taking, social rules, and is feeling socially isolated. Sensory: Sara experiences increased hypervigilance to loud noises. Cognitive <ul style="list-style-type: none"> <i>Attention:</i> Sara is having difficulty with her selective attention, sustained attention, automatic processing, control processing, and overall attention span skills. <i>Executive Function:</i> Sara struggles with impulse control, decision making, judgment, conceptual reasoning, and problem solving. <i>Memory:</i> Sara has challenges with memory processing and working memory skills. 	<ul style="list-style-type: none"> Physical <ul style="list-style-type: none"> Sara is in her main classroom for four hours a day. Sara spends an hour in the lunch room, an hour in the music room, an hour in the gymnasium, and an hour in art class every day. Sara sits in the back of the classroom away from the whiteboard but close to her teacher's desk. Sara's desk is arranged into a groups with three other desks in which she has three other classmates at her table. Social <ul style="list-style-type: none"> Sara interacts with 25 peers a day. She has a primary teacher that she interacts with up to four hours a day. She additionally has a different teach for art, music, physical education, and lunchroom faculty that she socially engages with on a daily basis.

	<ul style="list-style-type: none"> ○ Prior to her TBI, Sara considered herself to have more friends. 	<ul style="list-style-type: none"> ○ Sara is required to complete group activities with her peers. ○ Sara engages socially with her peers during lunch, physical education, recess, and during unstructured or transitional times of the day.
Assessment of Transactions: PxExO		
PxO	PxE	OxE
<ul style="list-style-type: none"> • Sara feels limited in her social participation. • Sara's has impulsive behaviors in social situations while eating, playing with peers, and completing group educational activities. • Sara's behavioral challenges have impacted her ability to socialize with her teacher, peers, and parents. • Sara is often left out of her social environments at lunch, during play time, in physical education class, and on the playground. 	<ul style="list-style-type: none"> • The social environment makes Sara feel "dumb" and left out. • Sara's behavioral changes have negatively impacted her social environment. • Sara has difficulties with social and emotional cue interpretation, response generation, turn taking, and following social norms. • Sara's increased aggression, impulsivity, and reduced frustration tolerance has negativity impacted her ability to engage in her social environment with her peers and teachers. • Sara's cognitive challenges impact her ability to complete assignments and she requires increased assistance from her teacher or peers to remain on track during academic tasks. • Loud noises impact Sara's ability to engage socially. 	<ul style="list-style-type: none"> • There are loud noises during lunch, recess, music class, physical education, and during unstructured play. • Socialization occurs in many areas of the academic setting such as the hallway, playground, lunchroom, bus, or classrooms. • Socialization can be structured or unstructured.
Construction of Occupational Performance Challenge(s)		
<ul style="list-style-type: none"> • Sara will require a supportive and flexible social environment to build on her strengths, experience success, and explore the occupation of social participation with her peers in school. Sara will be required to learn the social norms and appropriate behaviors needed to interact with peers during different occupations throughout the school day. 		

Goals for Sara Related to Social Participation:

- During unstructured play, Sara will participate and share with her peers for 10 minutes with no more than 1 verbal cue in 3 out of 4 opportunities as measured by teacher/staff/therapist.
- When given scenarios of social conflicts, Sara will demonstrate problem solving skills by identifying the problem and generating two solutions appropriate to the situation in 4/5 trials, as measured by data collection.
- During recess, the student will initiate a back and forth conversation exchange (with one of the previously identified classmates) independently with 80% success across 3 consecutive weeks.

Approaches to Guide Intervention

Direct Intervention Strategies:

- SOCCSS (situation, options, consequences, choices, strategies, simulation)
- Cog-Fun
- Peer-mediated interventions
- Video Detective

Indirect Intervention Strategies:

- Collaborative approach with Sara's teacher for providing modifications and adaptations to Sara's social environment when in the classroom, lunchroom, playground, etc. Provide the teacher with strategies such as positive reinforcement for Sara's good behaviors when socializing with her peers. Provide the teacher with direct positive affirmations and different social activities to facilitate positive interactions between Sara and her classmates. Refer to the Educational Learning Card regarding socialization in the lunch room for indirect intervention strategies.

Recommendations for PEO Fit

- Supportive social environments with room for trial and error when engaging with classmates.
- Weekly sessions to support problem-solving and action planning of arising issues that occur during social participation.

*The chart was modified and adapted from Strong & Rebeiro-Gruhl (2019).

Section IV

Intervention

Based on the data collected in the evaluation, the occupational therapy practitioner will decide whether direct, indirect interventions, or a combination of the two intervention types are appropriate to pursue.

Direct Intervention

Direct interventions will be addressed involving various approaches including neurocognitive, sensory, social/emotional/behavioral, or visual-motor perceptual. Occupational therapy specific examples will be provided and will further be broken down by the PEO model (Law et al., 1996. Direct interventions include occupations, activities, preparatory methods, preparatory tasks, education, and at times through group intervention (American Occupational Therapy Association [AOTA], 2014)

Indirect Intervention

Indirect interventions will be addressed through a collaborative approach with the occupational therapy practitioner and the education staff. The occupational therapy practitioner will take on a consulting role and education learning cards for teachers will be provided. Indirect interventions include education, training, and advocacy (AOTA, 2014).

Table 7

Evidenced-Based Interventions for Pediatric mTBI

Approach	Definition	OT Specific Examples	Components of PEO Targeted
Neurocognitive	Mental processes that are associated with perceiving, making sense of, and using information that is multi-faceted and draws on multiple perspectives within the context of occupational performance, including addressing the relationship among the person, his/her roles, daily occupations, and context (Brown, 2019; Katz, 2018).	<ul style="list-style-type: none"> • Cognitive Orientation to daily Occupational Performance (CO-OP) <ul style="list-style-type: none"> ○ (Dawson, McEwen, & Polatajko, 2017) • Alert Program <ul style="list-style-type: none"> ○ (Williams & Shellenberger, 1996) • Cognitive- Functional (Cog-Fun) <ul style="list-style-type: none"> ○ (Hahn-Markowitz, Manor, & Maeir, 2011) 	Person factors: <ul style="list-style-type: none"> • Cognitive <ul style="list-style-type: none"> ○ This is addressed when a student is learning problem-solving, attention, executive function, and memory strategies. • Affective <ul style="list-style-type: none"> ○ This is addressed when a student is learning self-regulation. Environment factors: <ul style="list-style-type: none"> • This is addressed when the environment is modified to compensate for cognitive deficits. Occupation factors: <ul style="list-style-type: none"> • This is addressed when modifying occupations or providing cognitive strategies for completion of occupations involved in education.
Sensory	The procedure of the brain receiving, interpreting, and establishing sensory information from the environment. Then taking that information and providing a response for sensory processing (Parham & Mailloux, 2015).	<ul style="list-style-type: none"> • Sensory Processing Framework <ul style="list-style-type: none"> ○ (Dunn, 1997) 	Person factors: <ul style="list-style-type: none"> • Physical/Cognitive <ul style="list-style-type: none"> ○ These are addressed when determining a student's sensory sensitivity. • Sensory

			<ul style="list-style-type: none"> ○ This is addressed when a student learns sensory processing approaches. • Affective <ul style="list-style-type: none"> ○ This is addressed when a student is learning self-regulation. <p>Environment factors:</p> <ul style="list-style-type: none"> • This is addressed when environmental modifications are required to meet a student’s sensory needs in the academic setting. <p>Occupation factors:</p> <ul style="list-style-type: none"> • This is addressed when modifying occupations or providing sensory strategies in order to complete occupations.
Social/ Emotional/ Behavioral	Difficulty with building or maintaining satisfactory interpersonal relationships with peers or teachers or demonstrating inappropriate types or behaviors or feelings under normal circumstances (Scheibel, 2019).	<ul style="list-style-type: none"> • Peer-mediated interventions <ul style="list-style-type: none"> ○ (Hilton, 2015) • SOCCSS (situation, options, consequences, choices, strategies, simulation) <ul style="list-style-type: none"> ○ (Rossa, 1995) • ALERT Program <ul style="list-style-type: none"> ○ (Williams & Shellenberger, 1996) • The incredible 5-point scale <ul style="list-style-type: none"> ○ (Buron & Curtis, 2003) • Video Detective <ul style="list-style-type: none"> ○ (Hilton, 2015) 	<p>Person factors:</p> <ul style="list-style-type: none"> • Cognitive <ul style="list-style-type: none"> ○ This is addressed when a student is learning problem-solving, attention, and executive function, and strategies. • Affective <ul style="list-style-type: none"> ○ This is addressed when a student is learning self-regulation. <p>Environment factors:</p> <ul style="list-style-type: none"> • Physical

		<ul style="list-style-type: none"> • Stress Thermometer <ul style="list-style-type: none"> ○ (Hilton, 2015) • Comic Strip Conversations <ul style="list-style-type: none"> ○ (Hilton, 2015) • Privacy Circles <ul style="list-style-type: none"> ○ (Hilton, 2015) • Positive Behavior Supports <ul style="list-style-type: none"> ○ (Feeney, 2010) • Cognitive Behavior Therapy (CBT) <ul style="list-style-type: none"> ○ (Beck, 2011) • Zones of Regulation <ul style="list-style-type: none"> ○ (Kuypers, 2011) 	<ul style="list-style-type: none"> ○ This is addressed during environmental modifications. • Social <ul style="list-style-type: none"> ○ This is addressed when a student learns interpersonal relationship strategies and conversation skills. • Institutional <ul style="list-style-type: none"> ○ This is addressed with environmental supports within the academic setting. • Cultural <ul style="list-style-type: none"> ○ This is addressed when interacting with peers. <p>Occupation factors:</p> <ul style="list-style-type: none"> • This is addressed when modifying occupations or providing social/emotional/behavioral strategies in order to complete occupations in the academic setting.
Visual-motor Perceptual	A complex process responsible for reception and cognition of visual stimuli combined with motor skills in performance of various occupational activities (Schneck, 2019).	<ul style="list-style-type: none"> • Visual-motor integration <ul style="list-style-type: none"> ○ (Schneck, 2019) 	<p>Person factors:</p> <ul style="list-style-type: none"> • Physical <ul style="list-style-type: none"> ○ This is addressed when a student is practicing visual-motor integration activities. • Cognitive

			<ul style="list-style-type: none"> ○ This is addressed when a student is improving visual-motor perception. <p>Environment factors:</p> <ul style="list-style-type: none"> ● This is addressed when environmental modifications are applied to the physical, institutional, or virtual environments to promote visual-motor perception. <p>Occupation factors:</p> <ul style="list-style-type: none"> ● Productivity/Work <ul style="list-style-type: none"> ○ This is addressed when participation in class requires writing or reading. ● Leisure <ul style="list-style-type: none"> ○ This is addressed in physical education and art classes requiring hand-eye coordination.
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Education Support Cards for Children with mTBIs

What?

The Education Support Cards for Children with mTBIs were developed in order to: (a) increase awareness of school personnel (teachers, education staff, occupational therapy practitioners, and special education professionals), (b) implement strategies for challenging situations (e.g. taking a test, completing homework, transitioning to another class) due to the mTBI they have experienced, and (c) apply evidence-based approaches to increase success for a child participating in the occupation of education.

Each of the education support cards include easy-to-implement evidence-based strategies and approaches for children with mTBIs including:

- *Neurocognitive*
 - Mental processes that are associated with perceiving, making sense of, and using information that is multi-faceted and draws on multiple perspectives within the context of occupational performance, including addressing the relationship among the person, his/her roles, daily occupations, and context (Brown, 2019; Katz, 2018)
- *Sensory*
 - The procedure of the brain receiving, interpreting, and establishing sensory information from the environment. Then taking that information and providing a response for sensory processing (Parham & Mailloux, 2015).
- *Social/Emotional/Behavioral*
 - Difficulty with building or maintaining satisfactory interpersonal relationships with peers or teachers or demonstrating inappropriate types or behaviors or feelings under normal circumstances (Scheibel, 2019).
- *Visual-motor perceptual*
 - A complex process responsible for reception and cognition of visual stimuli combined with motor skills in performance of various occupational activities (Schneck, 2019).

The Education Support Cards for Children with mTBIs include the educational performance concern followed by:

- Associated challenges.
- Accommodations broken into two separate age groups (K-2nd grades and 3rd-6th grades).
- Personalized planning and accommodation areas for the occupational therapy practitioner and teacher to collaborate.

Why are they Needed?

These cards are needed to provide gaps in the education system in regards to children with mTBIs. This product aims to provide a source of education for teachers on mTBIs, accommodation suggestions, provide services for students, and to provide a

supportive resource for the 504/IEP team who work with elementary students included in the mTBI population.

**Education Support Cards for Children with
mTBIs
Kindergarden-2nd Grades**

Taking a Test in the Classroom for a Child with a mTBI

Kindergarden-2nd Grades

Associated Challenges
<p>Thinking (Neurocognitive) Factors:</p> <ul style="list-style-type: none"> • Headache and dizziness can interfere with focusing on test questions. • Short attention span and slow processing speed. • Difficulty with decision making for selecting test answers. • Difficulty recalling information learned in class. • Difficulty determining the difference between pictures and/or with reading. • Group test taking creates various dynamics that can come with their own difficulties (attention, focus, stimulation, etc.). • Test question format can vary (multiple choice, true of false, matching, pictures, written, etc.) resulting in comprehension difficulty.
<p>Sensory Factors:</p> <ul style="list-style-type: none"> • Distractions to the student in the classroom environment can include noise, light, movement, and classmates. • Computer sound and lights can exacerbate symptoms. • Sensory stimulation can overwhelm the student. • Taking a test can occur on paper, computer, or orally which stimulate different senses, causing differing challenges.
<p>Social/Emotional/Behavioral Factors:</p> <ul style="list-style-type: none"> • Sensory stimulation can overwhelm student resulting in behaviors (irritation, aggression, etc). • A child may feel defeated while taking a test. • Group test taking creates various dynamics that can come with their own difficulties (working with others, turn taking, communication, etc.).
<p>Visual-Motor Perceptual Factors:</p> <ul style="list-style-type: none"> • Difficulties with writing • Difficulty determining the difference between pictures and/or with reading. • Tests can have differing sizes, fonts, and colors causing differing challenges. • Test question format can vary (multiple choice, true of false, matching, pictures, written, etc.) causing differing challenges. • Difficulty with written or virtual reading comprehension.

Accommodations

Thinking (Neurocognitive):

- Increase time to take test or repeat viewing times.
- Provide breaks.
- Modify test by simplifying questions.
- Provide assistance from education staff.
- Attempt to limit impulsive responses by encouraging the student to take “thinking time” before answering a question.
- Focus on one type of information at a time.
- Limit number of steps in exam questions.
- Provide verbal cues such as, “Good, now what would you do next?”
- Have the student use a cue card with written pictured steps when formulating an answer.
- Structure thinking processes on exam graphically with timelines, outlines, flow charts, and graphs.
- Decrease daydreaming that results from an inability to proceed by asking direct questions or providing a cue card. “Are you stuck?” or “Is that clear?”
- Review directions or sample items.
- Assure the student that they can complete the exam.

Sensory:

- Provide a quiet workplace to eliminate distractions.
- Provide breaks.
- Reduce classroom decorative clutter; projects hanging from ceiling.
- Lighting: soften lights.
- Decrease smells such as perfumes.
- Provide preferential seating.

Social/Emotional/Behavioral:

- Provide breaks.
- Provide assistance from education staff.
- Provide positive affirmations.
- Focus on one type of information at a time.
- Provide verbal cues such as, “Good, now what would you do next?”

- Decrease daydreaming that results from an inability to proceed by asking direct questions or providing a cue card. “Are you stuck?” or “Is that clear?”

Visual-Motor Perceptual:

- Use raised lined paper or textured paper with black lines.
- Place arrows or keywords on page to orientate students to space.
- Underline or highlight important words on test.

Collaboration between Occupational Therapy Practitioner and Teacher

Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)

Accommodations: (To be filled in by therapist and teacher in collaboration)

Socialization in the Lunchroom for a Child with a mTBI Kindergarden-2nd Grades

Associated Challenges
Thinking (Neurocognitive) Factors:
<ul style="list-style-type: none"> • Headache, dizziness, and difficulty focusing on conversation. • Difficulty maintaining conversations. • Difficulty attending, shifting attention, and processing. • Difficulty expressing ideas fluently. • Impairments with executive functioning such as impulse control, problem solving, judgment, and reasoning. • Memory impairments.
Sensory Factors:
<ul style="list-style-type: none"> • Auditory dysfunction causing difficulty hearing speech. • Hypersensitivity to noises. • Poor sense of body in space.
Social/Emotional/Behavioral Factors:
<ul style="list-style-type: none"> • Voice and speech functioning can affect articulation and conversation. • Perseverates on inappropriate topics or behaviors. • Fail to understand social humor and feelings of others. • Difficulty interpreting nonverbal cues. • Difficulty with social norms such as standing too close, interrupting, or being too loud. • Easily frustrated or irritable. • Poor conduct problems with empathy, emotional perceptions, and self-regulation. • Can act nervous, anxious, self-conscious, aggressive, or obsessive.
Visual-Motor Perceptual Factors:
<ul style="list-style-type: none"> • Slow and uncoordinated motor output during play.
Accommodations
Thinking (Neurocognitive):
<ul style="list-style-type: none"> • Collaborate with lunchroom staff to have them prompt students to use their social stories.

- Provide picture activity schedules.
- Positive affirmations from lunchroom faculty.
- Prompt students to use their lunchroom plan.

Sensory:

- Eat lunch in a quiet location and/or away from bright windows.
- Limit amount of people student eats lunch with.
- Use earplugs or noise-canceling headphones.

Social/Emotional/Behavioral:

- Use a buddy system.
- Prompt student to use self-regulation strategies.
- Provide social modeling from an adult sitting at the lunchroom table.
- Have lunchroom staff give structured conversation topics.

Visual-Motor Perceptual:

- Have the occupational therapist train lunchroom staff on approaches that are helpful for the student (cutting food, etc.).

Collaboration between Occupational Therapy Practitioner and Teacher

Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)

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Accommodations: (To be filled in by therapist and teacher in collaboration)

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Completing Educational Activities in the Classroom for a Child with a mTBI

Kindergarden-2nd Grades

Associated Challenges
<p>Thinking (Neurocognitive) Factors:</p> <ul style="list-style-type: none"> • Headache and dizziness can interfere with focusing in class. • Short attention span and slow processing speed. • Difficulty with decision making for completing classwork. • Difficulty recalling information learned in class. • Difficulty determining the difference between pictures and/or with reading. • Group activities can create various dynamics that come with their own difficulties (attention, focus, stimulation, etc.). • Comprehension and problem solving difficulties. • Challenges learning new concepts, facts, or information. • Difficulty remembering simple instructions or rules.
<p>Sensory Factors:</p> <ul style="list-style-type: none"> • Distractions to the student in the classroom environment can include noise, light, movement, and classmates. • Computer sound and lights can exacerbate symptoms. • Sensory stimulation can overwhelm the student. • Auditory dysfunction causing difficulty hearing teacher talking/instructing. • Hypersensitivity to noises. • Poor sense of body in space. • Feelings of restlessness while sitting at desk.
<p>Social/Emotional/Behavioral Factors:</p> <ul style="list-style-type: none"> • Sensory stimulation can overwhelm student resulting in behaviors (irritation, aggression, etc). • A child may feel defeated while completing difficult classroom activities. • Group activities can create various dynamics that come with their own difficulties (working with others, turn taking, communication, etc.).

- Voice and speech functioning can affect articulation and conversation (answering questions).
- Easily frustrated or irritable.
- Poor conduct problems with self-regulation.
- Can act nervous, anxious, self-conscious, aggressive, or obsessive.
- Blurting out in class due to impulsive tendencies.

Visual-Motor Perceptual Factors:

- Difficulties with writing.
- Difficulty determining the difference between pictures and/or with reading.
- Difficulty with written or virtual reading comprehension.
- Poor motor dexterity when cutting and drawing.

Accommodations

Thinking (Neurocognitive):

- Allowing student to take rest breaks.
- Repeat directions and have student repeat directions back to check for comprehension.
- Provide teacher assistance.
- Provide verbal directions for task.
- Use visual prompting.
- Excuse from completing unnecessary work.
- Regularly summarize information as it is being taught.
- Break down, limit, or simplify assignments.
- Give simple choices.
- Emphasize important information.
- Provide other supports for memory.
- Provide additional time to complete the task.
- Focus on one type of information at a time.
- Give cues, such as, “Good, now what would you do?”

Sensory:

- Provide a quiet environment that is less stimulating.
- Minimize distractions.

- Limit technology use.

Social/Emotional/Behavioral:

- Avoid singling out student in front of peers.
- Provide breaks.
- Provide assistance from education staff.
- Provide positive affirmations.
- Focus on one type of information at a time.
- Provide verbal cues such as, “Good, now what would you do next?”
- Decrease daydreaming that results from an inability to proceed by asking direct questions or providing a cue card. “Are you stuck?” or “Is that clear?”
- Limit perseverative behavior by using verbal directions (e.g., “Erase only once”) or by focusing attention on less threatening or more socially appropriate tasks.
- Emphasize what the individual can do and point out progress that has been made. Compare recent past and present work.
- Point to a sign “Return to work” when student stops working.
- Role-play appropriate responses (e.g., raising hand). Place a sign on the student’s desk with a picture of a hand and point to this when the student interrupts.
- Employ ‘stop-action’ technique. Immediately stop student from disrupting an activity, encourage him or her to verbalize an alternative behavior, and have the student follow through appropriately.

Visual-Motor Perceptual:

- Use raised lined paper or textured paper with black lines.
- Place arrows or keywords on page to orientate students to space.
- Underline or highlight important words on assignments.
- Use larger paper.
- Provide visual cues for beginning and end of lines such as placing a green dot in the left margin and a red dot in the right margin.
- If not able to do handwriting worksheets with peers, practice letter or shape formation using materials appropriate for muscle strength and endurance. For example, writing with fingers can be done with finger paint, crazy foam, shaving cream, or sand trays. More resistance is offered by writing with a pencil in a clay tray.

Collaboration between Occupational Therapy Practitioner and Teacher
Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)
Accommodations: (To be filled in by therapist and teacher in collaboration)

Transitions in the Hallway for a Child with a mTBI

Kindergarden-2nd Grades

Associated Challenges
<p>Thinking (Neurocognitive) Factors:</p> <ul style="list-style-type: none"> • Headache, dizziness, and difficulty focusing on task. • Difficulty attending, shifting attention, and processing. • Impairments with executive functioning such as impulse control, problem solving, judgment, and reasoning. • Memory impairments. • Difficulty with organization. • Confuses the sequence of events or other time-related concepts. • Gets lost in halls and cannot follow maps. • A student may be impulsive during the transition.
<p>Sensory Factors:</p> <ul style="list-style-type: none"> • Hypersensitivity to noises. • Poor sense of body in space.
<p>Social/Emotional/Behavioral Factors:</p> <ul style="list-style-type: none"> • Perseverates on inappropriate topics or behaviors. • Difficulty with social norms such as standing too close while walking or being too loud. • Easily frustrated or irritable. • Poor conduct problems with self-regulation. • Can act nervous, anxious, self-conscious, aggressive, or obsessive.
<p>Visual-Motor Perceptual Factors:</p> <ul style="list-style-type: none"> • Slow or uncoordinated motor output while walking. • Difficulty reading hallway signs.
Accommodations
<p>Thinking (Neurocognitive):</p> <ul style="list-style-type: none"> • Provide locker checklist or other visual prompts for packing backpack at the end of the day. • Provide teacher or peer assistance while going from class to class.

- Provide supports for memory of class schedule.
- Provide visual timers or activity schedules.
- Prepare the student for daily transitions with reminders of the next activity several minutes in advance.
- ‘Walk through’ transitions with the student (return the reading text to the desk, put away all their materials and line up at the door.)
- Maintain a consistent schedule.
- Review the schedule daily and when transitions will occur.
- Allow for increased time to transition.
- Especially point out any changes to the daily routine (field trip or activity). It can be helpful to also use “first” and “then”
- Provide positive reinforcement.
- Have student repeat multi-step directions and listen to themselves before attempting the transition.
- Demonstrate how transition skills can be used throughout the day. Discuss how student relies on the clock or a schedule to get up in the morning, begin school, or catch a bus.
- Discuss rules and their importance at the beginning of the transition.

Sensory:

- Provide earplugs or noise-canceling headphones.
- Have the child transition prior/after to other students transitioning.
- Provide the child with a “transition item” or an object that the child can hold in their hand that is not too distracting (such as a fidget or smooth stone).
- Place unnecessary materials out of sight or out of reach.

Social/Emotional/Behavioral:

- Encourage seeking help.
- Provide visual timers or activity schedules.
- Specified person to oversee on transition between class or end of day.
- Review boundaries with a child- this can be completed through verbal or a social story.
- Provide an adult to role model desired behaviors.
- Give cues, such as, “Good, now what would you do?”
- Explain how student’s impulsive acts, calling out, which disturb others.

- Employ ‘stop-action’ technique. Immediately stop student is disrupting other, encourage the student to verbalize an alternative behavior, and have the student follow through appropriately.
- Assure student that they can complete the task.

Visual-Motor Perceptual:

- Provide student with a simple map of the school when transitioning between classes.
- Provide universal design of images and arrows that help all students navigate the hallways.

Collaboration between Occupational Therapy Practitioner and Teacher

Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)

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Accommodations: (To be filled in by therapist and teacher in collaboration)

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**Education Support Cards for Children with
mTBIs
3rd- 6th Grades**

Taking a Test in the Classroom for a Child with a mTBI

3rd-6th Grades

Associated Challenges
<p>Thinking (Neurocognitive) Factors:</p> <ul style="list-style-type: none"> • Headache and dizziness can interfere with focusing on test questions. • Short attention span and slow processing speed. • Difficulty with decision making for selecting test answers. • Difficulty recalling information learned in class. • Difficulty determining the difference between pictures and/or with reading. • Group test taking creates various dynamics that can come with their own difficulties (attention, focus, stimulation, etc.). • Test question format can vary (multiple choice, true or false, matching, pictures, written, etc.) resulting in comprehension difficulty.
<p>Sensory Factors:</p> <ul style="list-style-type: none"> • Distractions to the student in the classroom environment can include noise, light, movement, and classmates. • Computer sound and lights can exacerbate symptoms. • Sensory stimulation can overwhelm the student. • Taking a test can occur on paper, computer, or orally which stimulate different senses, causing differing challenges.
<p>Social/Emotional/Behavioral Factors:</p> <ul style="list-style-type: none"> • Sensory stimulation can overwhelm student resulting in behaviors (irritation, aggression, etc). • A child may feel defeated while taking a test. • Group test taking creates various dynamics that can come with their own difficulties (working with others, turn taking, communication, etc.).
<p>Visual-Motor Perceptual Factors:</p> <ul style="list-style-type: none"> • Difficulties with writing. • Difficulty determining the difference between pictures and/or with reading. • Tests can have differing sizes, fonts, and colors causing differing challenges. • Test question format can vary (multiple choice, true or false, matching, pictures, written, etc.) causing differing challenges. • Difficulty with written or virtual reading comprehension.

Accommodations

Thinking (Neurocognitive):

- Increase time to take test or repeat viewing times.
- Provide breaks.
- Modify test by simplifying questions.
- Provide assistance from education staff.
- Open book or note tests.
- Underline or highlight important words on test.
- Place arrows or keywords on page to orientate students to space.
- Present one question at a time by covering up other test questions with a blank sheet of paper.
- Permit students to write shorter answers than classmates (one-two words rather than a complete sentence).
- Have the student organize information by using categories (ex: who, what when, where).
- Focus on one type of information at a time.
- Limit number of steps in exam questions.
- Provide verbal cues such as, “Good, now what would you do next?”
- Have the student use a cue card with written pictured steps when formulating an answer.
- Structure thinking processes on exam graphically with timelines, outlines, flow charts, and graphs.
- Decrease daydreaming that results from an inability to proceed by asking direct questions or providing a cue card. “Are you stuck?” or “Is that clear?”
- Review directions or sample items.
- Assure the student that they can complete the exam.

Sensory:

- Provide a quiet workplace to eliminate distractions.
- Provide breaks.
- Reduce classroom decorative clutter; projects hanging from ceiling.
- Lighting: soften lights.
- Decrease smells such as perfumes.
- Provide preferential seating.

Social/Emotional/Behavioral:

- Provide assistance from education staff.
- Provide positive affirmations.
- Attempt to limit impulsive responses by encouraging the student to take “thinking time” before answering a question.
- Provide verbal cues such as, “Good, now what would you do next?”
- Decrease daydreaming that results from an inability to proceed by asking direct questions or providing a cue card. “Are you stuck?” or “Is that clear?”

Visual-Motor Perceptual:

- Underline or highlight important words on test.
- Place arrows or keywords on page to orientate students to space.
- Use raised lined paper or textured paper with black lines.
- Present one question at a time by covering up other test questions with a blank sheet of paper.
- Permit students to write shorter answers than classmates (one-two words rather than a complete sentence).
- Structure thinking processes on exam.
- graphically with timelines, outlines, flow charts, and graphs.

Collaboration between Occupational Therapy Practitioner and Teacher

Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)

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Accommodations: (To be filled in by therapist and teacher in collaboration)

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Socialization in the Lunchroom for a Child with a mTBI

3rd-6th Grades

Associated Challenges
<p>Thinking (Neurocognitive) Factors:</p> <ul style="list-style-type: none"> • Headache, dizziness, and difficulty focusing on conversation. • Difficulty maintaining conversations. • Difficulty attending, shifting attention, and processing. • Difficulty expressing ideas fluently. • Impairments with executive functioning such as impulse control, problem solving, judgment, and reasoning. • Memory impairments.
<p>Sensory Factors:</p> <ul style="list-style-type: none"> • Auditory dysfunction causing difficulty hearing speech. • Hypersensitivity to noises. • Poor sense of body in space.
<p>Social/Emotional/Behavioral Factors:</p> <ul style="list-style-type: none"> • Voice and speech functioning can affect articulation and conversation. • Perseverates on inappropriate topics or behaviors. • Fail to understand social humor and feelings of others. • Difficulty interpreting nonverbal cues. • Difficulty with social norms such as standing too close, interrupting, or being too loud. • Easily frustrated or irritable. • Poor conduct problems with empathy, emotional perceptions, and self-regulation. • Can act nervous, anxious, self-conscious, aggressive, or obsessive.
<p>Visual-Motor Perceptual Factors:</p> <ul style="list-style-type: none"> • Slow and uncoordinated motor output during play.

Accommodations
Thinking (Neurocognitive):
<ul style="list-style-type: none"> • Provide/review social scripts. • Positive affirmations from lunchroom faculty.
Sensory:
<ul style="list-style-type: none"> • Eat lunch in a quiet location and/or away from bright windows. • Limit amount of people student eats lunch with. • Use earplugs or noise-canceling headphones
Social/Emotional/Behavioral:
<ul style="list-style-type: none"> • Use a buddy system. • Provide structured conversation topics at the table. • Prompt student to use self-regulation strategies. • Provide social modeling from an adult sitting at the lunchroom table.
Visual-Motor Perceptual:
<ul style="list-style-type: none"> • Have the occupational therapist train lunchroom staff on approaches that are helpful for the student (cutting food, etc.).
Collaboration between Occupational Therapy Practitioner and Teacher
Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)
Accommodations: (To be filled in by therapist and teacher in collaboration)

Completing Educational Activities in the Classroom for a Child with a mTBI 3rd-6th Grades

Associated Challenges
<p>Thinking (Neurocognitive) Factors:</p> <ul style="list-style-type: none"> • Headache and dizziness can interfere with focusing in class. • Short attention span and slow processing speed. • Difficulty with decision making for completing classwork. • Difficulty recalling information learned in class. • Difficulty determining the difference between pictures and/or with reading. • Group activities can create various dynamics that come with their own difficulties (attention, focus, stimulation, etc.). • Comprehension and problem solving difficulties. • Challenges learning new concepts, facts, or information. • Difficulty remembering simple instructions or rules. • Difficulty sequencing steps of a task. • Challenges with organizing materials.
<p>Sensory Factors:</p> <ul style="list-style-type: none"> • Distractions to the student in the classroom environment can include noise, light, movement, and classmates. • Computer sound and lights can exacerbate symptoms. • Sensory stimulation can overwhelm the student. • Auditory dysfunction causing difficulty hearing teacher talking/instructing. • Hypersensitivity to noises. • Poor sense of body in space. • Feelings of restlessness while sitting at desk.
<p>Social/Emotional/Behavioral Factors:</p> <ul style="list-style-type: none"> • Sensory stimulation can overwhelm student resulting in behaviors (irritation, aggression, etc).

- A child may feel defeated while completing difficult classroom activities.
- Group activities can create various dynamics that come with their own difficulties (working with others, turn taking, communication, etc.).
- Voice and speech functioning can affect articulation and conversation (answering questions).
- Easily frustrated or irritable.
- Poor conduct problems with self-regulation.
- Can act nervous, anxious, self-conscious, aggressive, or obsessive.
- Blurting out in class due to impulsive tendencies.

Visual-Motor Perceptual Factors:

- Difficulties with writing.
- Difficulty determining the difference between pictures and/or with reading.
- Difficulty with written or virtual reading comprehension.
- Poor motor dexterity when cutting and drawing.
- Difficulty tracking while reading (skips problems or parts of page).
- Difficulty copying information from the board.
- Difficulty with letter information or spacing.

Accommodations

Thinking (Neurocognitive):

- Help students use a planner, chart, checklist, or device to keep track of due dates and assignments.
- Allow alternative methods for demonstrating knowledge.
- Allowing student to take rest breaks.
- Repeat directions and have student repeat directions back to check for comprehension.
- Provide teacher assistance.
- Provide verbal and written directions for tasks.
- Use visual prompting.
- Excuse from completing unnecessary work.
- Regularly summarize information as it is being taught.
- Break down, limit, or simplify assignments.
- Give simple choices.

<ul style="list-style-type: none"> • Emphasize important information. • Provide other supports for memory. • Focus on one type of information at a time. • Give cues, such as, “Good, now what would you do?”
Sensory:
<ul style="list-style-type: none"> • Provide a quiet environment that is less stimulating. • Minimize distractions. • Limit technology use.
Social/Emotional/Behavioral:
<ul style="list-style-type: none"> • Avoid singling out student in front of peers. • Provide breaks. • Provide assistance from education staff. • Provide positive affirmations. • Focus on one type of information at a time. • Provide verbal cues such as, “Good, now what would you do next?” • Decrease daydreaming that results from an inability to proceed by asking direct questions or providing a cue card. “Are you stuck?” or “Is that clear?” • Limit perseverative behavior by using verbal directions(e.g., “Erase only once”)or by focusing attention on less threatening or more socially appropriate tasks. • Emphasize what the individual can do and point out progress that has been made. Compare recent past and present work. • Point to a sign “Return to work” when student stops working. • Role-play appropriate responses (e.g., raising hand). Place a sign on the student’s desk with a picture of a hand and point to this when the student interrupts. • Employ ‘stop-action’ technique. Immediately stop student from disrupting an activity, encourage him or her to verbalize an alternative behavior, and have the student follow through appropriately.
Visual-Motor Perceptual:
<ul style="list-style-type: none"> • Use raised lined paper or textured paper with black lines. • Place arrows or keywords on page to orientate students to space. • Underline or highlight important words on assignments.

- Provide larger print books or use books on tape.
- Move the student closer to visual materials or have the materials enlarged.
- Cursive handwriting maybe inappropriate for a student with limited endurance and stability. Students should be taught to read cursive but be allowed to continue to write in manuscript.
- Let student underline answers on worksheets rather than copying them on to a blank space
- A vertical paper holder maybe useful to hold the model in front of the student.

Collaboration between Occupational Therapy Practitioner and Teacher

Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)

Accommodations: (To be filled in by therapist and teacher in collaboration)

Transitions in the Hallway for a Child with a mTBI

3rd-6th Grades

Associated Challenges
<p>Thinking (Neurocognitive) Factors:</p> <ul style="list-style-type: none"> • Headache, dizziness, and difficulty focusing on task. • Difficulty attending, shifting attention, and processing. • Impairments with executive functioning such as impulse control, problem solving, judgment, and reasoning. • Memory impairments. • Difficulty with organization.
<p>Sensory Factors:</p> <ul style="list-style-type: none"> • Hypersensitivity to noises. • Poor sense of body in space.
<p>Social/Emotional/Behavioral Factors:</p> <ul style="list-style-type: none"> • Voice and speech functioning can affect articulation and conversation. • Perseverates on inappropriate topics or behaviors. • Fail to understand social humor and feelings of others. • Difficulty interpreting nonverbal cues. • Difficulty with social norms such as standing too close, interrupting, or being too loud. • Easily frustrated or irritable. • Poor conduct problems with empathy, emotional perceptions, and self-regulation. • Can act nervous, anxious, self-conscious, aggressive, or obsessive.
<p>Visual-Motor Perceptual Factors:</p> <ul style="list-style-type: none"> • Slow or uncoordinated motor output while walking. • Difficulty reading hallway signs.
Accommodations
<p>Thinking (Neurocognitive):</p>

- Provide locker checklist or other visual prompts for packing backpack at the end of the day.
- Provide teacher or peer assistance while going from class to class.
- Provide supports for memory of class schedule.
- Provide visual timers or activity schedules.
- Prepare the student for daily transitions with reminders of the next activity several minutes in advance.
- ‘Walk through’ transitions with the student (return the reading text to the desk, put away all their materials and line up at the door).
- Maintain a consistent schedule.
- Review the schedule daily and when transitions will occur.
- Allow for increased time to transition.
- Especially point out any changes to the daily routine. It can be helpful to also use “first” and “then”
- Provide positive reinforcement.
- Have student repeat multi-step directions and listen to themselves before attempting the transition.
- Demonstrate how transition skills can be used throughout the day. Discuss how student relies on the clock or a schedule to get up in the morning, begin school, or catch a bus.
- Discuss rules and their importance at the beginning of the transition.

Sensory:

- Provide earplugs or noise-canceling headphones.
- Have the child transition prior/after to other students transitioning.
- Provide the child with a “transition item” or an object that the child can hold in their hand that is not too distracting (such as a fidget or smooth stone).
- Place unnecessary materials out of sight or out of reach.

Social/Emotional/Behavioral:

- Encourage seeking help.
- Provide visual timers or activity schedules.
- Specified person to oversee on transition between class or end of day.
- Review boundaries with a child- this can be completed through verbal or a social story.
- Provide an adult to role model desired behaviors.
- Give cues, such as, “Good, now what would you do?”

- Explain how student's impulsive acts, calling out, which disturb others.
- Employ 'stop-action' technique. Immediately stop student is disrupting other, encourage the student to verbalize an alternative behavior, and have the student follow through appropriately.
- Assure student that they can complete the task.

Visual-Motor Perceptual:

- Provide student with a simple map of the school when transitioning between classes.
- Provide universal design of images and arrows that help all students navigate the hallways.

Collaboration between Occupational Therapy Practitioner and Teacher

Difficulty student experiences: (To be filled in by therapist and teacher in collaboration)

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Accommodations: (To be filled in by therapist and teacher in collaboration)

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