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Sensory Integration: Helping Students with Autism Incorporate Sensory Integration Techniques

Abstract

The present study focused on which sensory integration techniques are effective for students with autism and sensory processing disorder (SPD). Data from this study was gathered from observing four students who have autism and SPD, as well as interviewing the students' special education teacher and occupational therapist. The findings of this study demonstrate that sensory integration can support students with autism and SPD; however, professionals need to determine which strategies best support each students' needs. Hence, the findings impact special education teachers, occupational therapists, and parents/guardians of students with autism and SPD. Limitations of this study consist of time (lack of time) and a small number of participants, who were all attending a special education school.

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Sensory Integration: Helping Students with Autism Incorporate Sensory Integration Techniques

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Abstract

The present study focused on which sensory integration techniques are effective for students with autism and sensory processing disorder (SPD). Data from this study was gathered from observing four students who have autism and SPD, as well as interviewing the students' special education teacher and occupational therapist. The findings of this study demonstrate that sensory integration can support students with autism and SPD; however, professionals need to determine which strategies best support each students' needs. Hence, the findings impact special education teachers, occupational therapists, and parents/guardians of students with autism and SPD.

Limitations of this study consist of time (lack of time) and a small number of participants, who were all attending a special education school.

Introduction

Students with autism who have difficulties recognizing and coping with the stimuli in their environments (sensory processing disorder) face daily challenges. These challenges are ones that individuals without autism and sensory processing disorder may not understand. For example, a student who faces such obstacles may find transitioning from one activity to another overwhelming. Due to these feelings of anxiety, students may react in an array of manners, such as by self-injurious behavior (biting, slapping, and punching themselves), aggressiveness (kicking and pulling others' hair), and vocal outbursts (screaming). In this research study, strategies to help students with autism and sensory processing disorder (SPD) will be discussed. The purpose of finding strategies to further support these students is to help them feel more comfortable in their environments so that they can further be productive members in their classrooms, as well as in society.

In the research study, I observed four students in a self-contained setting in a special education school in upstate New York. The four students, who are fifteen, sixteen, and seventeen, have autism and SPD. I am the teacher aide in the classroom, and I work with the special education teacher. We teach students the functional curriculum and we integrate behavior strategies, including supports to help students with addressing their stimuli needs.

I received permission from both the special education teacher and the school administrator, as well as consent from the parents/guardians and the students. My role in this study was to observe the different sensory strategies that were employed by the special education teacher and the occupational therapist to determine which strategies were more effective for meeting the needs of the students. After taking notes and tallying the students' behaviors upon receiving the sensory integration support, I shared my findings with the special education teacher and occupational therapist. In our meeting, we discussed how students reacted to each sensory integration technique and what steps the occupational therapist can implement in the future.

The results of this study illustrate that each student has his own unique sensory diet, and that professionals need to collect data and analyze which strategy works best for each individual. This data enables teachers and therapists to further support the students as they work towards becoming more independent. The data should also be shared with parents/guardians, so that they are aware of what techniques can be used in the home setting. It is also important that professionals meet regularly to plan and reflect on the sensory integration practices that are being implemented so that ongoing alterations can be made.

Theoretical Framework

Sensory-based learners with autism face sensory difficulties, whether their bodies interpret stimulations too intensely or not intensely enough (Murray et al, 2009; Pfeiffer et al.,

2011; Viola & Noddings, 2006). Students with autism and SPD need help and support in order to be successful in different environments. A method that helps students with autism and SPD is sensory integration therapy. Sensory integration therapy is a theory that is based on the work of A. Jean Ayres.

Sensory Integration (SI) was introduced in the 1970s by A. Jean Ayres, who defined sensory integration as “the neurological process that organizes sensation from one’s own body and from the environment and makes it possible to use the body effectively within the environment” (Polenick & Flora, 2012, p. 29). Sensory integration is the brain and body (specifically the nervous system) working together to organize the different stimuli that come in from the environment. Things like loud noise, lights being turned on, and people brushing up against one another are all different stimuli that occur every day. Individuals without SPD are able to naturally organize these changes and notify the body so that it can adjust and function in the environment; however, this is not the case with students with SPD (Polenick & Flora, 2012). Viola and Noddings (2006) claim that a dysfunction occurs when the nervous system is unable to organize the incoming stimuli in a functional manner, resulting in the body being unable to react properly to the environment and causing inappropriate behaviors and learning experiences. Watling and Dietz (2007) write that sensory integration therapy “enhances nervous system processing of sensation to provide a stable foundation for the formulation and execution of appropriate behavior” (p. 575). The treatment created by Ayres is designed to provide controlled sensory experiences so that adaptive reactions and behaviors are created. Pfeiffer et al. (2011) also found that:

Interventions based on Ayre’s work on sensory integration therapy use planned, controlled sensory input in accordance with the needs of the child and are characterized

by an emphasis on sensory stimulation and active participation of the client and involve client-directed activities. (p. 77)

Therefore, interventions are aligned with each student to help him work on his challenges and cope with his sensory needs (Pfeiffer et al., 2011). In facing these challenges, working through them, and using different interventions, the ultimate goal of sensory integration therapy is to incorporate sensory into a student's daily routine. By doing so, the student will be able to better cope with behaviors, such as aggression, while enabling the nervous system to organize, modulate, and integrate information from the environment (Devlin, Healy, Leader, & Hughes, 2010). Using Ayre's sensory integration therapy and incorporating different interventions and strategies that have been proven effective, students with autism who have SPD have a better opportunity to lead successful and productive lives (Devlin et al., 2010; Pfeiffer et al. 2011; Watling & Dietz 2007).

Literature Review

Autism

Autism Spectrum Disorder (ASD) is a developmental disorder that impacts one percent of the population and is typically diagnosed when the child is one or two years old (American Psychiatric Association, 2013). The Diagnostic and Statistical Manual of Mental Disorders (2013) defines autism spectrum disorder as "persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing, maintaining, and understanding relationships" (p. 31). Although the Diagnostic and Statistical Manual of Mental Disorders (2013) emphasizes the social difficulties that students with autism experience, several studies have also documented that students with autism have struggles with processing sensory

stimuli in their environments (Baranek, 2002; Devlin, Healy, Leader, & Hughes, 2011; Hodgetts & Hodgetts, 2007; Murray, Baker, Murray-Slutsky, & Paris, 2009; Pfeiffer, Koenig, Kinnealey, Sheppard & Henderson, 2011; Polenick & Flora, 2012; Preis, 2007; Schaaf, Hunt, & Benevides, 2007; Watling & Dietz, 2007).

Autism and Sensory Processing Disorder

Students with autism who have challenges with recognizing and responding to sensory stimuli may have Sensory Processing Disorder (SPD) which is defined as “a complex disorder of the brain that affects children and adults. People with SPD misinterpret everyday sensory information such as touch, sound, and movement” (Murray et al., 2009, p. 246). Sensory processing disorder can stand alone as a disorder in children and adults, but it is also a common characteristic that affects 42-88% of students with Autism Spectrum Disorder (Baranek, 2002). In order to compensate for the misinterpretation, people who suffer from SPD may lack response to a stimulus or may feel overwhelmed by information in the environment and look for intense sensory experiences as an outlet (Pfeiffer et al., 2011).

In all individuals, the nervous system plays the largest role in the sensory input process by organizing and interpreting over 80% of the stimuli individuals encounter throughout the environment (Viola & Nodding, 2006). The nervous system is able to interpret that amount of information because of the body’s different senses, which include not only the common five (hearing, sight, taste, smell, and touch), but also three other senses that are less familiar. The vestibular, proprioceptive, and tactile senses, also known as the “near” or “hidden” senses, play a major role in the nervous system, by organizing and interpreting stimuli from the environment (Polenick & Flora, 2012). Polenick and Flora (2012) write the following about the vestibular, proprioceptive, and tactile senses:

The vestibular sense also thought of as our sense of balance, provides sensory input regarding the body's movement through space, the proprioceptive sense incorporates sensory input from muscles and joints, and the tactile sense involves sensory input related to touch. (p. 29)

These senses enable children to raise their hands, walk around a classroom safely and effectively, and recognize when something is hot or sharp (Polenick & Flora, 2012). However, students with autism and SPD may have difficulties with everyday tasks that involve the use of the senses (Polenick & Flora, 2012).

Students with autism who have SPD may have difficulties adjusting to different changes in their environments, such as the turning on of lights (Polenick & Flora, 2012); therefore, a student's ability to function properly in the environment is impaired and negative behaviors may result (Friedlander, 2008; Pfeiffer et al., 2011; Polenick & Flora, 2012). Due to the discomfort that these students feel, they may struggle with staying focused and completing academic and social tasks in the school setting (Polenick & Flora, 2012; Viola & Noddings, 2006).

Although all students with autism and SPD may struggle with adapting to different stimuli changes in their environments, each student reacts differently (Murray et al., 2009; Viola & Noddings, 2006). Students with autism who have SPD may be overresponders (Murray et al., 2009) which is also known as hypersensitive (Viola & Noddings, 2006), underresponders (Murray et al., 2009) which Viola and Noddings (2006) refer to as hyposensitive, or sensory seekers (Murray et al., 2009). Sensory seekers and over responders have many similar characteristics (Murray et al., 2009).

Characteristics of Sensory Seekers

Sensory seekers are students with autism who require a high activity level in order to receive the sensory integration they need to make up for lack of it in their nervous systems. These students have a high threshold, and seek out a significant amount of sensory input within the environment in order to reach that threshold. Often times, these students with autism are seen using self-stimulatory behaviors, which are repetitive movements that serve no distinguishable purpose in the environment, in order to help with their high sensory needs (Pfeiffer et al., 2011). Murray et al. (2009) also found that “the common characteristics seen with sensory seeking students with autism are incoordination, hyperactivity, distractibility, impulsivity, and lack of safety awareness. Running, aggression, and self-injurious behaviors have also been seen in order to help fulfill the need for sensory input” (p. 247).

Socially, students with autism who seek sensory input have difficulties socializing with others because they are consumed by their need for sensory input in order to feel calm and relaxed (Dunn, 2007). When they exhibit aggressive and self-injurious behaviors in the community or in school, they become a danger to themselves and others. Due to these behaviors, they are in most cases separated from classmates in order to maintain safety; consequently, they miss opportunities for interactions. These missed opportunities for interaction further impede the student because he does not learn ways to socially interact; therefore, he struggles with communicating his needs and may turn to negative behaviors, such as self-injurious actions (Pfeiffer et al., 2011). Students with autism who have sensory needs may struggle with learning how to communicate with others and how to form friendships.

Academically, sensory seekers complete school work that is often times illegible and disorganized as they struggle to concentrate on one thing long enough to make it cohesive and

understandable. For example, they may seek sensory input by pushing hard on pencils and pens (Murray et al., 2009). Sensory seekers are also commonly known as task avoiders in an academic setting. Leong, Stephenson, and Carter (2011) articulated that this occurs “because often times, the tasks they are being asked to complete lacks the necessary sensory input they need, so they are unable to complete a task” (p. 345). Due to struggles with communication, students with autism have difficulties articulating their sensory needs and tend to avoid tasks. This creates a very frustrating atmosphere for not only the student, but for also the teacher because the student refuses or avoids the task, but is unable to explain why he is having difficulty completing the assignment (Murray et al., 2009). Hence, the student may struggle to make academic gains because he requires a curriculum that incorporates different strategies and interventions in order to meet his high sensory needs.

Characteristics of Underresponders

The next type of sensory-based learner is called an underresponder, or a hyposensitive student with autism. Viola and Noddings (2006) state, “a hyposensitive child with autism does not receive and process enough sensory information because their brain registers sensations less intensely than most children” (p. 41). These types of learners are often described as quiet, passive, and complacent (Murray et al., 2009). They characteristically have a low tone, poorly developed gross and fine motor skills, and weak postural control, endurance and strength (Murray et al., 2009). Underresponders require intense sensory integration in order to physically move and participate. Some students will find ways to create additional sources of stimulation to reach average levels of alertness and engagement, such as fidgeting and squirming in their seats, singing to themselves, or becoming overly active in order to compensate for the lack of sensory input (Murray et al., 2009).

Students with autism who are hyposensitive endure several personal and social difficulties (Viola & Noddings, 2006). Some hyposensitive students, according to Viola and Noddings (2006), are unaware of pain, temperature, and how things feel, so they touch and grab different objects without knowing they could get burned or cut. They may also bump into people while walking as they are unaware of what that feels like and that it is inappropriate (Viola & Noddings, 2006). These behaviors impact students socially as they require supervision in order for them to be safe. Underresponders often do not respond to being spoken to or touched as their tactile sense is inhibited and does not enable the body to recognize what is happening (Leong et al., 2001). Hence, these students are sometimes viewed by others as being rude and inattentive (Leong et al., 2011). Hyposensitive students also struggle to form relationships with others as their low level of alertness and engagement results in a struggle to maintain attention to conversation, and they often lack the motivation to interact with their peers during activities like toy play.

Academically, hyposensitive students with autism often avoid tasks on a subtle basis, as the task has no meaning to the student, so they often sit quietly and do not participate (Watling & Dietz, 2007). Underresponders may ignore voices and have difficulty following verbal directions because they do not consistently interpret sensory input, such as sound. This can become frustrating for teachers as these students seem to be ignoring directions on a consistent basis and spend more time off task than on. Viola and Noddings (2006) also found:

The lack of safety awareness and touching objects that are sharp or hot is dangerous in an academic setting, which requires teachers to commit all of their time to ensure the student's safety with direct supervision, which becomes an overwhelming task and takes time away for learning for all students. (p. 42)

Hyposensitive students with autism struggle in an academic setting as their low sensory input creates difficulties for them to be attentive, motivated, and participate in different activities throughout the day (Viola & Noddings, 2006).

Characteristics of Overresponders

The last type of sensory-based learner is an overresponder, or a hypersensitive student with autism. Murray et al. (2009) writes that “overresponsiveness, also known as sensory defensiveness, is a condition in which learners’ neurological systems are overly sensitive to sensory stimulation and, therefore, triggered by virtually everything in the environment” (p. 249). The brain of a hypersensitive child, according to Viola and Noddings (2006), “registers sensory sensations too intensely, and will act out in two ways due to the over arousal: avoid the stimulation or react in a strong and negative manner” (p. 41). Hypersensitive students tend to be disorganized, distractible, and emotionally reactive to being touched or having demands placed on them. They commonly have high anxiety and experience difficulties with transitions. All of these emotions and responses to the environment are caused by the student’s nervous system responding too strongly to the sensory stimuli in the environment.

Hypersensitive students face personal, social, and academic difficulties, such as isolating themselves so that they are not prone to the sounds around them (Viola & Noddings, 2006). They prefer to work alone and in a quiet area away from others in order to limit the amount of sensory input. These types of students shy away from any kind of social interaction with their peers, including playtime, as that involves a lot of movement and touch. Overresponders are often perceived as cautious and fearful and prefer predictable routines and activities (Viola, & Noddings, 2006). Pfeiffer et al. (2011) writes that “when these students cannot avoid sensory stimulations, they often act out negatively and become aggressive, argumentative, seem overly

anxious, cry and refuse to do certain activities” (p. 77). All of these emotions refrain overresponders from creating relationships, and interacting with others as it is over-stimulating and overwhelming. It is difficult for teachers to include hypersensitive students with autism in classroom activities throughout the day, without allowing them to isolate themselves. Changes in classroom routines tend to upset these students because it is difficult for them to get back on track and be successful the rest of the day. Intervention strategies must be used in order to best support hypersensitive students with autism (Viola & Noddings, 2006).

Best Practices for Sensory Integration: Students with Autism

There are many different strategies that can be used to help students with autism who also have SPD (Leong et al., 2011; Murray et al., 2009; Viola & Noddings, 2006). The strategies and interventions that are used are based on the individual being hypersensitive, hyposensitive, or a sensory seeker. The strategies and interventions are interchangeable and are widely used on a trial and error basis, but when used properly and consistently, they can truly impact a student’s life in a positive way (Leong et al., 2011; Murray et al., 2009; Viola & Noddings, 2006).

A sensory profile needs to be completed in order to determine which sensory strategies and interventions should be used to help students with autism (Polenick & Flora, 2012). Polenick and Flora (2012) state that “a sensory profile is a standardized rating scale (always, frequently, occasionally, seldom, and never) that can be completed by a parent or primary caregiver” (p. 30). Preis (2007) also articulated that “a sensory profile can be conducted through observations and interviews in order to determine a student’s triggers, whether it be smell, touch, sound etc. that both calm and agitate the student” (p. 18). Once these triggers are observed throughout different environments over a period of time, it is easier and more efficient to establish strategies that will best support the student and his sensory needs (Polenick & Flora, 2012; Preis, 2007).

After the sensory profile, the first and most simple strategy that can be used to help students is altering the environment (Preis, 2007). Preis (2007) writes that “adapting a student’s environment to their learning style is considered to be a best practice in antecedent intervention” (p. 19) and can truly help a student get through his day in a successful and productive manner. Within the student’s environment, lights can be dimmed and outside noise can be limited, which can help the student feel calm and relaxed (Friedlander, 2008). By adapting the environment, a student’s overstimulation will be limited and the student may not react with negative or avoidant behaviors (Friedlander, 2008). Viola and Noddings (2006) as well as Preis (2007) provide several suggestions to teachers. They recommend that teachers organize their classrooms as this alleviates anxiety and helps the student feel safe in his environment and therefore less likely to be overwhelmed by the stimuli. A posted schedule that is altered daily also aids a student with autism in feeling calm and relaxed because he is prepared and comforted by knowing what is going on throughout the day. Along with adapting the environment, teachers also have to adapt their teaching styles in order to serve every student’s needs. For underresponders, teachers need to be animated and as energetic as possible in order to try and spark their arousal levels and get them engaged in the activity. Students who are overresponders and sensory seekers require teachers who are calm as this will help the students to not be overstimulated in the classroom setting (Murray et al., 2009; Preis, 2007 Viola & Noddings, 2006).

A successful way to modify a classroom for students with autism who have sensory integration needs is to create a multisensory environment (Murray et al., 2009; Thompson, 2011). Maintaining focus in the classroom and learning throughout the day is a difficult task for students with autism and having a multisensory environment available to students has been proven to “enhance the sensory awareness of individuals and assist with many of the problems

(aggression, agitation, wandering, poor coordination and other difficulties) to enhance individual engagement and participation and to reduce environmental barriers” (Thompson, 2011, p. 203).

Multisensory environments can be as simple as having a room with low lighting, beanbags, and a bubble machine. Students use these rooms throughout their day, before, during, or after stress provoking situations. These environments provide students with a calming atmosphere that allows them to regain control and continue learning (Preis, 2007; Thompson, 2011).

Students with autism who are over or underresponders need movement breaks so that they can receive the stimulation necessary to participate in classroom activities (Murray et al., 2009; Viola & Noddings, 2006). Students may sit on a ball, participate in heavy work, or do wall pushups in order to increase or decrease the stimulation as necessary (Murray et al., 2009). When creating different activities for students to take part in, adapting them to a student’s needs can be very helpful in achieving sensory integration (Murray et al., 2009). Tabletop activities can become a tactile experience for students with autism. For example, using Play Doh or Therapuddy for students who are hypersensitive and sensory seekers is beneficial. For students who are underresponders, the use of sandpaper and Magna Doodle for writing activities is also recommended (Murray et al., 2009).

It is significant for students to have communication tools available to them. Visual aids are a very important strategy that should be used as much as possible in order to better understand a student’s sensory needs (Preis, 2007). Preis (2007) writes:

Visual aids are an effective means of giving directions as the visual aids support student attention, illustrate their routine, standardize procedures between and among service providers, and increase the reliability and consistency of student response.

Additionally, the presence of visual aids allows instructors to reduce their own verbal

expression (an important antecedent intervention) when working with students with autism, stressing the pictures and/or words to structure the environment and direct the student, hence reducing the risk of language and/or sensory overload. (p. 19)

When students have the capability to express their needs to others, and also understand what other people are trying to say to them and what the expectations are, the risk of overstimulation is reduced (Freidlander, 2009; Murray et al., 2011; Viola & Noddings, 2006). Students with autism feel safe and prepared when they have the means to communicate with others, especially when they need sensory integration. Social stories, PECS (picture exchange, communication systems), DynaVox, and other basic communication boards, can significantly help students with autism by giving them the opportunity to express themselves (Freidlander, 2009; Murray et al., 2011; Viola & Noddings, 2006). Using the same visual cues consistently is also important and can include color coding different signs around the room and using specific bins for each student's individual sensory materials. These consistent visual cues make maneuvering in an environment less over stimulating and more efficient, and can also ease transition processes for students with autism who have a sensory processing disorder (Friedlander, 2009; Murray et al., 2011; Viola & Noddings, 2006).

The last strategy that can be used for students with autism who need sensory integration is sensory stimulation (Hodgetts & Hodgetts, 2007). Hodgetts and Hodgetts (2007) write that sensory stimulation is “applying one type of sensation, such as deep pressure, directly to a person with the purpose of eliciting a behavioral response. Somatosensory stimulation is a specific subtype of sensory stimulation that focuses on tactile, vibratory, or proprioceptive input” (p. 394). Examples of somatosensory stimulation are massages, joint compressions, brushing, or rubbing parts of the body, pressure garments, and weighted items such as vests or blankets. Both

sensory integration and somatosensory stimulation use meaningful, adapted interactions with the student in order to determine what is effective (Baranek, 2002; Hodgetts & Hodgetts, 2007; Leong et al., 2011; Polenick & Flora, 2012; Viola & Noddings, 2006). Hodgetts and Hodgetts (2007) found that “sensory stimulation has decreased self-stimulatory behaviors, and self-injurious behaviors, and also found increases in social interaction and attention span” (p. 395). These types of behaviors are commonly seen in students with autism who have SPD, and decreasing these behaviors through sensory stimulation makes a positive impact on the lives of those students. Devlin et al. (2010), like Hodgetts and Hodgetts (2007), also observed decreases in self-injurious behaviors among students with autism who received sensory stimulation.

In many studies of students with autism who have a sensory processing disorder, “a commonly used technique is ‘deep pressure’ (firm touch pressure providing calming input), which can be applied via therapeutic touch (massage, joint compression), or an apparatus (Hug Machine, pressure garments, weighted vests)” (Baranek, 2002, p. 408). The same techniques have also been articulated by Hodgetts and Hodgetts (2007), Leong et al. (2011) Polenick and Flora (2012), and Viola and Noddings (2006). These techniques are commonly known as a sensory diet and have a calming effect on students with autism, whether they are seeking more sensory stimuli in order to increase their arousal level or less sensory stimulation (Polenick & Flora, 2012). Leong et al., (2011) found that

Through interviews of teachers and supervisors that all of their students with autism that received sensory integration through deep pressure massages, use of weighted vests and joint compressions resulted in positive effects in any form including motor skills, social skills, attention, responses and adaptive responses along with other behaviors. (p. 349)

The use of these methods helps students with autism in a number of ways. For sensory seekers and overresponders, the use of weight or compression in their day helps calm their nervous system and keep them grounded instead of feeling out of control resulting in aggressions (Murray et al., 2009). For underresponders, brushing, vests, and compressions help them gain a sense of their body and how it moves, as they often struggle to feel anything via their tactile sense (Murray et al., 2009). When students with autism use these methods they are able to start their day feeling safe and calm. They can use or ask for these strategies to be applied as they begin to feel out of control and anxious due to lack of or too much stimuli within the environment. Students with autism become more successful in an academic setting as they are able to concentrate and be more willing to participate with others (Baranek, 2002; Hodgetts & Hodgetts, 2007; Leong et al., 2011; Murray et al., 2009; Polenick & Flora, 2012; Viola & Noddings, 2006).

Teachers are also beginning to help students with autism become self-advocates by providing students with the time and space to take care of their sensory needs (Viola & Noddings, 2006). Viola and Noddings (2006) reported students “giving themselves hugs for 15 seconds, bending and unbending fingers for 20 seconds, pressing their hands together tightly for 5 seconds, or pressing against their desks or chairs” (p. 44) and while students were standing in line they were able to “open and close their hands slowly, walk down the hall on tiptoe, or stretch or bend in a way that won’t disturb their neighbors” (p. 44). Viola and Noddings (2006) found that these methods improved concentration and focus in the classroom and reduced negative behaviors. Murray et al. (2009) also concluded that “students with autism learning self-regulation strategies and when to use them is vital, and can help a learner forego the use of problematic behaviors by improving self-awareness and communication skills, and teaching strategies to

modulate or regulate nervous systems” (p. 250). Counting and deep breathing are also useful strategies that can be taught to students to use in times of crisis when they feel out of control and do not have the necessary means to fulfill their sensory input, such as a vest or weighted blanket (Murray et al., 2009).

When helping students work through their sensory needs, whether it is with the use of a sensory diet or self-regulation, teachers should always be aware of the student’s sensory concerns and consult professional staff and parents when developing strategies (Freidlander, 2008). It is always useful to consult with professionals, as they are up to date on all the current research for what works for students with a sensory processing disorder, but truly, a teacher’s best resource is a student’s parents/caregiver. Involving parents in their child’s program will not only give a teacher better insight into what strategies the parents use at home, but it also provides a forum for the parents and teachers to brainstorm new strategies that can be adapted in both the home and school setting (Friedlander, 2008; Preis, 2007; Thompson & Rains, 2008).

Supporting Students with Autism at Home

Raising and supporting a child with autism who also struggles with SPD can be challenging. As it is a struggle for any parent to raise a child with a disability, “parents with children who are diagnosed with ASD [Autism Spectrum Disorder] suffer more stress than parents of children with special health care needs or other developmental disorders, and typically developing children” (Dillenburger et al., 2010, p. 13). Pennington, Grau, Bobo, Lorence, Tomcheck, Stewart, and Wooldridge (2013) also concur with Dillenburger et al. (2010) regarding the challenges that parents may face at home.

According to the National Center for Autism Research and Education (2008), the divorce rate of parents raising a child with autism is 82%. Not only are the parents affected by their child

having autism, but siblings in families also feel the impact as well. Roeyers and Mycke (1995) and Demyer (1979) found that 30% of siblings reported feelings of being neglected and 18% expressed worries and anxieties associated with ASD. Autism Spectrum Disorder impacts a family's life in many aspects, from emotional to economical, since "the total cost of raising a child with a disability is three times greater than the cost incurred by raising a typically developing child" (Dillenburger et al., p. 14). Due to the stressors that families face, there are many supports that can be provided to both the family and to the child with autism (Deris, 2009; Dillenburger, 2010; Pennington et al., 2013).

The types of supports that can be provided to families and to the child are emotional and instrumental care (Dillenburger, 2012; Deris, 2009; Pennington et al., 2013). Deris (2009) states that "social support is defined as being multidimensional, comprised of both 'emotional' (affection, sympathy and understanding, acceptance, and esteem from others) and 'instrumental' (goods, services, and information) functions that aid in mediating stress and dealing with day-to-day interactions" (p. 18) and that "the functioning of parents and child is enhanced when families receive that aid and assistance that match their identified needs and priorities" (Deris, 2009, p. 18).

The 'emotional' support is most often times received from family and friends. Often times, it is very hard for families to accept and adapt to the fact that their child has a disability. Families can struggle with the idea that something is wrong with their child, and the guilt can be overwhelming (Dillenburger, 2010; Deris, 2009; Tadema, & Vlaskamp, 2009). Emotional support is crucial for families to have in order to work through the phases of grief, and move into acceptance so that their child can receive all of the love and care that they need to live a quality life (Deris, 2009; Dillenburger et al., 2010; Thompson & Rains, 2008). Tadema and Vlaskamp

(2009) and Deris (2009) also found that family and friends can also help the family take care of the child. This can help reduce stress on the family as breaks allow them personal time (Dillenburger et al., 2010; Tadema & Vlaskamp, 2009; Thompson & Rains, 2008).

Instructional support is a more tangible support that families can rely on to truly make changes in their lives for the better, and improve the quality of life for their child with ASD (Deris, 2009; Tadema, & Vasklamp, 2009). Dillenburger et al. (2010) concluded that “the aid that parents receive from doctors, teachers and other professionals can provide them with better care for their child, and different strategies to help their child become more independent” (p. 25). This relieves the stress of constant care on families, and allows them to enjoy time together that is not always centered on helping the child. These professionals can also be resources for families to turn to with questions or concerns (Friedlander, 2008; Thompson & Rains, 2008), including different treatments and interventions that may help the child with ASD. Senel (2009) found that:

45% of families with a child with ASD used acupuncture, 47.5% used sensory integration, and 30% used Chinese medicine. 19% of families were trying to treat concentration or attention, 23% relaxation, 15% GI [gastrointestinal] problems, 12% communication/speech, 4% tactile sensitivity, 4% mild seizures, and 8% were trying to maintain general health. (p. 495)

According to Senel (2009) as well as Deris (2009) and Pennington et al. (2013), students with ASD have a wide range of characteristics, and parents look to professionals, such as doctors, who can provide them with information regarding treatments. However, parents want to be included in the decision making process regarding treatment options (Pennington et al., 2013).

Pennington et al. (2013) as well as Thompson and Rains (2008) found that parents want to be as

involved as possible in helping their child succeed, learn about the latest research on ASD, and how to implement treatments at home. One of the strategies that parents can execute at home is sensory integration therapy for students with ASD and SPD (Senel, 2009; Thompson & Rains, 2008).

There are many different sensory integration strategies that family members can use at home with their child (Dunn, 2007; Thompson & Rains, 2008). For hyposensitive students, parents can use rough and varied textures for wash clothes and towels, add texture to handles and toy surfaces, give bear hugs, and rub lotion on them to increase sensory input for the child's nervous system (Dunn, 2007; Thompson & Rains, 2008). Family members can also turn on bright lights, place favorite toys in harder to get places to motivate more movement, and turn on the radio. All of these techniques will help a hyposensitive student's brain respond to the stimuli in the environment with more intensity (Dunn, 2007; Thompson & Rains, 2008). For sensory seekers, Thompson and Rains (2008) and Dunn (2007) found that parents can massage their child, ask the child to move objects, such as chairs and tables, provide lively background music, and change the usual location of objects in order to help the student's nervous system fill the threshold of sensory input that sensory seekers need. Parents can also use scented bath products, place heavy books on the child's lap, and use scented lotions and detergents to help increase sensory input (Dunn, 2007). For hypersensitive students, parents at home can honor quiet play, repeat the same self-care and touching routines, use one food temperature and limit textures, and select an assigned seat in order to help the student relax and not become over stimulated by the environment (Dunn, 2007; Thompson & Rains, 2008). Family members can also provide predictable sensory challenges, use unscented soaps and lotions, and use very heavy blankets to aid a student with ASD who has SPD (Dunn, 2007; Thompson & Rains, 2008).

Conclusion

Students with autism are very unique individuals whose characteristics and needs truly set them apart in their own way. They are intelligent and bright students who can learn and succeed like any other student; they just have a set of needs that must be fulfilled in order to be successful and productive (Deris, 2009; Dillenburger et al., 2010; Dunn, 2007; Friedlander, 2008; Pennington et al., 2013; Senel, 2009; Thompson & Rains, 2008). Sensory integration therapy is a strategy that reaches a student with autism's needs in any way that is necessary. Those who seek out sensory input, respond too intensely, or not enough to stimuli in the environment, are given opportunities to be included with their peers and in the community through the use of sensory integration, as it provides students with different methods for calming and achieving thresholds of stimulation (Hodgetts & Hodgetts, 2007; Murray et al., 2009; Pfeiffer et al., 2011; Viola & Noddings, 2006). It also reduces and replaces negative and unwanted behaviors with positive interaction and participation that creates a positive learning atmosphere for all students (Baranek, 2002; Devlin et al., 2010; Leong et al., 2011; Preis, 2007). Sensory integration has been researched and proven to be successful in supporting students with autism who have a sensory processing disorder, and with more research in the future, sensory integration therapy will be included in every student with a sensory processing disorder's program, in order to give students the best chance possible of leading a successful and productive life in the future (Hodgetts & Hodgetts, 2007; Murray et al., 2009; Preis, 2007; Viola & Noddings, 2006).

Methodology

Context

My study on sensory integration for students with autism took place at a special education school in Upstate New York. My study occurred at this school, because I am a paraprofessional there, and the students I work with have both autism and SPD. The students who are participating in my study are in a self-contained 7:1:4 class at the special education school.

Participants

The participants in this study were four out of the seven students in my classroom, where I am employed as a paraprofessional. Steve is a 15-year-old student with autism and SPD; he participated in my study. Steve enjoys different leisure activities such as bouncing on a ball, coloring, and painting. Steve also enjoys completing different jobs around the school, such as delivering mail. Steve's struggle with SPD hinders his ability to process stimuli in the environment, as he does so too intensely. He therefore turns to negative behaviors, such as screaming, yelling, and hitting, in order to try and get away from over stimulating stimuli, such as another student screaming, music playing in the background, or the turning on of lights suddenly.

Andrew is the next student who participated in the study. Andrew is a 17-year-old boy with autism and SPD. Andrew is a high functioning student who has the ability to read, write, and use complex thinking skills to complete different work tasks. Andrew is considered a hyposensitive student, which means his brain does not strongly process stimuli in the environment; therefore, his arousal and motivation levels are very low. Andrew often enters other's personal space and bumps into individuals and objects because he is not aware that he is

doing so. He also sings to himself and quotes movies out loud in order to help his body integrate sensory stimuli. Getting Andrew to complete tasks and participate in different activities is difficult as his arousal and motivation levels are low; he has little to no interest in school activities.

The last two students that took part in my study are Adrian and Lee. Adrian is a 15-year-old boy with autism and SPD. Adrian is a hard working young man who consistently completes tasks to the best of his ability. He also enjoys doing different jobs around the school, such as shredding paper and recycling. Adrian is considered a sensory seeker, which means he has an extremely high sensory threshold, and spends most of his day trying to fulfill that threshold. Adrian spends a lot of time off task, and needs to be redirected. He is consistently seeking ways to fulfill his sensory needs and often times this includes slamming his hands on the desk, stomping his feet, running and jumping around, and throwing materials. All of these behaviors are distracting and sometimes dangerous for him and others.

Lee is a 17-year-old student with autism and SPD who truly enjoys school. He completes all of his demand tasks with no complaints, and he likes participating in many classroom jobs. Due to his struggle with sensory integration, Lee partakes in many self-stimulatory behaviors in order to cope with the stimuli in the environment. These behaviors involve hand movements which cause him to become off task, distract himself, and also distract his peers.

Researcher Stance

My role in this study was an observer and interviewer. I observed the students in my classroom over a period of one week. As students went through their day, I recorded field notes of what kind of behavior was occurring before sensory integration strategies were implemented, and the types of behaviors that were evident upon the implementation of sensory integration.

Some sensory integration tools included the use of a vest and brushing. Through these field notes, I analyzed if positive behaviors (i.e. being on-task, no hitting, no kicking, decrease in self-stimulatory behaviors) took place more often once sensory integration was implemented. I also tallied the negative behaviors that occurred during those time periods in order to analyze if negative behaviors decreased once sensory integration strategies were executed.

As an interviewer in my study, I interviewed both the special education teacher in the classroom and the occupational therapist that works with these students. Through these interviews, I analyzed the similarities and differences of the opinions of both the special education teacher and the occupational therapist on sensory integration, if they felt it was a useful strategy that worked for students with autism and SPD, and the strategies that they have used and implemented and had success with.

I am currently certified in Elementary Education, grades 1-6. I am presently enrolled in a program working towards earning a Master's of Science in Special Education. While I am working towards this certification, I am also employed as a paraprofessional at the special education school where I am conducting my study.

Method

The purpose of this study was to determine if sensory integration could help reduce negative behaviors, and increase the likelihood of success for students with autism. In doing so, I also wanted to determine if sensory integration as a whole truly is an effective technique to use with students with autism and SPD.

In order to serve the purpose of this study, I was first an observer when I gathered data on sensory integration techniques and the effectiveness of these methods. I observed and took notes on the behaviors of students with autism and SPD within the self-contained special education

classroom. I observed and recorded data on student behavior before sensory integration took place, during the demand at hand, and then afterwards, to determine if positive behaviors (i.e. on-task behavior, no aggressions) were exhibited more often once sensory integration took place. Along with the field notes, I then interviewed the special education teacher and the occupational therapist. I asked questions about their views on sensory integration, and if they feel that it is a successful and effective strategy to use when working with students with autism and SPD. I also asked them to provide examples of when they used a sensory integration strategy and the outcome of student behavior once the strategy was used.

Informed Consent and Protecting the Rights of the Participants

I received informed consent from the participants in my study by sending consent letters home and required a signature from the parent/guardian of the child, and also the signature of the child. Signing the letter of consent meant that the participant and the parent/guardian are fully aware that my study was in no way affecting their child's academic performance. The participants were aware that their involvement in the study was voluntary. The special education teacher and occupational therapist also signed a consent letter which stated that they understood that I was interviewing them, and that their answers would be used in my study on sensory integration. To protect the rights of the participants who volunteered in my study, I used pseudonyms.

Data Collection

The data I collected for this study consisted of field notes and interview responses. I observed and recorded data on student behavior before sensory integration took place, during the demand at hand, and then afterwards, in order to determine if positive behaviors (i.e. on-task behavior, no aggressions) were exhibited more often once sensory integration occurred. Along

with the field notes, I also interviewed the special education teacher and the occupational therapist. Through the interview process, I recorded the views of the two professionals regarding sensory integration, as well as the sensory integration techniques that they have used.

Data Analysis

After collecting the data from field notes and interviews, I analyzed the data in a number of ways. I closely read and analyzed my field notes. I tracked the number of times per student that sensory integration resulted in positive behaviors, both during and after the task the participant was being asked to do. I also tallied the number of negative behaviors that occurred per student in order to once again track the effectiveness of sensory integration. Based upon my data analysis, I was able to determine the effectiveness of sensory integration techniques for the students who participated in my study.

Using the interviews from the special education teacher and the occupational therapist, I re-read their responses and highlighted the similarities between the answers of the two professionals on sensory integration. Then, using a different highlighter color, I marked the differences between the two responders. Therefore, I compared and contrasted the strategies, views, and experiences of the special educator and occupational therapist.

Findings and Discussion

In order to investigate which techniques work best with students with autism and SPD, I observed four students and documented which methods were effective in meeting their sensory needs (refer to appendix A for charts). I also interviewed the special education teacher who teaches the four students as well as the occupational therapist (refer to appendix B for the interview questions). I organized my findings into three groups: sensory seekers, overresponders,

and underresponders. I also reviewed my notes from the interviews with the special educator and occupational therapist.

Students who are Sensory Seekers

One student in the class is a sensory seeker. The student's name is Adrian. Pfeiffer et al. (2011) describe students who are sensory seekers as needing frequent and significant amounts of sensory input. Due to this need, students who are sensory seekers tend to exhibit repetitive movements.

Sensory support is vital for Adrian. Through my observations, I found techniques that support Adrian, and techniques that cause him greater frustration. Without sensory input, Adrian tends to slap his hands on the tables, runs in the classroom, and throws materials, such as puzzles. Two of the successful sensory techniques that were used to support Adrian were the utilization of a weighted vest and brushing. A weighted vest is a zip on vest that has pouches that hold varying weights. The vest helps Adrian feel that he has control of his body. Adrian puts the vest on every morning and wears it for the entire school day. At the start of the day, the teacher prompts Adrian to wear the vest, and he does so independently. I observed that when Adrian was wearing the vest, he was calmer and willing to complete his work tasks. The second technique that helps Adrian is brushing. The brush that is used in the classroom is called a surgical brush, because it is soft and has teeth on both sides. Adrian's arms, back, and legs are brushed every morning. Each limb is brushed ten times (i.e. his back is brushed ten times). Prior to the brushing, Adrian breathes deeply and is overwhelmed. When he is brushed, his breathing becomes moderated and he is visibly calmer (he smiles and his muscles relax). Due to brushing, Adrian is able to sit for a longer period of time in order to complete work.

Three sensory techniques were found to not be successful for Adrian: sensory bins, weighted blanket, and deep pressure. Sensory bins consist of a small bin that is filled with materials (i.e. rice, noodles, beans) that produce a tactile response. Adrian put his hands in the bin, which was filled with noodles, and watched the noodles fall from a high elevation. The same method was tried with beans. Adrian's response was the same with the noodles as with the beans. He started throwing the beans and noodles across the room, and then he emptied the bins. When he sat at his seat for work time, he had to be removed from the classroom in order to take a walk. Adrian was having a difficult time focusing, and he was unable to complete his work independently. Thus, the sensory bins proved to be over-stimulating for Adrian.

Another strategy that was tried, but was ineffective for Adrian, was the weighted blanket. A weighted blanket is a large blanket that is filled with sand. Adrian was given the blanket and was shown different ways that he could wear it. At one point, during the observation, he placed the blanket over his head. Adrian also wore the blanket over his legs. Initially, Adrian was calmer. However, the weighted blanket did not sufficiently meet Adrian's threshold. Once he returned to his seat, Adrian resorted to slamming his hands on his desk so that he could receive more sensory input.

The third strategy that was used, which was also ineffective for Adrian, was deep pressure (joint compressions). Adrian's joints (wrists, elbows, and shoulders) were gently pushed together. Each joint was pushed ten times. At the beginning of this exercise, Adrian was calm; however, he then started to become impatient and negative behaviors (i.e. yelling and throwing materials) arose.

Based on the data regarding Adrian's reactions to different sensory techniques, it illustrates that when working with sensory seekers, educators need to be aware of how much

stimulation the student needs (Pfeiffer et al., 2011). Adrian required the appropriate amount of stimulation that enabled him to have a productive day. However, when he was under stimulated, such as when he used the weighted blanket, he pursued other means (i.e. throwing materials) to become stimulated. On the contrary, when he was overstimulated (i.e. sensory bins), he displayed negative behaviors when working directly within the confines of the technique (i.e. throwing the beans that were located in the bins).

Students who are Overresponders

Students who are overresponders react strongly to stimulation in their environments (Viola & Noddings, 2006). In order to cope with the overstimulation, they tend to demonstrate stress in negative ways, such as avoiding tasks and exhibiting aggression (Viola & Noddings, 2006). Two students in the classroom are overresponders; the students are Lee and Steve. Lee and Steve reacted similarly to many of the sensory techniques that were implemented in the school setting.

The use of the sensory room and therapuddy were both strategies that helped Lee and Steve. The sensory room is a location in the school that contains a wide array of equipment, such as swings, mats, and balls. Lee and Steve went to the sensory room, and they both reacted in a calm and content manner. Both students were smiling and laughing. They particularly enjoyed swinging. When I asked Steve how he was feeling in the sensory room, he responded by saying that he was happy. Over a period of one week, Lee and Steve went to the sensory room twice for approximately thirty minutes, each time. Once they returned to the classroom, they sat at their seats, worked diligently on their assignments, and they did not require any prompts to refocus.

The second strategy that was effective for Lee and Steve was the use of therapuddy. Therapuddy is like durable playdough. Steve and Lee pulled apart the therapuddy and rolled it.

The therapuddy helped Steve and Lee receive stimulation through their hands, and they were calm. Upon working with the therapuddy, they returned to their seats and completed their assignments.

The use of brushing and sitting on bean bags did not meet the sensory needs of Lee and Steve. When Lee and Steve were brushed (arms, legs, and back), they voiced concerns. Steve started yelling “no” and put his fingers through his hair. Lee kept pushing the brush away. Upon brushing, Steve and Lee had difficulties completing their work. Lee was self-stimulating by moving his hands vigorously. This caused him and his classmates to become distracted. Steve, once he returned to his seat, started screaming. He did not calm down during the work session, even when prompted to do so.

Another strategy that was used to help meet Lee’s and Steve’s sensory needs was the bean bags. Both students had the opportunity to sit on a bean bag in the classroom’s quiet area. Lee and Steve sat on the bean bags for twenty minutes. Although they both sat on the bean bags for this duration, they both exhibited varying behaviors while sitting on them. Lee used the bean bag for self-stimulating, as he was rubbing and squeezing the bean bag with his hands. Steve, on the other hand, was trying to reach for the lights, which are located above the bean bags. He attempted to pull down the lights. When Steve was prompted to stop reaching for the lights, he displayed aggression towards his peers and classroom staff (he attempted to hit and kick them). Steve and Lee were over stimulated, and they required multiple prompts and extended time to complete their work, after having sat on the bean bags.

As evidenced through the data, as well as the works of Viola and Noddings (2006), students who are overresponders require the appropriate amount of stimulation in order to lessen negative behaviors and have a productive day. For example, when the students went to the

sensory room, they could pick which equipment to work with. Once they found the swings, they remained calm. Therefore, it is essential to provide students with choices and for educators to document which strategies are the most effective.

Students who are Underresponders

The last type of sensory learner that was observed in my study was an underresponder. Students who are underresponders tend to react very little or not at all to the stimulation in the environment (Viola & Noddings, 2006). Due to this lack of response, students who are underresponders require a powerful sensory experience in order to be an active participant in the classroom (Murray et al., 2009). The student in the classroom, who is an underresponder, is Andrew.

The use of headphones and finger painting were both strategies that helped stimulate and motivate Andrew. Andrew wears the headphones in the morning, and continues to wear them for the entire day, in order to block out environmental sounds. When Andrew first places the headphones on, he is content as he has a smile on his face. He is able to get to work and independently complete the different tasks throughout the day. With the headphones, he is also able to block out sounds, such as other students in the room, which have caused him to feel frustrated. When he becomes distressed, he experiences negative behaviors (i.e. head banging, pulling staff's hair). Hence, by wearing the headphones, Andrew's sensory needs are met, and Andrew is able to have a successful day at school.

The second effective strategy for Andrew is finger painting. Due to Andrew's low arousal levels, it is difficult to get Andrew motivated to participate in any kind of activity throughout the day. With finger painting, Andrew was able to use his hands and create whatever he wanted. He used five different paint colors (green, yellow, red, blue, and orange) and painted on a large piece

of white paper. Andrew painted for twenty-five minutes. He was eager to begin finger painting as he immediately placed his fingers in the paint and began to produce artwork. While participating in this activity, he laughed and smiled. The finger painting provided him with a tactile experience that increased his arousal levels. Once he was done painting, he sat down at his seat, and he independently completed his work, while having a smile on his face.

The use of a compression vest and background music did not meet Andrew's sensory needs. The compression vest is comprised of Velcro on both sides, as well as on the shoulders, so that the vest can be kept on the student. It is made out of a tight, spandex-like material that is snug on the student, so that he can feel like he is getting a constant hug. From the moment the vest was put on, Andrew was distracted. He wore the vest for twenty-five minutes and spent most of that time trying to take it off. The vest may have increased his motivation levels, but the motivation was solely focused on removing the vest, and not on completing the work session. Andrew wandered around the room during his work session fidgeting and attempting to take off the vest. He had to be redirected back to his seat multiple times.

The background music also did not meet Andrew's sensory needs. The background music was played from an iPod hooked up to a set of speakers, and the music was very quiet and soothing, as it was a yoga-type playlist. At first, Andrew enjoyed it, and it spiked his arousal levels as he sat and started doing his work. However, after ten minutes, Andrew started singing loudly to the music and distracted himself and others around him. The music had to be turned off in order to help Andrew complete his work session.

Based upon the observational data that I collected, as well as the research conducted by Viola and Noddings (2006), and Murray et al., (2009), underresponders need constant sensory stimulation throughout the day in order to be motivated and successful. When this kind of

stimulation occurs, as seen with Andrew wearing the headphones and finger painting, his arousal levels rose and he became enthused and more willing to contribute. He sat down and completed his work sessions in a stimulated and independent manner.

Feedback from Professionals

Along with observing the students in the classroom, I also interviewed the special education teacher who is the students' case manager, as well as the occupational therapist that works with the students. Both professionals were asked an array of questions, including questions about their education and careers thus far, their experiences with sensory integration, and their views on whether or not sensory integration is a successful technique for students with autism and SPD.

Both the special education teacher and occupational therapist have a strong background in working with special education students, and more specifically, students with autism. The special education teacher attended Nazareth College for sociology, and also received his teacher certification at the college. He then worked as a teacher's aide at a special education school, and eventually became a teacher. He is currently in his fourth year of teaching. The occupational therapist attended the Rochester Institute of Technology (RIT) for occupational therapy, and upon receiving her degree, she was hired at a special education school as an occupational therapist. She has been employed in this position for five years.

The occupational therapist and special education teacher have had varying degrees of exposure to sensory integration techniques throughout their careers. The occupational therapist has had a greater array of experience with sensory integration as she still continues to use a number of techniques with the students that she works with. She explained that she uses brushing, vests, balls, different materials (i.e. play-doh, gloves, food coloring), cooking groups,

vibrating utensils, platforms and mats among many other sensory strategies. These approaches not only help students' fine motor skills, but they also give students the sensory input they require in order to make academic and behavioral gains.

The special education teacher has not had as much exposure to sensory integration techniques, but has seen some strategies implemented, as he has had to create sensory diets for different students throughout his career. He discussed sensory methods such as brain gym, which he has used in his own classroom to help students relax. He has seen compression and weighted vests used for sensory integration, as well as headphones and listening therapy.

When asked of their views and opinions on the success and usefulness of sensory integration as a strategy for students with autism and SPD, both the special education teacher and the occupational therapist had similar reactions. Both professionals feel that sensory integration is an effective method for students with autism and SPD, as they have both seen sensory integration change a student's educational career for the better, and result in outcomes that were never expected. They also believe that sensory integration helps students relax and feel more comfortable in their own bodies. When this is achieved, students have become successful in school, as well as outside of school. The special education teacher and the occupational therapist have also seen sensory integration reduce the amount of negative behaviors a student partakes in, as sensory integration helps students feel calm and in control. The one downfall that the special education teacher and occupational therapist noted about sensory integration is that it needs to be further researched so that it can be considered an evidence based theory for students with autism and SPD.

Implications and Limitations

After completing my research on students with autism and SPD, I concluded that there are several vital points that educators need to be cognizant of. It is imperative that educators know the students in their classrooms. Every student is unique and has individual needs that need to be met so that the student can experience the greatest opportunity for success. When educators are able to recognize the strengths and weaknesses of the students, then they are better able to support them. For example, overresponders, underresponders, and sensory seekers are all very different types of learners that have different needs, so the methods and strategies used when working with these students are diverse. When their needs are met, students feel calm and ready to learn.

It is also significant for educators to document and analyze student behaviors. When students turn to different behaviors, they are often times trying to express themselves, whether through yelling, running around the classroom, exhibiting aggression, or smiling. When these types of behaviors occur, they must be recognized in order to document how students are feeling. With documentation, patterns can arise that allow educators to recognize when behaviors occur, and ultimately why they are occurring. Hence, educators can begin to determine which sensory integration techniques, and at which times during the day, best support the students' needs.

Students with autism and SPD are different, whether they need sensory input to increase their arousal levels, to calm down, or to fulfill their high thresholds. It takes a trial-and-error approach to create a sensory diet for a student with autism and SPD. Different strategies and methods work for different students, and assuming that one method will work for all will only result in negative behaviors. Educators have to put in time and demonstrate patience when working with students with autism and SPD in order to find sensory integration techniques that

meets the students' needs and enables them to become active and successful participants, inside and outside the classroom.

The findings of the current study are valuable to special education teachers, occupational therapists, and to the parents/guardians of students who have autism and SPD. It is significant for these constituents to recognize what sensory integration entails, and which techniques are effective for students who have varying sensory needs (i.e. underresponders, overresponders, and sensory seekers). By studying the findings of the study, as well as literature on sensory integration, educators and parents can further support students.

The current study has many limitations. The first limitation was time. This study had to be completed within one semester, and I also had a limited amount of time (five days) to observe students in the classroom. In the future, I would recommend additional time to complete the study in order to gather more data to support the method of sensory integration when working with students with autism and SPD.

Also, the number of participants in my study was a limitation. The classroom only had seven students, and within those seven, only four were compatible with my study and able to be observed. In the future, I would invite more participants in order to further study the effectiveness of sensory integration therapy for students with autism and SPD. Lastly, my study was focused solely in a self-contained special education setting. In the future, I would expand my study to inclusive settings, which will enable me to determine if students with disabilities other than autism and SPD benefit from sensory integration.

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Appendix A

Effective and ineffective sensory integration techniques for Adrian (sensory seeker):

Effective Sensory Integration Techniques for Adrian	Ineffective Sensory Integration Techniques for Adrian
Weighted vest	Sensory bin
Brushing	Weighted blanket
	Deep pressure

Effective and ineffective sensory integration techniques for Steve and Lee (overresponders):

Effective Sensory Integration Techniques for Steve and Lee	Ineffective Sensory Integration Techniques for Steve and Lee
Sensory room	Brushing
Therapuddy	Sitting on bean bags

Effective and ineffective sensory integration techniques for Andrew (underresponder):

Effective Sensory Integration Techniques for Andrew	Ineffective Sensory Integration Techniques for Andrew
Headphones	Compression vest
Finger painting	Background music

Appendix B

Below are the interview questions that the special education teacher and occupational therapist answered:

- 1.) What has your career path been thus far?
- 2.) What is your experience with working with students with autism?
- 3.) In your experience, what are the main characteristics for a student with autism?
- 4.) Describe, if any, your experience working with students with autism and sensory processing disorder (SPD). What are the characteristics?
- 5.) What is your background knowledge on sensory integration?
- 6.) What sensory integration strategies have you used or seen been used?
- 7.) Were these sensory integration strategies successful? Why or why not?
- 8.) Do you think sensory integration is a successful strategy for students with autism and SPD? Why?