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# Kindergarten Readiness: The Impact of Sensory Integration on Preschool Children's Readiness for the Transition to Kindergarten

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Kindergarten Readiness: The Impact of Sensory Integration on Preschool Children's  
Readiness for the Transition to Kindergarten

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree

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School of Health and Natural Sciences

Dominican University of California

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This thesis, written under the direction of the candidate's thesis advisor and approved by the Chair of the Masters program, has been presented to and accepted by the Faculty of the Occupational Therapy Department in partial fulfillment of the requirements for the degree of Master of Science in Occupational Therapy. The content and research methodologies presented in this work represent the work of the candidates alone.

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## **Abstract**

The goal of this quantitative, descriptive pilot study was to identify the frequency of sensory processing disorders (SPD) in preschool students who are preparing for the transition into kindergarten. The research also explored the relationship between preschool teachers' perspectives of challenging classroom behavior and parents' reports of sensory processing in the home. Researchers distributed the Sensory Processing Measure for Preschoolers (SPM-P) assessment to parents and a behavioral questionnaire to teachers in three northern California preschools. Thirty-two SPM-P assessments were distributed to parents and 15 (47%) were accurately completed and returned. Of this sample, 2 (13%) student scores on the SPM-P reflected SPD. The SPM-P assessments not returned by parents were categorized as non-SPD students. Based on this assumption, 6.2% of the children within the greater population of 32 demonstrated sensory processing disorder. Results of the behavioral questionnaire found that teachers identified 3 or more maladaptive classroom behaviors for students who met the criteria for SPD. The research suggests that there may be a relationship between maladaptive classroom behavior and a child's ability to process sensory information. Thus, further education on sensory processing and environmental adaptations that encourage positive participation in school may benefit teachers, parents, and children.

## Introduction

A significant developmental milestone in childhood is the transition from preschool to formal elementary school education. Kindergarten readiness is a dynamic term used to describe this transition, and the characteristics needed for early elementary school success (Zhang, Sun, & Gai, 2008). The implementation of the No Child Left Behind Act of 2002 increased academic standards for children in kindergarten. This academic rigor affects teachers and parents' perceptions of qualities that define kindergarten preparedness for children in pre kindergarten preschool (pre-k) programs. The expectation is that children not only meet academic challenges, but also demonstrate self-regulation, impulse control, and adaptive classroom behavior (Lane, Givner, & Pierson, 2004). The additional skills required for school success includes a child's ability to focus on projects, cooperate with teachers, and socialize with peers (Capelloni, 2011). Thus, pre-k programs may incorporate educational activities along with socio-emotional play in order to prepare students for the demands of kindergarten.

As children transition from preschool into kindergarten, the challenges they face become evident. Problems with self-regulation, attention, and inhibitory control may affect the success a child has in kindergarten. Teachers reported greater than 15% of their kindergarten students had difficulty with the transition from preschool to kindergarten (Rimm-Kauffman, Curby, Grimm, Nathanson, & Brock, 2009). A child's inability to self-regulate emotion is often the underlying factor contributing to this challenge in kindergarten (Fantuzzo et al., 2007).

The ability to self-regulate emotion and behavior is an essential skill required for school success (Capelloni, 2011). Children unable to self-regulate emotions often

demonstrate non-adaptive behavior, and this interferes with their ability to participate in academic, social, and play activities in the classroom (Rimm-Kaufman et al., 2009).

Kindergarten and pre-k teachers describe non-adaptive behavior as a child's inability to focus, cooperate with peers, and follow instructions. The teachers also stated that approximately one-half of the students in their classrooms demonstrated said behavioral difficulties (Rimm-Kaufman et al., 2000). Children who display non-adaptive classroom behaviors in early education programs including kindergarten often struggle with later academic and social skills necessary for school success (Duncan et al., 2007).

A fundamental component contributing to self-regulation is sensory processing. Sensory processing is a neurological process by which our brains interpret, register, and respond to incoming stimuli from the sensory systems (Dunn, 2001). A child's ability to accurately interpret and register information from sensory systems enables him/her to respond appropriately in the environment. Thus, a child with proficient sensory processing skills will more likely demonstrate adaptive responses to classroom stimuli and increase participation in academic, social, and play activities (Miller, Anzalone, Lane, Cermak, & Osten, 2007). Children may experience problems with sensory processing when their nervous system is unable to modulate incoming sensory stimuli from the environment. A child may demonstrate an over response or under response to the stimulus (Dunn, 2001). This response may not be congruent with adaptive classroom behavior and may interfere with a child's socio-emotional and academic development.

Sensory processing disorder (SPD) is described as a child's inability to effectively register, process, organize, and/or respond to sensory input (Miller et al., 2007; Miller, Nielson, Schoen, & Brett-Green, 2009). Children with a sensory processing disorder may

exhibit atypical or non-adaptive classroom behavior when managing incoming stimuli. These children may have difficulties participating in occupations such as education, play, leisure, and socialization (Miller et al., 2007; Miller et al., 2009). Researchers estimated that 5.3% of children entering typical kindergarten classrooms demonstrated sensory processing disorder (Ahn et al., 2004; Armstrong, Harshbarger, & Kuffel, 2010).

The participation in early elementary education facilitates the development of children's emotional, social, and academic skill sets. Children with sensory processing difficulties may exhibit non-adaptive behaviors by disengaging in activities required for school success. Thus, it is important to understand the rate of sensory processing disorders in typically developing children and the effect of sensory processing disorders on classroom behavior (Ahn et al., 2004). The purpose of this study was to identify the frequency of sensory processing disorders in pre-k students who are preparing for the transition into kindergarten. We explored the relationship between preschool teachers' perspectives on challenging classroom behavior and parents' reports on sensory processing in the home. We also examined children's non-adaptive classroom behaviors in relation to sensory processing challenges, and their capacity to partake in the occupations of education, socialization, and play.

### **Literature Review**

An early education program facilitates children's socio-emotional and academic development. It also provides an opportunity for children to participate in structured occupations such as education, socialization, play, and leisure. Children in kindergarten are required to focus on projects, sit quietly, follow instructions, self-regulate emotions, and cooperate with teachers and peers (Lane et al., 2004). Children with sensory

processing difficulties may have challenges engaging in these school activities, which may produce non-adaptive classroom behavior (Dunn, 2001). Children in pre-k programs may also demonstrate non-adaptive classroom behavior, and this may significantly affect their successful transition into kindergarten and overall school success.

Duncan et al. (2007) found that a child's ability to attend and focus in pre-k and kindergarten predicted later achievement in academic and social skills. Children who demonstrated the ability to self-regulate emotion and produce adaptive classroom behavior increased their social and academic skill set.

In this literature review we will discuss the self-regulatory, academic, social, and play skills required for kindergarten readiness and overall school success. We will then discuss challenges to acquiring said skills, and factors that negatively affect children's kindergarten preparedness. Last, we will discuss ways that teachers and parents adapt the classroom for increased participation in play, social, and academic activities.

### **Skills Needed in Kindergarten**

A fundamental skill required for kindergarten success is a child's ability to self-regulate emotion and attend to classroom instruction, projects, and play activities (Lane et al., 2004). Lane et al. (2004) found that of 126 teachers surveyed the majority stated that children with the capacity to control behavior and cooperate with peers demonstrated increased school success. Early elementary school teachers and parents of children in pre-k education programs shared similar beliefs about qualities that constitute kindergarten readiness leading to school success (Zhang et al., 2008). The essential skills required for school success included a child's ability to self-regulate behavior, socialize

with peers, demonstrate proficient play, and engage in academic tasks (Capelloni, 2011; Kim, Murdock & Choi, 2005; Zhang et al., 2008).

Zhang et al. (2008) found that of 370 teachers and 218 parents surveyed about characteristics necessary for school readiness, the majority of participants believed that attention and self-regulation within the classroom were necessary for school success. Capelloni (2011) described self-regulation as a process by which a child modified and adapted his or her behavior in order to participate in classroom activities such as circle time, group play, and independent reading and writing. The self-regulatory process also included an individual's ability to calmly transition from task to task, follow directions, comprehend instructions, share with peers, and control emotions. A child's ability to self-regulate and control emotional behaviors facilitated increased attention, and created a positive relationship between student and teacher. This relationship cultivated a supportive, encouraging learning environment where the child was able to thrive socially and academically (Lara-Cinisomo, Fuligni, Daugherty, Howes, & Karoly, 2010). Capelloni (2011) also found that children who independently modified emotional outbursts by implementing coping mechanisms maintained positive social relationships with other class members. Furthermore, a child's capacity to self-regulate and attend in pre-k and kindergarten programs promoted greater success in fine motor tasks such as writing, drawing, and 3D art projects (Duncan et al., 2007).

Early elementary school teachers emphasized that a child's social participation directly affected his or her school success (Kim et al., 2005). Children who demonstrated difficulty with peer socialization also exhibited negative behavior, decreased attention, and a lack of cooperation with the teacher. These children often felt isolated from other

class members, and refused to initiate peer relationships. Kim et al. (2005) reported that 70% of participants surveyed believed that a child's willingness to integrate with peers in the classroom and on the playground indicated his or her school readiness and success. The children unable to share or engage in turn taking during group play felt ostracized by peers and excluded from classroom games and projects (Kim et al., 2005). Thus, social integration in the classroom may promote the confidence and self-assurance underlying one's ability to explore the environment and attempt challenging activities in both play and academics (Lilles et al., 2009).

Frequent participation in play activities during pre-k programs promoted emotional, social, and academic maturity in kindergarten (Long, Bergeron, Doyle, & Gordon, 2005). The exploration of early play activities encouraged a child's creativity, which facilitated problem-solving skills, language skills, and socialization with peers. It also supported gross motor skill acquisition on the playground such as ball play, running, jumping, swinging, and hopping (Lilles et al., 2009). In addition, Lilles et al (2009) found that preschool children who engaged in weekly playground activities with two or more peers had increased confidence leading to a positive transition into kindergarten.

Parents of children in pre-k and kindergarten programs emphasized the importance of academic skills upon entry into elementary school. According to Kim et al. (2005), the majority of parents who participated in the National Household Education Survey (NHES) ranked early academic prowess in math, letter recognition, and writing as an important factor contributing to kindergarten success. Parents stated that academic failure in kindergarten might affect children's future achievement in school. Thus, they believed that early participation in academic activities might facilitate an easier transition

from preschool to kindergarten (Kim et al., 2005). Conversely, early elementary school educators deemphasized said skills and believed that a child's ability to recognize a few numbers and several letters sufficed as kindergarten readiness. Teachers also stated that children acquire an academic skill set in kindergarten, but self-regulation and attention is the necessary foundation from which they build math, reading, and writing skills (Zhang et al., 2008).

Intrinsic qualities such as temperament, self-regulation, and cooperation with teachers and peers contribute to adaptive classroom behaviors (Rimm-Kauffman et al., 2009). However, external factors such as age, classroom environment, family support, and socioeconomic status may influence a child's behavior in the classroom, and potentially inhibit skills necessary for school success.

### **Challenges to Kindergarten Readiness**

While the majority of children are able to transition from preschool to kindergarten with little difficulty, some children experience challenges during this time (Duncan et al., 2007). In a study conducted by Rimm-Kaufman et al. (2000) teachers rated 16% of their students as having many problems with their transition into kindergarten. Many factors contribute to the readiness of a child for kindergarten. However, in some cases there may be barriers to readiness which affect the level of success a child will have in the academic realm. Factors that negatively influence children's success in kindergarten include their age, socioeconomic status, and their ability to interpret sensory information from their environment (Duncan, et al., 2007; Lapointe, Ford, & Zumbo, 2007; & Fantuzzo et al., 2007). Rimm-Kaufman et al. (2000)



also noted that since children enter kindergarten with a variety of different pre-education experiences, the successfulness of the transition to kindergarten will also vary.

The age of the children at the start of kindergarten may inhibit their ability to perform required tasks that predict school success because they are not on the same developmental level as the rest of their classmates. Oshima and Domaleski (2006) noted that in recent years a higher percentage of parents kept their children in preschool for an extra year in order to ensure academic and social preparedness in kindergarten. Older kindergarteners, those with earlier birthdays and those who are held back in preschool for an extra year, possessed higher levels of self-regulation and lower levels of disengaged behaviors than their younger peers (Fantuzzo, et al., 2007). In fact, age differences accounted for greater variations in academic ability than gender differences for those children in younger grades (Oshima & Domaleski, 2006). However, the authors also explained that the decision to delay the start of kindergarten should not simply be based on birth date, but rather on the individual's ability to perform the skills necessary for kindergarten. Moreover, delayed kindergarten entrance meant a widened age gap between children in the same classroom, which altered the classroom environment as the age range went from a few months to greater than a year in some cases (Oshima & Domaleski, 2006).

The environmental and social context in which a child is raised may have a great impact on cognitive, socio-emotional, and physical development (Lapointe, et al., 2007). Fantuzzo, et al. (2007) stated children from minority backgrounds and individuals living below the poverty line may lack important behavioral, social, and academic skills necessary for school success. Additionally, exposure to greater social and biological

risks, such as poverty and a reduction in safe learning spaces, negatively affected a child's ability to develop foundational school skills. Children who came from disadvantaged backgrounds often lacked access to quality early education and preschool opportunities (Fantuzzo, et al., 2007). Fantuzzo, et al. (2007) reported that lack of access to these services did have a negative impact on educational outcomes. Rimm-Kaufman et al. (2000) found that the opportunity to attend preschool increased the chance of success in kindergarten.

The ability to regulate incoming and outgoing sensory information sets students up for success in their academic pursuits (Fantuzzo, et al., 2007). Children diagnosed with a sensory processing disorder may face greater challenges with the demands of kindergarten. However, there is a distinct population of children who have sensory processing difficulties without a formal diagnosis (Miller et al., 2007). The demands of kindergarten further challenged these children because they often did not receive the necessary support. These self-regulation abilities have been associated with positive learning outcomes as well as decreased classroom behavioral problems (Fantuzzo, et al., 2007). While all children develop at different rates, girls and older children demonstrated higher levels of self-regulation than boys and younger children respectively.

Furthermore, an inability to self-regulate may lead to lower cognitive and social outcomes as well as disruptive classroom behavior. In turn, this may negatively influence children who are able to self-regulate (Fantuzzo, et al., 2007). Sensory processing difficulties are defined as an individual's inability to manage environmental demands or to attain internal control (Myers, Stephens, & Tauber, 2010). Sensory

processing difficulties can endure into childhood and influence the children's participation in daily occupations such as education, socialization, and play.

There are many challenges to the successful completion of kindergarten, and the implementation of support systems may help children succeed with their early academic careers. Fantuzzo et al., (2007) discussed screening preschool children in a systematic way in order to identify which children displayed non-adaptive behavior. By pinpointing the non-adaptive behaviors present in children, parents and educators may be able to give each individual child the best opportunity for success.

### **Adapting the Environment: Providing Sensory Supports in a School Setting**

Environmental adaptations for children with sensory processing difficulties emphasize the teacher-child relationship, opportunities for physical activity, and the use of assistive devices in the classroom. The relationship between the teacher and the child is important for a child's socio-emotional competence in elementary school (Rimm-Kaufman et al., 2002). In addition, children need opportunities to engage in physical activity in order to improve their social and academic skills in preschool, as well as their self-regulation. Lastly, assistive devices such as weighted vests and therapy balls may encourage greater participation in classroom activities for children with sensory processing impairments (Fertel-Daly, Bedell, and Hinojosa, 2001).

Teacher-child relationships in preschool settings affect a child's socio-emotional competence in elementary school. Teachers who demonstrate a high level of sensitivity towards the needs of their students create a positive classroom environment (Rimm-Kaufman et al., 2002). Socially assertive children who had sensitive teachers exhibited self-reliant behaviors, fewer negative behaviors, and less time distracted than socially

assertive children who had less sensitive teachers. Howes (2000) found that children who exhibited pro-social behavior with peers illustrated a high quality teacher-child relationship whereas children with behavior problems (such as aggression and disruption tendencies) displayed lower levels of teacher-child closeness. When kindergarten teachers demonstrate a high level of sensitivity towards the needs of their students, they create a positive classroom adjustment for the students. Children's behaviors and teacher's level of sensitivity in the classroom add to well-regulated, competent, and valued kindergarten behavior (Rimm-Kauffman et al., 2002).

Effective classroom management by the teacher can facilitate adaptive behavior from the students upon entrance into kindergarten. Rimm-Kauffman et al. (2009) investigated children's self-regulation and the classroom setting, and how these two factors predict adaptive classroom behavior. Classroom management is seen by higher levels of productivity, proactive teaching approaches and diversified teaching methods that cater more specifically to the learning styles demonstrated by the students. They found that children paired with teachers who efficiently managed their classrooms demonstrated improved behavioral and cognitive self-control in a kindergarten classroom (Rimm-Kauffman et al., 2009).

Therapy balls can benefit classroom behavior for children with attention difficulties and children with difficulties regulating and processing sensory input. Schilling and Schwartz (2004), found that preschool children increased their engagement and in-seat behavior when they used therapy balls in place of standard chairs. As a result, the teacher was able to efficiently manage the classroom and provide effective instruction. Schilling, Washington, Billingsley, and Deitz (2003) also investigated the

application of therapy balls instead of standard chairs on children's in-seat behavior and legible word productivity. They found that the children improved their in-seat behavior and handwriting skills when they sat on the therapy balls. Teachers who were able to understand the challenges that come from sensory processing difficulties were able to adapt their classroom in order to facilitate academic and social success for their students.

One strategy for providing children with these opportunities can be through recess and other variations of physical activity in a school setting. Play occupations involving gross motor skills activate children's vestibulo-proprioceptive systems, which can facilitate their engagement in academic tasks (Carlson et al., 2008). In addition, play occupations such as playground activities provide children with opportunities to socialize with their peers. Marchant et al. (2007) performed a playground intervention during recess for three elementary children with poor social skills. After assessing each child's social behavior, daily for 20 minutes, during a recess period, it was found that each child significantly improved his/her social interaction on the playground.

In addition, Carlson et al. (2008) investigated the relationship between the amount of time kindergarten students engaged in physical education and their academic achievement. Among a nationally representative sample of 5,316 students, they found that children improved their academic achievement in mathematics and reading after they engaged in physical activity. Recess and physical education are two ways in which elementary-aged children can be given opportunities to engage in physical activity in order to improve their social and academic skills as well as self-regulation.

Aside from the teacher-child relationship, assistive devices can also facilitate increased self-regulation in the classroom for children with and without sensory

processing difficulties. Weighted vests and therapy balls are two different types of assistive devices designed to enable active classroom participation for children with attention difficulties. Fertel-Daly et al., (2001) examined the effects of the weighted vest on children's attention to academic tasks and self-stimulatory behaviors. While the children wore the weighted vest, they increased demonstrated attention on fine motor tasks and decreased the duration of self-stimulatory behaviors. By decreasing the need for self-stimulatory behaviors and increasing attention the weighted vests can improve the quality of learning for all the students in the classroom, not just the students requiring the vests (Fertel-Daly, et al., 2001).

### **Statement of Purpose**

Kindergarten readiness encompasses a child's ability to transition from preschool to formal elementary school education. Foundational skills underlie a child's success within this transition and predict participation in classroom activities. Research indicated that teachers and parents shared similar beliefs on qualities necessary for early elementary school achievement. A child's ability to self-regulate behavior and attend during classroom activities was the essential skill for school success (Capelloni, 2011; Duncan et al., 2007; Kim et al., 2005; Zhang et al., 2008). However, many children entering kindergarten lack the skills necessary for success (Rimm-Kaufman, et al., 2000).

Kindergarten classrooms have more academic and social structure compared to preschool, and children who lack the ability to self-regulate may struggle during this transition (Duncan et al., 2007). Sensory processing difficulties may cause ineffective self-regulation and classroom behavior. However, there are in class adaptations and interventions that may assist children facing these challenges (Fantuzzo et al., 2007).

There is limited research on the relationship between sensory processing disorders and non-adaptive behavior for typically developing children attending preschool pre-k programs. The purpose of this study was to explore and investigate the relationship between sensory processing disorders and challenging behaviors in preschool pre-k classrooms. By identifying the frequency of sensory processing disorders in preschool pre-k, teachers and parents may gain knowledge of atypical behaviors. This may facilitate the implementation of, and participation in early intervention services, which may increase a child's success in the transition from preschool to kindergarten. Thus, the research questions were:

1. What are the rates of sensory disorders among typically developing preschool (pre-k) students in early education classrooms in California?
2. Is there a relationship between preschool teachers' perspectives of challenging classroom behavior and parents' reports of sensory processing in the home?

### **Theoretical Framework**

Jean Ayers' sensory integration was the frame of reference influencing our research. According to Ayers (1972), sensory integration is "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" (p.11). Sensory integration is the process by which the brain organizes all of the body's senses, including touch, taste, smell, sight, hearing, proprioception, and kinesthesia in order to promote adaptive behavior. This process facilitates an individual's ability to sort critical information in the environment from unimportant information, and provide meaning and purpose to daily activities. The sensory integration process provides an individual with opportunities to

respond to his or her environment in an adaptive, purposeful manner and thereby is essential for learning and behavior within an academic setting.

Bundy and Murray (2002) postulated three overarching assumptions that shape the foundation of sensory integration theory: (a) learning depends on one's ability to integrate sensations from the environment and utilize this information to organize behavior, (b) poor ability to process sensory information may affect learning and behavior, and (c) when an individual's sensations are associated with an adaptive response to meaningful activities, he or she improves the ability to process sensations and thereby increases learning and behavior.

Williamson and Anzalone (2001) theorized that the sensory integration process is comprised of five interrelated stages: registration, orientation, interpretation, response and execution. Sensory registration occurs when the individual first becomes aware of the sensory input. The activation of the central nervous system occurs during this initial stage. Sensory registration embodies the concept of sensory threshold, which is the individuals' ability to take in sensation and stimuli. An individual's sensory threshold is constantly changing in relation to the individual's present arousal level, past sensory experiences, and expectations (Williamson & Anzalone, 2001). Orientation occurs when the individual focuses on the novel sensory input. The individual may overly attend to details, or in contrast, the individual may miss critical information. Interpretation refers to integrating and making sense of the sensory input across the different sensory systems. After the individual registers, orients, and interprets the input, he/she organizes a response to it. The individual selects a cognitive, affective, and/or motor response to the



sensory input. Lastly, the individual executes the response, which creates new sensory input (Williamson & Anzalone, 2001).

### **Typical Sensory Processing**

Sensory processing embodies an individual's daily experiences across the different areas of occupation. From activities of daily living to work and education to play and leisure, sensory processing affects an individual's participation in each occupational area. The ways in which individuals process information from different sensory systems affect their abilities to make choices (Dunn, 2001).

Dunn's Model of Sensory Processing (2001) presents two variables relevant to sensory processing style and neurological threshold. This model compares individuals who exhibit a high and low neurological threshold. People who display a high neurological threshold need more sensory input from their environment in order to activate their systems. In contrast, individuals who have a low neurological threshold need less sensory input from their environment in order to stimulate their systems.

In addition to neurological threshold, individuals may respond passively or actively to sensory stimuli. People who display a high threshold and passively respond to stimuli are referred to as low registration. These individuals enjoy sensory stimulation and physical movement, however, they will not actively seek it. People who have a high threshold but who actively respond to stimuli are viewed as sensory seeking. These individuals also enjoy physical movement, and they will actively seek it. In contrast, people who exhibit a low threshold and passively respond to stimuli are sensory sensitive. These individuals do not enjoy sensory stimulation, and they will not search for ways to avoid it. Finally, people who also have a low threshold but who actively respond to

stimuli are described as sensory avoiding. These individuals also do not like sensory stimulation and they will actively avoid incoming stimuli.

### **Sensory Processing Disorder**

Sensory processing disorder (SPD) reflects an individual's inability to effectively register, process, organize, and/or respond to sensory input (Miller et al., 2007; Miller et al., 2009). Individuals with sensory processing disorder may exhibit non-adaptive behavior when confronted with high levels or inadequate sensory stimulation. Thus, children with sensory processing disorder may have difficulties in the implementation of, and participation in occupations such as education, play, leisure, and socialization (Miller et al., 2007; Miller et al., 2009).

Miller et al. (2007) described three categories of sensory processing disorder; sensory modulation disorder (SMD), sensory discrimination disorder (SDD), and sensory-based motor disorder (SBMD). Miller et al. (2007) described sensory modulation as an individual's ability to register and process sensory input, and adapt or modify emotional behavior in response to the stimuli. There are three subtypes of SMD including sensory over-responsiveness (SOR), sensory under-responsiveness (SUR), and sensory seeking (SS). Individuals with SOR demonstrate quick, intense reactions to incoming sensory stimulation. This sensitivity may occur in one or multiple sensory systems including tactile, auditory, and olfactory systems. Furthermore, SOR often escalates when an individual is in an unfamiliar environment or encounters an unexpected transition. An individual's behavioral response to this sensory input may range from impulsive and aggressive actions to withdrawn and passive behavior (Miller et al., 2007).

Individuals with sensory under-responsiveness (SUR) may have minimal response to stimuli, and they may need excessive sensory input to register information. These individuals may not explore the environment, engage in socialization, or participate in school activities such as play and academic projects. In addition, children with SUR often exhibit lethargy, apathy, and disorganization in both the home and school environment (Miller et al., 2007). Conversely, the sensory seeking (SS) subtype describes individuals who crave a disproportionate amount of sensory input in order to self-regulate or sustain function throughout the day. Children with SS prefer to engage in high intensity activities such as bumping, crashing, and spinning. Excessive sensory seeking primarily interferes with a child's ability to participate in occupations such as academics and socialization. For example, SS may limit a child's ability to attend during designated classroom tasks and projects. It may also interfere with social boundaries because of behaviors such as extreme touching, pushing, or crowding of peers in order to obtain sensory input (Miller et al., 2007).

The second category within SPD is sensory discrimination disorder (SDD) (Miller et al., 2007). Individuals with SDD are unable to distinguish characteristics of sensory input from the visual, tactile, auditory, olfactory, vestibular, and proprioceptive sensory systems. These individuals with SDD have the ability to perceive and regulate responses to stimuli, but they cannot discern the qualities of the stimuli such as spatial relationship or intensity of sensory input. The inability to discriminate sensory stimuli may result in uncoordinated motor skills, delays in cognitive processing, and language disabilities. This inevitably affects individuals' self-confidence, self-esteem, and motivation, which is crucial for school success (Miller et al., 2007; Miller et al., 2009).

The final category of SPD is called sensory-based motor disorder (SBMD) (Miller et al., 2009). SBMD encompasses deficits in motor planning and/or a lack of postural control. Subtype 1 of SBMD is postural disorder (PD), which is an individual's difficulty in maintaining balance, equilibrium reactions, core strength, and weight shifting. Subtype 2 is dyspraxia, which is the inability to conceive of, and execute a plan for motor actions. It also includes impaired bilateral integration, coordination, and sequencing skills. Thus, children with dyspraxia may have challenges in fine and gross motor activities in school leading to non-adaptive classroom behavior (Miller et al., 2009).

Sensory integration is a neurological process that organizes and responds to sensory input from the visual, auditory, tactile, vestibular, proprioception, gustatory, and olfactory systems (Miller et al., 2007). While there is a range of sensory processing styles and abilities, the inability to integrate sensory stimuli from the environment may preclude children from partaking in occupations such as education, play, leisure, and socialization. Thus, a diagnosis of sensory processing disorder occurs when sensory-based challenges impair individuals' abilities to participate in these daily occupations (Miller et al., 2007). It is critical for children to participate in said occupations in order to gain the necessary social, emotional, and academic skill set required for early elementary school success. Dunn (2001) stated that a child's inability to process sensory stimuli appropriately might manifest itself as non-adaptive classroom behavior. It is vital that both teachers and parents have the knowledge and awareness of typical and atypical sensory processing abilities in order to facilitate an optimal learning environment for every child (Dunn, 2001). The purpose of our research was to explore the rate of sensory processing disorders in preschool pre-k children. Researching the frequency of sensory

processing disorders in preschool children provides added knowledge for parents, teachers, and other professionals interested in identifying said behaviors. In turn, this awareness may facilitate children's positive transition into kindergarten leading to overall school success.

## **Methodology**

### **Design**

This research was a descriptive, cross-sectional quantitative pilot study using a convenience sample of both teachers and parents of children in preschool from three Northern California schools, Novato Youth Center (NYC) in Novato, CA, Fairfax Children Center (FCC) in San Anselmo, CA and Children's Corner Child Care Center in Petaluma, CA. A descriptive design facilitated the process for gathering information on parents' and teachers' interpretations of the children's behavior at home and in the classroom. The data provided us with information on the relationship between non-adaptive classroom behavior and the presence of sensory processing disorder. In addition, the descriptive design gives us deeper insight into behaviors demonstrated in the classroom, teachers' perceptions of behaviors in the classroom, and reactions to sensory input in the home environment.

### **Sample**

Parents of preschool children, aged 4 to 6 years old, and their preschool teachers comprised our target population. Our age range was based on the typical age of children at the start of Kindergarten. In California, the law states that all children must be allowed to enroll in Kindergarten programs when they will turn five by December 2nd of that calendar year ([www.cde.ca.gov](http://www.cde.ca.gov)). Early enrollment is evaluated on a case by case basis,

with no requirements from the state for the individual school districts. The parents participating in this research could have children who are currently four years old and turning five before December 2, 2012 as well as parents whose children had already turned five. We set the upper age at six years old in order to include parents of children who delayed the start of Kindergarten for a year and subsequently are already six years old but currently enrolled in a Pre-K program.

Novato Youth Center is a private non-profit organization with a mission to “inspire and prepare youth to succeed” (Novato Youth Center, 2011). They currently serve a population of 3,500 children and families annually and begin caring for children as young as six weeks old. Their teacher to student ratio is 1:8 or less depending on the age of the student. In addition to providing day care services, NYC currently has a school readiness program called Kinder Academy, which takes parents and students through a five-week course on what to expect in kindergarten. This program consists of free health and community resources, health insurance, and workshops informing parents about nutrition, dental health, and general school readiness (Novato Youth Center, 2011).

Fairfax-San Anselmo Children’s Center currently serves 150 children aged 3 years to 10 years old. Their main goal is to support low and moderate-income parents by providing a variety of childcare and workshop services to parents who are currently working or in training to work (Fairfax Children’s Center, 2011). Their childcare services include day care, after school care, sick childcare, and extended day care for families who work longer hours. Additionally, they provide transportation for families when necessary.

Children's Corner Child Care Center, located in Petaluma, CA was the third and final site used for data collection. This school serves children with families aged 16 months through pre-Kindergarten, and averages 85 children in attendance each day (Children's Corner Child Care Center, 2012). All head teachers have credentials in Early Childhood Education and many have received special certification for working with children with unique needs. The classroom curriculum is based on developmental achievements and considers the needs of each individual family in a collaborative way.

There were no restrictions for participation in the study based on gender, race, or ethnicity of the children and their parents. We excluded those children who had a diagnosed sensory processing disorder or other developmental disability, as we were looking at typically developing children. Parents and teachers who were not fluent in English were also excluded as the instrument was only available in English.

Thirteen of the 15 families who returned the SPM-P also completed the demographic questionnaire provided on the SPM-P assessment. The demographic questionnaire contained items such as gender, age, and ethnicity of the participating families. Table 1 identifies demographic percentages for participating families in relation to the general population in California and the United States.

The sample consisted of 7 males and 8 females for a total of 15 students. The average age for males was 4.6 years and females 4.9 years. Seventy-three percent of families listed ethnicity as Caucasian, 13% Hispanic, and 13% indicated Unknown.

Table 1  
*Student Demographics*

Characteristics	Sample <i>n</i> =15 %	California <i>n</i> =37,691,912 <sup>a</sup> %	U.S. <i>n</i> =311,591,917 <sup>b</sup> %
Age (Mean)	4.75	-	-
<b><u>Gender</u></b>			
Male	47	49.7	49.2
Female	53	50.3	50.8
<b><u>Ethnicity</u></b>			
African American	0	6.6	13.1
Asian	0	13.6	5
Caucasian	73	74	78.1
Native American	0	1.7	1.2
Hispanic	13	37.1	16.7
Unknown	13	-	-

Numbers and percentages for California and U.S. comprise residents of all ages.

<sup>a</sup>U.S. Census Bureau Quickfacts (2011)

<sup>b</sup>U.S. Census Bureau American Factfinder (2001)

### **Instrumentation**

The Sensory Processing- Preschool (SPM-P) was used to establish which children presented with sensory processing disorders. Parents filled out the SPM-P based on observations of their children's behaviors seen in the home (Glennon, Miller-Kuhaneck, & Herzberg, 2011). The SPM-P was developed in response to the need to evaluate and address sensory processing disorders in younger children (Glennon et al., 2011). The SPM-P was used in this study instead of the Dunn Sensory Profile, which was used in the original Ahn et al. (2004) study, due to more clear cut-offs for diagnosis of sensory dysfunction.



The SPM-P contains a home form consisting of 75 questions as well as a school form. For this study, only the home form was used. The items are divided into six categories: vision, hearing, touch, body awareness (proprioception) balance, and motion (vestibular) (Glennon et al., 2011). The form takes approximately 20 minutes to complete and 10 minutes to score. Once scored, the data was presented in the six categories listed above as well as a total sensory system score, planning and ideas score and social participation scores. Data was reported as *T* scores, which were converted to standard scores and percentile ranks (Glennon et al., 2011). These standard scores create three categories, “Typically Developing” which indicates that the child is not having many difficulties. On the opposite end of the spectrum is “Definite Dysfunction” which describes children that are having significant difficulties across different categories scored in the SPM-P. In between these categories lies the category titled “Some Problems”. This describes a child who is showing some dysfunction across categories but not enough to clearly indicate a sensory processing disorder (Glennon et al., 2011).

The SPM-P was standardized on a sample of 651 children including 242 children receiving OT services (Glennon et al., 2011). According to Glennon et al. (2011), the SPM-P has adequate internal consistency with a Chronbach’s alpha of greater than 0.70 on all subscales. Test-retest reliability was found to have a correlation coefficient above 0.90, which demonstrates stability over a two-week period. Finally, the SPM-P has high content and construct validity, which means it is able to differentiate between children with sensory processing disorders and typically developing children (Glennon et al., 2011).

The SPM-P is easy for non-clinicians such as parents and teachers to understand. It has also been used in other collaborative projects and parents report that they feel validated by being involved in the process with their child (Glennon et al., 2011). Additionally, the SPM-P was found to aid a non-professional in understanding what is happening for a child who is experiencing sensory integration dysfunction (Henry & McClary, 2011).

### **Procedures**

This study is a replication of a study done by Ahn et al. (2004). Instead of looking at the perceptions of kindergarten teachers and parents, this study focused on the perceptions of preschool teachers and parents. This research followed the ethical guidelines set out by the American Occupational Therapy Association in the Occupational Therapy Code of Ethics and Ethics Standards (2010) as well as the principles outlined by Dominican University of California's Internal Review Board (IRB). IRB approval was obtained by the researchers on February 29, 2012 (Internal Review Board for the Protection of Human Subjects Application, #9067) (see Appendix A).

Upon receiving the approval to begin this study, student researchers distributed fliers and packets containing the SPM-P, consent forms and teacher questionnaires to the directors of the pre-school programs (see Appendix B). The student researchers then presented the purpose and procedure of the research at a staff meeting at each school and handed out information regarding the nature of our research to the teachers (see Appendix C). We gave the teachers an opportunity to ask questions and presented them with packets with letters detailing our project and informed consent documents.

Preschool teachers who agreed to participate in the study received information and a checklist questionnaire to fill out (See Appendix D). Student researchers provided teachers and parents with envelopes, one for their own responses, and one to collect the responses of participating parents.

Information regarding the purpose and nature of the study, a description of what we asked them to do, and our contact information was presented to the parents in the form of a cover letter (see Appendix E). Additionally, the parents received instructions for filling out the Sensory Processing Measure-Preschool and a copy of the home form. Information was either returned to the classrooms or mailed back to the researchers in provided envelopes. Data collection began on March 15, 2012 at Children's Corner and Novato Youth Center, and on March 29, 2012 at Fairfax Children's Center. In total, 17 surveys and checklists were returned to the researchers for analysis.

### **Data Analysis**

In order to answer our first research question, "What are the rates of sensory disorders among typically developing preschool students in early education classrooms in California?" we scored the SPM-P according to the model set out by Glennon et al. (2011). In each category, scores are grouped and then a cut off is set distinguishing typical behaviors from atypical behaviors. A general sensory processing score is generated as well as seven sub-scores.

To answer our second research question, "Is there a relationship between preschool teachers' perspectives on challenging classroom behaviors and parents' reports on sensory processing in the home?" we utilized a visual analysis of the data and ran a Fisher Exact test due to the small sample size. We expected that students who scored as

having sensory processing difficulties according to the SPM-P to display maladaptive behaviors on the teacher checklists whereas children who did not demonstrate sensory processing difficulties not to demonstrate maladaptive classroom behaviors.

## **Results**

### **Sensory Processing Disorders**

Researchers distributed 32 SPM-P assessments to parents and 32 behavioral checklists to the preschool teachers. Eighteen (56%) SPM-P assessments and behavioral checklists were completed and returned by the specified deadline of May 1, 2012.

However, 3 of the 18 SPM-P assessments returned did not meet inclusion criteria for age requirements and were marked as invalid. Thus, the total number of SPM-P assessments used for statistical analysis was 15 (47%).

The SPM-P calculates scores based on 75 items within 8 sensory categories such as social participation, vision, hearing, touch, taste/smell, body awareness, balance/motion, and planning/ideas. The total scores are categorized as Typical Function, Some Problems, and Definite Dysfunction. Two of the 15 children in the sample (13%) had cumulative scores indicating Definite Dysfunction, thus meeting criteria for a sensory processing disorder. Ahn et al. (2004) suggested that assessments not returned by parents indicated children in the Typical Function category. Based on this assumption using the SPM-P assessment, 6.2% of the children within the greater population of 32 demonstrated sensory processing disorder.

Children who met the criteria for SPD had a mean age of 53.5 months, or four years, five months, which is four months younger than the rest of our sample (average

age: four years, 9 months). One of the surveys indicated that the child was of Hispanic background, and the other survey indicated Unknown.

### **Teacher Identified Behavior**

Teachers identified five dominant maladaptive behaviors demonstrated by children in the classroom. These behaviors included extreme talkativeness, overly fidgety, lack of focus, inability to stay on task, and inability to remain seated/standing. The Fisher's Exact test was chosen due to the small sample size in order to determine the statistical relationship between the SPM-P responses from the parents and what the teachers reported on the behavioral checklist. We compared children who had three or more behaviors with children who had two or fewer behaviors identified by the behavioral checklist. The relationship between the children who had a definite diagnosis of a sensory processing disorder and children who had three or more identified behaviors was not statistically significant ( $p= 0.476$ ).

Table 2

*Fisher Exact Test*

	(3+) Behaviors	(2-) Behaviors
Definite Diagnosis (SPM-P)	1	1
No Diagnosis (SPM-P)	4	9

Based upon a visual analysis of the Behavioral Checklist, the most commonly reported responses from the teachers were negative "other" comments ( $n=10$ ). This answer allowed teachers to write in responses not present in the rest of the checklist. The teacher selected all behaviors at least one time and no behavior other than "other" was selected more than three times (see Table 3). The percentages calculated do not include

the 17 children whose families choose not to fill out the SPM-P because this form included parental consent for participation in the research.

Table 3

*Teacher Identified Behaviors*

Behavior Items	Frequency <i>N=15 (%)</i>
Other	10 (66.6%)
Positive Comment	3 (20%)
Negative Comment	7 (46.6%)
Overly Fidgety	3 (20%)
Inability to Remain Seated/Standing	3 (20%)
Extreme Talkativeness	3 (20%)
Inability to Stay on Task	2 (13.3%)
Lack of Focus	2 (13.3%)
Difficulty Making Friends	2 (13.3%)
Overly Active	2 (13.3%)
Activity Avoidance	1 (6.6%)
Hitting	1 (6.6%)
Bullying	1 (6.6%)
Extreme Shyness	1 (6.6%)
Difficulty Transitioning	1 (6.6%)

## Discussion

The research results indicate that 6.2% of children in pre-kindergarten early education programs may demonstrate sensory processing disorder. These findings suggest that 2 to 3 children entering a kindergarten classroom may demonstrate sensory processing challenges. When generalizing to the U.S. population, this statistic translates into approximately 2.9 million children in early education programs. These outcomes are consistent with a study conducted in 2010 on the prevalence of sensory processing disorder in kindergarten and first grade classrooms (Armstrong, Harshbarger, & Kuffel, 2010). Ahn et al. (2004) also found that 5.3% of children within kindergarten classrooms demonstrated sensory processing disorder, which further supports our research. It is evident that children attending early education programs and preparing to transition into kindergarten may benefit from further assessments in sensory processing function (Ahn et al., 2004).

Teachers identified five dominant maladaptive behaviors demonstrated by children in the classroom. These behaviors included extreme talkativeness, overly fidgety, lack of focus, inability to stay on task, and inability to remain seated/standing. When using a sensory integration theoretical framework, there may be specific reasons for maladaptive behavior within the classroom (Miller et al., 2007). For example, a child lacking focus may be sensory sensitive and an external stimulus within the classroom easily distracts him or her while attempting to stay on task. A child who is overly fidgety and overly active may be seeking sensory input in order to self-regulate. A child who has difficulty making friends may be trying to avoid sensory stimuli such as tactile or auditory input. This may impact a child's ability to participate in occupations such as

academic tasks, play, and socialization. Furthermore, these maladaptive classroom behaviors may be viewed as a disciplinary problem. However, classroom adaptations and sensory-based activities may reduce said behaviors, and increase a child's overall success in school (Miller et al., 2007).

Thirteen out of 15 children did not meet the SPM-P criteria for sensory processing disorder. However, teachers reported that 9 of the children exhibited two challenging classroom behaviors and 4 of the children demonstrated three or more challenging classroom behaviors. The behaviors included lack of focus, overly fidgety, overly active, difficulty staying on task, and difficulty making friends. This may suggest that the child's emotional and cognitive development may not be in line with educators' expectations in relation to classroom behavior (Kim et al., 2005). The No Child Left Behind Act of 2002 increased behavioral expectations within the classroom for every grade level. Lane et al. (2004) found that the expectation is that children not only meet academic challenges, but also demonstrate self-regulation, impulse control, and adaptive classroom behavior in early education. This may be contributing to the high number of children indicated by teachers as having classroom difficulties without sensory processing disorder. In addition, this information further suggests that children demonstrating sensory processing disorder may have an even more difficult time adapting to classroom activities, and meeting the new standards for school behavior.

The 2 out of 15 children who met the SPM-P criteria for sensory processing disorder also demonstrated difficult behavior within the classroom and on the playground. The behaviors included lack of focus, overly fidgety, and difficulty staying on task. This may indicate that children exhibiting sensory challenges at home are also



demonstrating difficulties within the classroom. Thus, sensory processing disorder may affect classroom behavior, and overall participation in classroom activities. Miller et al. (2007) found that children displaying sensory challenges in early education may have greater difficulty achieving later school success. Thus, it may be beneficial to provide sensory integration screenings for children preparing to transition to kindergarten.

Performance patterns in early education may set the foundation for later academic achievement and social participation. Teachers, parents, and other students may stigmatize children with maladaptive classroom behaviors, further exacerbating the problem. Environmental adaptations, education on sensory processing subtypes, and individualized therapeutic supports within the classroom may increase a child's participation in academic tasks, play, and socialization. This improved participation may also encourage positive self-regulation, and overall school success for the present and future.

### **Conclusion**

When a child transitions from preschool to kindergarten, the expectations for their abilities rise exponentially. Skills necessary for kindergarten include the ability to remain seated for an extended period of time, pre-skills for writing and reading, sharing and cooperating with classmates, paying attention to the teacher and regulating and modulating their own emotions (Capelloni, 2011). The successfulness with which a student completes kindergarten plays a large role in his or her future academic success. In some cases, this leap in desired abilities is too great for the students to manage. For some students, the challenges in succeeding in kindergarten may be a result of a sensory processing disorder. The results of this study indicate that in each preschool classroom,

there will be an average of 2 out of 15 students who have a sensory processing disorder. A sensory processing disorder in and of itself makes academia challenging, however this is at times compounded by a teacher's lack of knowledge of how to best work with a student working with a sensory processing disorder. Additionally, since the passage of the No Child Left Behind Act, expectations for kindergartners have risen above what might be reasonably expected for children of that age developmentally (Lane et al., 2004). In cases such as this it become increasingly important for a teacher to have a good relationship with each student, that the teachers have a sound knowledge base of sensory processing difficulties and that their classroom environment sets these students up for successes instead of failures.

### **Limitations**

This pilot study has a number of limitations which may have impacted the results. With a sample size of 15, the results may not be able to be generalized to a larger population than the one sampled. The main limitation on the size of the sample was the number of parents who were willing or able to fill out the SPM-P. The SPM-P has not yet been translated into any language other than English, which prevented a number of willing participants from filling it out. Also, the demographic information of this sample was not similar to the larger demographic picture in California, which makes the results difficult to generalize to other counties in this state.

While the SPM-P home can provide part of a definite diagnosis of a sensory processing disorder, it is best when used in conjunction with the school form. The researchers choose not to use the SPM-P school form due to the amount of work it would have placed on the teachers. An abbreviated questionnaire was given to the teachers

instead of the school form. This questionnaire included challenging behaviors often identified on the SPM-P but it is not a complete substitute for the second half of this assessment tool. According to the publishers, the home form can be used alone, though the results are more difficult to generalize to settings outside the home. Additionally, the researchers were limited in our ability to contact parents directly due to limitations outlined by the IRB and the schools. It is possible, that if the researchers had been able to hold a parent meeting we would have been able to gather more data than was possible using the teachers as our only recruiters.

This study did not consider children who had not been diagnosed with a sensory processing disorder, but who had another diagnosed disorder such as autism or attention disorders. Children with conditions such as these often have difficulties processing sensory information in an effective way, and thus this could have influenced our results. Additionally, these researchers have no way of knowing whether or not children who were found to have a sensory processing disorder were receiving occupational therapy or other services.

### **Future Research**

The results of this study are consistent with what Ahn et al. (2004) and Armstrong et al. (2011) demonstrated regarding the percentage of children in school with the potential of having a sensory processing disorder. However, samples that are much larger and diverse will give more weight to these results and may help call for further education for teachers on the importance of sensory processing. In the future, using the SPM-P home and school forms together will be able to add information that is simpler to generalize from differing environments. Finally, when looking at children in a county

where there is a large number of families where English is a second language, it would be beneficial to use an assessment tool that has been translated and standardized for this use.

### **Occupational Therapy Implications**

The main implication for occupational therapists is the growing need to be advocates for children who are having difficulty processing sensory information. This advocate role can assume a number of variations, the main one being to provide teachers with knowledge about sensory processing disorders. This information can provide the teachers with a base from which to work, and will not be a “one size fits all” approach towards managing these difficulties. Education for teachers will help bring understanding to the struggles children with sensory processing disorders face, as well as provide successful solutions for challenging classroom behaviors.

While advocating for children who already have a diagnosis of a sensory processing disorder is important, occupational therapists can also serve to screen pre-kindergarten students for these disorders before they move from preschool to kindergarten and their academic career begins too soon. By identifying these challenges earlier, rather than after the child falls behind, parents can become advocates for their children and can help cut off some of the larger classroom challenges before they begin. Kindergarten sets up the rest of a child’s academic career, and their future success can be based on their early educational experiences. As occupational therapists, we can give children who have varying levels of sensory processing abilities the best chance for success in their educational careers by adding to the knowledge about sensory processing difficulties and ways to work with the abilities these children possess.

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## Appendix A-IRB Approval Letter



February 29, 2012

Shannon Sobieraj

183 Tamalpais Rd.

Fairfax, CA 94930

Dear Shannon:

I have reviewed your modified proposal (entitled, Kindergarten Readiness: The Impact of Sensory Integration on Preschool Children's Readiness for the Transition to Kindergarten) submitted to the Dominican University Institutional Review Board for the Protection of Human Subjects (IRBPHS Application, #9067). I am approving it as having met the requirements for the modification.

In your final report or paper please indicate that your project was approved by the IRBPHS and indicate the identification number.

I wish you well in your very interesting research effort. Sincerely,

A handwritten signature in black ink that reads "Martha Nelson". The signature is written in a cursive, flowing style.

Martha Nelson, Ph.D. Chair, IRBPHS

cc: Stacy Frauwirth

Institutional Review Board for the Protection of Human Subjects

Office of the Associate Vice President for Academic Affairs 50 Acacia Avenue, San Rafael,  
California 95901-2298 415-485-3278 [www.dominican.edu](http://www.dominican.edu)

## Appendix B – Teacher Consent Form

**DOMINICAN UNIVERSITY of CALIFORNIA**  
**CONSENT TO BE A RESEARCH PARTICIPANT**

## Purpose and Background:

Ms. Laura Boyd and Ms. Shannon Sobieraj, graduate students in Occupational Therapy at Dominican University of California, are conducting a research study designed to look at the sensory processing of preschool students. The researchers are interested in the effect sensory processing has on classroom behavior.

I am being asked to participate because I am a preschool teacher.

## Procedures:

If I agree to be a participant in this study, the following will happen:

1. I will provide the researchers with a student roster.
2. I will complete the teacher questionnaire on behavior identification.
3. I will return the signed consent form and questionnaire to the research team by \_\_\_\_\_.
4. I will collect my student's research forms in the manila envelope given to me and will return the large envelope to the research team in the manner that is most convenient for me.
5. Upon my request, I will be furnished with a written summary of the relevant findings and conclusions of this project. Such results may not be available for six to nine months.

## Risks and/or Discomforts:

1. I understand that my participation involves no physical risk, but may involve some psychological discomfort.

## Benefits:

There will be no direct benefit to me from participating in this study. The anticipated benefit of this study is a better understanding sensory processing of preschool students in a typical classroom.

## Questions:

If I have further questions about the study, I may contact Laura Boyd or Shannon Sobieraj at **SensoryProcessing.Thesis@gmail.com** or our research supervisor, Ms. Stacy Frauwirth, MS, OTR/L, Assistant Professor of Occupational Therapy at (415) 257-1380. If I have any questions or comments about participation in this study, I should speak first with the researchers and the research supervisor. If for some reason I do not wish to do

this, I may contact the Dominican University of California Institutional Review Board for the Protection of Human Subjects (IRBPHS), which is concerned with the protection of volunteers in research projects. I may reach the IRBPHS Office by calling (415) 257-1389 and leaving a voicemail message, by FAX at (415) 257-0165, or by writing to the IRBPHS Office of the Associate Vice President for Academic Affairs, Dominican University of California, 50 Acacia Avenue, San Rafael, CA 94901.

Consent:

**PARTICIPATION IN RESEARCH IS VOLUNTARY.** I am free to decline to be in this study or withdraw my participation at any time without fear of adverse consequences.

My signature below indicates that I agree to participate in this study.

\_\_\_\_\_  
**SUBJECT'S SIGNATURE**

\_\_\_\_\_  
**DATE**

\_\_\_\_\_  
**SIGNATURE OF RESEARCHER**

\_\_\_\_\_  
**DATE**

## Appendix C – Teacher Cover Letter

Dear Preschool Teacher,

We are Laura Boyd and Shannon Sobieraj, and we are graduate students in the Department of Occupational Therapy at Dominican University of California. We are working as part of a research team and are requesting your voluntary participation in a research study on the sensory processing of preschool students. We are interested in the ways young school age children process sensory information and how this affects their daily participation in the classroom. We are asking you to complete a brief questionnaire and identify students who display behaviors that present challenges in the classroom. You are being asked to participate because you are a preschool teacher. The questionnaire should take about 5 minutes to complete and your answers will remain **completely confidential**. Although we ask that you provide us with students' names all information collected will remain confidential and only the researchers and our faculty advisor will see this information.

Participation in research is voluntary. You are free to decline to be in this study or withdraw from it at any point.

If you choose to participate in this study, please:

- Review and sign the page titled Consent to be a Research Subject.
- Complete the Teacher Questionnaire answering all of the questions to the best of your ability.
- Supply the researchers with a classroom roster.
- Return all of the pages fully completed and sealed in the envelope provided.
- Parents may return the research forms directly to you in a sealed envelope. Please place these in the large manila envelope that we will provide you. We will arrange to collect all of the forms, including yours, in the manner that is most convenient for you.

Thank you in advance for your participation.

Sincerely,

Laura Boyd and Shannon Sobieraj  
Graduate Students  
Department of Occupational Therapy  
Dominican University of California

## Appendix D - Teacher Questionnaire

Teacher Name:

School:

Teacher Questionnaire  
Behavior Identification

A. Here is a list of behaviors that are often seen in a preschool school classroom and can be disruptive to the student, their peers or the classroom as a whole.

- |                              |  |
|------------------------------|--|
| 1. Lack of focus<br>standing | 8. Inability to remain seated or<br>standing |
| 2. Activity avoidance        | 9. Inability to stay on task                 |
| 3. Hitting                   | 10. Difficulty transitioning                 |
| 4. Bullying                  | 11. Difficulty making friends                |
| 5. Extreme talkativeness     | 12. Overly active                            |
| 6. Extreme shyness           | 13. Other:                                   |
| 7. Overly fidgety            |  |

B. Of the behaviors listed above, please identify the student(s) who display these behaviors and the specific behaviors that they display. Please identify the behavior of the child(ren) by number. Feel free to identify as many behaviors per child as you wish, and to list as many children as you wish. If there are *other* behaviors you are witnessing in your classroom that concern you please list them under number 13 and identify the behavior.

*Example: Johnny Smith 4, 10, 11*

- 1.
- 2.
- 3.
- 4.
- 5.

## Appendix E – Parent Cover Letter

Dear Parents,

Hello! We are Laura Boyd and Shannon Sobieraj, and we are graduate students in the Department of Occupational Therapy at Dominican University of California. We are asking for your participation in a research study to learn more about the ways children in preschool process sensory information and how this affects their participation in the classroom. You are being asked to participate because you have a son or daughter in preschool. We are asking you to complete a brief family questionnaire and the Sensory Processing Measure – Preschool (SPM-P). The questionnaire and SPM-P should only take about 15-20 minutes to complete and your answers will remain **completely confidential!** Although we ask that you fill in your child's name, we assure you that all information collected will remain confidential and only our faculty advisor and we will see this information.

Your participation is voluntary! You are free to decline to be in this study or withdraw from it at any point.

If you choose to participate in this study please complete the following steps:

- Review and sign the page titled Consent to be a Research Subject.
- Fill out the Family Questionnaire answering all of the questions to the best of your ability.
- Complete the Sensory Processing Measure – Preschool by following the instructions that are attached to the document.
- Return all of the pages fully completed and sealed in the envelope provided by \_\_\_\_\_. You may either return it to your child's teacher or mail it directly to the researchers at the address on the envelope.

If you have any questions or concerns about sensory processing, please contact us at [SensoryProcessing.Thesis@gmail.com](mailto:SensoryProcessing.Thesis@gmail.com) and we will be happy to provide you with more information.

Thank you in advance for your participation.

Sincerely,

Laura Boyd and Shannon Sobieraj  
Graduate Students  
Department of Occupational Therapy  
Dominican University of California