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Sensory Processing Disorder and Solutions:
An Overview of How to Help Children Living with SPD

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Submitted in partial completion of the requirements of the

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Sarah Lawrence College

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Abstract

The purpose of this thesis is to offer children with Sensory Processing Disorder and their families solutions to everyday sensory processing challenges. Interviews conducted with occupational therapists offer insight into treatment. Ways in which supports in the home, in occupational therapy, play, and other areas of children's lives can help children living with SPD are researched and discussed. The goal is to help children better regulate their sensory processing and feel empowered in the process.

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Thank you to Robbie Levy and all the other occupational therapists at Dynamic Kids who helped me overcome the many sensory challenges I faced as a child through the use of their spectacular OT gym. Thank you to my OT, Samantha, who visited me in my home as a child to conduct our sessions, and to Linda, my elementary school OT.

Thank you to my parents for supporting my education, and for getting me the help I needed as a child. Thank you to my mother for attending early intervention conferences and contacting SPD researchers—such as Carol Stock Kranowitz, who is referenced in this paper—directly to better understand my condition.

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CHAPTER ONE

INTRODUCTION

Sensory Processing Disorder affects 5-16% of children in the United States (Ben-Sasson et al., 2009 & Ahn et al., 2004, as cited in STAR Institute, 2020). Sensory Processing Disorder is a neurological disorder in which the brain struggles to process sensory information (STAR Institute, SPD FAQs), yet SPD is not recognized in the most recent version of the Diagnostic and Statistical Manual of Mental Disorders. Untreated sensory processing problems can lead to decreased confidence and self-esteem, academic difficulties, social struggles, and emotional problems (Kranowitz, 2006). In order for children with Sensory Processing Disorder to live their happiest and most successful lives, symptoms of the disorder should be identified and treated.

Sensory Processing Disorder manifests itself in a variety of ways, however, there is no one-size-fits-all treatment. Additionally, SPD is lesser known than many other disabilities and is often wrongfully included with other issues or is misdiagnosed (Kranowitz, 2006). For instance, a child who presents with autism spectrum disorder *and* SPD may only be diagnosed with having ASD, and therefore the sensory issues may be assumed to stem solely from the child's autism. When SPD is assumed to be a part of another disorder, a child might not receive the most appropriate and effective intervention and this leads to even greater challenges for children and their families.

When Sensory Processing Disorder goes untreated in children, behavioral problems, anxiety, depression, and academic failure are more likely to occur as compared to children with SPD who do receive treatment (Star Institute, 2020). Sensory Processing Disorder can interfere with a child's emotional well-being, their social lives, and their success in school. In many instances, young children with SPD need help with rudimentary life skills, such as feeding,

dressing, toileting, or even sleeping (Kranowitz, 2006). Children with undiagnosed SPD are more likely to struggle to make and keep friends, communicate appropriately, and struggle to regulate their emotions (Kranowitz, 2006). For these reasons and more, Sensory Processing Disorder is important to diagnose and treat.

Sensory Processing Disorder impacts children's lives in a myriad of ways and when left untreated, may hold them back emotionally, socially, and academically (Star Institute, 2020). More research and education on the subject are necessary in order to ensure that children and their families receive the proper care they need. This thesis will explore the ways in which supports in the home, in occupational therapy, play, and other areas of children's lives can be most beneficial. The ideas for solutions suggested in this paper will relate to specific sensory integration problems, rather than assuming a standardized approach. All of the body's senses and each category of dysfunctional sensory behaviors (sensory seeking, low registration, sensory sensitivity, and sensory avoidance) will be considered for each proposed solution.

The motivation behind this thesis stems from the sensory integration issues I experienced as a child. This personal relevance has inspired me to delve deeply into the subject and to research the most effective ways to help children and their families encountering the same difficulties I once did. Interviews from two occupational therapists who have worked with children with SPD will be included. The interview questions focus on the treatments that children best respond to and the therapists' clinical case work involving children with SPD.

CHAPTER TWO

SENSORY PROCESSING DISORDER DEFINITION AND TREATMENT

Defining Sensory Processing Disorder

SPD expert Carol Stock Kranowitz defines Sensory Processing Disorder as,

Difficulty in the way the brain takes in, organizes and uses sensory information, causing a person to have problems interacting effectively in the everyday environment. Sensory stimulation may cause difficulty in one's movements, emotions, attention, relationships, or adaptive responses. (Kranowitz, 2006, p. 318)

Seven primary senses are considered in SPD: taste, touch, sight, hearing, smell, vestibular, and proprioceptive (Dunn, 1997). While many people are familiar with the first five senses, the vestibular and proprioceptive senses are not as widely known or understood. The vestibular sense—also known as the balance and movement sense—is characterized as,

the sensory system that responds to the pull of gravity, providing information about the head's position in relation to the surface of the earth, and coordinating movements of the eyes, head, and body, that affect equilibrium, muscle tone, vision, hearing, and emotion security. Receptors are in the inner ear. (Kranowitz, 2006, p. 320).

Meanwhile, the proprioceptive sense is defined as

the unconscious awareness of sensation coming from one's muscles and joints, that provides information about when and how muscles contract or stretch; when and how joints bend, extend, or are pulled; and where each part of the body is and how it is moving (Kranowitz, 2006, p.316)

Leading SPD researcher Winnie Dunn divides sensory processing issues into one of four categories: sensation seeking, sensation avoidant, sensory sensitive, and low sensory registration (2007). Sensation seeking children crave visual, vestibular, textile, olfactory, aural, or taste sensations in high amounts. For example, sensation seeking children may crave constant

movement and have difficulty sitting still, or may delight in highly sensory experiences, such as loud noise or bright visuals. Sensory avoidant children, on the other hand, have low thresholds for sensory stimuli. They are quick to withdraw from situations that exceed this threshold. A sensory avoidant child with a low threshold for loud noises may run away from loud spaces, run from crowds of people brushing up against them, or may be picky eaters.

Like sensory avoidant children, sensory sensitive children have low thresholds for sensory stimuli. However, it is the child's response to these stimuli that distinguishes sensory avoidant and sensory sensitive children from each other. Sensory sensitive children are more reactive than avoidant.

Finally, children with low sensory responses have a high threshold for sensory stimuli like sensory seeking children, but unlike sensory seeking children, they have a passive instead of active response to stimuli. Children with low sensory registration may seem unresponsive in situations where other children typically display emotion.

All of the above descriptions coincide with the most common form of SPD known as sensory modulation disorder (Ayres, 1972). However, there are two other SPD subtypes: sensory discrimination disorder and sensory based motor disorder. Sensory discrimination is the ability to distinguish one sense from another or to understand what a sense means. An example of sensory discrimination disorder may be a child with good eyesight struggling to process visual stimuli (struggling to recognize facial expressions and gestures, complete visual tasks like lining up columns or understanding where objects are located in space, etc.) or a child who struggles to process auditory stimuli (struggling to understand verbal cues and instructions, inability to rhyme or recognize the differences between sounds, etc.). Sensory discrimination disorder also occurs

in children who struggle with body position and muscle control, movement and balance, taste, smell, and touch awareness (Ayres, 1972).

Sensory Based Motor Disorder is divided into two categories: postural disorder or dyspraxia. Postural disorder is when the child struggles with bilateral coordination, and is often associated with low registration and poor sensory discrimination. Dyspraxia—sometimes referred to as Developmental Coordinator Disorder— is difficulty with fine motor and gross motor skill planning. Dyspraxic children struggle to execute coordinated voluntary actions, such as tying their shoelaces or riding a bike, both of which are examples drawn directly from my own childhood experiences with the disorder.

Children with sensory processing difficulties of any kind may find that it negatively impacts their lives. As such, regardless of what types of sensory processing a child struggles with, it is important that their needs be met as best as possible.

To better understand a child's sensory needs or dysfunction, parents and other adults in the child's life may want to complete a sensory profile on the child (Kranowitz, 2006). A sensory profile assesses a child's comfort with various sensory stimuli in a number of everyday circumstances. Created by Winnie Dunn, the most current edition may be found here:

<https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Behavior/Attention-ADHD/Sensory-Profile-/p/100000566.html>. When parents know their children's sensory profile, they may be better equipped to respond to their different needs and cravings, and can plan how to incorporate everyday strategies to meet them accordingly.

Strategies for dealing with SPD

Sensation seeking children may benefit from heightened stimuli in their everyday routines. For example, wearing bright colors or putting on scented lotion may help satisfy visual and olfactory cravings (Dunn, 2007). Children who crave movement during times when they are expected to sit still—such as mealtimes, bed or bath time—can benefit from their parents creating new opportunities for movement. Potential strategies include having the child assist in setting and clearing the table, placing bath objects away from the child so he will have to swim forward to retrieve them, and scheduling time to bounce, rock, sway, or any other movement the child feels the need to engage in before she climbs into bed. Ensuring that the child has time and space to engage in play involving lots of movement may be beneficial as well.

For children who experience low registration without sensation seeking, parents can find ways to make every day routines easier for their children by also increasing the sensory stimuli involved, only in this case the purpose is to help the child better register the various cues involved in these everyday processes (Dunn, 2007). For example, if a child struggles to recognize smells, her parents wearing certain scents might help her learn to associate that smell with her parents. Children who struggle to understand where their bodies are in space may benefit from wearing a backpack or carrying heavier objects, so that they can practice experiencing the sensation of how objects impact how they position their bodies (Dunn, 2007). In my childhood, my OT would often have me wear a heavy stuffed salamander over my neck and shoulders for this very purpose. The weight of the salamander allowed me to understand how outside forces could impact my body's position in space.

Children who are sensory avoidant need their caregivers to limit sensory stimulation. Keeping the house quiet by turning off background noise such as televisions and radios while the child plays can help a child who is overstimulated by auditory stimuli focus on and better enjoy

their play. Children who are visually avoidant may benefit from reducing sources of light in a room, such as by drawing curtains or not using light in a room if the sun is already shining through the windows. For bathing and dressing, selecting clothes and towels made out of more gentle materials may help children with textile avoidance feel more comfortable with these everyday processes. Using unscented bath products and limiting the amount and potency of scents in the home may reduce olfactory overstimulation.

Children who are sensory sensitive need spaces and routines where their quick reactions to sensory stimuli can be best accommodated. Creating rituals and explaining things step by step before they happen may allow the child to relax into the routine. Other possible methods include reducing stimulation similar to how caregivers may strive to reduce sensory stimuli for their sensory avoidant children, such as turning off loud noises and limiting light in a room (Dunn, 2007).

Although a formal diagnosis is not necessary for parents and caregivers to employ these strategies, a diagnosis can give greater insight into the child's condition and may produce positive impacts in other ways (Kranowitz, 2006). One area in which a diagnosis of SPD may benefit children is in the classroom (Kranowitz, 2006). Teachers are better able to help their students when they understand their needs. A diagnosis may help teachers and administrators better understand the struggles of children with SPD, and therefore inform them on what supports students require in order to succeed. When children are not diagnosed, teachers and other adults may mistakenly assume their behavioral or academic problems stem from laziness, irresponsibility, or immaturity, instead of from a disability. When students with SPD are misdiagnosed or are only partially diagnosed (ex: having ADHD and SPD, but only the former

receiving a formal diagnosis) then the supports they receive will be geared solely towards the issue they were diagnosed with, instead of that issue and SPD.

Lucy Miller: A SECRET and SPD

Miller (2011) posits that there exists an eighth sense: interoception. Interoception is the recognition of the internal sensors that allow us to recognize when we are hungry, thirsty, or need to use the restroom. Children who struggle with sensory discrimination involving their interoceptive domain may be hyper-responsive or under-responsive to their body's internal sensations. If they are over-responsive, they may experience unusually intense feelings of hunger and dehydration, constant aches and pains, or get nauseous easily. If they are under-responsive, they may struggle to recognize when they are in pain, hungry or thirsty, or need to use the restroom.

Miller proposes an acronym that parents and other adults in a child's life can remember in times of sensory dysfunction: A SECRET.

Attention

Sensation

Emotional Regulation

Culture, Context, or Current Conditions

Relationship

Environment

Task.

A SECRET is meant to create problem solving strategies. Parents should consider redirecting their child's attention elsewhere when their child is having a severe sensory response. For example, if a child struggles to play soccer but enjoys memorization, encouraging him to focus on helping his teammates remember their plays and set them up to kick may compensate for the child's own difficulty kicking. However, if redirecting a child's attention is not feasible or not effective, parents should consider what sensory input pleases and upsets their child. For instance, if a child struggles to play sports because they do not register the sensory stimuli involved, helping the child get "warmed up" for the game may help. Playing catch on a trampoline or kicking back and forth on a swing set may help children feel more prepared for practice.

Miller's definition of culture in the context of A SECRET is "the way things are usually done regarding customs, context, habits, or conditions that create a way of life that generates the atmosphere or culture of your family or classroom" (p. 46). For a culture to be supportive to a child, creating a routine that reflects that culture may make him or her feel more secure. If the child does not enjoy certain elements of that culture, however, they may pose sensory challenges and exacerbate their sensory dysfunction. For example, a child with dyspraxia or severe motor delays may benefit from a more individualized sport that allows them to go at their own pace, such as swimming, rather than a team sport like baseball or soccer that would require faster processing speeds and more coordination. In this instance, if the child is struggling to feel confident playing with his teammates and expresses a desire to quit, switching sports ensures they continue to engage in sports without losing their confidence.

Relating to the child's emotions can soothe distress. If the adult is calm and understanding, the child will likely relax. If the adult responds to the child's distress in kind, the

child becomes more distressed. Altering children's environments, when possible, may also reduce sensory dysfunction. For instance, if a child is sensitive to sunlight, wearing sunglasses may prevent negative sensory reactions. If a child struggles with auditory processing, reducing background noise may help them better concentrate on the words of the person speaking.

Modifying a task that poses sensory issues is another way to help children feel more comfortable. If a child struggles with getting dressed, breaking the process down into smaller steps may help. (e.g: saying "first we put on our socks, then we put on our shoes, then we tie our shoes," etc.) If the child struggles to get dressed on an empty stomach, waiting to dress until after breakfast may make the process easier. Time timers are timers that show blocks of time against a colored background. The timer can be set for any duration of time. The color slowly disappears as time runs out. When the color is gone, time is up. Miller has found timers to be effective at helping children understand the passage of time and may prove useful in ensuring children do not spend too much time on any one step in a task.

Occupational Therapy

Occupational therapy engages children through therapeutic play (STAR Institute, 2021). The aim of occupational therapy (often abbreviated as "OT") is to help children develop the capacity to be organized and regulated in their bodies, create ideas and execute plans for action, and improve their problem-solving skills and relationships with others (STAR Institute, 2021). All these skills are necessary for a child to succeed in the classroom and in everyday life. Therapeutic play with their parents, therapists and other children allows them to develop motor confidence, body scheme, impulse control, goal directed actions, and social success (STAR Institute, 2021).

Occupational therapists often work with children in OT gyms—large rooms with play equipment—but they may also do in-home visits or work in schools or pediatric hospital centers (Kranowitz, 2006). Regardless of location, occupational therapists monitor the child’s arousal regulation, motor and processing skill developments, and help the child achieve a sort of sensory balance (STAR Institute, 2021). OTs have toys and equipment for children to play with, ranging from physical equipment like swings or balance boards, to tabletop activities like playing with putty or drawing or even board games. It is through engaging children in these playful activities that occupational therapists are able to help children meet their sensory needs.

CHAPTER THREE

THE ROLE OF PLAY IN SPD

Children with sensory processing issues in general struggle with playing more than typically developing children their age (Roberts, Stagnitti, Brown, & Bhojti, 2018; Watts, Stagnitti, & Brown, 2015). In particular, children with sensory processing problems tend to struggle in the areas of body awareness, balance, touch, and social participation as they concern play (Roberts et. al, 2018). Roberts et. al also studied how children aged 5-7 years with sensory processing issues engaged with toys during play compared to their typically developing peers and found that problems with balance and proprioception interfered with playing with toys. Holding, balancing, and moving toys were significantly more difficult for children with sensory processing problems. Proprioception and balance are often key components of play, such as when participating in athletic activities or using playground equipment. Children who struggle to play with toys may benefit from occupational therapists practicing how to move and hold objects, based on understanding how toys relate to their hands and body positions. If children crave harder or softer surfaces to stimulate their tactile senses, focusing on toys that meet those criteria could help children better understand and enjoy playing with toys.

If children struggle to understand touch, they may exert too much force with their peers (e.g: hitting instead of tapping another child in a game of tag) or they may not respond appropriately to being touched (ex: not registering that they have been tagged and have to chase the other children now, because they did not process the other child's touch.). Social participation is a vital element of any sort of play with other people, and if children's sensory difficulties prevent them from participating to their best abilities, this could potentially interfere

with them making friends with the other children as they play. Children with SPD are less engaged with play overall in comparison to their typically developing peers (Baranek et. al, 2002).

Children with SPD may be less likely to explore or engage in new forms of play (Benson, Nicka, & Stern, 2006). For instance, they may struggle to come up with new games or characters in dramatic play and stick to repeating what they have done previously, as it is what they are most familiar with. In imagination-based play, they may reenact or quote a scene from a story instead of creating their own. The reduced initiative to create and explore new methods of play may suggest that children with SPD may not feel comfortable or confident enough in their playing abilities to try new things. It is also possible that children use play as a means of satisfying their sensory needs, and therefore less likely to stray from what they are accustomed to. For instance, children with SPD often select toys and engage in play activities that fulfill their individual sensory cravings (Mische Lawson & Dunn, 2008). Children who crave rough and tumble play may select building blocks to stack and then knock down, for instance, whereas children who crave visual stimuli and touch may gravitate towards finger painting.

Social Participation in Children with SPD

Cosbey, Johnston, and Dunn (2010) examined the social participation patterns of children with SPD and typically developing children, all aged 6-9. All children reported their participation patterns when interviewed, including what activities they most often engaged in and what children they most often played with. Results indicated that both groups of children exhibited generally similar patterns of activity preferences and use of free time but differed significantly in intensity and enjoyment of involvement and in their social groups.

Recreational activities were identified as informal, generally non-physically intensive activities, such as coloring or pretend play. Across the board, children with SPD on average enjoyed nearly all of the activities that fell into this category more than their typically developing counterparts. Quiet table-top activities (i.e., crafts, drawing, or coloring), pretend play, and computer or video games were children with SPD's favorite activities, whereas these activities were least enjoyed by typically developing children out of all the activities they participated in. However, children with SPD did not enjoy specific recreational activities, like board games or playing cards or solving puzzles nearly as much as they enjoyed the other recreational activities they played. It can be theorized that the reason children with SPD enjoyed recreational activities is because they are less structured and better allow them to go at their own pace. Conversely, puzzles and table-top games are more structured and require rules for children to memorize and follow, and may be especially challenging for children with visual processing difficulties (Ayres, 1979, as cited in Cosbey et. al, 2010.)

Physical activities—especially team sports— were much more enjoyed by typically developing children with typical development. Children with SPD were far less likely to participate in these activities. Typically developing peers had larger social networks, whereas children with SPD were more likely to play alone or with their family. To help children with SPD expand their social networks, Cobsey et. al suggest that children may benefit from social skills instruction and interventions to develop more prosocial behaviors. They also encourage therapists and parents to help children with SPD identify their strengths and plan social activities around those strengths. Lastly, parents and therapist should encourage children with SPD to identify other children with similar play preferences.

In the world of skill-based activities (art lessons, informal dancing, playing music etc.) children with SPD appeared to be involved in a wider variety of activities, and were more likely to participate in multiple different activities compared to typically developing children. 75% of children with SPD reported participating in informal dancing, compared to only 25% of their peers. This may be due to the opportunity to move their bodies without conforming to expectations or structure.

Dyspraxia and Play

As mentioned previously in the literature review, dyspraxia—sometimes referred to as Developmental Coordinator Disorder—is difficulty with fine motor and gross motor skill planning. Dyspraxic children struggle to execute coordinated voluntary actions, such as tying their shoelaces or riding a bike, both of which are examples drawn directly from my childhood experiences with the disorder. In a study by Bart et. al, fifty children aged 5–7 years, half of whom met the diagnostic criteria of dyspraxia, completed the Children Assessment of Participation and Enjoyment (CAPE) and were administered the Motor Assessment Battery for Children (MABC) as well as the Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI) (Bart, Engle-Yeger, Jarus, & Lourie-Gelberg, 2010). A correlation between participation patterns and motor ability emerged. Dyspraxic children exhibited limited participation diversity in which they participated less frequently and chose quieter and more socially isolated activities in comparison to the children with standard praxis. However, there were no apparent differences in their levels of enjoyment regarding the activities each group chose to partake in. The researchers do not note what specific play activities the children engaged in, although they note that the study contained significantly more boys than girls, which has the potential to skew the results.

Poulsen, Johnson, and Ziviani, 2008, examined the relationship between Australian dyspraxic boys' active participation in play and their self-concepts. 60 boys with dyspraxia and 113 boys with regular praxis between the ages of 10 and 13 completed the Self-Description Questionnaire-I and the Movement Assessment Battery for Children. Their parents completed 7-day journal entries that were used to record intensity, length, quality, and social and physical context of their sons' play activities. Dyspraxic boys showed lower mean scores than boys with typical praxis for energy expenditure and self-concept appraisals of physical ability and appearance, relationships with their parents and peers, and overall self-concepts. Dyspraxic boys were less likely to engage in vigorous physical activity and more likely to engage in low intensity physical activities. Overall, this pattern contributed to lower total energy expenditure for boys with dyspraxia compared to boys without it, a finding which multiple researchers have cited previously (Cairney, Hay, Faught, Mandigo, & Flouris, 2005). However, Poulsen et. al's findings provided more information about the intensity and duration of the physical activities dyspraxic boys engage in. Dyspraxic boys were significantly less likely to engage in physical social activities with their peers, such as team sports. This finding suggests that dyspraxic boys are more prone to missing out on physical play activities with their peers. However, boys with positive peer relations correlated positively with positive self-concepts, and these boys were more likely to engage in social physical activity.

Altanis, Boloudakis, Retalis, & Nikou (2021) presented significant findings from an empirical study regarding the effectiveness of the use of a Kinect learning game for children with gross motor skill problems—such as dyspraxia—and other motor impairments. The game followed the principles of an approach, called Kinems, which indicates that special educators and occupational therapists may use learning games that through embodied touchless interaction –

via a Microsoft Kinect camera- dyspraxic children can improve related skills. The Kinems games were played with hand and body gestures, incorporating both fine and gross motor movements. Kinems suggests that games should be configurable so that a teacher can modify the settings—such as difficulty levels or time settings— based on the individual needs of each child. Additionally, teachers should have access to kinetic and learning analytics of the child’s interactive progress and achievements should be safely stored and vividly presented. Children who have played the games have noted they are more entertaining than simply practicing hand movements in front of a mirror, and the entertainment value may increase their motivation to practice the game. Although further research is needed for results to be conclusive, the data gathered thus far have been promising.

Occupational therapist Stephanie Bodison (2015) aimed to investigate the impact of developmental dyspraxia on the play skills of autistic children. Two subsets of the Sensory Integration and Praxis Tests and the Planning and Ideas domain of the Sensory Processing Measure Home Form—also known as SPM-H--were used to determine the praxis abilities of 32 children with autism. Meanwhile, play and leisure skills were assessed with the second edition of the Vineland Adaptive Behavior Scales. The mean age of children in this study was 7.5 years. All assessments in this study were administered as questionnaires completed by the children’s parents.

The items on the Planning and Ideas domain of the SPM–H that parents most consistently identified as difficult tasks for their children included repeating the same play activities, imitating demonstrated actions (ex: mirroring their playmates’ motor actions and responses), thinking of new ideas for games and activities, and building things based on preexisting models, such as building a house with Legos. the play and leisure activities that were

most difficult for the children included playing cooperatively with multiple other children for more than five minutes at a time, playing with other children unsupervised, using objects for make-believe play, and playing make-believe with others in general.

Dyspraxic problems in children with ASD in Bodison's study strongly impacted how successfully they engaged in play and leisure activities. As play is a critical aspect of healthy child development, it may be useful for occupational therapists to focus on helping autistic children with dyspraxic tendencies work to overcome the obstacles they encounter during play. In particular, it may prove beneficial to focus on playing make-believe, as struggling to play pretend with other children may be a barrier to making friends. If occupational therapists are able to identify what elements of imagination-based play are challenging, they may practice imagination play with children and help them feel more comfortable exploring the areas they struggle with. As an example, if a child struggles to use a stick or paper towel roll as a magic wand during play, perhaps the occupational therapist and child could practice fine motor exercises meant to help the child adjust to holding objects better (improving grip, making hand and fingers more secure, increasing bodily awareness of the object in the hand, etc.) These exercises could include holding various objects and practicing different fine motor combinations to see which is most comfortable and secure, or stimulating the child's tactile sense in other ways, such as using their fingers to dig for coins and other items in a piece of clay putty.

If children struggle to mirror their peers' emotions and gestures—something which is not uncommon in children with autism—the OT could practice recognizing feelings in others and mimicking body language. For instance, if a child struggles to recognize facial expressions, perhaps the OT could make different facial expressions and explain to the child how they communicate specific emotions. The child and OT could also practice mirroring each other's

body language, especially if a mirror is available so the child can see how their gestures match the OT's.

Occupational Therapy as Treatment for Improving Play Skills

A sensory-integrative approach in occupational therapy may benefit children with sensory modulation issues (Schaaf & Nightlinger, 2007). To support this hypothesis, occupational therapists Schaaf and Nightlinger documented a case study of a four-year-old boy, "J", with sensory modulation problems. J displayed extreme sensory sensitivity, including oral and auditory aversions and significant struggles with movement. He was shy and reluctant to engage in new activities. He feared many aspects of social interaction, especially in regards to play. J's occupational therapists conducted interviews with his parents before and after intervention. His parents completed a sensory profile for J in both interviews. Every week over the span of ten months, J's occupational therapists focused on targeting J's sensory struggles to help him feel more comfortable playing.

J's OTs focused on activities that targeted his vestibular, oral, fine-motor, hand-strength, and visual coordination difficulties. They would often begin with a simple warmup he enjoyed before progressing to more difficult tasks. An example of the kinds of warmups J participated in is him tossing bean bags at a large stuffed bear in an attempt to knock it over. Warmups of this nature were done in order to ensure J felt comfortable and ready for play. His OTs would ask him what play activities he would like to engage in each session.

To improve his praxis, J would engage in active sensory motor play with an emphasis on multisensory input. Such play included swinging on a "space bag" and crashing into pillows and bolsters. This was done to help reduce his fear of running into things: by seeing that movement

did not have to mean pain, J became more confident to move more freely. J would also climb ladders and bolsters and then jump into a pillow crash pad, also to improve his praxis and decrease his fears stemming from his sensory sensitivities. To improve his social skills and decrease his oral sensitivities, J would bring snacks prepared by his mother to OT, and share them with the other children. J's mother would pack an extra food or beverage J was less familiar with, but more likely to try in the presence of the other children.

J's parents and OTs noted that his tolerance for vestibular activities, oral sensations, his social skills, and his sensory-motor coordination significantly improved over the course of the program. As such, he became much more comfortable with playing with other children as well as with play in general. He became more open to new play experiences, including areas in which he previously struggled.

Miller, Bundy, Shia, & Qi, (2007) explored the relationship between sensory processing disorder and playfulness, as well as how occupational therapy-based intervention may affect playfulness. The parents of twenty children with SPD and twenty typically developing children completed the Short Sensory Profile (SSP) while their children completed the Test of Playfulness (ToP). Children with SPD completed the praxis portions of the Sensory Integration and Praxis Tests (SIPT) and received twenty occupational therapy sessions. All of the children with SPD struggled with sensory modulation.

Following the recommended ToP protocol, each child in both the typically developing and the SPD groups was videotaped during fifteen minutes of free play in whatever settings they selected. Play frequently included toys and playmates. To investigate the effects of intervention on the children with SPD, two clips of free play were taken for each: one before all the OT sessions and one after.

Typically developing children had higher ToP scores than children with SPD. Children with SPD did not significantly differ in their ToP scores before and after intervention. However, Millet et. al also accounted for changes in play activities. Prior to intervention, children with SPD were significantly more prone to engage in sedentary play activities than in active play. However, post-intervention, three children with SPD voluntarily participated in active play. Overall, the authors considered both groups of children to be “extraordinarily playful”. Although ToP scores were strongly positively correlated with SSP scores, Miller et. al found that the association with SIPT scores was low to moderate and negative. They concluded that modulation seemed to have a more direct effect than praxis on playfulness. In other words, children with sensory modulation issues were more likely to struggle with playfulness than children with dyspraxia, Millet et. al found.

CHAPTER FOUR

INTERVIEWS

Methods

Participants were contacted via email describing the project and requesting their participation. Participants were occupational therapists with experience working with children with SPD. Each participant signed a consent form. I then interviewed them over Zoom about their experiences treating SPD. R's interview was completed in one 60-minute session while D's interview was completed over the course of two sessions. Their comments are transcribed in the interview sections below.

All study procedures and interview questions were approved by the Sarah Lawrence College Institutional Review Board prior to the interviews. A copy of the consent form and interview questions can be found in the appendix.

D's interview

I: D, could you please tell me a little bit about where you work?

D: I have several jobs; I have a sensory clinic that does DIR/Floortime also. And we work on parent coaching and the experiences that children feel through their sensory, through their interoception and their emotions and relationships and motor systems. We do arts and crafts, we have an indoor playground and we bake. We do activities of daily living. We try to take what the child is interested in and enjoys and use those activities as a conduit to modeling the experience of what's hard for them to do through the day. And then I have another job where a clinical psychologist and I go into homes and work in the moment of the lived experience. When the chaos of dysregulation is occurring, we go in at that moment and do parent coaching and work with the child all at the same time and work with the family system to get through the activities, the relationships, the interactions, and the tasks. So, we might get to a house at six in the morning and support the family to get through the morning routine.

I: When you work with children with undiagnosed sensory issues, how do you approach the topic with their parents? Do you communicate with the rest of their support team as well?

D: Many of my children don't have other team members, but if they do, I feel it's really important that we approach the family in the same approach. And I also feel that you need to be transparent with the caregiver, you need to have an alliance with them, you want them to be involved, and you want to honor what is going on

for them. I always think of the caregivers as being an insurmountable, important component of your team.

I: Do you prescribe the parents of children with SPD a sensory diet to work on with their children at home?

D: It depends. Sometimes I do. But I view [treating] sensory processing disorder as much bigger than just a sensory diet. I view it as something that impacts daily living and relationships. I don't look at it in that terminology. What I try to do is incorporate sensory rich activities of daily living and play within what the child does and in the way they interact with people.

I: Did you learn about sensory processing issues when you trained to be an OT?

D: No, it was really very absent from the curriculum of the university that I went to. In those days it was very early that people were learning about sensory processing. Jean Ayres just came up with it in 1974. In those days, it wasn't really integrated into the curriculum of universities. So, I learned about sensory processing through extracurricular workshops, certification, and study groups. And lots and lots of reading!

D believes that Sensory Processing Disorder should be formally recognized in the present Diagnostic and Statistical Manual of Mental Disorders. She stated that she has worked with many children who she had strong reason to believe had SPD, but were never diagnosed with it, or were diagnosed with a different disorder instead.

The equipment and activities D and her patients engage in vary depending on the child's sensory needs. However, many of the activities that children regularly partake in include making

slime, stacking building blocks to create structures, hanging on the suspended swing, and arts and crafts.

A particular case that stands out to D is when she worked with a four-year-old child with severe touch aversion. The child, his mother, and his infant sibling attended the first therapy session together. D noticed that the mother did not feed her infant by holding him; instead, the bottle was attached to the stroller in front of the infant's face for the infant to drink from. D asked the mother if this was always how she fed her children, including her son who was here for therapy. The mother responded that she had always fed her children this way, as she was uncomfortable holding them while they ate. D quickly realized the child's aversion to touch stemmed from him not being held enough as an infant.

An interesting element of this example to note is that not only does the child attending therapy have an aversion to physical contact, but it appears his mother does as well. Although D never learned the reason his mother was uncomfortable holding her children, the fact that she had such an aversion to it indicates that her own aversion to touch contributed to her child's own aversion to it. On the subject of treatment for the child, she said the following:

D: The first thing we do in therapy is we want the child to feel comfortable that they trust us, that we are in alliance with them. So, with that in mind, I want to do what the child feels good about and what they want to do. So, we start there. I remember this child really liked to build. We would just work on where people would sit together to build a structure because if you sit too close, that's a trigger. It's not so much about doing the activity: it's more the process of how you do the activity.

Eventually, we would make slime. We worked a lot on his issues in the playground with sensorimotor experiences and then we brought in his friends from the neighborhood, his cousins. We do things with other children because children are very unpredictable. And often when a child has sensory triggers, they can develop into having controlling behaviors. And it's difficult to control unpredictable playdates. We worked a lot on how do you deal with something that you think is going to be a trigger. You have to control your environment so that you don't get triggered. So those were a lot of what we did with this when it came to the child's friends... That's how the controlling behavior came in, it always had to be his idea. A lot of difficulties sharing ideas. He had a lot of difficulty with flexibility. What if his friend came up with an idea he didn't want to do what his friend wanted to do? We worked on all those things.

In regards to her thoughts on the intersection between play and treatment for SPD, she stated that:

D: They say that play is the occupation of a child and developmentally, play partially plays a large part—but certainly not all— of the way that a child learns. And so, the experiences of play will help a child build their emotional capacity, build their relationships and build symbolic thinking. So, we use play because that's what a child relates to. Being an OT, I don't believe it's all about play. I also think it's about what we were talking about before of a child having that agency of being independent. And so, I feel like working on activities of daily living like routines, being independent with getting dressed, also builds those same things that play builds.”

D provided another memorable case of working with a child with SPD over the course of her career:

D: I was working with this child, he was four or five years old, and his mother was sitting there nursing her baby [his sibling]. The baby wouldn't stop crying. I asked her if he always did that, and she said yes. I noticed that it happened every time she switched breasts. And what we figured out is that the baby had vestibular dysfunction, and that as the mother switched breasts, she was moving his head and his body, and it was a trigger for him. So at seven weeks old, we worked on his vestibular system.

I: How did you work on it?

D: I provided extra proprioceptive input as I gave him vestibular input. I did it very slowly and I worked on all planes. Horizontal, vertical, rotation of head, in relation to the body. Eventually, believe it or not, eventually he started to enjoy the movements.

I: Did you primarily use your hands to provide the vestibular and proprioceptive input?

D: Yes, it was all my hands. At that age, you can't really use objects, like pillows or crash pads.

The following interview is with R, an occupational therapist who directs her own sensory integration gym, one which I attended as a child.

R's interview

I: Could you please describe your work setting?

R: I work as an OT at and am the director of a multidisciplinary therapy center that doubles as an OT gym.

I: How long have you been an OT and how did you get into it?

R: I have been an OT for forty years. I wanted to work with children and I studied development in college. I went to a sensory OT program as part of college. I became certified in sensory processing treatments through three-week long courses, which included observations and tests. I had a great sensory internship. I am also certified in DIR/Floortime.

I: Do you often work with children with sensory processing issues?

R: Yes, roughly 75% of my cases relate to SPD.

I: What are some memorable experiences you have had working with children with SPD?

R: I've had so many, it's hard to pick one specific example. However, I have often worked with the same families for several years at a time, particularly if more than one child needs OT. This has allowed me to really bond with many of the families I work with. I work with children from birth through adolescence, although most of the children I work with are five or under.

I: What did you learn about the disorder from those experiences?

R: Deep pressure is good for children with touch aversions, and breathing activities help with hypersensitivity in general. Breathing exercises combine the different sensory

systems together to help them modulate the information. You need to get homeostasis/sensory regulation, so breathing really helps achieve that.

I: What methods have you found work best when working with children with SPD?

R: We always base treatments on the child's sensory profile. Parents fill out a sensory profile for their children, and we take it into account as we observe the child's responses to sensory stimuli. The goal is to help them process sensory information in a normalized way, to regulate their sensory responses so they feel more in control of them.

I: Do children with SPD tend to gravitate to any particular OT equipment or materials (swings, putty, etc.)?

R: I have seen children gravitate towards balance boards, all kinds of swings, weights and resistance bands, balance beams, obstacle courses, therapy balls, therapy logs, bean bags. I have also seen children prefer making slime or playing with putty or Play-Doh, playing with the sensory bins, playing board games or solving puzzles, or engaging in pretend play. When they do pretend play, it is often based on a character in a movie or tv show they already know and like, such as Elsa from Frozen or Peppa Pig. We have multiple sensory gyms and distraction rooms for the children to choose from.

I: How do you feel about the DSM-5¹ no longer recognizing SPD as a valid diagnosis?

R: I think it's very disappointing, and should absolutely still be recognized in the DSM. So many children have this issue, and it is harder to diagnose it if it is not officially recognized in the most current edition. Sensory Processing Disorder not only effects the child who has it, but also the family unit as a whole. When a child gets treatment for

¹ The DSM-5—also known as the Diagnostic and Statistical Manual of Mental Disorders—is the official book of psychiatric and neurological disorders.

SPD, their family's stress levels decrease and their bond increases. It can be very stressful for parents when their child is struggling in this area but they do not understand why.

When children get the treatment they need, parents understand them better and the bond between them is stronger.

I: Do you assign a sensory diet for parents to work on at home?

R: Yes, I assign home activities families can work on together. However, home activities are only successful if they fit in naturally with the child's routine. For example, reading a book before bedtime at the same time each night while the child wears a weighted blanket can help soothe children to sleep, but if the story was read at a different time of day or the bed time was inconsistent, it would not be as effective. Other times parents often engage in home activities with their children is during meals or bath time.

I: Do you talk to other members of children's therapy teams (teachers, intervention specialists, etc.)?

R: Absolutely. We have frequent communications with their teachers and specialists.

I: Have you ever worked with children with sensory processing issues who were not diagnosed with it? How did you help the child and explain their issues to their parents? What was the process?

R: Many times. I would ask parents to fill out a sensory profile, after receiving all the necessary information about the child's current issues and other treatments (ex: speech services, special education, etc.). I would proceed from there the way I normally would with a child, regardless of whether or not they had received a formal diagnosis. I would discuss what I observed with the parents and recommended home activities for them to practice, based on how the child was responding to treatment with me. Even when

children are not diagnosed beforehand, they can still get the help they need. OT is a very positive profession that allows you to really connect with children and their families. Children enjoy being here and families notice significant positive changes in their children 'wellbeing and behaviors. Our number one goal is building the child's self-esteem. Children with SPD often struggle with self-confidence and self-esteem, due to their difficulties with processing sensory stimuli in a secure fashion. When treatment begins, we focus on not only helping the child adapt to various forms of sensory stimuli, but also in building the confidence the child needs to overcome these challenges and lead their happiest, most fulfilling lives.

Reflections on D's and R's interviews

Both R and D have extensive experience treating SPD. Although they assign sensory diets for parents to implement at home, both made a point to emphasize that they must fit naturally into the child's life in order for these skills to be integrated into day to day living. They also lamented that Sensory Processing Disorder is not recognized in the DSM-5, as in their experiences working with children with SPD, a formal diagnosis can make treatment and the processing of getting the right help much more effective. While OT is necessary to help children master everyday life skills, R and D also emphasize that treating SPD is important for children's self-confidence and their relationships with other people. Their experiences are supported by research that has consistently yielded similar findings (Kranowitz, 2006).

Over the course of her forty years as an OT, R mentioned she has found breathing techniques to be effective in regulating sensory responses. Although this method was not discussed in the literature I read, given her expertise in treating sensory processing issues, the anecdotal evidence she presents suggests it is worthy of future study and serious consideration.

R and D's reports indicate that incorporating home activities intended to reduce sensory dysfunction is an effective strategy parents can use at various times of day when their children are prone to sensory difficulties. Coming up with routines during these times allows parents to foresee potential triggers and obstacles in advance and determine how to work around them. R gave the example of reading a bed time story while their child wears a weighted blanket to help them relax before bed. Other possible examples could be turning off bright lights and loud sounds to help children understand it is time to relax and go to sleep, or letting tactile avoidant children choose what clothes are most comfortable if they struggle to dress in the morning.

Both R and D stated they communicate frequently with the child's caregivers and other members of their support teams. This communication is necessary in order for children to receive the best supports across all areas of their lives. If parents or guardians are unsure or have questions, they should not hesitate to talk to their child's OT or any other members of their child's support team.

Although the OT environment cannot always be mimicked at home, caregivers can create an environment based on the OT room that allows their child to thrive. For instance, if a child meets their vestibular needs through swings, and their home has a backyard with space for one, parents may want to consider buying a swing set for their child. As a child, my home's swing set greatly regulated my vestibular and proprioceptive senses, and soaring through the air from the safety of my swing made me feel that much more grounded when I stood on my own two feet.

Balance boards, Play Dough, TheraPutty, therapy balls, and weighted stuffed animals or blankets are all other pieces of equipment children may benefit from using at home in addition to during OT. In my own childhood, my OT, Samantha, would often have me wear a heavy stuffed salamander over my neck and shoulders for this very purpose. The weight of the salamander allowed me to understand how outside forces could impact my body's position in space. Practicing this at home in addition to during sessions helped improve my proprioception. My OT also had me practice sorting different stuffed bears based on size and color to help improve my visual discrimination, and I soon found that organizing and identifying visual stimuli based on these characteristics allowed me to better spot differences between visual stimuli overall.

Creating a home environment with the intention to create opportunities to regulate the senses in a way that is akin to an OT setting may benefit children with SPD.

CHAPTER FIVE

DISCUSSION

Sensory Processing Disorder interferes with sensory regulation and processing. Some children with SPD are over-responsive to sensory stimuli while others are not responsive enough. SPD can interfere with the simplest tasks and occupations of daily living, from academic success to making and maintaining high quality friendships, to necessary bodily functions like eating and sleeping.

Dyspraxia is a specific subset of SPD in which the individual struggles with fine and gross motor movements. It is the ability to coordinate their bodies the way they need to in order to function properly, whether that is through hand-eye coordinated movements such as tying shoelaces, or whole body coordinated movements like riding a bicycle. Certain types of play such as team sports may be especially challenging for dyspraxic children so it is necessary for parents and their children to evaluate what forms of play most benefit the child. Occupational therapy can help treat dyspraxia, based on my own experiences as well as empirical data. Occupational therapy helps dyspraxic children by helping them better coordinate their muscle movements and regulate their sensory experience.

Per the literature review, children with SPD struggled with play more than their typically developing peers overall. However, they may benefit from occupational therapists working on their play skills with them during sessions. Additionally, children with SPD still enjoy play, so it may benefit caregivers to focus on what play activities they enjoy most and create more opportunities to engage in them. Caregivers and their children may also benefit from remembering Lucy Jane Miller's A SECRET method and employ it when they anticipate situations that may pose sensory challenges.

The OTs interviewed in this thesis offer their expertise on treating sensory processing disorder. They emphasize home activities parents may engage in with their children, communication across all members of a child's support team, and the goal to help children feel more empowered by taking control of their sensory processing and regulation.

Sensory Processing Disorder significantly impacts children's lives in many areas, and treatment for it is necessary to help children lead their happiest and healthiest lives. Occupational therapy is an excellent source of treatment, and parents and caregivers may practice the methods their child's OT uses at home. Play is a key component in treating SPD, and play based on meeting the child's sensory needs and reducing their sensory challenges may reduce overall sensory dysfunction.

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Additional Resources to Learn More about SPD

Dr. A. Jean Ayres

Sensory Integration and the Child: Understanding Hidden Sensory Challenges

Winnie Dunn

Dunn's Sensory Profile

Living Sentionally: Understanding Your Senses

Dyspraxia Resources

Caged in Chaos: A Dyspraxic Guide to Breaking Free by Victoria Biggs

(Author's note: This book helped me understand some of my own dyspraxic struggles growing up.)

Can't Play Won't Play: Simply Sizzling Ideas to get the Ball Rolling for Children with Dyspraxia by Sharon Drew and Elizabeth Atter

Dyspraxia Foundation

Carol Stock Kranowitz

The Out-of-Sync Child

The Out-of-Sync Child Has Fun

The Out-of-Sync Child Grows up

Lucy Jane Miller

No Longer a Secret

Sensational Children: Hope and Help for Children with Sensory Processing Disorder

STAR Institute

GLOSSARY

Dyspraxia

Difficulty with fine motor and gross motor skill planning and execution

Fine Motor Skills

Coordinated movements involving muscles in the hands, such as holding a pencil or turning a doorknob.

Gross Motor Skills

Motor movements involving the whole body, such as jumping or climbing stairs.

Interoception

The recognition of the internal sensors that allow us to recognize when we are hungry, thirsty, or need to use the restroom

Occupational Therapy

The therapeutic use of activities associated with daily living, such as movement. Focuses on planning and executing actions.

Proprioception

“the unconscious awareness of sensation coming from one’s muscles and joints, that provides information about when and how muscles contract or stretch; when and how joints bend, extend, or are pulled; and where each part of the body is and how it is moving.” (Kranowitz, 2006).

Sensory Processing Disorder

“Difficulty in the way the brain takes in, organizes and uses sensory information, causing a person to have problems interacting effectively in the everyday environment. Sensory

stimulation may cause difficulty in one's movements, emotions, attention, relationships, or adaptive responses. "(Kranowitz, The Out-of-Sync Child, 2006).

Vestibular Sense

"The sensory system that responds to the pull of gravity, providing information about the head's position in relation to the surface of the earth, and coordinating movements of the eyes, head, and body, that effect equilibrium, muscle tone, vision, hearing, and emotion security. Receptors are in the inner ear. "(Kranowitz, The Out-of-Sync Child, 2006).

Interview Questions

- Could you please describe your work setting?
- How long have you been an OT and how did you get into it?
- Do you often work with children with sensory processing issues?
- What are some memorable experiences you have had working with children with SPD?
- What did you learn about the disorder from those experiences?
- What methods have you found work best when working with children with SPD?
- Do children with SPD tend to gravitate to any particular OT equipment or materials (swings, putty, etc.)?
- Did you learn about sensory processing disorder when you trained to be an OT?
- How do you feel about the DSM–5 no longer recognizing SPD as a valid diagnosis?
- Do you assign a sensory diet for parents to work on at home?
- Do you talk to other members of children’s therapy teams (teachers, intervention specialists, etc.)?
- Have you ever worked with children with sensory processing issues who were not diagnosed with it? How did you help the child and explain their issues to their parents?
What was the process?

SARAH · LAWRENCE · COLLEGE**Sensory Processing Disorder and Solutions: An Overview of How to Help Children Living
with SPD**

**Researcher and contact information: Ivory Butler, ibutler@gm.sl.c.edu , 1 Mead Way,
Bronxville NY, 10708.**

I am asking you to take part in a research study at Sarah Lawrence College. Please read through the following questions and responses and *ask any other questions* that will help you to decide whether or not to participate.

What is the purpose of this study?

The purpose of this study is to learn from professional occupational therapists which methods and treatments best benefit children with sensory processing disorder.

Why am I being asked to participate?

You are being selected due to your expertise of and experience working with children with sensory processing disorder.

What will I be asked to do?

You will be asked to participate in an interview over Zoom on your experiences working as an OT with children with SPD.

The session will take about an hour. If you wish to talk again, we may have multiple sessions.

The interview will be recorded both visually and auditorily, however you may ask to not have certain segments recorded if you are uncomfortable with them being recorded.

- Participation is voluntary and you are welcome to revoke your consent at any time. Doing so will not impact your relationship with Sarah Lawrence College or otherwise negatively impact you in any way. If you do not wish to divulge certain information, your choice to decline answering questions you are not comfortable with will be respected, no explanation necessary.

Are there any benefits or risks associated with my participation in this study?

- There are no risks or direct benefits to you from participating in this study.

Will I be compensated for my participation?

- Participants will not be compensated.

Will the information I provide be kept confidential?

- Participants will not be identified in any written or oral report of the research study.
- Your data will be stored securely and accessed solely by the researchers involved in this study.
- If the study includes an online component, such as a survey, clarify that every reasonable effort will be made to keep data secure and confidential; however, the degree to which this is possible is determined by the technology being used. Specify what information will be collected automatically versus that which will not be collected (e.g., IP addresses, email addresses, user ID, etc.).

If I have any questions or concerns after the study, how can I contact you?

- Please contact me at ibutler@gm.sl.c.edu or at 914-623-2093 for any questions or concerns. You may contact my advisor, Cindy Puccio, at 310-428-3197 or at cindypuccio@gmail.com.

Who can I contact if I have questions about my rights as a research participant?

- The IRB co-chairs Professors Elizabeth Johnston (203-722-3287) and Claire Davis (914-395-2605) at irb@sarahlawrence.edu.

Please indicate with your signature on the space below that you understand your rights and voluntarily agree to participate in the study.

Signature of Participant

Date

Print Participant Name

[NAME], Investigator

Date

[Include if applicable.] Please indicate with your signature on the space below that you understand your rights and voluntarily agree to have your participation in this study audio- and/or video-recorded.

Signature of Participant

Date