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Sensory Integration Therapy for Students with an Autism Spectrum Disorder

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Sensory Integration Therapy for Students with an Autism Spectrum Disorder in the Classroom

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Abstract

Children with autism spectrum disorders often struggle socially and emotionally in the classroom setting due to overstimulation. The purpose of this literature review is to synthesize research on the effects of Dr. A. Jean Ayre's sensory integration therapy intervention for students with an autism spectrum disorder, specifically as they are applied in the classroom. Ayres was an occupational therapist, educational psychologist, and an advocate for individuals with special needs. Dr. Ayres developed the sensory integration therapy approach, or SIT, in the 1970s, and SIT has since been used by hundreds of occupational therapists around the world. Overall, sensory integration therapy has proven to be a marginally effective intervention to enhance the social, emotional, and behavioral needs of students with ASD. This literature review critically analyzes research from scholarly journals and peer-reviewed articles that were published within the last decade regarding the selected topic of interest. Published research on Ayre's sensory integration approach indicates some positive effects on children with autism and their overall functioning in the classroom, but additional research is needed to determine the magnitude of effect.

Sensory Integration Therapy for Students with an Autism Spectrum Disorder in the Classroom

Autism spectrum disorder, commonly referred to as ASD, is a lifelong developmental disability related to brain development. ASD begins in childhood, with most cases being identified within the first five years of the child's life. The World Health Organization, WHO, estimates that one in 160 children have an autism spectrum disorder (*Autism spectrum disorders* 2019). According to research by Natascia et al. (2015), the prevalence of autism has increased, with the disorder generally affecting boys more than girls. Several hypotheses exist about why autism is more prevalent in boys than girls, but additional research is needed to certify efficacy.

Autism spectrum disorders are categorized on a continuum, with symptoms varying depending on the severity of the disorder. The spectrum encompasses Asperger's syndrome, childhood disintegrative disorder, and other pervasive developmental disorders. ASD can affect a person's ability to communicate and connect with others. Moreover, the disorder can cause difficulties in processing sensory input. Parents, physicians, occupational therapists, and teachers often observe poor eye contact, resistance to touch, preference to solitary play, trouble recognizing non-verbal cues, repetitive movements, sensory processing difficulties, or fixations on certain objects or topics in children who have ASD (Lord et al., 2018).

Sensory input is the stimuli that individuals receive through taste, touch, smell, sound, and sight. Throughout a single day, children receive and process hundreds of sensory stimuli. Some of the stimuli is well-received, and an appropriate response is elicited. Conversely, other stimuli may be poorly received. For children with an autism spectrum disorder, some stimuli such as bright lights, loud noises, or touch may be perceived poorly (Feldman et al., 2019).

Research by Feldman et al. (2019) in the "Brief Report: Differences in Multisensory Integration Covary…" indicates that children with ASD differ in their sensory responsiveness compared to same-age peers. Children can be hyperresponsive, be hyporesponsive, have enhanced sensory perceptions, or have sensory-seeking behaviors (Little et al., 2015). Children who exhibit hyperresponsiveness often have a heightened arousal level, and their responses may seem exaggerated. Alternatively, children who are hyporesponsive may have limited responses and may view a large number of stimuli as only a small quantity (Little et al., 2015).

Studies by Green et al. (2012) indicate higher levels of anxiety for children who are hyperresponsive or over-responsive. However, it should be noted that sufficient evidence is lacking to determine the root of the correlation. The classroom can often be an intimidating place as it presents many stimuli. Many classrooms encompass loud noises and bright color schemes. The problem is that sensory overload creates a stressful environment for students with ASD in the classroom, creating undesired behaviors and adversely affecting the learning of students with ASD and their peers (Pfeiffer et al., 2011).

For students with ASD to have success in the general education classroom, they must be able to cope with the sensory input they are presented. Sensory integration therapy, developed by Anna Jean Ayres in the 1970s, is one type of therapy that is designed to help children with sensory needs. The goal of the therapy is not to remove the stimuli but rather help the child cope with the difficulties they are having from the stimuli (Bodison & Parham, 2018). Recent research alludes to the fact that sensory integration therapy can help students with ASD by exposing them to sensory stimulation in a non-threatening way. Over time, research has indicated that the brain is able to adapt to the sensory input more appropriately after SIT. The

need to find supporting evidence for this research is strong as it could dramatically improve the educational outcomes of students with autism spectrum disorders (Pfeiffer et al., 2011).

The purpose of this literature review is to identify how sensory integration therapy can benefit children with autism spectrum disorders in the general education classroom and improve social, emotional, and behavioral success. The research question that is addressed in this literature review is, "How does sensory integration therapy benefit the learning of students who have an autism spectrum disorder?" To examine how sensory integration therapy can be utilized to help children with ASD in the school environment, sensory integration therapy studies published in the last 10 years were reviewed through the Northwestern College Dewitt Library resource. To be considered for this literature review, studies had to include information regarding autism spectrum disorder or sensory integration therapy following the Anna Jean Ayres sensory integration frame of reference.

Sensory integration therapy has proven to be an effective intervention to enhance the social, emotional, and behavioral needs of students with ASD to a certain degree. Improved social interactions, emotional regulation, and behavior often correlate with higher levels of academic success. Additional studies are needed to further identify what specific strategies within the SIT intervention lead to increased efficacy. These findings could potentially help occupational therapists and teachers to make evidence-based decisions that will ultimately lead to student success. Boujut et al. (2016) reported that autism spectrum disorders in school are often a large stressor for teachers. Additional support and specialized training were reported to reduce classroom stress for the teacher and ultimately reduce stress for the students. Children with autism who have sensory processing difficulties will reap the benefits of sensory

integration therapy by restructuring the brain to adapt more efficiently to sensory stimulation (Schaaf et al., 2012).

This literature review outlines the characteristics of autism spectrum disorders and the sensory needs that often correspond to them. This review then addresses the classroom effects of autism, the efficacy of sensory integration therapy, implementation of sensory integration therapy, and the benefits of sensory integration therapy in the classroom. Finally, implications of sensory integration therapy for children with ASD and classroom providers are examined, and future research considerations are outlined.

Literature Review

Characteristics of Autism Spectrum Disorders

As illustrated by Lord et al. (2018) autism spectrum disorders, or ASD, are neurological and developmental disorders that are often diagnosed during childhood. Research indicates that most individuals are diagnosed with autism in childhood by a physician who completes a thorough medical examination including medical history, assessment of symptoms, caregiver/teacher observations, and diagnostic tests. Other experts such as psychologists, occupational therapists, and educators are additional sources of recommendations and advice. "To be diagnosed with ASD, a person must show evidence of difficulties, past or present, in each of three social communication subdomains, and they must have or have had difficulty in two of the four different restricted, repetitive sensory-motor behaviors" (Lord et al., 2018, p. 1).

According to the American Psychiatric Association's Diagnostic and Statistical Fifth Edition Manual (DSM-5), autism spectrum disorders are characterized by difficulties in social interactions and repetitive behaviors (Diagnostic and Statistical, 2013). Autism spectrum

disorders can vary in nature, with symptoms varying from mild to moderate. Individuals with ASD may have difficulty maintaining eye contact, engaging in reciprocal conversations, maintaining relationships, identifying non-verbal communication, adapting to new or unfamiliar situations, and identifying non-literal language. In early childhood, many children struggle with reciprocal conversations and non-literal language. However, when children grow, they tend to acquire these skills. Children with ASD may be limited in their skill acquisition in these areas, a limitation that can make social interaction differences more apparent in teenage years.

Repetitive behaviors for children with ASD are often unique to the child, but some may include rocking, hand or arm flapping, pacing, tapping, or bouncing. Repetitive behaviors are often referred to as stimming and are considered a self-stimulatory behavior (Lord et al., 2018). "Atypical sensory processing was associated with increased risks of sleep disturbances, emotional and behavioral problems, and abnormal mealtime behaviors in the children with ASD …" (Wang et al., 2019). Research indicates that autism spectrum disorders can affect many components of a child's life and activities of daily living.

The American Psychiatric Association's Diagnostic and Statistical Manual now includes Asperger's disorder and pervasive developmental disorders within the autism spectrum due to similarities of the two disorders to autism in regard to social interactions and repetitive behaviors (Diagnostic and Statistical, 2013). Individuals with Asperger's disorder are often high functioning intellectually, but they may exhibit compulsive or obsessive behaviors. Additionally, psychologists note that individuals with an Asperger's disorder may have an intense interest with a certain topic or subject. This intense interest can cause social problems if the interest is overbearing during social interactions. Pervasive developmental disorders also fall

within the ASD umbrella and present developmental delays similar to other autism spectrum disorders (Siapperas et al., 2012).

Classroom Effect

Research by Ashburner et al. (2008) suggests that the classroom setting can be intimidating and overwhelming to a child with an autism spectrum disorder. The social norms and barriers that are in classrooms can make it difficult for children with ASD to feel secure and comfortable in their setting. Classrooms often have bright lights, colorful walls, and loud noises. Behaviors seen of children with autism in the classroom may "be explained by hypersensitivity and aversion to rapid, changing, or unpredictable sensory input coupled with preference for predictable, repetitive sensory input" (Ashburner et al., 2008, p. 565). Ashburner et al. (2008) gives the example of touch. People with ASD often react adversely to the touch of others yet enjoy other tactile experiences.

Rotheram-Fuller et al. (2010) maintains that while children with ASD are able to participate in the general education setting with a high degree of participation, many children with ASD need social support and guidance. One social network survey by Rotheram-Fuller et al. 2010) measured reciprocal friendships, rejection, acceptance, and social involvement of children with autism spectrum disorders. Their research indicated that students engage in reciprocal friendships less with peers who have ASD than peers who do not. Additionally, the study found that children with ASD in this setting were more rejected than their peers. This rejection increased as children grew older and transitioned into middle school and high school (Rotheram-Fuller et al., 2010).

Evidence by Randell et al. (2019) shows that children with ASD often have trouble relating to the environment around them. "Difficulty responding to sensory information (noise,

touch, movement, taste, sight) is common, and might include feeling overwhelmed or distressed by loud or constant low-level noise (e.g. in the classroom)" (Randell et al., 2019, p. 1). As seen through the Rotheram-Fuller et al. (2010) study, children with ASD are often rejected from their peers. The correlation between trouble relating to the social settings and rejection levels show the effect sensory processing issues can have on a child's social participation and emotional well-being. Research is evident that children on the autism spectrum have needs that extend beyond academic concerns (Sarrett, 2018).

Efficacy of Sensory Integration Therapy

Sandra (2010) outlines development and the acquisition of socially appropriate behaviors by explaining that humans learn how to regulate emotions and create responses that are appropriate for the situation and context. As a person grows, their nervous system matures as well. Individuals' nervous system begins to identify preferences and preferred behaviors and learn when there is a presence or absence of danger through sensory processing and habituation. Problems develop when the central nervous system falsely identities situations as dangerous when they are in fact harmless. For example, most people would view a touch on the shoulder as comforting and a sign of love. People with sensory processing disorders view this touch as alarming and may behave in a manner that is deemed not socially appropriate (Sandra, 2019).

Research collectively confirms that Ayres sensory integration, or ASI, was developed in the 1970s by an American occupational therapist and psychologist named Anna Jean Ayres (Schaaf et al., 2018). Ayres was a strong advocate for individuals with disabilities, working with many individuals, specifically clients and patients with cerebral palsy and learning disabilities. She was specifically interested in children who had neurological impairments in sensory processing. Critz et al. (2014) asserts that Ayre's theory was developed to "identify those

children who appeared to have challenges integrating multiple sensory stimuli from visual, auditory, tactile, tase, vestibular, and proprioceptive input" (Critz et al., 2014, p. 1). Her work analyzing sensory integration difficulties ultimately led to the development of sensory integration therapy.

Preis et al. (2014) describes sensory integration therapy as it is used for intervention. Sensory integration therapy is an intervention that has been employed by occupational therapists, but it has also been used by other service providers and speech pathologists who are trained in sensory integration therapy, or SIT. Occupational therapists work on activities of daily living with their clients and patients. Activities of daily living can range from dressing to eating to taking care of pets to play. Therapists utilize sensory integration therapy to help clients gain more independence in these daily activities. Sensory integration therapy is often play-based, and therapists may incorporate swings, trampolines, mats, or other toys into their intervention. Weighted vests, vestibular activities, deep pressure, and brushing may also be included (Preis et al., 2014).

Feldman et al. (2019) analyzes the varying opinions surrounding Ayre's intervention by explaining that Ayre's intervention has long been criticized for over-use in the field of occupational therapy and for the lack of research-based evidence supporting its implementation. Consistent with Feldman et al. (2019), the American Occupational Therapy Organization (AOTA) has published guiding principles that state when implementation would be appropriate, such as working with a client who has autism and sensory processing difficulties. The AOTA also advises practitioners to create a comprehensive sensory integration therapy plan rather than using isolated sensory strategies. Many practitioners use sensory integration therapy strategies alone, without creating a comprehensive plan. Trends such as sensory diets have also become

popular within the public. Many SIT specialists would advise against these isolated treatments and would urge parents and practitioners to ensure that the employed techniques are suitable for the client (Feldman et al., 2019).

Other skeptics have completed similar studies comparing the efficacy of other autism spectrum disorder interventions to the sensory integration approach. Studies by Devlin et al. (2011) were conducted to compare the outcomes of a behavioral intervention approach to a sensory integration therapy approach in the treatment of challenging behavior for children who have autism. For all four participants in the study, the behavioral intervention outperformed the sensory integration therapy intervention. This study proposes that when focusing on challenging behaviors, a sensory integration approach is not the best option (Devlin et al., 2011). Other studies have indicated that better approaches are available. Han et al. (2015) criticizes sensory integration therapy (SIT) by addressing the methodological flaws, poor quality of research, and diversity of outcome measures. When compared with other countries, the United States uses the sensory integration approach much more frequently than other developed countries (Leong et al., 2013).

Research indicates occupational therapists are often instrumental in the implementation of the sensory integrative approach (Leong et al., 2013). Research indicates that when used effectively and with fidelity, the sensory integration therapy approach has led to some success with clients. To ensure fidelity, the Sensory Integration Fidelity Measure (2020) can be used. This measure ensures that therapists are remaining faithful to the principles and are implementing the approach as intended (Study Finds Sensory, 2020). A study conducted by Pfeiffer et al. (2011) found that significant progress was made towards individualized client goals when a sensory integration approach was employed, and some autism mannerisms were

decreased. While these results were promising, Pfeiffer et al. (2011) did note that additional research is needed. Some clients and therapists believe that sensory integration therapy can help with sensory processing, emotional regulation, enhanced motor planning, and increased spatial awareness. All of these components can translate to higher participation in daily occupations, increased independence, and the ability to follow norms to a higher degree in social and academic contexts. A study by Schaaf et al. (2012) also shared promising research. After a 10-week intervention using sensory integration, the researchers found that the children showed improvements in sensory processing and increased occupational participation across various contexts.

Sensory Integration Therapy Implementation

Research published by the American Journal of Occupational Therapy (Ashburner et al., 2008) indicates that the sensory integration therapy is often implemented once a need has been identified. The first step in a data-driven model, according to Faller et al. (2016) includes identifying student strengths and participation challenges. The therapist would consider what areas the child excels in to determine the child's foundation. Participation challenges would then be assessed. As revealed by Faller et al. (2016), participation challenges are barriers or deficits that impede the child from accessing the academic curriculum or from engaging in social interactions.

The subsequent step, per the "Application of Data-Driven Decision-Making Using Ayres Sensory Integration with a Child with Autism," would include conducting the chosen assessment(s). Assessments may include the Short Sensory Profile, the Sensory Integration and Praxis Test, or the PEDI clinical assessment. Research by Faller et al., (2016) notes differences among the assessments, stating that the sensory profile is a parent questionnaire while the

Sensory Integration and Praxis test is a quantitative assessment that identifies raw scores within the following categories: discrimination, integration, visual, tactile, proprioceptive, and vestibular, motor, praxis, balance, bilateral coordination, imitation, sequencing of actions, laterality, and crossing midline. The Sensory Integration and Praxis test is considered the "gold standard" for assessing sensory integrative function (Koester et al., 2014). "For children with ASD, the Short Sensory Profile scores under responsive/seeks sensation and auditory filtering explained 47% of the variance in academic performance, yet estimated intelligence was not a significant predictor of academic performance" (Ashburner et al., 2008, p. 564). The PEDI, on the other hand, measures capability and performance of functional activities in self-care, mobility, and social function (Faller et al., 2016).

Benefits of Sensory Integration Therapy in the Classroom

Research by McGovern (2015) narratively addresses the role that legislation plays in classroom decisions being made. When therapists and teachers create interventions, they are often driven by the law, specifically The Individuals with Disabilities Education Act, or IDEA. IDEA is a law that ensures that children with disabilities receive a free and appropriate education, or FAPE (Individuals with Disabilities, 2020). Part of this law focuses on the idea of the least restrictive environment. As described by McGovern (2015), the goal of the least restrictive environment, or LRE, is to enable students with disabilities to participate with peers who do not receive special education services as much as possible. This integration usually includes push-in models with co-teaching or additional special education support staff. Many children with autism spectrum disorders are able to participate in the general education classroom to a very high degree (Individuals with Disabilities, 2020).

Implications for the Interprofessional Team

School-based occupational therapists, pediatric therapists, and teachers have an ethical responsibility to serve their caseloads to the best of their abilities. Part of that responsibility includes choosing models of practice, frames of reference, and instructional strategies that best suit their individual students and their individual needs. Before implementing a sensory integration therapy approach, occupational therapists and practitioners must understand the research that supports and refutes the approach. While sensory processing issues are something that many children with autism spectrum disorders struggle with, research indicates that every child with an autism spectrum disorder is unique, and a sensory integration therapy approach may not work for all children. Atypical sensory reactivity has been linked to arousal, affect, attention, and activity level. If a provider notices a deficit in any of these areas, sensory processing testing may be necessary and a sensory integration approach may be appropriate (Roley et al., 2015).

A recent descriptive qualitative study by Grandisson et al. (2020) in Quebec, Canada assessed how Response to Intervention, or RTI could be used by occupational therapists to support classroom teachers. Grandisson et al. (2020) found that teachers and support staff were most concerned with the frequent outbursts and limited autonomy shown by their students with ASD. Teachers reported concerns with low motivation and anxiety for their students with ASD. While sensory overload could be the root problem of the outbursts, limited autonomy, low motivation, anxiety, and other factors could be contributing to limited success in these areas (Grandisson et al., 2020).

Future Research

Gaps in research and efficacy of outcomes of the sensory integration approach indicate a need for future research (Feldman et al., 2019; Devlin et al., 2011; Han et al., 2015). Whereas

fidelity measurement tools such as the Sensory Integration Fidelity Measure ensure that the approach is being implemented as intended (Study Finds Sensory, 2020), questions regarding quality of research, methodological flaws, and diversity of outcome measures still remain (Han et al., 2015). In an era that urges occupational therapists and teachers to follow evidence-based practice, the sensory integration approach creates a dilemma.

Conclusion

The existing literature suggests that sensory integration therapy can help children with autism with neural organization of sensory information for increased functional behavior. In order for increased efficacy of sensory integration therapy, literature suggests that the intervention should be employed by a trained practitioner and should include a holistic intervention rather than isolated strategies. Moreover, the degree to which sensory integration therapy can help children with autism in the general education or special education setting requires further study. Collectively, the current research suggests a role for sensory integration therapy in occupational therapy interventions to enhance students' occupational performance in the classroom setting if a sensory processing difficulty has been identified and the intervention is implemented as a whole. Teachers, parents, caregivers, and occupational therapists may find the potential for sensory integration therapy as an intervention promising, specifically for children with an autism spectrum disorder.

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