A Senior Honors Thesis

February 2012

An Examination of the Efficacy of Sensory Integration in Occupational Therapy

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If an individual with sensory processing disorder undergoes occupational therapy treatment with the incorporation of sensory integration techniques, he or she will show measurable improvements in overall functioning, i.e., tactile sensitivity, taste/smell sensitivity, movement sensitivity, seeking sensation or under-responsiveness, and visual/auditory sensitivity.

ACKNOWLEDGMENTS

I would like to thank and acknowledge the many people who have helped make this Thesis of An Examination of the Efficacy of Sensory Integration in Occupational Therapy a success. First of all, to my advisor Mrs. Betty Marko, thank you for all the time spent with me in meetings, reading and revising my project, and giving me such wonderful guidance, advice, and insight. I very much appreciate all you have done and more. To my reader, Dr. Bob Humphries, thank you for your generous suggestions and for taking the time to help read and revise my project. To Dr. Laci Fiala Ades, thank you so much for all your help with my data consolidation. Without you as my statistical liaison, I would not have been able to convey my results in such an informative and intelligent manner. To Dr. Koop Berry and the rest of the Honors Committee, thank you for presenting me with this opportunity to come up with original research regarding my interest in occupational therapy. I know this experience can only help in my journey to graduate school, and it has left me with valuable lessons for life as well. To the staff, children, and parents from Concorde Kids Therapy, especially Janet Murphy, OTR/L, Brittannie Cestari, OTR/L, and Amy Hammock COTA/L, thank you for all your help, assistance, and enthusiasm towards my project. Spending time with you has been a very rewarding and exciting experience. Thank you to Jill Tyree, OTR/L, for your suggestions and support at the start and throughout my project. And a big thank you to my parents for your continued support and love throughout the years, and for the blessing of attending Walsh University. Each of you has played a vital role in helping me finish this project, and I appreciate everything you have done and given me. Thank you!

DEDICATION

I would like to dedicate this Senior Thesis Research Project to my little sister. You are truly an inspiration to me, and I would not be who I am today without you in my life. You light up the lives of those around you with your simplicity and love. I admire your happiness, and I truly value and enjoy being your sister.

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INTRODUCTION

Background Information

Sensory integration was first developed by A. Jean Ayers. It is a "normal developmental process that allows one to take in, process and organize sensations one receives from one's body and the environment" (Vander Zanden, 2007, p. 207). Sensory integration typically occurs automatically for people, but individuals who struggle with sensory processing disorder are faced with numerous challenges each day in their everyday life. Sensory processing disorder is the more current term for sensory integration dysfunction or sensory integration disorder. Those with sensory processing disorder often need intervention that relies on sensory integration techniques in their treatment.

Young children usually enjoy sensory experiences with different textures and colors of new objects, but children who do not enjoy these sensory experiences may have some degree of sensory integration problems. Children who are sensitive to things like sound or touch may also be clumsy or have difficulty with fine motor skills. According to Kranowitz (1998), sensory processing disorder intensifies the already-prevalent problems of autistic children, children with developmental disorders, and those with language difficulties. Sensory processing disorder is rarely a diagnosis that stands alone. For these individuals, Kranowitz (1998) said that occupational therapy often has a positive effect overall. There are also children who present without any significant disability who have issues with sensory integration.

Ayers' work with sensory integration was driven by her observations of children with learning disabilities. She defined sensory integration as "the neurological processes

used to organize sensation from the body and the environment, leading to effective environmental interactions" (Reynolds & Lane, 2007, p. 522). There are three main areas of sensory integration: tactile (touch), vestibular (balance and movement), and proprioceptive senses (body position).

An individual experiences tactile dysfunction when he or she experiences some level of difficulty or discomfort when being touched or touching others. One might be tactile defensive or he or she could seek more, more, and more touch. Difficulty with vestibular functioning comes with difficulty with balance, coordination, and motor planning. The proprioceptive sense increases body awareness and contributes to motor abilities; those with proprioceptive dysfunction have difficulties with everyday tasks of buttoning shirts or zipping a jacket.

Through occupational therapy, one may develop or improve functional skills related to sensory-motor integration, coordination, fine motor skills, and self-help skills (e.g., self-feeding, dressing, and bathing). A goal of occupational therapy is to help people live more independent, productive, and satisfying lives. The central idea of therapy is to provide and control sensory input in a way that the child adaptively responds to integrate those sensations. It is also possible for professionals to compare sensory integration therapy or techniques to other approaches such as psychotherapy, play therapy, general education, and perceptual motor training (Ayres, 1979). But overall, the goal of occupational therapy is to better the functioning of the individual in the necessary areas after evaluating the individual's skills.

Purpose of this Study

The primary objective of this study in occupational therapy examined individuals' issues being alleviated or improved while undergoing occupational therapy **with sensory integration**. As mentioned previously, sensory integration therapy may be compared to other approaches when it comes to treating or ameliorating sensory processing disorder. Sensory integration therapy is not universally accepted as best possible practice, however many occupational therapists say they see it work (Delaney, 2008). Although sensory integration has not always been embraced, this study sought to use the *Sensory Profile* as a quantitative measure in addition to qualitative observations to scrutinize the efficacy of sensory integration practices in occupational therapy. The researcher measured these improvements by use of the *Sensory Profile*, personal observations ranked according to the scale of the *Sensory Profile*, and input from the occupational therapists with whom the research was conducted.

Relevance

The relevance of this project was found in the evaluation of the possibilities for improvement that sensory integration techniques may have for individuals undergoing occupational therapy for sensory treatment. This thesis could certainly be replicated for future study in order to contribute further to evidence-based practice.

There was sparse research and literature on the efficacy of sensory integration treatment in occupational therapy; thus, additionally this project served to contribute, even in a small way, to the lack of previous studies. More research on sensory integration such as this present study contribute to treatments for sensory processing

disorder, and research on sensory integration within occupational therapy contributes to best possible practice in occupational therapy. Further, the study provided evidence for stakeholders with regard to the successful use of sensory integration.

Identifying more children with sensory processing disorder validates why these children are "out of sync" and through appropriate treatment facilitates positive outcomes. Having discussed this project as relevant, the use of sensory integration in occupational therapy has been shown to be efficacious in the field.

Hypothesis

A sensory integration plan incorporated with occupational therapy shows improvements in overall functioning (i.e., the areas of tactile sensitivity, taste/smell sensitivity, movement sensitivity, seeking sensation or under-responsiveness, and visual/auditory sensitivity) and in sensory deficient areas for individuals with sensory processing disorder.

Limitations

This study was conducted in a small private therapy practice in North Canton, Ohio. The sample included fifteen participants from ages 2 to 14. Parent cooperation was a limiting factor to some extent due to the fact that some parents did not sign the consent form; therefore the researcher had one less participant for the study resulting in a final *n* of 15 individuals. It was also a very timely process having the parents fill out and return the *Sensory Profiles* at the initial and end of the study. This instrument also has a certain degree of error associated with its consistency. This means one may not always

necessarily get the same score when the profile is repeated. According to the creators of the *Sensory Profile*, Pearson Education, Inc. (2008), "The values of reliability for the various age groups and quadrant scores ranged from .639 to .775, with 0 representing no consistency and 1 representing perfect consistency." The limitation in the case of the *Sensory Profile* is the reliability of the instrument and the limited number of instruments available to measure this construct. This tool is also a judgment-based questionnaire, meaning it is filled out based on personal observation. However, research efforts have supported its validity, and this profile has also been able to identify many sensory processing patterns (Cole and Tufano, 2008). Unfortunately the *Sensory Profile* is not a diagnostic tool, which means it does not explicitly identify or determine the appropriate actions in order to fix the problem. However, it does give occupational therapists a place to start, and they are able to infer the next steps to take in order to address the issues. This study was further limited by a short time frame of only five weeks of observation due to scheduling and availability. Initially, starting this project came with many limitations such as contacting a location, awaiting approval from the human subjects review board, and coming up with an entirely original project. This original thesis was not based off any previous research to the researcher's knowledge. This was limiting in the fact that there was not much experience with honing in on an adequate process for this study. A final limitation was that the researcher was not able to obtain a complete picture of the participants. The occupational therapists gave basic background descriptions and basic demographic data, but the researcher was not able to fully investigate the background of these children.

Summary

Overall, incorporating sensory integration treatment techniques as a part of occupational therapy allowed for benefits and improvements in the overall functioning of sensitive areas of the individual who was struggling with sensory processing disorder. By focusing on the areas of deficit in sensory integration, people are better able to improve these sensory areas. A sensory evaluation and realistic goals directed attention to the areas of focus for the patient. The *Sensory Profile* was used to provide detailed information on all sensory aspects of the child.

This research project intended to show that being able to find possible benefits and improvements of incorporating beneficial sensory integration techniques as a part of and concurrent with occupational therapy would be an appropriate treatment for individuals with sensory processing disorder. The great impact of sensory processing disorder on the overall functioning of individuals with regard to their sensory functioning can be ameliorated by occupational therapy treatment with the incorporation of sensory integration.

LITERATURE REVIEW

Abstract

This literature review scrutinized the efficacy of sensory integration treatment in occupational therapy. The idea of sensory integration in occupational therapy has been discussed. The focus is on occupational therapy, as well as the *Sensory Profile*, a standardized tool. Explorations of therapy in addressing sensory integration issues have been examined. Benefits of incorporating sensory integrative techniques as a part of and concurrent with occupational therapy have been suggested.

Keywords: sensory integration, sensory integration dysfunction, sensory processing disorder, occupational therapy, sensory profile, oversensitive, undersensitive, tactile, vestibular, proprioceptive

Introduction

This literature review discussed sensory integration and how occupational therapy served to ameliorate functioning of individuals who experience sensory issues. The *Sensory Profile* was examined as a tool to measure improvements brought about by occupational therapy with sensory integration. Sensory integration is a "normal developmental process that allows one to take in, process and organize sensations one receives from one's body and the environment" (Vander Zanden, 2007, p. 207).

A. Jean Ayres was the woman who first developed the theory of sensory integration, which was established to help individuals with sensory integration dysfunction; the more current term is now sensory processing disorder. Ayres created the theory of sensory integration based on recognized knowledge from the field of

neuroscience (Yack, Sutton, & Aquilla, 1998). Much of her research was devoted to assessment tools and their validity, such as the *Sensory Profile* (Cole & Tufano, 2008). According to Delaney (2008), sensory processing disorder was manifested due to neurological disorganization that affects the nervous system. The brain either received incomplete messages or received no messages at all; or the sensory information coming in was inconsistent or simply did not integrate properly with other sensory information. The theory of sensory integration has become a valuable idea for not only occupational therapy, but other areas as well (Yack, Sutton, & Aquilla, 1998).

Sensory Integration

Sensory integration represents an important aspect of development (Fisher, Murray, & Bundy, 1991). Sensory integration theory can be used by occupational therapists to assess and intervene with individuals who have sensory processing dysfunction that negatively affects their daily functioning (Crepeau, Cohn, & Boyt Schell, 2009). The process of sensory integration typically occurs automatically for people, and Ayres (1979) said sensory integration was often taken for granted; however, an individual struggling with sensory processing disorder faced numerous challenges each day in everyday life. If someone's sensory system does not receive sensory stimuli in a typical way, he or she may easily react to the world differently (Atchison & Dirette, 2007). However, many people commonly experienced sensory issues (Delaney, 2008).

The cooperation of the body's nerves working together to coordinate and send information correctly make up the process of sensory integration (Horowitz, 2007). Sensory difficulties have an overall impact on daily life, relationships, learning, and

behavior (Emmons, 2005). In fact, all the information individuals receive from the environment must first come through the sensory systems (Anderson, 1996). Sensory integration is a process as well as a theory. The value of theory in occupational therapy gives propositions that guide best possible practice (Fisher, Murray, & Bundy, 1991).

Sensory integration theory intended to explain learning and behavioral problems in children, especially problems with motor coordination and poor sensory processing (Fisher, Murray, & Bundy, 1991). A large component of sensory integration therapy was to help the child better understand how the sensory nervous system impacts his or her behavior as well as learning how to cope with sensory processing disorder (Delaney, 2008).

Development and Sensory Integration

According to Jean Piaget, children learned about their bodies and environment thought experiences and sensory feedback. Sensorimotor development is an important basis for all other forms of development. Both development and sensory integration are sequential, and establishing foundations is necessary since each new developmental acquisition is learned and built upon previous ones. No part of the central nervous system works alone, and both sensation and integration are certainly important in learning about the world and environment (Cratty, 1967). Sensory integration is an example of sensorimotor approach, but not all sensorimotor approaches to interventions are considered sensory integration (Fisher, Murray, & Bundy, 1991).

Sensory Integration Theory in Treatment

As applied to occupational therapy, sensory integration theory can be used in combination with other theories and approaches already utilized in the field to meet children's needs (Fisher, Murray, & Bundy, 1991). Sensory integration emphasizes the role of the individual in guiding the activities used in therapy. In occupational therapy, the evaluation and intervention is driven and based on the functional needs of the client. The goal for the child is to improve in functional behaviors that reflect some sort of improved sensory processing (Fisher, Murray, & Bundy, 1991). Although sensory integration research is fairly new, those who undergo therapy and learn coping mechanisms have experienced success both academically and socially (Delaney, 2008). And even though many people do not take sensory processing disorder seriously, there is research to support the fact that it is a real condition; it has to deal with a neurological processing difficulty (Delaney, 2008). Those who promote sensory integration therapy are faced with others who do not know much about it, or others who have negative opinions. However, many occupational therapists use sensory integration as just one of many treatment models, and they choose and plan their therapy sessions accordingly to each client's needs (Hanft, 1987). Crepeau, Cohn, and Boyt Schell (2009) write that some authors suggest the sensory integrative approach is effective in reducing self-stimulating behaviors which interfere with being able to accomplish more functional tasks. They also suggest that further research is needed and sensory integration intervention needs more examination, but it has been suggested already that sensory integration approaches help to improve play, interactions with other people, toys, and objects, and improve tolerance for vestibular and proprioceptive stimulations, as well as

overall exploration of the environment (Crepeau, Cohn, & Boyt Schell (2009).

The work of A. Jean Ayers was driven by her observations of children with learning disabilities. She believed there was a problem in *how* sensory information was being received which is what contributed to behavior and learning problems. Her definition of sensory integration is as follows: "the neurological processes used to organize sensation from the body and the environment, leading to effective environmental interactions" (Reynolds & Lane, 2007, p. 522). There are three main areas of sensory integration which make up a substantial part of one's daily life: tactile (touch), vestibular (balance and movement), and proprioceptive senses (body position) (Kranowitz, 1998).

Sensory Deficits and Everyday Life

Sensory integration is integral to an individual's ability to function. Sensory integration deficits compromise an individual's ability to interact with people and objects in their environment as well as being able to feel in control (Fisher, Murray, & Bundy, 1991). In order to maximize an individual's ability to function, sensory integration treatment is essential. When an individual experiences tactile dysfunction, he or she experiences some level of difficulty or discomfort when being touched or touching others. A deficit in tactile processing may be expressed as tactile defensiveness (Fisher, Murray, & Bundy, 1991). Someone with tactile dysfunction lacks good body language, may have delayed gross motor skills, and may withdraw from certain stimuli (Kranowitz, 1998). Someone who withdraws from tactile senses (hypersensitive) may shy away from "normal" affection whereas someone who constantly seeks more input (hyposensitive)

may not even respond to a "normal" touch because he or she needs exposure to more of the stimulus. Through treatment for tactile defensiveness, therapists observe behaviors in response to various types of sensory information to find the best combination of sensory experiences for reducing the tactile or overall sensory defensiveness (Fisher, Murray, & Bundy, 1991).

When the vestibular sense is lacking, Kranowitz (1998) says that one would not have a good feel for his or her own movements, or the movements of others and objects around him or her. Difficulty with vestibular functioning comes with difficulty with balance, coordination, and motor planning (Emmons, 2005). One might also notice gravitational insecurity with vestibular dysfunction. Fisher, Murray, and Bundy (1991) say that linear movements help with aversion to activities that demand vestibular input. When the vestibular system is functioning correctly, an individual can adjust his or her body with ease during physical changes such as shifting balance forward, backward, or to the side (Horowitz, 2007).

The proprioceptive sense tells information about someone's own movement or body position. This sense increases body awareness and contributes to motor abilities (Kranowitz, 1998). This system provides foundation for posture and other important things involving the muscles and joints in the body (Horowitz, 2007). Those with proprioceptive dysfunction have difficulties with everyday tasks of buttoning shirts, or zipping a jacket due to poor body awareness.

Further examples of sensory issues that are commonly noticed in children include aversion to brushing teeth, difficulties with pencil-grasping, and difficulties with staying still and seated for a small length of time (Emmons, 2005). Delaney (2008) also

mentions difficulty with scissors, handwriting, throwing a ball, jumping with two feet off the ground, or reluctance to try a new activity. Cole and Tufano (2008) give examples of calming and alerting sensations for each of these senses. The tactile sense is calmed by hugging or holding (e.g. self-massage) and alerted by rubbing or patting (e.g. hand clapping). The vestibular sense is calmed by slow, rhythmic movements (such as a rocking chair), and alerted by rotation or rapid forward movement (such as running). And the proprioceptive sense is calmed by moderate pressure (e.g. being wrapped in a blanket), and alerted by light pressure (being brushed with a feather, for example).

Other Disorders

Many individuals who undergo occupational therapy experience a wide range of diagnoses. According to Kranowitz (1998), sensory processing disorder intensifies the already-prevalent problems of autistic children, children with developmental disorders, and those with language difficulties. It has been commonly found with children who have learning disabilities and/or attention deficits. Since sensory processing disorder is rarely a diagnosis that stands alone, one can recognize the other diagnoses that are also associated with it such as autism, Down syndrome, cerebral palsy, conduct disorder, bipolar disorder, obsessive-compulsive disorder, and other learning disabilities (Emmons, 2005). For these individuals, Kranowitz (1998) also says that occupational therapy often has a positive effect overall. Fisher, Murray, and Bundy (1991) say that a combination of sensory integration procedures with teaching specific skills can be applicable to individuals with different disabilities, such as Down syndrome. Sensory issues in children with autism are often more prevalent than with the population of children who

have developed typically (Atchison & Dirette, 2007).

There are also disabilities that could be due to brain or muscle weakness, not sensory integration problems. In these situations, sensory techniques are still applicable. For example, vestibular techniques or activities that stimulate the vestibular system could help facilitate the muscles (Fisher, Murray, & Bundy, 1991). Many individuals who have some degree of mental retardation and exhibit tactile defensive behaviors can seek sensory integration therapy to decrease their tactile sensitivity. And of course, there are also typical children who present without any significant disability who have issues with sensory integration. Many sensory integration problems can overlap with attention deficit disorder (ADD) such as inattention, distractibility, hyperactivity, and impulsivity, but the two can also be very different (Horowitz, 2007). A child could in fact be suffering from a sensory integration problem that is "causing" ADD behavior; this child could present differently than a child who has sensory issues but no ADD (Horowitz, 2007).

It is not only important for a child's sensory systems to function correctly, but they also must be able to function together. Both emotional and social development are intertwined (Vander Zanden, 2007). Poor ability to process sensory input may impact the individual's ability to participate in social, home, and school activities (Schaaf & Miller, 2005). When these processes are part of a disorder, problems in learning, development, or behavior may arise. Therapy is one way to address emotional and sensory integration issues because it provides opportunities for engagement in sensory-motor activities rich in all three of these sensation areas (Schaaf & Miller, 2005).

Sensory Processing Disorder

Sensory processing disorder is sometimes considered a "hidden disorder" because it can be hard to diagnose if the child appears to be typical or behaviors are not extreme enough to attract attention (Anderson, 1996). As mentioned before, this may also be referred to as sensory integration disorder or dysfunction. Also, with sensory processing disorder, senses often develop in an uneven way (Ayres, 1979). However, individuals with sensory processing disorder may be referred to occupational therapy. Within occupational therapy, tactile information for feeling, vestibular information for movement, and proprioceptive information for muscle strength are available to help children develop (Horowitz, 2007).

More examples of sensory issues include: fear of swinging, disliking being upside down, over/underreactive to pain, difficulty calming down appropriately, touches everything or avoids touch, avoids messy projects, lack of eye contact, or hyper/hypotonic (rigid/floppy muscle tone) (Delaney, 2008). An example of a sign of low muscle tone may be the "W seated position," where the child's legs bend out in the shape of a "W." This position provides a wide, stable base of support. Direction on how to sit properly and therapy to improve muscle tone are sufficient solutions for this issue.

Opposite ends of the sensory continuum include over- and under-sensitivity. Children who are defined as more "oversensitive" seek less stimulation, whereas "undersensitive" children seek much more stimulation (Kranowitz, 1998). Behaviors associated with oversensitive individuals include avoidance of certain stimuli. They may cover their ears or have limited diets due to sensitivity to taste or texture of certain foods (Reynolds & Lane, 2007). Oversensitive individuals may also be easily overwhelmed in

certain environments. If children react severely to certain foods due to their taste or texture, sensory integration techniques may be helpful to normalize their systems and their response to sensory input (Vander Zanden, 2007). Overly sensitive children tend to avoid stimulation as well, and they may be referred to as "sensory defensive" (Vander Zanden, 2007).

Oversensitive individuals may be referred to as hypersensitive. Someone who is hypersensitive may exhibit a fight or flight response in what one would see as a normal, non-threatening situation. The sensations of taste, sound, or taste may be experienced as painful or threatening. Additionally, those who are undersensitive (hyposensitive) may seek more sensation than necessary, such as banging their head on the wall, or requiring pressure on their body before they are able to calm themselves down. Emmons (2005) lists some of the things over or undersensitive children may experience such as being overly sensitive to touch, movement, sights, or sounds, being under-reactive to a stimulus, exhibiting unusually high or low activity level, experiencing coordination difficulties, language delays, or delays in motor skills or academic achievement.

Sensory integration truly does become a major issue in causing interference in everyday life, as well as family life, life at school, and social life (Reynolds & Lane, 2007). A child with sensory dysfunction may experience low self esteem as well as other emotional insecurities; self esteem is a child's own sense of self worth or his or her self image, which is an important aspect to maintain positively throughout the stages of development. Therefore, in treatment and providing aid to individuals who are coping with sensory processing disorder, occupational therapists are available to help. During therapy sessions occupational therapists play an integral role in providing support and

exercises for positive outcomes.

The Role of Occupational Therapists

Occupational therapists document evaluations of cases of sensory processing disorder by focusing on areas of sensory integration that are lacking and how this affects everyday life. There are progress notes which reflect the individual's responses to different stimuli and sensory experiences, and the goals are focused on increased duration of exposure to the stimuli or repetitions of an activity (Sames, 2005). An occupational therapist may complete a full sensory evaluation incorporating direct observation of a child along with parent questionnaire, such as the *Sensory Profile* which provides detailed information on all sensory aspects of the child.

The evaluation process of occupational therapy assesses the client's needs and creates goals based off those needs. The child's input, priorities, and goals guide the entire evaluation process. Two steps in this evaluation process, the occupational profile and evaluation of occupational performance then lead to the intervention process (Meriano & Latella 2008). The occupational profile determines the goals of the client, and what he or she likes so the therapist can incorporate these into treatment. The evaluation of performance allows the therapist to gather which specific areas will require attention in the intervention process.

The *Sensory Profile* as a Tool

The *Short Sensory Profile* is a judgment-based questionnaire that aims to provide a comprehensive assessment of an individual's sensory abilities. The scores describe the

individual's sensory processing abilities by a classification system of three categories: **typical**, **probable difference**, and **definite difference**. This classification system was developed from a national study of children with and without disabilities. As aforementioned, the reliability coefficients limit the *Sensory Profile* (a range from .639 to .775 (with 0 representing no consistency and 1 representing perfect consistency)). The limited number of instruments available to measure the sensory processing abilities is another restriction. Validity was established by determining that the *Sensory Profile* sampled the full range of children's sensory processing behaviors and that the items were placed appropriately in the different sections. This assessment measures thresholds of auditory, visual, vestibular, touch, and oral sensory processing (Cole & Turfano, 2008). It also identifies patterns that relate to modulation and responses (behavioral and emotional). The *Sensory Profile* assesses areas of sensory processing, modulation, and these responses (Crepeau, Cohn, & Boyt Schell, 2009). Cole and Turfano (2008) mention that the common goal of the *Sensory Profile* is to help identify the types of sensory experiences and responses to these experiences that an individual undergoes through his or her daily activities. This tool was selected for the study because it uses a questionnaire format to categorize observable behaviors, and according to Cole and Tufano (2008), this questionnaire has positively identified many sensory processing patterns, and its validity has been supported by research efforts. Using the *Sensory Profile* in research allows for documentation of change over a period of time.

Occupational Therapy

Occupational therapy is a type of therapy which is based on helping an individual engage in meaningful activities of everyday life. Occupational therapy frequently works with fine motor skills. Through occupational therapy, one may develop or improve functional skills related to sensory-motor integration, coordination, fine motor skills, and self-help skills (such as self-feeding, dressing, bathing, etc.). Ayres (1979) says occupational therapy is designed to help people with motor and behavioral handicaps form adaptive responses to improve their conditions. Occupational therapy using a sensory integration approach may help resolve sensory issues or areas of sensory dysfunction (Haynes, 1983). The primary goal is for an individual to live as normal a life as possible; to achieve a greater degree of functioning and more independence (Haynes, 1983). Crepeau, Cohn, and Boyt Schell (2009) say that research and neuroscience are advancing, which is helping expand and support Ayres' original hypotheses. This is, in turn, contributing to evidence-based practice.

An occupational therapist "helps children … to improve basic motor functions and reasoning abilities … The goal of occupational therapy is to help people have independent, productive, and satisfying lives" (Vander Zanden, 2007, p. 226). The therapist treats the child's occupational deficits that impact his or her life, not just sensory issues (Delaney, 2008). Occupational therapists traditionally view themselves as client advocates in helping them obtain new skills or regain what has been lost (Hanft, 1987). Sensory integration principles within occupational therapy lead to improved occupational commitment and social involvement (Crepeau, Cohn, & Boyt Schell, 2009).

Occupational therapists work with many children with sensory processing

difficulties. Occupational therapy curriculum includes courses in neurology, anatomy, physiology, as well as classes that teach how to break down everyday tasks into sequential steps (Delaney, 2008). Core values of occupational therapy include the following: altruism, dignity, equality, freedom, justice, truth, and prudence (Atchison & Dirette, 2007). Occupational therapists help enable individuals to understand their dysfunctions and the purpose of the interventions. By giving individuals strategies to adapt to and compensate for these dysfunctions, occupational therapists provide them relief. Using sensory integration theory to give explanations for these difficulties also provides feelings of relief to the individual struggling with them (Fisher, Murray, & Bundy, 1991). Occupational therapists are trained in task analysis and teaching new skills, which is important in teaching basic dressing, feeding, and toileting skills (Yack, Sutton, & Aquilla, 1998). To maximize learning and functioning, the combination of sensory integration theory is combined with task analysis. Therapists who use sensory integration aim to create an optimal environment for the child to be motivated to participate and benefit from the therapy experiences (Horowitz, 2007). Each situation and play in the therapy must be customized to fit each child's specific sensory needs. The therapist aims to empower the child and make play in therapy both enjoyable and beneficial (Horowitz, 2007).

Sensory integration in occupational therapy utilizes assessment tools, intervention strategies, and theoretical concepts that support evidence-based practice (Crepeau, Cohn, & Boyt Schell, 2009). An example of a method of sensory integration commonly used in occupational therapy is brushing. Using a soft plastic surgical brush, the therapist rubs it back and forth over the child's arms and legs. The deep pressure stimulation from the

brush is then followed by gentle joint compressions. This input helps the mind and body organize and process incoming stimulation (Delaney, 2008). Crepeau, Cohn, and Boyt Schell (2009) say that there are a few hallmark features of intervention when using sensory integration. Sensory integration interventions should include: a qualified therapist with knowledge of sensory integration theory, sensory opportunities with various tactile, vestibular, and proprioceptive sensations, the opportunity to move through a spacious area, collaboration between the child and therapist on choices of activities, structure created by the therapist to ensure success, and environmental opportunities for success.

Occupational therapists address children's needs for adaptive development, behavior and play, as well as sensory, motor, and postural development (Vander Zanden, 2007). An occupational therapist not only needs to know how a person develops physically (to be able to treat physical dysfunction), but also psychologically and socially since emotional components are included in therapy as well (Copeland, 1976). Finding benefits and improvements from incorporating sensory integration techniques in occupational therapy would be an appropriate treatment for individuals with sensory processing disorder. Regular occupational therapy sessions may help with normalizing responses to sensory stimuli as well as helping with the organization of sensory information (Yack, Sutton, & Aquilla, 1998). Occupational therapists attempt to establish an intervention program based on principles of sensory integration theory (Fisher, Murray, & Bundy, 1991). Those therapists who want to promote sensory integration theory must be able to present the idea of sensory integration in a way that colleagues and clients can understand (Hanft, 1987). The therapist must understand sensory integration

theory and practice because the more he or she knows about it, the more strongly he or she can advocate for its benefits. Occupational therapy also must be the context for the sensory integration. Occupational therapy helps people achieve adaptive responses to sensory input (Hanft, 1987).

Identifying more and more children with sensory processing disorder is beneficial because an understanding as to why these children are "out of sync" is brought about and more ideas and treatments can evolve to help ameliorate sensory issues (Kranowitz, 1998). There are tests that can be used to help determine the presence of sensory issues. The *Sensory Profile*, of course, is one such test by Winnie Dunn. It uses a questionnaire format to categorize observable behaviors. There are four versions which include ages 0 to 11 years old (Delaney, 2008). Again, according to Cole and Tufano (2008), the *Sensory Profile* has positively identified many sensory processing patterns, and research efforts have supported its validity. Other tests include the Sensory Integration Praxis Test, Sensory Processing Measure, Bruininks-Oseretsky Test of Motor Proficiency, Peabody Developmental Motor Scales, Developmental Test of Visual Perception, as well as a few other assessments (Delaney, 2008). The *Sensory Profile's* stated purpose according to Crepeau, Cohn, and Boyt Schell (2009) is "to determine how well a subject processes sensory information in everyday situations and to profile the sensory system's effect on functional performance" (p. 1142). Again, using the *Sensory Profile* assessment allows for confirmation of change over a period of time.

Sensory Integration Therapy

Sensory integration therapy attempts to remedy or ameliorate certain sensorimotor disorders that are responsible for many individual motor or learning difficulties (Hoehn & Baumeister, 1994). Sensory integration promotes adaptive responses in the occupational therapy setting. It improves the ways that a child's brain integrates and processes information, so the child is then able to respond appropriately (Horowitz, 2007). Since sensory integration may be applied to various populations, there are different principles to a sensory integrative approach in therapy (Schaaf & Miller, 2005). In occupational therapy, individuals as well as the occupational therapists are challenged to action. Sames (2005) says that one way to achieve sensory-oriented goals for patients with sensory processing disorder would be to integrate sensory techniques for tactile processing gradually, and increase them in duration and intensity over time.

Play has often been used as a motivator for occupational therapy sessions (Delaney, 2008). Using play as a part of treatment with sensory integration theory allows for a certain predictability when dealing with children (Fisher, Murray, & Bundy, 1991). Play is a medium in which individuals are able to become masters of their own environment, and this serves as a very powerful therapeutic tool. It is also a fun and motivating way to acquire active participation in therapy sessions. Sensory integration is a foundation for play, so sensory integration theory gives therapists an indirect way of evaluating some precursor experiences to play. Therapy that is based on sensory integration principles allows individuals to partake in activities that incorporate opportunities for increased sensory intake as well as those that demand adaptive behavior (Fisher, Murray, & Bundy, 1991). This type of environment is specifically designed to

allow for enhanced sensory intake. An important characteristic of sensory integration therapy is that it is directed by the child (Horowitz, 2007). Many therapy sessions are ultimately structured by the occupational therapist, but still allow room for the child to get the sensory inputs they need.

The Efficacy of Therapy Regarding Sensory Integration

The use of therapy to address issues related to sensory integration does prove to be beneficial for the individual undergoing the therapy sessions. To address these issues, occupational therapists use a wide variety of equipment, toys, and therapy tools such as textured mitts, carpet squares, ramps, swings, and other objects during sensory integration treatment (Hoehn & Baumeister, 1994, p. 338). These different items are used to address the different sensory issues in each of the three areas of tactile, vestibular, and proprioceptive dysfunction. Other materials used in sensory integration therapy include whistles, bubbles (to help breath control), a variety of swings, hammocks, tunnels, tents, large balls, scooter boards, and trampolines (for movement and postural control). Also tactile materials such as putty, koosh balls, bean bags, and toys that help with hand-eye coordination are used (Horowitz, 2007). With therapy, there are positive psycho-social changes that occur, as well as improvement in these sensory deficit areas. Further, many emotional issues are also alleviated.

The great impact of sensory processing disorder on the overall functioning of individuals can be ameliorated by occupational therapy treatment with the incorporation of sensory integration and by using the *Sensory Profile*.

DESCRIPTIONS OF IMAGES:

Bubble Ball Bath: This image with the numerous plastic balls depicts a child sitting among them. This may be used in therapy for play or sensation. There could be a tactile component that may be playing a role as well. During this research at Concorde Kids, the therapists had a giant sheet with these balls inside them, and the patient would climb in as the therapist swayed back and forth. The balls would wash over the individual, and there would be either a calming or arousing effect depending on the speed of swaying. If it was towards the end of a session, slower motion was used to help calm the child down. If at the beginning, faster motion would help "wake up their muscles" and let them be ready to play.

Scooter Board and Ramp: The scooter board and ramp activity was used as a fast paced game with a focus on upper arm strengthening and motor planning. Either bowling pins would be set up to crash into at the end of the hallway, or a puzzle to complete with each round coming down the ramp. The patient had to maneuver him or herself with both hands pushing or pulling their bodyweight and the scooter board. Going up the ramp served as a challenge for many children, especially as the activity is repeated.

Textured Mitts: There is a variety of treatment materials that are used when developing activities that provide opportunities for the client to take in tactile information. The goal here is to decrease tactile defensiveness. Textured mitts are one type of treatment material that can give light or deep pressure feelings against the skin of an arm or leg. Decreasing tactile defensiveness may be achieved by gradually introducing the touch of something like a textured mitt. Eventually, the patient becomes less sensitized towards this type of touch, and shows improved toleration of the activity.

Surgical Scrub Brush: Surgical scrub brushes are a very commonly used tool in therapy and even school. "Brushing" is the beginning activity for almost every therapy session with each child. For those who crave tactile sensations, brushing more firmly and deeply across the patient's arms, legs, and sometimes back is routine. This helps them focus for the session because right from the start they get what they need to be in equilibrium with their own body. For those who shy away from this type of tactile sensation (i.e., tactile defensive), brushing puts them one step closer to tolerating and living with this sensation that causes problems for them in their daily life. In addition to brushing, "pushes" are also given – deep pressure to the joints of the upper

and lower extremities (at the shoulder, elbow, thighs, and knees). This provides proprioceptive input (that deep pressure feeling).

Bolster Swing and Crash Pad: The bolster swing is a challenging swing to stay atop. It requires good body position and awareness (the vestibular sense), and core muscle strength. On the swing, one can move in a linear motion, rotary/orbital, or side to side.

One of the goals of swinging like this is to help a patient tolerate common movement experiences without feeling dizzy or sick (riding in a car or sitting on a playground swing). Children who show persistent signs of aversion to movement experience a prevention of their participation in many activities of daily life.

Those who seek sensation, however, are quite the opposite – they love to swing high and fast, and they love to crash. Lots of crashing into the crash pits provides good tactile and proprioceptive input and stimulation. Concorde Kids has many crash pads filled with foam squares that the children love to crash and fall into. Walking across the crash pits is also used for a vestibular focus; since they are so uneven and challenging to get one's bearing while walking or crawling across them, they provide good practice for body awareness and control.

Glider Swing with Large Ball: Like with the bolster swing, the glider swing provides an opportunity for enhanced vestibular and propioceptive reception. This swing can also move in a linear fashion, rotating motion, or from side to side. It requires adequate arm strength to make the swing move, and good body positioning to remain on the swing itself. The occupational therapists at Concorde Kids often used a large therapy ball with this swing for an extra challenge to keep the swing moving, or for the patient to take in deep touch-pressure as the large therapy ball comes in contact with the swing. The ball can be rolled under the swing, providing resistance, or it can hit the front end of the swing, providing proprioceptive input.

(All images from this section were obtained from Google Images: *http://www.google.com/imghp?hl=en&tab=wi*.)

METHODOLOGY

Overview

Observation was chosen for this thesis to facilitate the validity of the study and to also facilitate the data collection. Although five weeks is a relatively short amount of time, this method could easily be replicated to further the study and to obtain the same results in order to demonstrate its validity. This particular study will be able to contribute to best possible practice in occupational therapy as well as to treatments for sensory processing disorder. The project demonstrated the benefit of sensory integration treatment in occupational therapy. In order to complete this project, the occupational therapists were an integral component and their input was much appreciated. This project consisted of observational examination in which individuals with sensory processing disorder were observed over a five week time period during occupational therapy sessions.

Researcher Methodology

Using a descriptive research framework, observation was central to this study. This project is unique in that it used the *Short Sensory Profile* as a measure of numerical data. Due to the researcher's student status and lack of occupational therapy credentials, a large component of this project was based on the researcher's discussions with the occupational therapists after each session. The researcher looked at the diagnoses for each individual and focused on two: sensory modulation dysfunction and hypotonia (low or weak muscle tone). Changes in these two areas were compared.

The researcher was able to accomplish the majority of the study in conjunction with the occupational therapists, making her own observations in addition to the data and terminology they provided. The researcher's data is triangulated as follows: data from the occupational therapist (observations and insight), the *Sensory Profile* (numerical data), and the researcher's own observations and insight as well as comparison of the data presented to the researcher throughout the study. Based on the observations, the researcher assigned numerical values in alignment with the *Sensory Profile* in order to better aggregate the data. Therefore the researcher's project represents a mixed method design with both qualitative (observations and thoughts) and quantitative (*Sensory Profile*) data. The mixed method component is appropriate because the researcher wanted quantitative data in addition to the qualitative observations to provide more support and validity to the research, in hopes that it can contribute to evidence-based practice in occupational therapy in the future.

The researcher especially wanted to include the subjective information because it would provide more support to the objective information, mainly the researcher's own notes. Multiple observations were recorded qualitatively, but the *Sensory Profile* made up the primary quantitative aspect of the researcher's data.

Researcher's Role

Over these five weeks, observation of the individuals working with their occupational therapist took place in their therapy sessions each week. The researcher assisted and interacted with the occupational therapist as well as the patient during the sessions. The researcher acted as passively as possible when it came to influencing the

child in his or her sensory skills in any way. Any actions taken by the researcher were done and directed only by the occupational therapist. Observations were recorded during and after each therapy session on the observation forms, and were then scored based on the *Sensory Profile* scoring system. The researcher's role was solely to gather information and to experience firsthand the occupational therapy sessions with each participant. The researcher wrote observations as unbiased as possible, and with strict notes of what happened or may have improved from before. No data forms from previous weeks were referenced at any time that new observations were recorded.

Selection of the Participants

A group of fifteen individuals with sensory aversions/sensory seeking problems were observed in occupational therapy. These individuals were selected based on the occupational therapist's recommendation. When the demographics of each individual were collected, the sample size consisted of a solid number of participants with sensory oriented diagnoses, i.e., sensory modulation dysfunction, sensory integration disorder, and sensory processing disorder, as well as hypotonia (low muscle tone) and developmental delay. These individuals were recommended by the occupational therapists particularly because many of their therapeutic exercises with these children incorporate sensory integration techniques.

These individuals were from various ages (two years old to fourteen years old), which provides diversity in this project; hopefully it will support the efficacy of sensory integration treatment across all ages. Both males and females were considered participants, although fewer females from Concorde Kids were available for this study.

Before participants were selected, the researcher spent a few sessions simply shadowing at Concorde and being present in some of the therapy sessions. This experience provided a preview in learning the dynamics during the therapy sessions, and it also helped some of the children to become accustomed to the researcher's presence; thus they would be unaffected or indifferent to the researcher's observations and presence during the actual five week study.

With the approval of the occupational therapists at Concorde, the researcher spoke with each parent or set of parents before beginning observations. The researcher explained the thesis, gave them a consent form to sign and give or not give consent, another to keep, and an initial sensory profile if they agreed to participate. The parents of the participants were informed that the decision to participate in the study was completely voluntary and would in no way impact their normal therapy routine or affect them negatively if they should choose not to participate.

Data Collection and Procedures

The data collection that took place in this project, as mentioned before, consisted of a triangulation from three areas: the occupational therapist, the *Sensory Profile*, and the data forms/observations of the researcher. The occupational therapist provided insight and assistance throughout the project, the *Sensory Profile* was completed by the parents at the beginning and again at the end of the study, and the data forms were filled out by the researcher every week for each child for the duration of the study (five weeks).

i. *Short Sensory Profile*

The standard *Sensory Profile* was filled out by one or both of the parents. The baseline data came from information from the individuals before the researcher's observation of the sensory integration techniques in the occupational therapy sessions. At the end of the study (five weeks of observation), the *Sensory Profile* was filled out again and compared with the initial one from the start of the five weeks. The researcher used this initial and final data to compare the baseline results of this measure for each individual, before sensory integrative techniques were applied to the second measure, at the end of the five weeks. Through this study, any improvements or lacks in sensory processing for those individuals who were receiving therapy with the added sensory integration treatment would be noted. The *Sensory Profile* was used at two different times during the observations: once at the beginning (pre-test) and again (post-test) at the end of these five weeks. The researcher had all participants' families in the study fill out the *Sensory Profile* initially when the research began (for baseline data), and again at the end to constitute the comparative data.

Short Sensory Profile

SENSORY PROFILE
Winnie Dunn, Ph.D., OTR, FAOTA

Child's Name: _____ Birth Date: _____ Date: _____

Completed by: _____ Relationship to Child: _____

Service Provider's Name: _____ Discipline: _____

INSTRUCTIONS

Please check the box that **best** describes the frequency with which your child does the following behaviors. Please answer all of the statements. If you are unable to comment because you have not observed the behavior or believe that it does not apply to your child, please draw an X through the number for that item. Please do not write in the Section Raw Score Total row.

Use the following key to mark your responses:

ALWAYS	When presented with the opportunity, your child always responds in this manner, 100% of the time.
FREQUENTLY	When presented with the opportunity, your child frequently responds in this manner, about 75% of the time.
OCCASIONALLY	When presented with the opportunity, your child occasionally responds in this manner, about 50% of the time.
SELDOM	When presented with the opportunity, your child seldom responds in this manner, about 25% of the time.
NEVER	When presented with the opportunity, your child never responds in this manner, 0% of the time.

Item	Tactile Sensitivity	ALWAYS	FREQUENTLY	OCCASIONALLY	SELDOM	NEVER
1	Expresses distress during grooming (for example, fights or cries during haircutting, face washing, fingernail cutting)					
2	Prefers long-sleeved clothing when it is warm or short sleeves when it is cold					
3	Avoids going barefoot, especially in sand or grass					
4	Reacts emotionally or aggressively to touch					
5	Withdraws from splashing water					
6	Has difficulty standing in line or close to other people					
7	Rubs or scratches out a spot that has been touched					
	Section Raw Score Total					
Item	**Taste/Smell Sensitivity**					
8	Avoids certain tastes or food smells that are typically part of children's diets					
9	Will only eat certain tastes (list: _____)					
10	Limits self to particular food textures/temperatures (list: _____)					
11	Picky eater, especially regarding food textures					
	Section Raw Score Total					
Item	**Movement Sensitivity**					
12	Becomes anxious or distressed when feet leave the ground					
13	Fears falling or heights					
14	Dislikes activities where head is upside down (for example, somersaults, roughhousing)					
	Section Raw Score Total					
Item	**Underresponsive/Seeks Sensation**					
15	Enjoys strange noises/seeks to make noise for noise's sake					
16	Seeks all kinds of movement and this interferes with daily routines (for example, can't sit still, fidgets)					
17	Becomes overly excitable during movement activity					
18	Touches people and objects					
19	Doesn't seem to notice when face or hands are messy					
20	Jumps from one activity to another so that it interferes with play					
21	Leaves clothing twisted on body					
	Section Raw Score Total					

0761638199

Item	Auditory Filtering	ALWAYS	FREQUENTLY	OCCASIONALLY	SELDOM	NEVER
19	Is distracted or has trouble functioning if there is a lot of noise around					
20	Appears to not hear what you say (for example, does not "tune-in" to what you say, appears to ignore you)					
21	Can't work with background noise (for example, fan, refrigerator)					
22	Has trouble completing tasks when the radio is on					
23	Doesn't respond when name is called but you know the child's hearing is OK					
24	Has difficulty paying attention					
	Section Raw Score Total					

Item	Low Energy/Weak					
25	Seems to have weak muscles					
26	Tires easily, especially when standing or holding particular body position					
27	Has a weak grasp					
28	Can't lift heavy objects (for example, weak in comparison to same age children)					
29	Props to support self (even during activity)					
30	Poor endurance/tires easily					
	Section Raw Score Total					

Item	Visual/Auditory Sensitivity					
31	Responds negatively to unexpected or loud noises (for example, cries or hides at noise from vacuum cleaner, dog barking, hair dryer)					
32	Holds hands over ears to protect ears from sound					
33	Is bothered by bright lights after others have adapted to the light					
34	Watches everyone when they move around the room					
35	Covers eyes or squints to protect eyes from light					
	Section Raw Score Total					

FOR OFFICE USE ONLY

Summary

Instructions: Transfer the score for each section to the Section Raw Score Total column. Plot these totals by marking an X in the appropriate classification column (Typical Performance, Probable Difference, Definite Difference).*

SCORE KEY

1 = Always	4 = Seldom
2 = Frequently	5 = Never
3 = Occasionally	

Section	Section Raw Score Total	Typical Performance	Probable Difference	Definite Difference
Tactile Sensitivity	/35	35–30	29–28	27–25
Taste/Smell Sensitivity	/20	20–15	14–13	12–10
Movement Sensitivity	/15	15–13	12–11	10–9
Underresponsive/Seeks Sensation	/35	35–27	26–25	24–23
Auditory Filtering	/30	30–23	22–21	20–19
Low Energy/Weak	/30	30–26	25–24	23–22
Visual/Auditory Sensitivity	/25	25–19	18–17	16–15
Total	/190	190–155	154–142	141–129

*Classifications are based on the performance of children without disabilities (n = 1,037).

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ISBN 076-1638-19-9

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Printed in the United States of America.

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ii. Researcher's Data Collection Form

An Examination of the Efficacy of Sensory Integration in Occupational Therapy

WEEK 1

ID:_____

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		
Taste/Smell Sensitivity		
*Movement Sensitivity		
*Seeking Sensation/ Underresponsiveness		
Visual/Auditory Sensitivity		

*expected to be seen most often

overall: **__ out of 15**

_____difference

ADDITIONAL NOTES:

_____

_____

_____

_____

This data form was created for observation of five main sensory areas, based off the information from the *Short Sensory Profile*. The observations for each therapy session were categorized into three of these five areas, if applicable. It was unlikely that all five areas would be scrutinized in one session, so each week the researcher tried to look at three, based on the activities the occupational therapist did with the child that day. In the "observations/notes" section on this form, the researcher included the activities of the session and the notes of the child's performance and what happened during each activity. The areas with the asterisk were expected to be seen most often since they are the most broad and common areas for sensory sensitivity. Since only three areas were accounted for on each form, the total score was ranked out of fifteen. Each area has five points just like the *Sensory Profile*: 1-always aversive, 2-frequently, 3-occasionally, 4-seldom, and 5-never). A lower score ultimately shows there are sensory issues. Based on the ranking of fifteen total points, a score ranging from 3 to 10 would be categorized as **definite difference**, 11 to 12 as **probable difference**, and 13 to 15 as **typical performance**. In each "degree of difference" section, the researcher would assign a number, 1 through 5 based on the ability or willingness of the participant to engage in or successfully accomplish that activity.

Reliability

The *Short Sensory Profile* is a norm-referenced tool which contributes to its reliability and validity. It is a questionnaire based on judgment which aims to summarize a thorough assessment of someone's sensory abilities and deficits. The scores are divided into a classification system of three categories: **typical**, **probable difference**, and

definite difference. This classification system helps describe the individual's sensory processing abilities. This classification system was developed from a national study of approximately 1000 children, both with and without disabilities. When the *Sensory Profile* was created, validity for this tool was established by appropriately determining a full range of children's sensory processing behaviors and by placing these behaviors within each applicable section. Literature reviews as well as expert reviews by therapists who were experienced in sensory integration theory application were involved in this process. Unfortunately this instrument has a certain degree of error associated with its consistency which means repetition of the profile may not always necessarily get the same score. As mentioned before, according to the creators of the *Sensory Profile*, Pearson Education, Inc. (2008), "The values of reliability for the various age groups and quadrant scores ranged from .639 to .775, with 0 representing no consistency and 1 representing perfect consistency." The limitation in the case of the *Sensory Profile* is the reliability of the instrument and the limited number of instruments available to measure this construct. This tool is also a judgment-based questionnaire, meaning it is filled out based on personal observation.

FINDINGS AND CONCLUSION

Overview

Over a period of five weeks, fifteen individuals were observed in occupational therapy. Information about these individuals, ranging in ages 2 to 14 was gathered. Each parent was asked to fill out the *Short Sensory Profile* on two occasions: at the beginning of the study (pre-test), and again at the end of the five weeks (post-test) for the purpose of establishing baseline data and showing growth or change over time. The researcher's observations comprised another aspect of the numerical data. The third area was the input provided by the occupational therapists at Concorde Kids. Data was collected and organized to look at the following aspects: sensory profile information, the researcher's observations, and a summary of each.

Results and Findings

Table 1 in Appendix K is a consolidated version of the demographics for the researcher's data. Figure 1 shown below presents the observed data in a table which are the scores the researcher assigned to each individual for three sensory areas every week. The researcher's observations from Weeks One through Five were recorded. The numbers in italics are the averages for each week. Previous weeks' data had no influence on the score that would be given for the current week because all observed notes were kept separate until the very end. The averages reflect the increase in scores from Week One to Week Five, which speaks well for this research – the observations and notes the researcher took demonstrate overall sensory improvement for the children in this study. The results reflect the degree of difference in overall sensory areas from observation of

the individuals. A higher score indicates a lower degree of difference. i.e., a score of 15 out of 15 would be the best possible outcome, meaning there is no degree of difference (the individual experiences very few sensory issues).

ID	Week1	Week2	Week3	Week4	Week5
J0001M	7	6	7	11	9
B0003C	9	6	5	9	9
B0004C	5	7	9	9	11
B0005C	7	7	7	8	12
B0007C	7	7	6	7	9.5
J0008M	6	4	6	9	13
B0010C	7	6	7	7	11.5
B0011C	6	8	9.5	12.5	13
B0012C	5	4	5	10	12
J0014M	7	7	7	9	12.5
J0015M	6	5	5	8	9
J0016M	4	4	4	10	10
J0018M	6	8	10	10.5	13
J0019M	9	10	13	14.5	14
B0020C	8	9	9	11	13
	6.60	*6.53*	*7.30*	*9.70*	*11.43*

Figure 1: Weekly Data Table

Figure 2, represents the increase from Week One to Week Five for overall observed sensory performance for all participants. This noted increase further validates the use of sensory integration therapy. As the participants experienced more therapy each week, they began to show improved tolerance to sensory experiences, and had less aversion to certain sensory experiences. Based on the scoring protocol of the *Sensory Profile*, Weeks One through Four show an average of **definite difference**, but with consistent improvement in the numbers, and Week Five shows an average of **probable**

difference, which is moving closer to the **typical** performance category. Again, these are just the averages, but when looking at specific individuals, many made an improvement to the **typical** performance category.

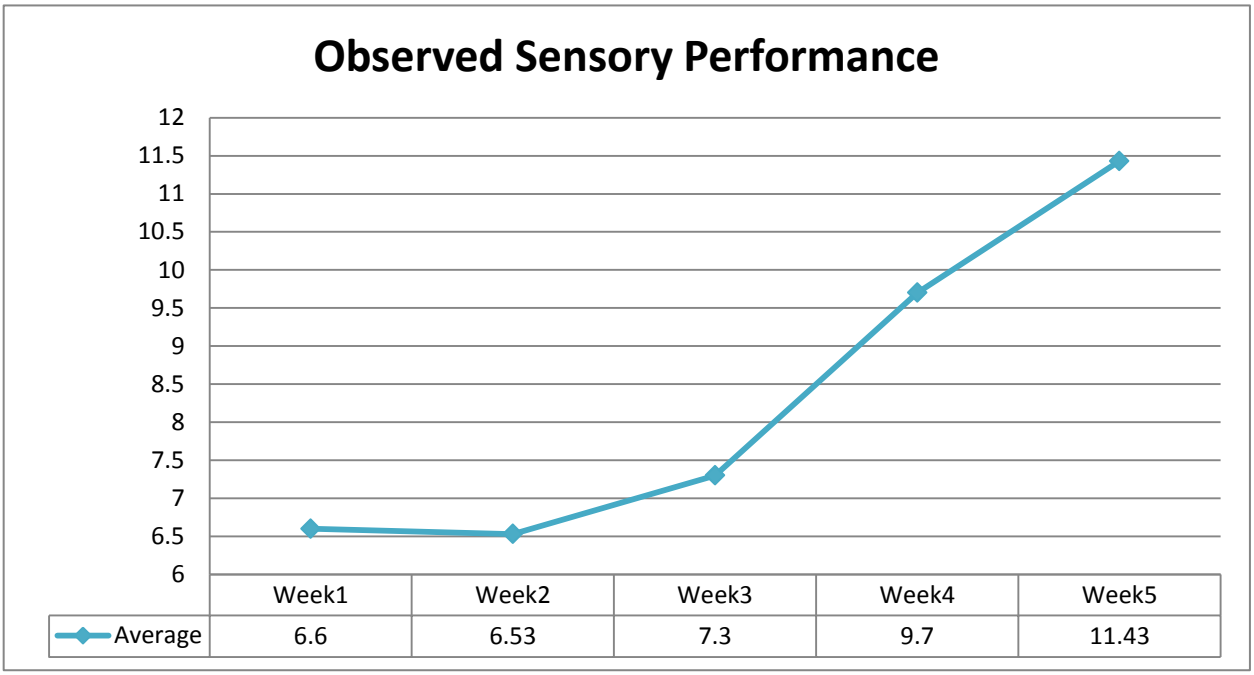


Figure 2: Weeks One through Five Overall Data

Figure 3 shows the changes for each individual from the researcher's weekly observations across the five week trial. Changes were recorded by subtracting the score of Week One from Week Five. Nearly every individual showed improvement based on the differences of observation across the five weeks, some more than others. One did not change at all (B0003C). The greatest change that was seen was a numerical value of seven and represented the mode for change. Four individuals showed this degree of improvement (J0008M, B0011C, B0012C, and J0018M). Although there were varying states of improvement, it can be generalized that every individual in the study, except

one, increased in their tolerance or acceptance of certain sensory stimuli or experiences. Overall, the researcher's observations of each child in the sample show improvements over the five weeks. This is a significant start for future research due to the visible pattern of improvement.

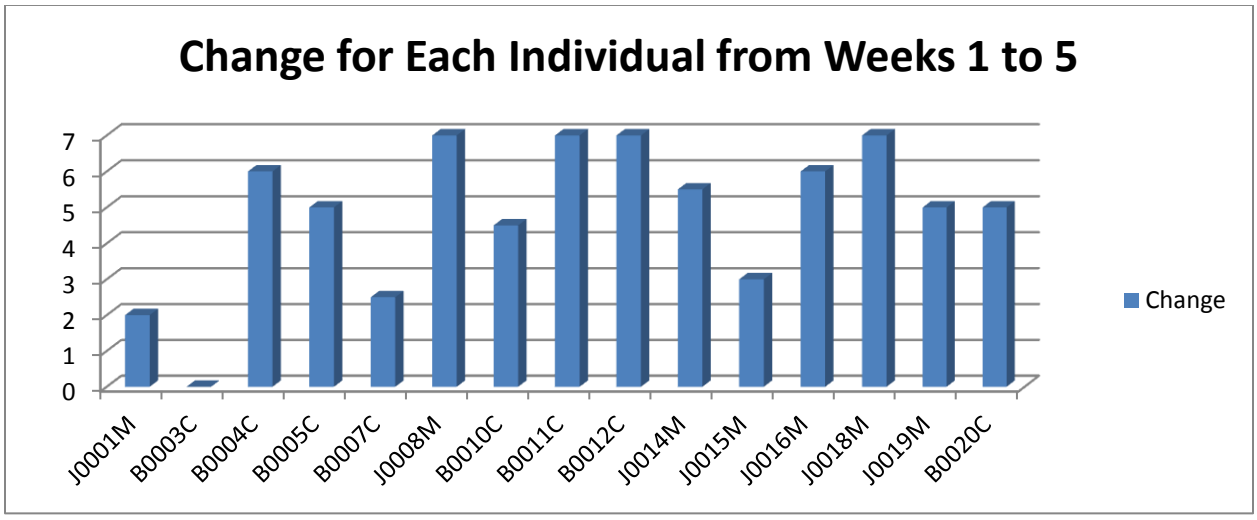


Figure 3: Changes for Each Individual for Weeks One to Five

Figures 4 through 7 outline the demographics of the individuals in the study more specifically. The researcher looked at the diagnoses for each individual and focused on two: sensory modulation dysfunction and hypotonia (low or weak muscle tone). Figures 4 and 5 present the individuals with and without sensory modulation dysfunction and hypotonia over the five weeks. There is improvement overall, but those individuals without that specific diagnosis had slightly higher scores than those with it, which makes sense. There is a smaller difference among those on the sensory modulation graph versus the hypotonia graph. This could indicate those with sensory modulation dysfunction struggle with improvement in the sensory areas very similarly as those without it. And

likewise, the greater difference between those with and without hypotonia could suggest those without hypotonia are much less affected by sensory experiences than those who are diagnosed with it. These figures also used averages determined for those individuals with and without sensory modulation dysfunction and hypotonia derived from the group statistics.

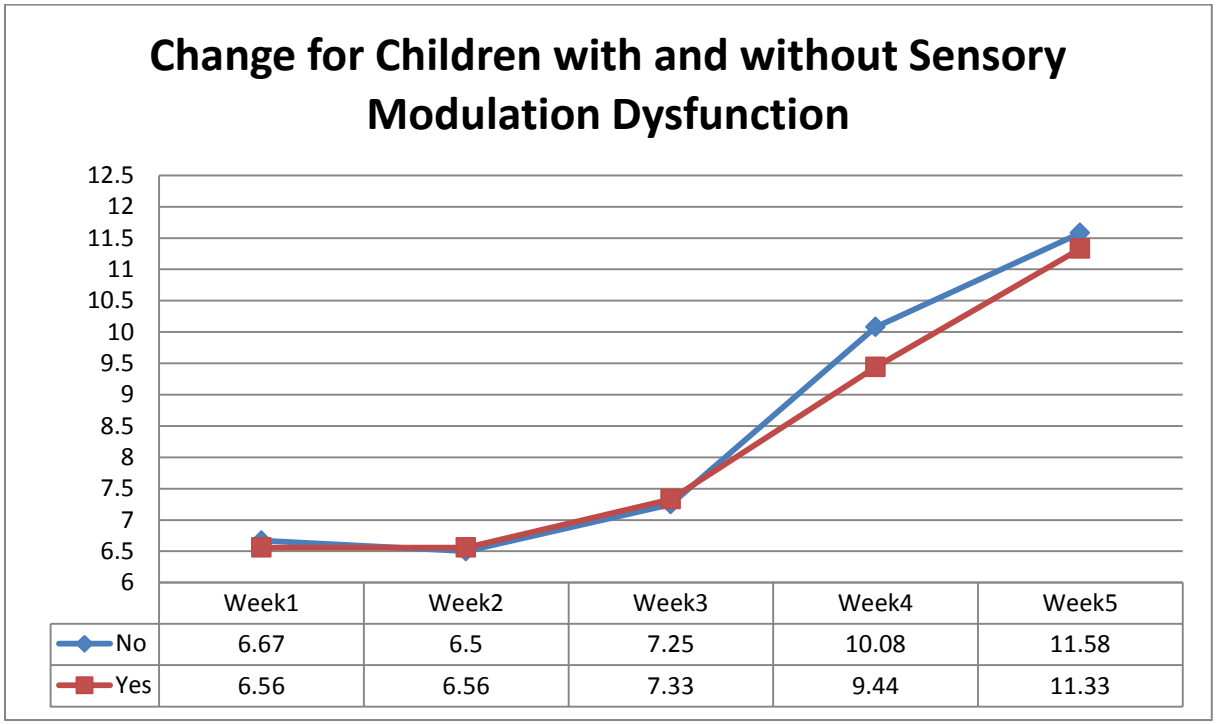


Figure 4: Individuals With and Without Sensory Modulation Dysfunction

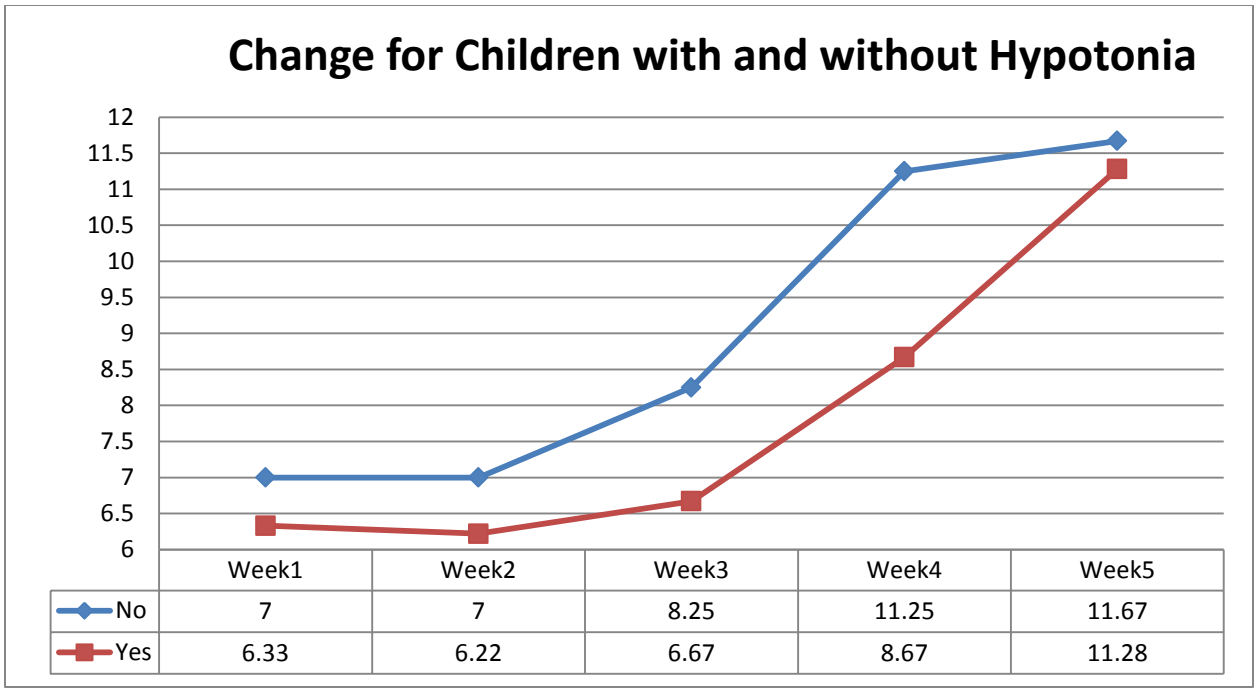
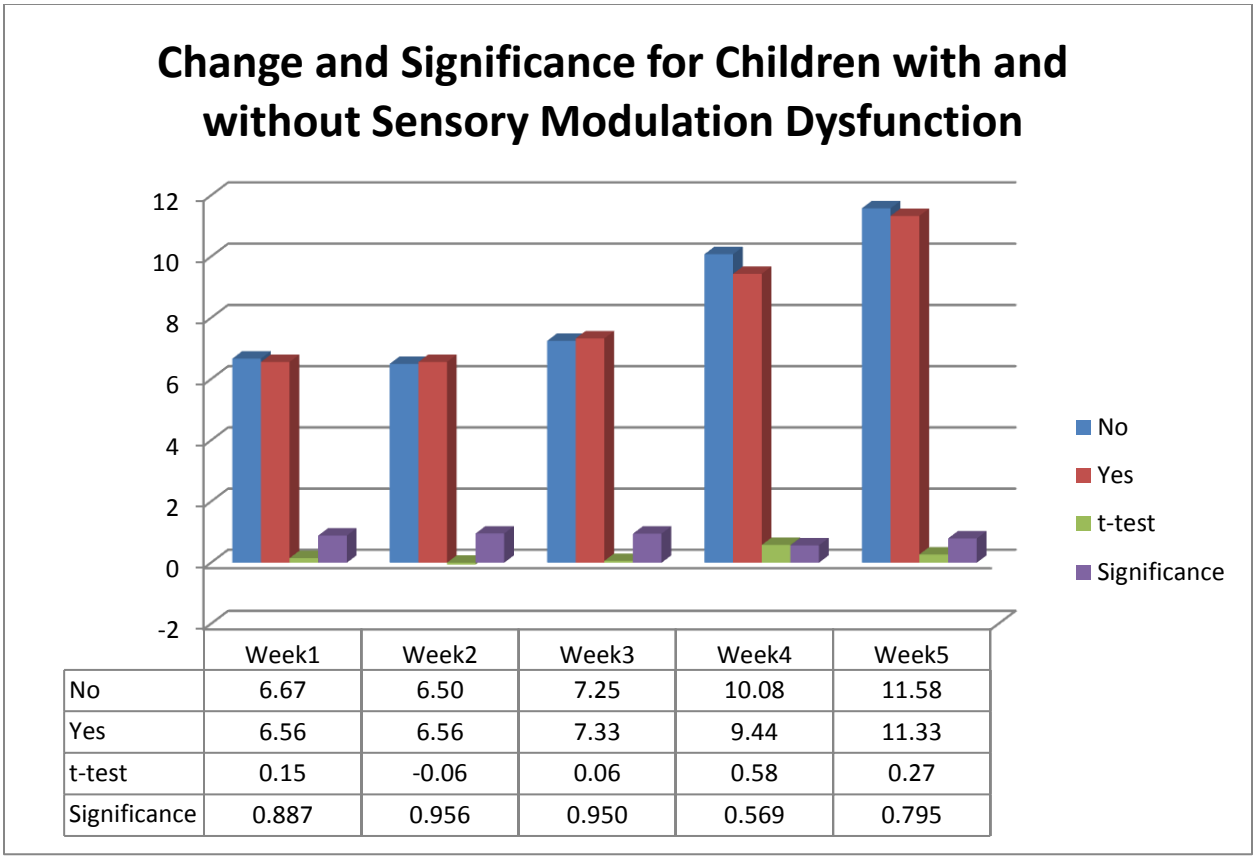


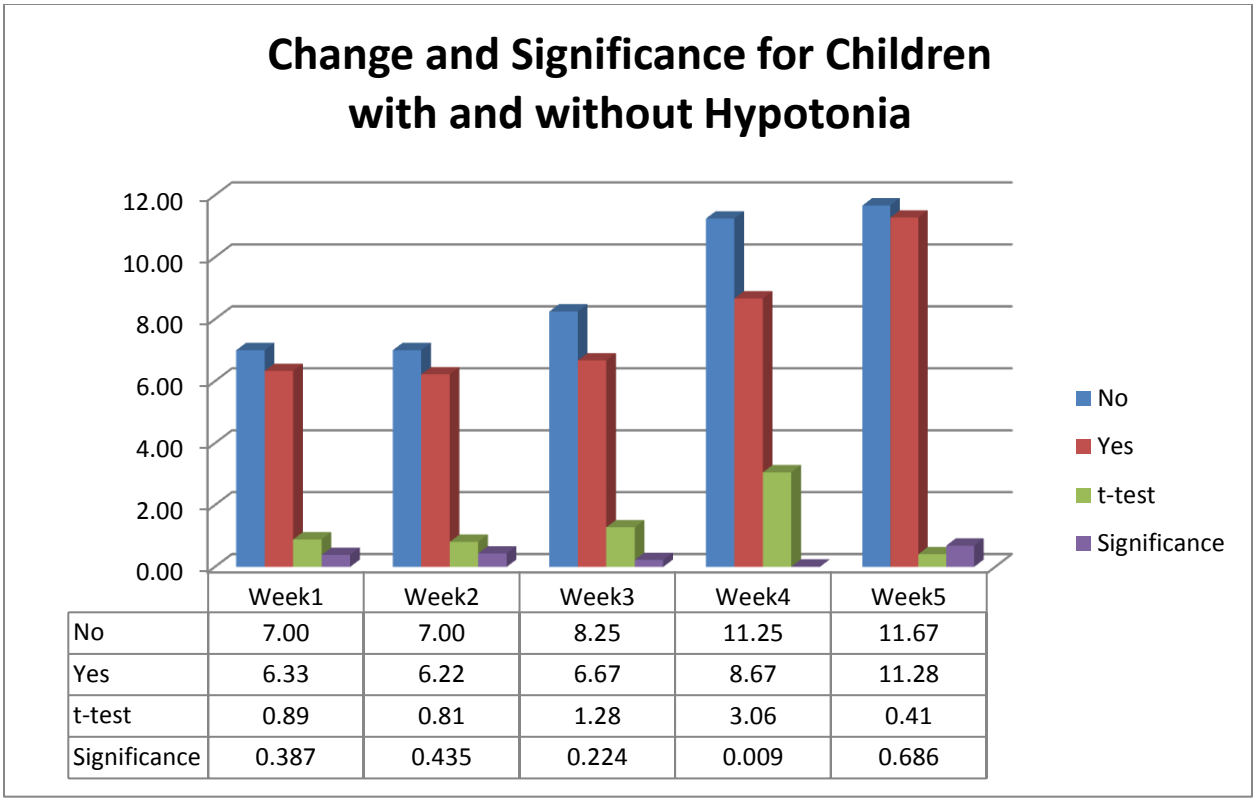
Figure 5: Individuals With and Without Hypotonia

Figures 6 and 7 depict this same data for those with and without sensory modulation dysfunction and hypotonia, but added components include t-test data and the actual significance of this data. Unfortunately, no significance was seen in the sensory modulation dysfunction data, but there is significance at the 0.05 level for those in Week Four of the hypotonia data. Although these pieces of data are not necessarily significant, a pattern of improvement is seen as the weeks progressed, which is a key element for future replication and revision of a study like this. This significance and t-test data were derived from Tables 5 and 6 in Appendix K.



	Week1	Week2	Week3	Week4	Week5
No	6.67	6.50	7.25	10.08	11.58
Yes	6.56	6.56	7.33	9.44	11.33
t-test	0.15	-0.06	0.06	0.58	0.27
Significance	0.887	0.956	0.950	0.569	0.795

Figure 6: Observation of Sensory Differences and Significance for those With and Without Sensory Modulation Dysfunction



	Week1	Week2	Week3	Week4	Week5
No	7.00	7.00	8.25	11.25	11.67
Yes	6.33	6.22	6.67	8.67	11.28
t-test	0.89	0.81	1.28	3.06	0.41
Significance	0.387	0.435	0.224	0.009	0.686

Figure 7: Observation of Sensory Differences and Significance for those With and Without Hypotonia

Table 7 in Appendix K depicts the *Sensory Profile* data filled out by the parents at the beginning and again at the end of the study. This table is simply the demographics for each individual aligned with their initial and final numeric results for each area of the *Sensory Profile*. Table 8 includes the mean change and average ranges from the *Sensory Profile*. The mean changes are similar to the graph of the initial versus the final *Sensory Profiles* (Figure 10), showing the positive changes and improvement from the initial to the final *Sensory Profile* results gathered from the parents. In Figures 8 and 9, this mean change and average ranges for the *Sensory Profile* are depicted.

The main feature to focus on in this graph is the overall sensory section which has a mean of -0.07. Although the data shows the overall sensory change from the *Sensory Profile* reports is negative, it is not statistically significant and it does not negatively impact the results of the study. This small number could be the result of the averages of the other sensory areas; the wide range of scores given by the parents for each sensory area or for each child somewhat negates the results in the overall section. Especially the most negative area, low energy/weakness could have cancelled out the positive areas of tactile sensitivity or sensory seeking. But largely, it seems the general sensory changes remained static – certain areas just changed more than others which balanced this out. Those areas that exhibit improvement are the areas of tactile sensitivity, sensory seeking/aversion, and auditory sensitivity. The areas that are depicted as negative in Figure 8 are the areas that decreased from the initial *Sensory Profile* reported by the parents to the final.

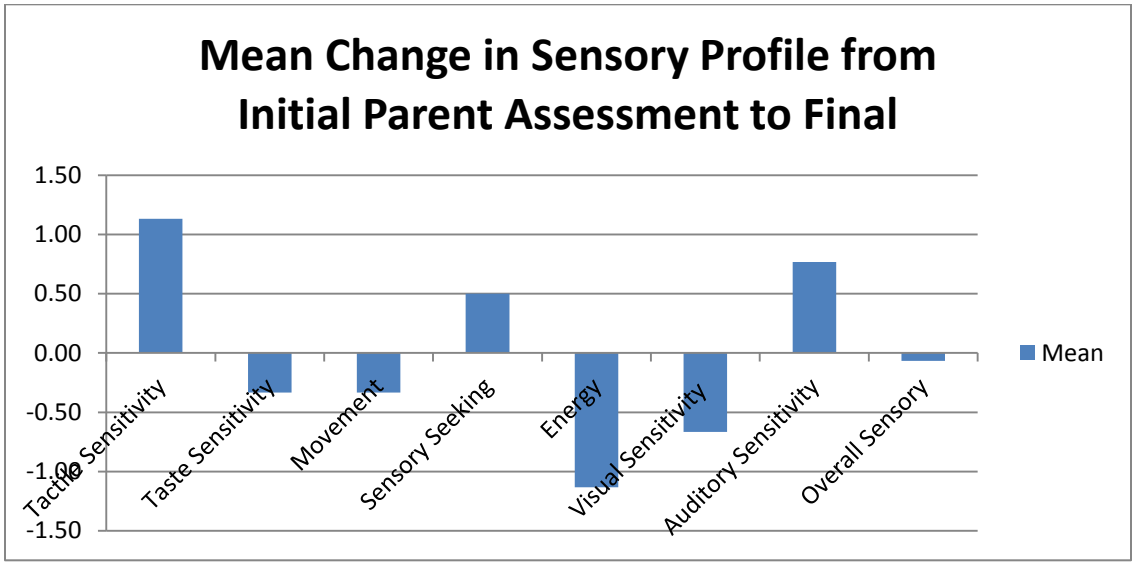


Figure 8: Mean Change in *Sensory Profile*

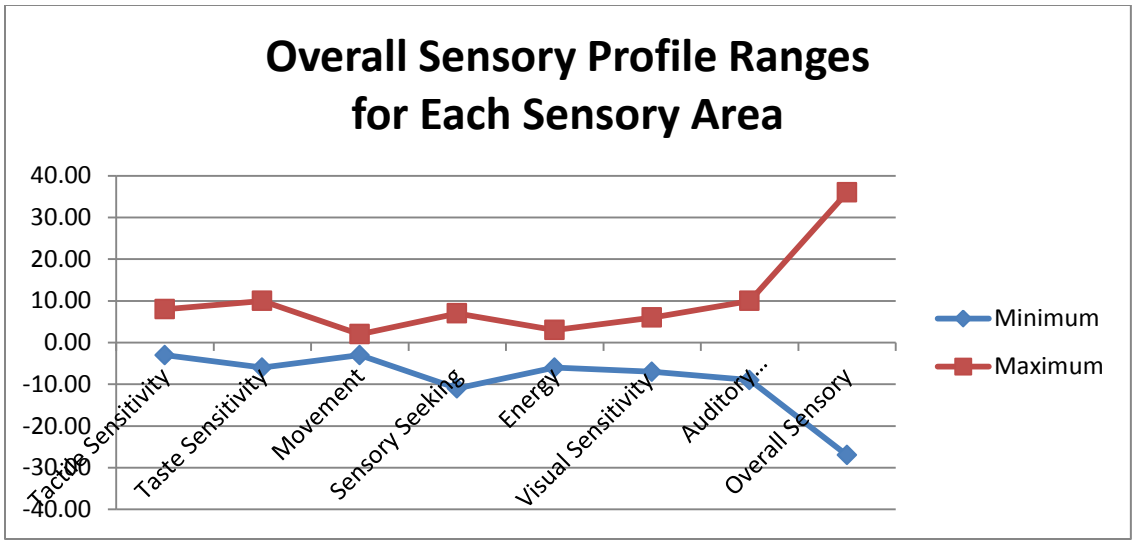
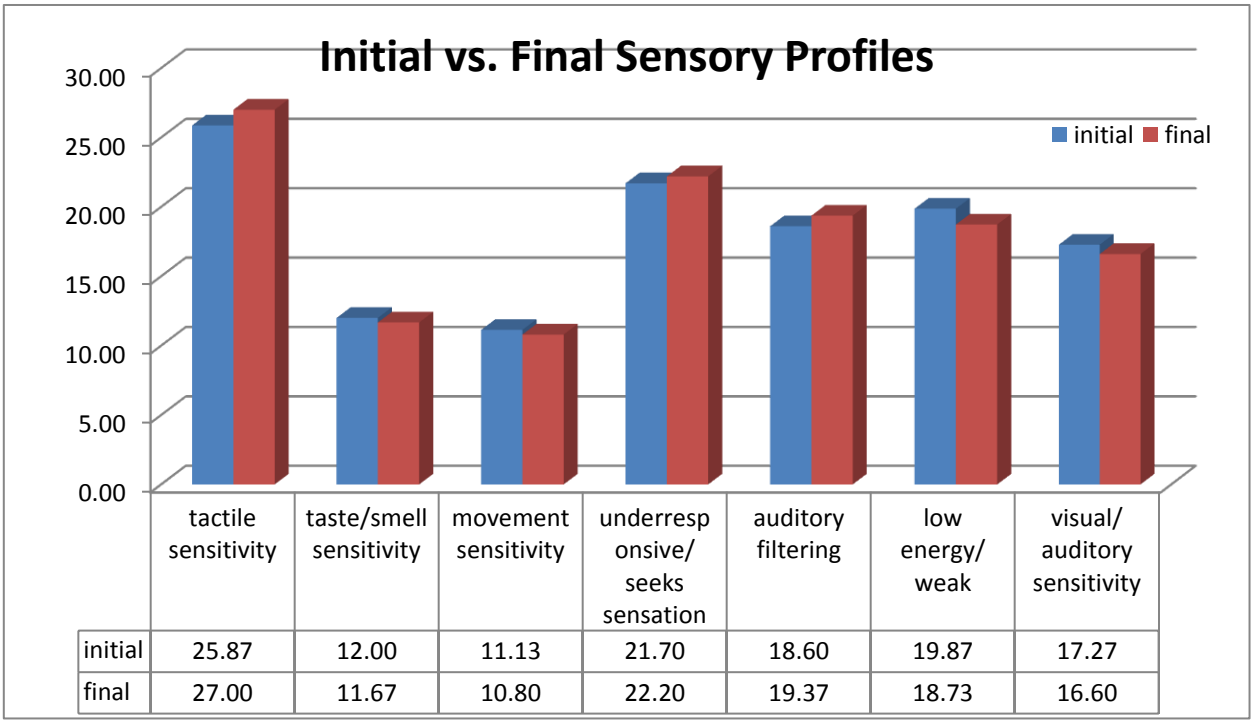


Figure 9: Overall Ranges for *Sensory Profile*

Figure 9 depicts the range of children in the study. The minimum and maximum scores that were reported from the *Sensory Profile* are on this graph. This actually shows that the children in the sample size are very similar – the ranges are relatively close together, with the exception of the overall sensory section. The extreme range of overall sensory degrees of difference indicates the participants in the study were at varying degrees of sensory integration, i.e., they were not all at the exact same starting point (a low versus a high overall sensory score) but they were generally similar in each specific sensory area (see Table 8).

Table 9 in Appendix K further looks at the numeric results of the *Sensory Profile*. Here one can see the averages for each area of sensory integration. Overall scores are the total of each of the average scores; the overall "initial" average was 126.44 and the overall "final" average was 126.37. Both these scores fall into the range of **definite difference** on the *Sensory Profile* and what one would look for is an improvement from initial to final (hopefully an increase in numerical value), however a very slight decrease

can be noted. Figure 10 visually compares the initial versus the final *Sensory Profiles* filled out by the parents. This figure shows data from the *Sensory Profiles* filled out by the parents at the beginning of the study and again after the five weeks of observation. The areas of tactile sensitivity, sensory seeking or underresponsiveness, and auditory filtering all increased, i.e., showed improvement. Those that decreased did so only slightly (both taste/smell sensitivity and movement sensitivity decreased by only 0.33, and visual/auditory sensitivity decreased by only 0.67) which suggests an insignificant change. Low energy/weak sensitivity decreased the greatest amount, by 1.14. Although there is a decrease, this does not mean there was no improvement throughout the study; it simply indicates there may have been inconsistency when the parents filled out the initial versus the final forms. It is also the average of everyone's profiles; therefore this data is broad and may not clearly articulate each specific individual's improvement.



	tactile sensitivity	taste/smell sensitivity	movement sensitivity	underresponsive/ seeks sensation	auditory filtering	low energy/ weak	visual/ auditory sensitivity
initial	25.87	12.00	11.13	21.70	18.60	19.87	17.27
final	27.00	11.67	10.80	22.20	19.37	18.73	16.60

Figure 10: Overall *Sensory Profile* Data (Initial vs. Final *Sensory Profiles*)

The researcher believes part of the inconclusiveness with the *Sensory Profile* data is due to the parent reliability. Parent account is generally accurate; however with human error and a time lapse of five weeks, the parents may not have necessarily filled out the final *Sensory Profile* in the same mindset or environment as they had for the initial *Sensory Profile*, which could have impacted the outcome of the *Sensory Profile* data. Considering the limiting parameters of this project, much more could be done if repeated with a larger *n* or added more variations to improve it. This study certainly could be replicated further and over a longer period of time with more precise *Sensory Profile* data. Perhaps sitting down with each parent and discussing with them as they fill out the *Sensory Profile* in the same sort of environment each time they fill it out could help generate more consistent results.

Conclusion

In conclusion, it is evident that sensory integration does have a positive impact on occupational therapy. Yes, progress was seen, especially from week to week over the total five weeks. Some of the data appeared to compromise the findings, but as a whole, *Sensory Profile* data and the researcher's observations showed improvements. The best advocates for the success of sensory integration in occupational therapy from this study are Figures 2 and 3, which show the increase in sensory performance over the weeks and for each individual. If anything, this study can pave a way for future research in this area; hopefully more conclusive and sound data can be generated in the future. However, limitations of long term implications in future research may include sample size, available participants, participants with similar diagnoses, and time frame. Although

with professional researchers and a research environment, these things may be facilitated much more adequately than in this small-scale project. For this study, the researcher did not focus on occupational therapy being better with sensory integration versus occupational therapy without sensory integration; the researcher wanted to see if sensory integration would have an effect and would show improvement.

From this study, the researcher concludes that one can see improvements and weekly progression of individuals who experience sensory integration in occupational therapy. The researcher knows this data can be taken further and more research can be done to test the validity of these findings, especially with work done involving the *Short Sensory Profile*. Hopefully with more resources, a bigger sample size could undergo a similar, but improved, version of this study. To readdress the hypothesis, *if an individual with sensory processing disorder undergoes occupational therapy treatment with the incorporation of sensory integration techniques, he or she will show measurable improvements in overall functioning, i.e., tactile sensitivity, taste/smell sensitivity, movement sensitivity, seeking sensation or under-responsiveness, and visual/auditory sensitivity*, the researcher concludes that measurable improvements have been seen in overall functioning.

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APPENDICES

Appendix A: Honors Committee Approval Letter

Dear Shannon:

Congratulations! The Honors Committee has **approved with advice** your thesis proposal on "The Efficacy of Sensory Integration in Occupational Therapy". However, we would like clarification in several areas. Please send this information by June 15.

- You need to tighten up your definitions. For example, you talk about "overall functioning" – what do you mean by that? How are you going to measure it? The keywords that are in your abstract need to be defined.
- You need an observational tool that will ensure consistency in your observations. You need to pilot this tool before you start your observations. You discussed one with the committee but I don't remember what it was.
- You need to collect demographic data on the participants. Your literature review talks about preexisting conditions so this will be pertinent. Some data that you will need to ensure the accuracy of your study will be age, gender, how long the patient has been in therapy, etc.
- We would like a copy of all the tools you will be using to measure or evaluate your data.

Dr. Laci Fiala is the Honors statistical liaison. She will be available to work with you on your survey as well as on the tabulation of your results. Please contact her and make an appointment with her before you revise your survey.

Keep in mind that the thesis process includes intense writing **and revising.** Your advisor and reader will want to read your work as you go - don't wait until the last minute to submit any part of your thesis to your team.

Also remember that if you use any part of your Junior Honors Project that adds to the total number of pages for your thesis. For example, if you use five pages from your JHP your thesis should be approximately 45 pages.

Finally, a reminder about the deadlines that were given to you at your defense. Your complete literature review is due to me and your advisor by July 15. A **draft of your summer work** is due **September 1** to me, your thesis advisor and your reader. You **complete thesis** is due to me, your thesis advisor and your reader on **February 1, 2012**. **Oral presentations** begin in March, 2012. The final copy of your thesis is due to your thesis advisor and your reader on April 8, 2012. Your **four bound copies** are due to me by **April 20, 2012**. An electronic copy is due to me at this time as well.

We think you have a good project and encourage you to continue working on it in a timely manner.

Dr. Berry

Appendix B: Human Subjects Review Board Certification of Training

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Shannon Phillips** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 04/27/2011

Certification Number: 678621

Appendix C: Application to Human Subjects Review Board

WALSH UNIVERSITY
APPLICATION FOR APPROVAL TO USE HUMAN SUBJECTS IN RESEARCH

Principal Investigator	**Co-Investigator ***
Name: Shannon Phillips	Name: Mrs. Betty Marko
Department: Biology	Department: Education
Address**: P.O. Box 874 2020 East Maple St. North Canton OH 44720	Address**: 2020 East Maple St. North Canton OH 44720
Phone: 330-808-2537	Phone: 330-490-7090 ext. 4730
Fax: n/a	Fax: n/a
Email: shannonphillips@walsh.edu	Email: bmarko@walsh.edu
Position: ☐ Faculty ☐ Graduate student ☑ Undergraduate student ☐ Other	Position: ☑ Faculty ☐ Graduate student ☐ Undergraduate student ☐ Other
Type of project: ☐ Faculty Research ☐ Student Research ☑ Thesis/Dissertation ☐ Funding Status ☐ Pending ☐ Awarded ☐ Non-applicable Externally Funded Agency: _____ ☐ Other Specify: _____	*Submit the names of additional co-investigators on a separate piece of paper, including all the information requested above. **For address, include your preferred contact address. n/a

If the Principle Investigator is a student include the following:
Faculty Advisor: Mrs. Betty Marko Department: Education
Office Address: 111A Hannon Center Phone/email: 330-490-7090 ext. 4730 / bmarko@walsh.edu

Project Title: An Examination of the Efficacy of Sensory Integration in Occupational Therapy

Duration of Project: Start Date: June 2011 End Date: August 2011

Preliminary Review: (Please type)
Summarize proposed project and procedures to which human subjects will be subjected. Please include any special instruments. **Do not write "See Attached"**

1. Primary Objective(s), purpose(s), hypothesis (es), and significance(s) of the research:

The primary objective of this case study is to explore the effectiveness of sensory integration treatment in occupational therapy for those who have sensory aversion/sensory seeking problems. I hypothesize that the use of sensory integration in occupational therapy will have a positive effect on the individual undergoing the therapy, and he or she will show measurable improvements in overall functioning of sensory areas, i.e., tactile sensitivity, taste/smell sensitivity, movement sensitivity, seeking sensation or under-responsiveness, and visual/auditory sensitivity. The

improvements will be measured from three areas, making my data triangulated: data from the standardized Sensory Profile questionnaire, the occupational therapist's observations and insight, as well as my observations and knowledge through my research.

I will be studying a cohort of children in occupational therapy who are dealing with sensory issues. I will be using a sort of mixed-method approach because I want quantitative data in addition to the qualitative observations, in order to provide more support and validity to my research. I hope to gather data in this manner with anticipation that it can contribute to evidence-based practice in occupational therapy in the future.

This project is significant because it evaluates the possibilities for improvement that sensory integration techniques may have for individuals undergoing occupational therapy for sensory treatment. This method could easily be replicated to further the study and obtain the same results in order to demonstrate its validity. Although two months is a relatively short amount of time, this study will give us an idea of what more can be done, and if sensory integration techniques may have a positive effect. This study could certainly be replicated over a longer period of time. The baseline Sensory Profile will be filled out by each participant at the start of my project, and again at the end. In order to complete this project, various aspects will be deferred to the occupational therapist as a reliable source. Every aspect of the sensory profile will be filled out because each individual's sensory issues are unique, and in order to obtain a clear profile of the individual's sensory issues and degree of these issues, they would need to complete all sections. I want to see if a specific individual's issues are alleviated or improved as time goes on while they undergo occupational therapy with sensory integration.

There is sparse research and literature on the efficacy of sensory integration treatment in occupational therapy, so this project will be able to contribute, even in a small way, to that. Although sensory integration is not always embraced, I believe a sensory integration plan incorporated with occupational therapy will show improvements in overall functioning (i.e., the areas of tactile sensitivity, taste/smell sensitivity, movement sensitivity, seeking sensation or under-responsiveness, and visual/auditory sensitivity) and in sensory deficient areas for individuals with sensory processing disorder, and it has the potential to be replicated for further study.

2. Identify the basic research design of the study: (i.e., experimental, quasi-experimental, single-case, single-factor, multiple-factor designs or non-experimental, retrospective, prospective designs).

This project will employ a mixed method design with both qualitative (observations and thoughts) and quantitative (sensory profile) data, in which children enrolled in occupational therapy will be observed for a total of eight weeks. It will consist of an observational case study in which individuals with sensory processing disorder will be observed over a two month time period during occupational therapy sessions.

A group of individuals with sensory aversions/sensory seeking problems will be observed in occupational therapy. The standard Sensory Profile will either be filled out from the parents through the occupational therapist or obtained from previous intake records from the occupational therapist.

The baseline data would be the information from the individuals *before* sensory integration techniques were implemented in occupational therapy. At the end of the

study (roughly two months of observation), the Sensory Profile would be filled out again and compared with the Measure that was filled out before the individual began his or her occupational therapy sessions. I would compare the initial, baseline results of this measure for each individual, before sensory integrative techniques were applied to the second measure, at the end of the two months. Through this study, we would be able to note any improvements or lacks in sensory processing for those individuals who are receiving therapy with the added sensory integration treatment.

Over these two months, observation of the individuals working with their occupational therapist will take place biweekly. Measurements of the Sensory Profile will be made at two different times during the observations: once at the beginning and again at the end of these two months. Initial screening and evaluation of the patients will allow for the development of a treatment plan that would include sensory techniques. The majority of actual observations will be recorded qualitatively, but the Sensory Profile will be the primary quantitative aspect.

3. Description of Subjects (include age range, selection criteria, recruitment procedures, anticipated and desired sample size)

The subjects I will be observing are children between ages two through fifteen. Currently I am planning to observe fourteen children. The children in this sample fit my study because each of their diagnoses that their occupational therapy is treating deals with sensory integration and different sensory issues. My plan for using the Sensory Profile also fits well with this population because many of them have already filled it out within the past month of their initial treatment; I will easily be able to obtain an updated profile that the parents will fill out at the beginning of my research. These children are used to their therapy environment, and their occupational therapist. Additionally, I have already had the chance to observe some of these kids for my observation hours requirement for graduate school, which is good because this can ensure they will not be influenced by my presence or a situation involving a new person.

These children will be recruited based on their treatment diagnosis and the type of therapy the occupational therapist has been focusing on with them (i.e., types of sensory integration to address the child's specific sensory needs). The children will be part of my study on a volunteer basis, with the approval and signed consent form of the parents. A decision to participate in this study will be completely voluntary and a decision not to partake in this study will be equally voluntary. The location for this study will take place at Concorde Kids Therapy, 5156 Whipple Ave. NW, Canton, OH 44718; (330) 478-1752.

4. Research Procedures (to which human subjects will be subjected) including each variable, measurement instruments and their reliability and validity:

The participants in this case study will be observed for a total of eight weeks in their occupational therapy sessions. The Sensory Profile will be used as a measure of numerical data. For each "initial" therapy session ("initial" being the intake therapy session for the individual), a Sensory Profile will be given by the therapist to be filled out by the parents. Since I do not have occupational therapy credentials, much of this project will be done *through* an occupational therapist. I will be working in conjunction with the occupational therapist, making my own observations in addition to the data she provides for me. My data will be triangulated as follows: data from the occupational therapist (observations and insight), the Sensory Profile (numerical data), and my own

observations and insight and comparison of the data presented to me throughout the study.

The *Short Sensory Profile* is a judgment-based questionnaire that aims to provide a comprehensive assessment of an individual's sensory abilities. The scores describe the individual's sensory processing abilities by a classification system of three categories: typical, probable difference, and definite difference. This classification system was developed from a national study (N=1,037 children with and without disabilities). "Content validity was established during development of the Sensory Profile by determining that the test sampled the full range of children's sensory processing behaviors and that the items were placed appropriately within sections. Methods used included a literature review, expert review by eight therapists experienced in applying sensory integration theory to practice, and category analysis based on a national study" (http://psychcorp.pearsonassessments.com/hai/Images/pdf/technical_reports/SP_TR_Web.pdf).

Over the eight week time period, the Sensory Profile will be filled out at the beginning – before the first therapy sessions, as baseline data – and end of the project, to compare the numerical scores. Twice a week for these two months, I will attend therapy sessions with the child and occupational therapist. I will record my observations and consult with the occupational therapist regarding sensory integration and the child's care.

My observations will be guided by the occupational therapist in order to remain as reliable and accurate as possible, the Sensory Profile acts as a reliable, standardized measure that will add to the validity of this study, and the presence and assistance of the occupational therapist, as well as my advisor will ensure for valid and consistent data recording.

The design for my project is simple and straightforward, which can allow for further studies to expand from it. Although I have a small sample size and this is a relatively short amount of time, this project has potential and my triangulated data will allow for comprehensive and reliable results.

5. Risks and Benefits: Identify/Describe benefits and risks/or discomforts that will be experienced by the subjects. Include the risks and benefits in the informed consent form.

This type of intervention will allow for observations in typical occupational therapy with a focus on sensory integration. This project will be a positive contribution to this area because there is very sparse literature on the area of sensory integration and its validity in occupational therapy. This project is designed to be as subtle and unobtrusive as possible, allowing for the children to be comfortable and uninfluenced under my presence. In no way will these individuals be forfeiting or receiving less therapy treatment than the occupational therapist has already determined for the individual in her plan of treatment previous to this study. I expect very little to no risk to be experienced by the children. However, in using the Sensory Profile, areas of "difference" will be determined to designate which areas of sensory integration need to be focused on. This, as well as subtle observations make up the basis of my research in order to safely and effectively monitor improvements in overall functioning of the areas of sensory integration. Below is a list of possible risks and benefits that the participating individuals may experience:

- Risks:

- The child may be distracted or give less attention to the therapy task at hand due to my presence, which may take away from the overall productivity of that therapy session.
- There may be a negative impact on the children from a feeling of "being watched" while I observe and play with them during therapy.
- There is always a risk of injury due to the use of specific equipment in occupational therapy (e.g. suspended equipment such as the many different types of swings, also bouncy balls, etc.), especially at some of the intensities that certain children may crave.

- Benefits:
  - This case study project will allow for optimum results in tying together and making connections between my observations, the occupational therapist's observations, and the Sensory Profile.
  - This research could lead to bigger studies and better understandings of the effectiveness of sensory integration used in occupational therapy, thus bettering evidence-based practice in occupational therapy itself.
  - The field of occupational therapy as well as treatment for each individual child may be better understood and improved with time, stemming from this project as a basis for getting word out about sensory integration therapy.
  - This study is designed to be as noninvasive and objective as possible, causing no discomfort or uneasiness among the children in their therapy sessions.
  - The child's occupational therapy treatment will in no way be interrupted or stopped due to this study.
  - The Sensory Profile at the initial stage of this case study will help determine areas where the child has the most sensory issues and throughout the research, techniques to ameliorate these issues will be used in therapy.

6. Include a copy of the following:

**yes** Statement of Informed Consent and/or Cover Letter

_**n/a**_ Assent forms, if needed I do not believe assent is needed because I will not be providing any treatment to the individuals; the occupational therapist, who is already licensed, registered, and has experience is the only one providing treatment. I thought my observation would be covered in the consent form for me to be present in sessions as well as being able to use information about the children that is pertinent to my study.

**yes** Copies of material given to the subjects and parents/guardians

**yes** Data collection forms including demographic data, questionnaires, surveys,
interview questions, and so on. Copyrighted material that cannot be copied need
not be submitted. The Committee may request to review the material.

_**n/a**_ Scripts of verbal instructions and project information

7. PLEASE ANSWER THE FOLLOWING:

1	Yes	**No**	N/A	Will subjects be identifiable either through records, responses, pictures, or identifiers (labels, numbers) linked to the subjects?
2	Yes	**No**	N/A	Will subjects be at risk of criminal or civil liability, changes in conditions of employment, undue damage to financial standing, or undue embarrassment if others than the project director know the responses?
3	Yes	**No**	N/A	Does research deal with sensitive aspects of subject's behavior such as illegal conduct, drug use, sexual behavior, use of alcohol, beliefs or values, and could present a possible invasion of privacy?
4	**Yes**	No	N/A	Does research involve the collection or study of existing data (documents, records, pathological specimens or diagnostic specimens) from sources not publicly available?
5	Yes	**No**	N/A	Will the subject be video/audio taped?
6	**Yes**	No	N/A	Are subjects free to withdraw at any time without penalty?
7	Yes	**No**	N/A	Does the research involve deception?
8	**Yes**	No	N/A	Does the research deal with special populations in addition to minors under 18 years of age? Indicate the special populations included in the research: ☑ Minors (under 18 years of age) ☐ Pregnant women ☐ Prisoners/arrestees ☐ Economically disadvantaged ☐ Cognitively/mentally impaired ☐ Institutionalized ☐ Patients
9	Yes	**No**	N/A	Are some or all of the subjects likely to be vulnerable to coercion or undue influence through means other than #8

8. If you answered yes to question number 7, describe the rationale for deception involved in the study, its necessity, and any debriefing procedures that are to be done at the end of the study.

n/a

9. If you answered yes to number 8 or 9, include how you will provide special protections to these groups. (They are entitled to special consideration under federal regulations: 45 CFR Subparts B (pregnant women), C (prisoners), and D (children).

Any information that could identify the children (full name or any other private information) will not be disclosed through this study's documentation. Although age and background information will be retained for documentation purposes, they will in no way be used as identifiers of the child. The only individuals who will have access to this information will be the child's parent(s)/guardian(s), his or her occupational therapist, myself, and my advisor. Anything with identifying information will remain at Concorde Kids, safely kept with the rest of their patient files. Any findings will not be used to impact the usual occupational therapy treatment or to negatively impact any individuals. The child or his or her parent/guardian may withdraw from this study at

any time without any consequences. The children also will not be subjected to any method that has not already benefited another group – there will be no "experimental therapy" created on my part; everything will come from the expertise of the occupational therapist.

I certify that the research procedures stated and the method of obtaining consent (if any), as approved by the Human Subjects Review Board, will be followed during the period covered by this research project. Any future changes will be submitted for Board review and approval prior to implementation.

_____

_____

Project Director Co-director

_____ _____

Date

FOR HSR USE ONLY

Date received: _____

_____ Recommended for exemption from review (Level 1 No Risk)

_____ Recommended for expedited review (Level II Minimal Risk)

_____ Recommended for full board review (Level III High Risk)

_____ Revisions not required. Approval and comments are addressed in a separate memorandum to the primary investigator.

_____ Revisions required. Comments and contingencies are addressed in a separate memorandum to the primary investigator.

Final Approval Date: _____
Denial Date: _____

HSR Approval expires on _____. If the duration of the project takes more than 12 months, continuation of approval will require a renewal application.

Signature HSR Chair _____ Date _____

Appendix D: Human Subjects Review Board Letter of Approval

To: Shannon Phillips
Mrs. Betty Marko

July 8, 2011

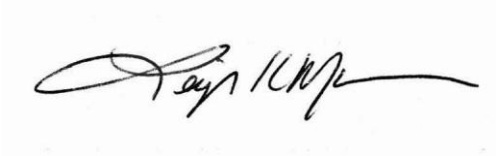
Re: HSR proposal 11-26

Your research project titled "An examination of the Efficacy of Sensory Integration in Occupational Therapy" **has been given approval** by the HSR committee. We appreciate your attention to detail and the changes you submitted. It has made your proposal much clearer and our ability to assess confidentiality and adequate explanation of your study to the parents is simple and easy to understand.

If there should be any changes to your research methods, you will need to stop your project immediately, and send in a request or addendum outlining your changes to the HSR chair, Dr. Murray, at lmurray@walsh.edu. You will then need to wait for approval prior to starting your project again.

Thank you and good luck with your project!

Sincerely,



Leigh Murray, PT, MA, PhD
Chair, Human Subject Review Committee
Walsh University

Appendix E: Facility (Concorde Kids) Letter of Approval

Concorde Kids

July 6, 2011

Shannon Philips has my permission to observe and collect data on the children at Concorde Kids. She also has my permission to engage/interact with the children as needed.

Janet S. Murphy OTR/L

Janet S. Murphy OTR/L
President/Concorde Kids

T. J. Tyler, Inc. 5156 Whipple Avenue NW Canton, OH 44718 (330) 478-1752 Fax (330) 478-1763

Appendix F: Participant Cover Letter and Consent Form

An Examination of the Efficacy of Sensory Integration in Occupational Therapy

Dear parent(s)/guardian(s),

My name is Shannon Phillips and I am a student at Walsh University. This summer I will be working on my senior thesis in conjunction with the Honors Program. I plan to attend graduate school for occupational therapy after I receive my undergraduate degree. For this project, I plan to observe occupational therapy of children dealing with sensory issues. I will examine both the *Short Sensory Profile* and the sensory integration techniques implemented by the occupational therapist for my research. I hope to show effectiveness of sensory integration when used in occupational therapy.

In order to accomplish this project, Janet Murphy and Brittannie Cestari have agreed to allow me to shadow them as they work with your child. Prior to allowing my access to your child's therapy sessions, I need your informed consent.

For eight weeks I plan to observe your child in therapy, speak with the occupational therapist about your child's care, and obtain previous therapy notes and background information through your child's occupational therapist. I will also be using the *Short Sensory Profile* at the start and end of my project, which you will need to fill out. The *Short Sensory Profile* as well as subtle observations make up the basis of my research in order to safely and effectively monitor improvements in overall functioning of the areas of sensory integration. Below is a list of possible risks and benefits that the participating individuals may experience:

- Risks:
    - The child may be distracted or give less attention to the therapy task at hand due to my presence, which may take away from the overall productivity of that therapy session.
    - There may be a negative impact on the children from a feeling of "being watched" while I observe and play with them during therapy.
    - There is always a risk of injury due to the use of specific equipment in occupational therapy (e.g. suspended equipment such as the many different types of swings, also bouncy balls, etc.), especially at some of the intensities that certain children may crave.

- Benefits:
    - This case study project will allow for optimum results in tying together and making connections between my observations, the occupational therapist's observations, and the *Short Sensory Profile*.
    - This research could lead to bigger studies and better understandings of the effectiveness of sensory integration used in occupational therapy, thus bettering evidence-based practice in occupational therapy itself.
    - The field of occupational therapy as well as treatment for each individual child may be better understood and improved with time, stemming from this project as a basis for getting word out about sensory integration therapy.
    - This study is designed to be as noninvasive and objective as possible, causing no discomfort or uneasiness among the children in their therapy sessions.
    - The child's occupational therapy treatment will in no way be interrupted or stopped due to this study.
    - The *Short Sensory Profile* at the initial stage of this case study will help determine areas where the child has the most sensory issues and throughout the research, techniques to ameliorate these issues will be used in therapy.

Any information that could identify the children (full name or any other private information) will not be disclosed through this study's documentation. All information will be used for the sole purpose of this study only. All my documentation and information will be kept at Concorde Kids, 5156 Whipple Ave. NW, Canton, OH 44718; (330) 478-1752. The *Short Sensory Profiles*, my observations and notes, as well as the occupational therapist's notes for my research will be kept locked in a file cabinet in the office at Concorde, where all other patient folders are safely stored.

If you have any questions or concerns about research involving human subjects, you may contact the HSR chair from Walsh University, Dr. Leigh Murray at lmurray@walsh.edu or call (330) 490-7259. Additionally, if you have further questions, please feel free to contact me by email at shannonphillips@walsh.edu, or my thesis advisor, Mrs. Betty Marko at bmarko@walsh.edu. Janet Murphy and Brittannie Cestari are also available as contact persons if you should need them, (330) 478-1752.

Please sign and date below if you are comfortable with my involvement in your child's therapy sessions. Please return your signed copy to either Janet, Brittannie, or myself when you are finished. You will also receive a copy of this letter. Thank you.

I, _____ **give** / **do not give** consent for _____
print your name
print child's name
to participate in this project, which includes being observed and permitting access to his/her therapy information at Concorde Kids.

Signature: _____ Date: _____

Witness: _____ Date: _____

Appendix G: Sample *Sensory Profile*

Short

SENSORY PROFILE

Winnie Dunn, Ph.D., OTR, FAOTA

Child's Nan

Completed

Service Pro

INSTRUCTIONS

Please check the box that **best** describes the frequency with which your child does the following behaviors. Please answer all of the statements. If you are unable to comment because you have not observed the behavior or believe that it does not apply to your child, please draw an X through the number for that item. Please do not write in the Section Raw Score Total row.

Use the following key to mark your responses:

- **ALWAYS** — When presented with the opportunity, your child always responds in this manner, 100% of the time.
- **FREQUENTLY** — When presented with the opportunity, your child frequently responds in this manner, about 75% of the time.
- **OCCASIONALLY** — When presented with the opportunity, your child occasionally responds in this manner, about 50% of the time.
- **SELDOM** — When presented with the opportunity, your child seldom responds in this manner, about 25% of the time.
- **NEVER** — When presented with the opportunity, your child never responds in this manner, 0% of the time.

Item	Tactile Sensitivity	ALWAYS	FREQUENTLY	OCCASIONALLY	SELDOM	NEVER
	Expresses distress during grooming (for example, fights or cries during haircutting, face washing, fingernail cutting)		X			
	Prefers long-sleeved clothing when it is warm or short sleeves when it is cold			X		X
	Avoids going barefoot, especially in sand or grass			X		
	Reacts emotionally or aggressively to touch				X	
	Withdraws from splashing water			X		
	Has difficulty standing in line or close to other people			X		
	Rubs or scratches out a spot that has been touched					X
	Section Raw Score Total					
Item	**Taste/Smell Sensitivity**					
	Avoids certain tastes or food smells that are typically part of children's diets			X		
	Will only eat certain tastes (list: Chicken, rice, ~~carrots~~ cereal)			X		
	Limits self to particular food textures/temperatures (list: _____)					X
	Picky eater, especially regarding food textures			X		
	Section Raw Score Total					
Item	**Movement Sensitivity**					
	Becomes anxious or distressed when feet leave the ground			X		
	Fears falling or heights				X	
	Dislikes activities where head is upside down (for example, somersaults, roughhousing)					X
	Section Raw Score Total					
Item	**Underresponsive/Seeks Sensation**					
	Enjoys strange noises/seeks to make noise for noise's sake				X	
	Seeks all kinds of movement and this interferes with daily routines (for example, can't sit still, fidgets)		X			
	Becomes overly excitable during movement activity			X		
	Touches people and objects		X			
	Doesn't seem to notice when face or hands are messy					X
	Jumps from one activity to another so that it interferes with play		X			
	Leaves clothing twisted on body					X
	Section Raw Score Total					

0761638199

Item	Auditory Filtering	Always	Frequently	Occasionally	Seldom	Never
22	Is distracted or has trouble functioning if there is a lot of noise around			X		
23	Appears to not hear what you say (for example, does not "tune-in" to what you say, appears to ignore you)			X		
24	Can't work with background noise (for example, fan, refrigerator)					X
25	Has trouble completing tasks when the radio is on					X
26	Doesn't respond when name is called but you know the child's hearing is OK				X	X
27	Has difficulty paying attention				X	
	Section Raw Score Total					

Item	Low Energy/Weak					
28	Seems to have weak muscles	X				
29	Tires easily, especially when standing or holding particular body position	X				
30	Has a weak grasp			X		
31	Can't lift heavy objects (for example, weak in comparison to same age children)	X				
32	Props to support self (even during activity)			X		
33	Poor endurance/tires easily	X				
	Section Raw Score Total					

Item	Visual/Auditory Sensitivity					
	Responds negatively to unexpected or loud noises (for example, cries or hides at noise from vacuum cleaner, dog barking, hair dryer)					X
	Holds hands over ears to protect ears from sound			X		
	Is bothered by bright lights after others have adapted to the light				X	
	Watches everyone when they move around the room				X	
	Covers eyes or squints to protect eyes from light			X		
	Section Raw Score Total					

Summary

Instructions: Transfer the score for each section to the Section Raw Score Total column. Plot these totals by marking an X in the appropriate classification column (Typical Performance, Probable Difference, Definite Difference).*

SCORE KEY

1 = Always	4 = Seldom
2 = Frequently	5 = Never
3 = Occasionally	

Section	Section Raw Score Total	Typical Performance	Probable Difference	Definite Difference
Tactile Sensitivity	25 /35	35 — 30		
Taste/Smell Sensitivity	14 /20	20 — 15		
Movement Sensitivity	12 /15	15 — 13		
Underresponsive/Seeks Sensation	23 /35	35 — 27		
Auditory Filtering	24 /30	30 — 23		
Low Energy/Weak	10 /30	30 — 26		
Visual/Auditory Sensitivity	19 /25	25 — 19		
Total	127 /190	190 — 155	154 — 142	

*Classifications are based on the performance of children without disabilities ($n = 1{,}037$).

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ISBN 076-1638-19-9

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Appendix H:
Demographics

An Examination of the Efficacy of Sensory Integration in Occupational Therapy

ID	AGE	GENDER	RACE	HOMETOWN	DIAGNOSIS
J0001M	9	male	Caucasian	Canton	decreased strength, lack of fine motor control, dyspraxia
B0003C	2	male	Caucasian	East Sparta	speech delay, sensory modulation dysfunction, lack of normal physiological development
B0004C	3	male	Caucasian	Canton	Gastroesophageal reflux disease (GERD), sensory integration disorder, hypotonia; medical history of sensory modulation dysfunction
B0005C	14	male	Caucasian	Alliance	ADHD, Autism, hypotonia, Sensory Processing Disorder (SPD)
B0007C	4	female	Caucasian	Canton	sensory modulation dysfunction, hypotonia, Autism
J0008M	8	male	Caucasian	Canton	head trauma, hypotonia
B0010C	5	male	Caucasian	Canton	developmental delay, ASD, hypotonia, sensory mod dysfxn
B0011C	2	female	Caucasian	Canton	lack of normal physiological development, developmental delay
B0012C	5	male	Caucasian	Dover	lack of coordination, sensory mod dysfxn
J0014M	8	female	Caucasian	Hartville	neuronal migrational disorder, hypotonia, brain malformation
J0015M	2	female	Caucasian	Sugarcreek	static encephalopathy, hypotonia

J0016M	6	female	Caucasian	Hartville	ASD, hypotonia, sensory integration, dyspraxia
J0018M	5	male	Caucasian	Canton	sensory mod dysfxn, poor fine motor coordination
J0019M	8	male	Caucasian	Canton	sensory modulation disorder
B0020C	8	male	Caucasian	N. Canton	hypotonia, lack of coordination/dyspraxia

Appendix I: Overall Initial and Final *Sensory Profile* Results

INITIAL SENSORY PROFILES

J0001M:	score:	out of:	performance:
tactile sensitivity	28	35	probable difference
taste/smell sensitivity	17	20	typical
movement sensitivity	11	15	probable difference
underresponsive/seeks sensation	12	35	definite difference
auditory filtering	20	30	definite difference
low energy/weak	14	30	definite difference
visual/auditory sensitivity	14	25	definite difference
total:	116	190	definite difference

B0003C:	score:	out of:	performance:
tactile sensitivity	29	35	probable difference
taste/smell sensitivity	11	20	definite difference
movement sensitivity	11	15	probable difference
underresponsive/seeks sensation	22	35	definite difference
auditory filtering	14	30	definite difference
low energy/weak	30	30	typical
visual/auditory sensitivity	12	25	definite difference
total:	129	190	definite difference

B0004C:	score:	out of:	performance:
tactile sensitivity	17	35	definite difference
taste/smell sensitivity	4	20	definite difference
movement sensitivity	10	15	definite difference
underresponsive/seeks sensation	19	35	definite difference
auditory filtering	14	30	definite difference
low energy/weak	14	30	definite difference
visual/auditory sensitivity	13	25	definite difference
total:	91	190	definite difference

B0005C:	score:	out of:	performance:
tactile sensitivity	27	35	probable difference
taste/smell sensitivity	17	20	typical
movement sensitivity	10	15	definite difference
underresponsive/seeks sensation	13	35	definite difference
auditory filtering	15	30	definite difference
low energy/weak	16	30	definite difference
visual/auditory sensitivity	16	25	probable difference
total:	114	190	definite difference
B0007C:	score:	out of:	performance:
tactile sensitivity	26	35	definite difference
taste/smell sensitivity	4	20	definite difference
movement sensitivity	5	15	definite difference
underresponsive/seeks sensation	9	35	definite difference
auditory filtering	13	30	definite difference
low energy/weak	25	30	probable difference
visual/auditory sensitivity	17	25	probable difference
total:	99	190	definite difference

J0008M:	score:	out of:	performance:
tactile sensitivity	34	35	typical
taste/smell sensitivity	16	20	typical
movement sensitivity	15	15	typical
underresponsive/seeks sensation	26	35	probable difference
auditory filtering	26	30	typical
low energy/weak	27	30	typical
visual/auditory sensitivity	23	25	typical
total:	167	190	typical

B0010C:	score:	out of:	performance:
tactile sensitivity	17	35	definite difference
taste/smell sensitivity	10	20	definite difference
movement sensitivity	6	15	definite difference
underresponsive/seeks sensation	24	35	probable difference
auditory filtering	15	30	definite difference
low energy/weak	12	30	definite difference
visual/auditory sensitivity	12	25	definite difference
total:	96	190	definite difference

B0011C:	score:	out of:	performance:
tactile sensitivity	21	35	definite difference
taste/smell sensitivity	11	20	definite difference
movement sensitivity	9	15	definite difference
underresponsive/seeks sensation	28	35	typical
auditory filtering	20	30	probable difference
low energy/weak	13	30	definite difference
visual/auditory sensitivity	17	25	probable difference
total:	119	190	definite difference

B0012C:	score:	out of:	performance:
tactile sensitivity	27	35	probable difference
taste/smell sensitivity	20	20	typical
movement sensitivity	15	15	typical
underresponsive/seeks sensation	13	35	definite difference
auditory filtering	16	30	definite difference
low energy/weak	19	30	definite difference
visual/auditory sensitivity	20	25	typical
total:	130	190	definite difference

J0014M:	score:	out of:	performance:
tactile sensitivity	30	35	typical
taste/smell sensitivity	12	20	probable difference
movement sensitivity	15	15	typical
underresponsive/seeks sensation	29	35	typical
auditory filtering	16	30	definite difference
low energy/weak	23	30	definite difference
visual/auditory sensitivity	16	25	probable difference
total:	141	190	definite difference

J0015M:	score:	out of:	performance:
tactile sensitivity	33	35	typical
taste/smell sensitivity	16	20	typical
movement sensitivity	15	15	typical
underresponsive/seeks sensation	25	35	probable difference
auditory filtering	18	30	definite difference
low energy/weak	6	30	definite difference
visual/auditory sensitivity	20	25	typical
total:	133	190	definite difference

J0016M:	score:	out of:	performance:
tactile sensitivity	19	35	definite difference
taste/smell sensitivity	16	20	typical
movement sensitivity	3	15	definite difference
underresponsive/seeks sensation	29	35	typical
auditory filtering	23	30	typical
low energy/weak	18	30	definite difference
visual/auditory sensitivity	15	25	definite difference
total:	123	190	definite difference

J0018M:	score:	out of:	performance:
tactile sensitivity	29	35	probable difference
taste/smell sensitivity	10	20	definite difference
movement sensitivity	15	15	typical
underresponsive/seeks sensation	19	35	definite difference
auditory filtering	19	30	definite difference
low energy/weak	24	30	probable difference
visual/auditory sensitivity	22	25	typical
total:	138	190	definite difference

J0019M:	score:	out of:	performance:
tactile sensitivity	30	35	typical
taste/smell sensitivity	10	20	definite differnce
movement sensitivity	15	15	typical
underresponsive/seeks sensation	26.5	35	probable-typical
auditory filtering	23	30	typical
low energy/weak	28	30	typical
visual/auditory sensitivity	24	25	typical
total:	156.5	190	typical

B0020C:	score:	out of:	performance:
tactile sensitivity	21	35	definite difference
taste/smell sensitivity	6	20	definite difference
movement sensitivity	12	15	probable difference
underresponsive/seeks sensation	31	35	typical
auditory filtering	27	30	typical
low energy/weak	29	30	typical
visual/auditory sensitivity	18	25	probable difference
total:	144	190	probable difference

FINAL SENSORY PROFILES

J0001M:	score:	out of:	performance:
tactile sensitivity	26	35	definite difference
taste/smell sensitivity	19	20	typical
movement sensitivity	11	15	probable difference
underresponsive/seeks sensation	13	35	definite difference
auditory filtering	11	30	definite difference
low energy/weak	16	30	definite difference
visual/auditory sensitivity	13	25	definite difference
total:	109	190	definite difference

B0003C:	score:	out of:	performance:
tactile sensitivity	28	35	probable difference
taste/smell sensitivity	11	20	definite difference
movement sensitivity	10	15	definite difference
underresponsive/seeks sensation	24	35	probable difference
auditory filtering	20	30	probable difference
low energy/weak	30	30	typical
visual/auditory sensitivity	15	25	definite difference
total:	138	190	definite difference

B0004C:	score:	out of:	performance:
tactile sensitivity	25	35	definite difference
taste/smell sensitivity	14	20	probable difference
movement sensitivity	12	15	probable difference
underresponsive/seeks sensation	23	35	definite difference
auditory filtering	24	30	typical
low energy/weak	10	30	definite difference
visual/auditory sensitivity	19	25	typical
total:	127	190	definite difference

B0005C:	score:	out of:	performance:
tactile sensitivity	28	35	probable difference
taste/smell sensitivity	16	20	typical
movement sensitivity	10	15	definite difference
underresponsive/seeks sensation	13	35	definite difference
auditory filtering	14	30	definite difference
low energy/weak	12	30	definite difference
visual/auditory sensitivity	19	25	typical
total:	112	190	definite difference
B0007C:	score:	out of:	performance:
tactile sensitivity	31	35	typical
taste/smell sensitivity	4	20	definite difference
movement sensitivity	5	15	definite difference
underresponsive/seeks sensation	15	35	definite difference
auditory filtering	12	30	definite difference
low energy/weak	23	30	definite difference
visual/auditory sensitivity	16	25	probable difference
total:	106	190	definite difference

J0008M:	score:	out of:	performance:
tactile sensitivity	35	35	typical
taste/smell sensitivity	18	20	typical
movement sensitivity	15	15	typical
underresponsive/seeks sensation	30	35	typical
auditory filtering	26	30	typical
low energy/weak	30	30	typical
visual/auditory sensitivity	23	25	typical
total:	177	190	typical

B0010C:	score:	out of:	performance:
tactile sensitivity	19	35	definite difference
taste/smell sensitivity	9	20	definite difference
movement sensitivity	6	15	definite difference
underresponsive/seeks sensation	20	35	definite difference
auditory filtering	16	30	definite difference
low energy/weak	12	30	definite difference
visual/auditory sensitivity	12	25	definite difference
total:	94	190	definite difference

B0011C:	score:	out of:	performance:
tactile sensitivity	23	35	definite difference
taste/smell sensitivity	10	20	definite difference
movement sensitivity	9	15	definite difference
underresponsive/seeks sensation	30	35	typical
auditory filtering	25	30	typical
low energy/weak	12	30	definite difference
visual/auditory sensitivity	13	25	definite difference
total:	122	190	definite difference

B0012C:	score:	out of:	performance:
tactile sensitivity	30	35	typical
taste/smell sensitivity	20	20	typical
movement sensitivity	13	15	typical
underresponsive/seeks sensation	14	35	definite difference
auditory filtering	20	30	probable difference
low energy/weak	20	30	definite difference
visual/auditory sensitivity	21	25	typical
total:	138	190	definite difference

J0014M:	score:	out of:	performance:
tactile sensitivity	27	35	probable difference
taste/smell sensitivity	13	20	probable difference
movement sensitivity	14	15	typical
underresponsive/seeks sensation	26	35	probable difference
auditory filtering	15	30	definite difference
low energy/weak	17	30	definite difference
visual/auditory sensitivity	14	25	definite difference
total:	126	190	definite difference

J0015M:	score:	out of:	performance:
tactile sensitivity	33	35	typical
taste/smell sensitivity	16	20	typical
movement sensitivity	15	15	typical
underresponsive/seeks sensation	25	35	probable difference
auditory filtering	24	30	typical
low energy/weak	6	30	definite difference
visual/auditory sensitivity	20	25	typical
total:	139	190	definite difference

J0016M:	score:	out of:	performance:
tactile sensitivity	16	35	definite difference
taste/smell sensitivity	13	20	probable difference
movement sensitivity	3	15	definite difference
underresponsive/seeks sensation	18	35	definite difference
auditory filtering	20	30	probable difference
low energy/weak	18	30	definite difference
visual/auditory sensitivity	8	25	definite difference
total:	96	190	definite difference

J0018M:	score:	out of:	performance:
tactile sensitivity	29	35	probable difference
taste/smell sensitivity	4	20	definite difference
movement sensitivity	15	15	typical
underresponsive/seeks sensation	26	35	probable difference
auditory filtering	22.5	30	typical-probable
low energy/weak	23	30	definite difference
visual/auditory sensitivity	20	25	typical
total:	139.5	190	definite difference

J0019M:	score:	out of:	performance:
tactile sensitivity	31	35	typical
taste/smell sensitivity	4	20	definite difference
movement sensitivity	15	15	typical
underresponsive/seeks sensation	23	35	definite difference
auditory filtering	19	30	definite difference
low energy/weak	28	30	typical
visual/auditory sensitivity	23	25	typical
total:	143	190	probable difference

B0020C:	score:	out of:	performance:
tactile sensitivity	24	35	definite difference
taste/smell sensitivity	4	20	definite difference
movement sensitivity	9	15	definite difference
underresponsive/seeks sensation	33	35	typical
auditory filtering	22	30	probable difference
low energy/weak	24	30	probable difference
visual/auditory sensitivity	13	25	definite difference
total:	127	190	definite difference

Appendix J: Completed Data Collection Forms

WEEK 1

ID: J0001M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	beanbag paddle (both hands)	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	net swing (prone, with bungees) Tarzan swing (5sec hold, 5x) (fatigued quickly)	**2**
*Seeking Sensation/ Underresponsiveness	walking on crash pits (challenged) postural input	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 2

ID: J0001M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	putty with money some struggle, but overall increased strengthening	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with peanut ball net swing (prone), no fatigue	**2**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	lowercase letters	**2**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT

WEEK 3

ID: J0001M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	putty - no marbles! bean bag baseball	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	balls on trampoline (very good) (30/30/50 with heavy, med, light balls) hippity hop around hallway	**1**
*Seeking Sensation/ Underresponsiveness	net swing and red rope (tired hands)	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

low tone; did not seem dyspraxic (because they've worked on it)

WEEK 4

ID: J0001M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	putty pull 3x	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	net swing, prone/bungee weighted ball/tramp 50x each ball	**4**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	great attn to tasks	**4**

*expected to be seen most often

overall: **11 out of 15**

probable difference

ADDITIONAL NOTES:

DPPT

PACE

WEEK 5

ID: J0001M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	putty pegs RHS speed (good)	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with bean bags hard time with graded movement	**3**
*Seeking Sensation/ Underresponsiveness	net swing prone (singing)	**4**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

mom present instead of dad

WEEK 1

ID: B0003C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	interacted with the elmo pop-up toy 1x (no fighting to functionally play) did not play with the balls on ramp (did not want the balls)	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	*loved* the swing (forward motion, side to side, and orbital); shifted weight on own	**5**
*Seeking Sensation/ Underresponsiveness	prop input on crash pits (bouncing/jumping on crash pits) wanted more swing (frequently wanted more)	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

babbling (vowels, consonants) - mamama, dedede, ahhh)

very happy today

almost did the sign for "more" with hands (mostly hand-over-hand)

facial expressions while on swing; made some eye contact (difference of 1.5, improvement from previous)

WEEK 2

ID: B0003C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	did not want as much carpet swing (did not want "more," said NO) attempted to play with tire (did not hit it, would not sit)	**1**
*Seeking Sensation/ Underresponsiveness	monkey bed (4x: 2 okay, 2 with fighting/resistance) jumping on the crash pits	**3**
Visual/Auditory Sensitivity	distracted by wanting the bad did not want ropes and blocks (uninterested)	**2**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 3

ID: B0003C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing bouncing on the big ball with Amy (happier when facing mirror) net swing (straddled and tied in; did not like) (prop against monkey bed)	**2**
*Seeking Sensation/ Underresponsiveness	feet rubbed, got eyes (prop input)	**2**
Visual/Auditory Sensitivity	coloring! Picked up crayons instead of lining them up scribbled and eyes followed the marks on the paper	**1**

*expected to be seen most often

overall: **5 out of 15**

definite difference

ADDITIONAL NOTES:

hand over hand "more" and "done"

WEEK 4

ID: B0003C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	net swing attempt with seat insert no success (tantrum)	**3**
*Seeking Sensation/ Underresponsiveness	rubbed scarves on legs	**4**
Visual/Auditory Sensitivity	looking out window at the sunshine visually stimming	**2**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 5

ID: B0003C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	stacked tower of blocks (3) 3x independently increased ability to build	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	tire swing with increased prop min movement with feet on ground minimum meltdown	**2**
*Seeking Sensation/ Underresponsiveness	walking/crawling across crash pits 5x with puzzle (mod0max cues) cues to increase attn	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT

WEEK 1

ID: B0004C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	doesn't love brushing (DPPT), but tolerates it NO SOCKS (tactile defensive when putting them on - needs to be smooth/ tighter)	**1**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	lycra ladder (no fear) tire swing with min movement bounced very low/lightly on trampoline	**2**
*Seeking Sensation/ Underresponsiveness	prop input (trampoline) ran on crash pits	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **5 out of 15**

definitel difference

ADDITIONAL NOTES:

doesn't like feet off the ground (movement sensitivity)

brushing program (DPPT) - deep pressure and proprioceptive technique

WEEK 2

ID: B0004C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	no socks hand on ear (soothing)	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing puzzle on the crash pits spiderman with crashes	**2**
*Seeking Sensation/ Underresponsiveness	"more bounce" on monkey	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

nervous about spiderman (feet off ground), was first time with it

carpet swing: linear movement was choice, also circles

9 piece puzzle: 2 pieces each time (put in and take back), running and crawling across pits

WEEK 3

ID: B0004C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	socks and shoes off at beginning requested help with putting socks on at end when they were misaligned	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	rockwall tantrum/meltdown sensitivity	**2**
*Seeking Sensation/ Underresponsiveness	jump into crash pits liked it (very positive rxn) used weighted blanked on swing	**5**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 4

ID: B0004C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	lycra ladder 3x	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	rock wall 3 attempts scared	**2**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	prewriting	**3**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 5

ID: B0004C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	kept socks on!	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	weighted balls on tramp and catch caught with chest and arms, good for first time carpet swing and putty pulls, both hands	**3**
*Seeking Sensation/ Underresponsiveness	scooter board and puzzle pulled self up ramp mostly (min mod assist) lycra ladder saved 3 friends, with swing and bounce	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **11 out of 15**

probable difference

ADDITIONAL NOTES:

all new activities today!

kept socks on!

while family was present (mom, dad, 2 brothers - cheering patient on)

very talkative today!

WEEK 1

ID: B0005C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	walk across crash pits with 12 piece puzzle	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	net swing sitting and holding on to ropes linear min-mod rotary for postural control	**3**
*Seeking Sensation/ Underresponsiveness	mount tire 2x after visual demo	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT

WEEK 2

ID: B0005C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	no movement/work on carpet swing (OT did the work) very very low tone; not good postural control	**1**
*Seeking Sensation/ Underresponsiveness	not really a seeker was very excited when wrote the letter "A" (8x, last 2 on own, mostly hand over hand) laughed when peanut ball was added under carpet swing	**4**
Visual/Auditory Sensitivity	distracted by other noises/kids	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

no midline crossing

very low tone, doppy

impulsive

cannot write name

"W" sitting

WEEK 3

ID: B0005C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	writing held onto hotdog swing	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	net swing (no balls off mirror - can't kick) hot dog for first time (nervous but did well)	**2**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	writing bean bag baseball (better visual tracking)	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

writing: got circles after cued, bad grip on pencil, no more lines after circles just scribbled)

hot dog swing: first time with min assist, nervous expression, held 2x for ABC's

held in place for bean bag baseball

WEEK 4

ID: B0005C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	chalk writing "A" and "D" a few A's independently D was new, more of circular scribble	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with bean bags excited when got them in the trash can	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	good visual in beanbag baseball	**3**

*expected to be seen most often

overall: **8 out of 15**

definite difference

ADDITIONAL NOTES:
impulsive/grabby today

WEEK 5

ID: B0005C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	climb up ladder 2x with cautiousness jump into crash pits with reservation cautious with increased times to jump	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	tolerated increased height swinging on net swing	**4**
*Seeking Sensation/ Underresponsiveness	liked use of physioball for increased prop while on net swing carpet swing toss bean bags (no sensitivity noted)	**5**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **12 out of 15**

probable difference

ADDITIONAL NOTES:

WEEK 1

ID: B0007C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	poor attn span pegs midline crossing L/P pull/put in	**1**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	net swing linear/min rotate breaks for communicate "swing"	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	prewriting attempts visual cues with and without success scribble palmar grasp (max assist for positioning)	**3**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 2

ID: B0007C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	putty with marbles 12x R and L hands put in ball (good task attention ~7 min) good visual attention	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	monkey bed sitting (tired, needed more support; decreased postural control with increased monkey bed attempts) adverse to prone position (on belly) tire swing at min-mod intensity	**2**
*Seeking Sensation/ Underresponsiveness	net swing (sitting at mod intensity) linear movement okay with prone holds adverse to laying and remaining prone (but okay after 1 unhappy attempt)	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT

WEEK 3

ID: B0007C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	scissors buttons, zipper on vest socks off coloring	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	tire swing net swing ran on crash pits towards zip line	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	scripting	**1**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

good on tire swing; net swing prone without resistance

scissorsL cut straight line; stacked 5 blocks, imitated train shape

coloring - scribble, lines, not really circle

no buttons/zipper vest (half zipped it)

scripting, not much eye contact

after prompted, socks off

WEEK 4

ID: B0007C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	pulling putty while on carpet swing	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	monkey bed (did not like laying on belly) carpet swing tolerated prone (not much eye contact though)	**2**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	distracted some mimicking mostly scripting coloring: scribbles (not long attention span, maybe 10 sec)	**1**

*expected to be seen most often

7 out of 15

overall:

definite difference

ADDITIONAL NOTES:

DPPT

blew bubbles to try and keep head up while prone on carpet swing

WEEK 5

ID: B0007C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing lateral and side to side for increased postural control and eye contact ~10 min	**3**
*Seeking Sensation/ Underresponsiveness	monkey bed 5x with mod bounce with both hand support on knees putty pull downs with 1 finger for marbles 15x min assist	**3.5**
Visual/Auditory Sensitivity	decreased scripting decreased meaningful verbalization when OT asked what was wanted	**3**

*expected to be seen most often

overall: **9.5 out of 15**

definite difference

ADDITIONAL NOTES:

dad present

said preschool eval went well

DPPT

WEEK 1

ID: J0008M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	upset when outside the lines	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity		**n/a**
*Seeking Sensation/ Underresponsiveness	good attention to task	**2**
Visual/Auditory Sensitivity	Beery VMI 75th% visual perception 73rd% (good scanning) motor coordination 21st%	**2**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

25 min eval

been seeing JM since 18 months

WEEK 2

ID: J0008M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with bean bags in trash can spiderman, ladder, jumps tarzan swing	**1**
*Seeking Sensation/ Underresponsiveness	big swings, lots of swings lots of crashing seeker	**1**
Visual/Auditory Sensitivity	writing - mazes (eyes/hands - visual, motor) crazy 8s	**2**

*expected to be seen most often

overall: **4 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT

WEEK 3

ID: J0008M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing/bean bags into trash can balls on mirror with net swing	**3**
*Seeking Sensation/ Underresponsiveness	tire swing (attempts to stay on, not be knocked off) 4x	**1**
Visual/Auditory Sensitivity	PACE, visual-motor dot to dot puzzles mazes letters/writing carpet swing/bean bags into trash can	**2**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 4

ID: J0008M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity	sour spray (wanted it)	**4**
*Movement Sensitivity	net swing with balls on mirror carpet swing with bean bags hippity hop 3x	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	mazes, dot to dot for visual motor bean bag catch in bucket while walking on infinity loop	**2**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

PACE with DLR (eyes with cross/puppet crawls)

break dancing!

WEEK 5

ID: J0008M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	great visual motor	**5**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	great size/spacing with letters	**4**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	dot to dot 2 more intricate mazes small, between the lines handwriting	**4**

*expected to be seen most often

overall: **typical** **13 out of 15**

ADDITIONAL NOTES:
DPPT

WEEK 1

ID: B0010C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	scooterboard independently 5x min assist up ramp 3x mod assist last 2x	**3**
*Seeking Sensation/ Underresponsiveness	beanbag baseball 50x no sign of fatigue tire swing mod intensity 5min linear/rotary	**2**
Visual/Auditory Sensitivity	letters: magic c (a, g, o) 4x each first reversal of the a	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT

WEEK 2

ID: B0010C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	toss/catch weighted balls, trampoline 20x each	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing mod intensity w/o fatigue min cues with peanut ball	**2**
*Seeking Sensation/ Underresponsiveness	tire swing 50 pushes mod intensity linear, rotating	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

good visual attn

DPPT

WEEK 3

ID: B0010C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	rock wall (good strengthening), no fatigue	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	spiderman, climb on ladder, jumps cross crawls (good motor coordination)	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	mazes (stayed within lines 90% and 100% 1x each) writing (magic C: c a o g 1-2x each)	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

cues with mazes

WEEK 4

ID: B0010C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	hot dog balls on trampoline (good: heavy 15x, med 20x, light 20x) tire swing	**3**
*Seeking Sensation/ Underresponsiveness	crashing hot dog tire swing	**2**
Visual/Auditory Sensitivity	writing on board (work on letter recognition) (d, g, q, c, o, a)	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

very oppositional

WEEK 5

ID: B0010C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	rockwall without fatigue	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	tire swing holding ropes at mod intensity linear, orbiatl movement to increase prop	**3.5**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	Peabody tests - sat at table (min cues to maintain attn)	**4**

*expected to be seen most often

overall: **11.5 out of 15**

probable difference

ADDITIONAL NOTES:

DPPT

Peabody finemotor subtests - 25 percentile grasping, visual motor integration 50%,

fine motor 35%

good engagement today

WEEK 1

ID: B0011C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	carpet swing with bean bags in left sea urchin "buggie" ok oosh koosh NO feather boa on face	**1**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	beads on string blocks in giraffe (L support shoulder, R cross midline)	**2**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 2

ID: B0011C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	buggies/balls - very good hard touch with the oosh koosh - good putty pulls: L hand and midline crossing	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with putty L shoulder support during giraffe blocks	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	attn to task with blocks (giraffe) buttons	**3**

*expected to be seen most often

overall: **8 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT (not soft)

WEEK 3

ID: B0011C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	squish toys without brushing first 6x quickly removed boa from neck (light touch) engaged well with all other toys	**3.5**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	OT discussed with mom the dislike of being on back for diaper changes	**3**
*Seeking Sensation/ Underresponsiveness	L weight bearing to build the train mindline crossing with L to build with the blocks	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9.5 out of 15**

definite difference

ADDITIONAL NOTES:
used R hand for button vest

WEEK 4

ID: B0011C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	brush, happy, likes it shaving cream - hesitant but eventually touched it with L hand then at the end, put R hand in there as well	**3.5-4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	putty pulls on carpet (no fear) L pull and midline crossing	**5**
*Seeking Sensation/ Underresponsiveness	swing and baseball toss L pull and midline pegs with shoulders support (both sides)	**4**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **12.5 out of 15**

probable difference

ADDITIONAL NOTES:

WEEK 5

ID: B0011C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	played with putty without tactile defensiveness 7x putty pulldowns	**5**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	tolerated side sitting with weight bearing on L linear rocking on carpet swing with putty	**4**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	buttons with both hands on and off socks and shoes	**4**

*expected to be seen most often

overall: **13 out of 15 typical difference**

ADDITIONAL NOTES:

WEEK 1

ID: B0012C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity	OT discussed with mom adding crunchy/chewy to diet to decrease oral seeking	**2**
*Movement Sensitivity	spiderman with crashes beanbag baseball 50x (fatigue at 30) 50% accurate beanbags, low coordination, needed cues	**2**
*Seeking Sensation/ Underresponsiveness	tarzan swing 10s 4x, 8s 2x mod intensity/height with crashes	**1**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **5 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

MKY writing 3x each (Y demo)

WEEK 2

ID:
B0012C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	putty with R on carpet swing balls on the trampoline (dyspraxia: no motor planning)	**1**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity		**n/a**
*Seeking Sensation/ Underresponsiveness	spiderman and jumps tarzan (lots of prop)	**1**
Visual/Auditory Sensitivity	letters M K Y, name	**2**

*expected to be seen most often

overall: **4 out of 15**

definite difference

ADDITIONAL NOTES:
midline crossing,
hand dominance

WEEK 3

ID: B0012C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	scooter board with mod/max assist hippity hop (dyspraxic); 1st time (mostly used legs, didn't bounce)	**2**
*Seeking Sensation/ Underresponsiveness	zipline washing machine seeker!	**1**
Visual/Auditory Sensitivity	crashes for prop and attn to task	**2**

*expected to be seen most often

overall: **5 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

fast/slow/med car, rate how you do things 1-10

wants zip line and lycra ladder next time

WEEK 4

ID: B0012C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	introduced wall/floor pushes (for when angry or frustrated)	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with bb toss (1, 5, 10 degree of throws) fast/slow/med car tornado swing to calm before leaving scooter board with #s puzzle	**4**
*Seeking Sensation/ Underresponsiveness	zipline spiderman with jumps in crash pits	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **10 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 5

ID: B0012C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	jumps with yellow ladder 10x incorporating engine run terms (fast/slow/med car)	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	blue lycra ladder to save the guys 5x mod assist no loss of balance	**4**
*Seeking Sensation/ Underresponsiveness	bounces between saving guys and crashes at end spiderman swing 7x 6s holds with min/mod crash	**4**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **12 out of 15**

probable difference

ADDITIONAL NOTES:

mom and sister present

DPPT

working on fast/med/slow car to increase safety awareness

WEEK 1

ID: J0014M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	needs lots of work on putting parts of picture together	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	perception of what sees and how to draw it is unusual	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	visual motor integration L--> R grid on white board 20x good visual scanning	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:
Beery VMI

WEEK 2

ID: J0014M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	increased visual tracking to R visual field kept eyes on target	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	alphabet 8s with letters in name 90% accurate min verbal cues	**2**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	DPPT with visual tracking, DLR visual perception 2% visual motor skills with Beery VMI 25th%	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 3

ID: J0014M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	scooter board with pennies	**3**
*Seeking Sensation/ Underresponsiveness	tarzan swing and crashing	**2**
Visual/Auditory Sensitivity	PACE standing, lying down for eyes drawing (zig zags), letters	**2**

*expected to be seen most often

overall: **7 out of 15**

definite difference

ADDITIONAL NOTES:

crashing to wake up body/eyes

WEEK 4

ID: J0014M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	tarzan swing 3x 5 sec hold, 1x 10 sec hold	**3**
*Seeking Sensation/ Underresponsiveness	lycra swing jumps	**3**
Visual/Auditory Sensitivity	PACE with DLR for eyes writing and drawing for visual fields (diagnols, connecting from side to side) (letters: a, c, q, s, d, h, g, 9) - magic c's and diver letters	**3**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 5

ID: J0014M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	needed increased assist to complete motor plan visual motor roataion around midline 8x total breakdown of motor plan at 6th rep	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity		**n/a**
*Seeking Sensation/ Underresponsiveness	blowing bubbles with tubing	**5**
Visual/Auditory Sensitivity	good tracking some depth perception issues today	**4.5**

*expected to be seen most often

overall: **12.5 out of 15**

probable difference

ADDITIONAL NOTES:

disprganized today

PACE, DLR (good tracking L--> R --> L without blinking at midline)

difficulty remaining focused at school

dad present

WEEK 1

ID: J0015M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	strengthening pushing into upright position (circle sitting) mod assist 10x	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity		**n/a**
*Seeking Sensation/ Underresponsiveness	prone on crash pits with mod assist on chest for weight bearing 10x 10s	**2**
Visual/Auditory Sensitivity	visual tracking	**2**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

lots of crabbing but not crying

worked hard

lots of repetitions

WEEK 2

ID: J0015M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	deep pressure on hands	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity		**n/a**
*Seeking Sensation/ Underresponsiveness	sitting up: good work monkey bed more bounce, more vibrations (got a smile)	**2**
Visual/Auditory Sensitivity	eye tracking to left side	**1**

*expected to be seen most often

overall: **5 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 3

ID: J0015M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	rolling self over monkey bed	**1**
*Seeking Sensation/ Underresponsiveness	seeks more more bounce (on peanut ball and monkey bed)	**2**
Visual/Auditory Sensitivity	good eyes today! played with baby toy for attn	**2**

*expected to be seen most often

overall: **5 out of 15**

definite difference

ADDITIONAL NOTES:

sitting up on peanut ball

prone and wanted more bounce, also rolled over on monkey bed

RHS stronger (pulls L up when leaning to L)

RHS usually get more eye attn; today was centered and to left

WEEK 4

ID: J0015M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity	wanted to chew liked the open end of theratube no sour	**2**
*Movement Sensitivity	supine with hands to midline eyes at middle 10x 10s	**3**
*Seeking Sensation/ Underresponsiveness	increased resistance to chopping which decreased eyes to midline	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **8 out of 15**

definite difference

ADDITIONAL NOTES:

visual motor

DPPT

WEEK 5

ID: J0015M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	sitting on OT lap on ball/bouncing 10x forward reach to knock ball off mirror 15x	**4**
*Seeking Sensation/ Underresponsiveness	more bounce	**3**
Visual/Auditory Sensitivity	closed eyes and became very lethargic	**2**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

DPPT

good work for about 15 min then very fatigued

WEEK 1

ID: J0016M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	postural, net swing mod height carpet swing: med height with OT behind for support	**1**
*Seeking Sensation/ Underresponsiveness	okay with mod motion through space but FEAR past that	**2**
Visual/Auditory Sensitivity	no head movement off midline	**1**

*expected to be seen most often

overall: **4 out of 15**

definite difference

ADDITIONAL NOTES:
DPPT

WEEK 2

ID: J0016M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	won't climb small ladder to make list	**1**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	postural security monkey bed with min bounce very slow to crash	**1**
*Seeking Sensation/ Underresponsiveness	carpet swing (max assistance to stay on) net swing: max height without fear	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **4 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 3

ID: J0016M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	did not want to hit ball while in net swing at first	**1**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	did not want to swing too high	**1**
*Seeking Sensation/ Underresponsiveness	no big swinging or big jumps	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **4 out of 15**

definite difference

ADDITIONAL NOTES:

very wary of feet off ground or trying new things

net swing: almost in tears saying no to the ball but then loved it

steps and very small jumps (didn't want to jump down off crash pits, but then did it)

carpet swing with bean bag toss (knocked towers down, good throwing)

tire swing (wanted to just sit, but did bounce, and started to allow slight/very min swinging at end)

WEEK 4

ID: J0016M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	net swing with ball 50x (no fear)	**3**
*Seeking Sensation/ Underresponsiveness	carpet with peanut ball min challenge	**3**
Visual/Auditory Sensitivity	jump off platform 3x w/o fear	**4**

*expected to be seen most often

overall: **10 out of 15**

definite difference

ADDITIONAL NOTES:
very fearful of new things

WEEK 5

ID: J0016M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	jumping 6x independently came down from crash pits	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	tarzan 2x net swing max height tire swing rotating, feet were off ground	**3**
*Seeking Sensation/ Underresponsiveness	wanted the ball with net swing	**4**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **10 out of 15**

definite difference

ADDITIONAL NOTES:

didn't get to putty although it was on the list, but no meltdown

WEEK 1

ID: J0018M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	hot dog swing tornado swing to calm save the guys on the scooter with rope	**2**
*Seeking Sensation/ Underresponsiveness	hot dog swing carpet swing with peanut ball	**1**
Visual/Auditory Sensitivity	climbing ladder (eyes on the ladder)	**3**

*expected to be seen most often

overall: **6 out of 15**

definite difference

ADDITIONAL NOTES:

body feels like pooh, tigger, eeyore

WEEK 2

ID: J0018M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	bean bag baseball on balancing board (good!)	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	hippity hop with mod/max assist hot dog tornado swing in circles scooter board/bowling pins	**2**
*Seeking Sensation/ Underresponsiveness	seeker loves to crash blew bubbles through tube to slow body down to "pooh"	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **8 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 3

ID: J0018M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	pooh/tigger/eeyore verbally can tell what needs to be done for body but actually physically out of control	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	hot dog swing fell off carpet swing 2x (out of control)	**4**
*Seeking Sensation/ Underresponsiveness	zipline tire swing (looking for dad's approval)	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **10 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 4

ID: J0018M

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity		**n/a**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with peanut ball pooh, tigger, eeyore	**4**
*Seeking Sensation/ Underresponsiveness	rock wall with crashes and jumps	**3.5**
Visual/Auditory Sensitivity	balls on trampoline carpet swing with bubbles and "snow" (long and short breaths, blowing)	**3**

*expected to be seen most often

overall: **10.5 out of 15**

probable difference

ADDITIONAL NOTES:

PACE

very good pooh today!

WEEK 5

ID: J0018M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	treadmill eeyore (very slow)	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing - eeyore net swing with balls - pooh/tigger	**5**
*Seeking Sensation/ Underresponsiveness	hot dog - tigger tornado swing - tigger and pooh (back and forth)	**4**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **typical** **13 out of 15**

ADDITIONAL NOTES:

self reg

tigger/pooh/eeyore (engine terms) with 2 actions for each - picked appropriate actions for each!

transitioned between these three with only verbal cueing

great job today!

WEEK 1

ID: J0019M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	zoomball with L beanbags (throw at ball with L) kicking the big medicine ball	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	balancing (hands and knees on medicine ball, sitting, rolling on ball)	**2**
*Seeking Sensation/ Underresponsiveness	tarzan swing carpet swing (with beanbags)	**4**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 2

ID: J0019M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	hot dog with only L (stayed on 10 sec ~4x) pegs 32s to remove 33 pegs L only	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	great at balancing! beanbag baseball with balance balancing on all fours on big ball sitting in middle of big blue ball and smaller green ball	**3**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	writing letters with eyes closed (alphabet)	**3**

*expected to be seen most often

overall: **10 out of 15**

probable difference

ADDITIONAL NOTES:

PACE

WEEK 3

ID: J0019M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	hot dog swing upside down with L arm/leg holding	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	core strength surpine kicks 20x (18/20 accurate) balance on ball 3-5 sec hold zipline with pull/kick off wall 5x	**5**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	carpet swing with bean bag toss 70x pegboard race 31/28s for 33 pegs	**4**

*expected to be seen most often

overall: **typical** **13 out of 15**

ADDITIONAL NOTES:

shifts to R (difficult to balance)

increased scores at brain balance (esp visual motor)

WEEK 4

ID: J0019M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	carpet beanbag toss (near/far) > 85% accuracy	**5**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	ball on all 4s, balancing ball kicks (surpine kicks) new: walking on the barrel (nervous)	**4.5**
*Seeking Sensation/ Underresponsiveness	hot dog no hands 3s and 7s blew nose while upside down! tarzan (long holds)	**5**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **typical** **14.5 out of 15**

ADDITIONAL NOTES:
great balancing!
not PACE, new: "rocker"

WEEK 5

ID: J0019M

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	balance: all 4s on ball (independently got on)	**5**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	core strengthening supine ball kicks 30x mod kick sititing on ball without feet on ground 4s 5x	**5**
*Seeking Sensation/ Underresponsiveness		**n/a**
Visual/Auditory Sensitivity	handwriting: all alphabet without hand on board with hand on board: letters dark and small without hand there: finer movement and easier	**4**

*expected to be seen most often

overall: **typical** **14 out of 15**

ADDITIONAL NOTES:
said "I hate writing"

WEEK 1

ID: B0020C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	DPPT shoe tying	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	balls/trampoline beanbag baseball hippity hop around between shoe tying	**3**
*Seeking Sensation/ Underresponsiveness	tarzan swing "taco squish" (squished by crash pits)	**2**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **8 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 2

ID: B0020C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	bean bag baseball shoe tying	**3**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	hot dog tarzan swing	**3**
*Seeking Sensation/ Underresponsiveness	more taco squish doesn't want to crash too high/far off tarzan	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 3

ID: B0020C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	weak: attempted tangles/snaps without success decreased hand strength	**2**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	jumprope with twirling 2x consecutive jumps	**4**
*Seeking Sensation/ Underresponsiveness	seeking increased crash into pillows off tarzan and wants extra squish hippity hop around hallway 2x (increased prop)	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **9 out of 15**

definite difference

ADDITIONAL NOTES:

WEEK 4

ID: B0020C

Behavior	**Observations/Notes**	**Degree of Difference**
*Tactile Sensitivity	beanbag baseball (increase motor plan and coordination) 2x ~40 bags ~85% accurate	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing with peanut ball (increase hand strength to complete fine motor activities 3x) fatigue after 2nd time	**4**
*Seeking Sensation/ Underresponsiveness	weighted balls 30x, 30x, 15x frustration with fatigue	**3**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **11 out of 15**

probable difference

ADDITIONAL NOTES:

DPPT

PACE

frustrated when pushed to do more

WEEK 5

ID: B0020C

Behavior	Observations/Notes	Degree of Difference
*Tactile Sensitivity	blue lycra to save the guys mod/max assist	**4**
Taste/Smell Sensitivity		**n/a**
*Movement Sensitivity	carpet swing side to side and linear with putty	**5**
*Seeking Sensation/ Underresponsiveness	tarzan with squishes 7x 10s hold mod intensity swing height crash and squish with pillows	**4**
Visual/Auditory Sensitivity		**n/a**

*expected to be seen most often

overall: **typical** **13 out of 15**

ADDITIONAL NOTES:

DPPT

PACE

better able to control emotions when things don't go as planned

Appendix K

Table 1

Demographics for Data

ID	AGE	GENDER	SENMOD	HYP
J0001M	9	0	0	0
B0003C	2	0	1	0
B0004C	3	0	1	1
B0005C	14	0	1	1
B0007C	4	1	1	1
J0008M	8	0	0	1
B0010C	5	0	1	1
B0011C	2	1	0	0
B0012C	5	0	1	0
J0014M	8	1	0	1
J0015M	2	1	0	1
J0016M	6	1	1	1
J0018M	5	0	1	0
J0019M	8	0	1	0
B0020C	8	0	0	1

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Table 2

Researcher's Observations: Weeks 1 through 5 for Each Individual

Changes for Each Individual from Weeks 1 through 5

ID	Change
J0001M	2
B0003C	0
B0004C	6
B0005C	5
B0007C	2.5
J0008M	7
B0010C	4.5
B0011C	7
B0012C	7
J0014M	5.5
J0015M	3
J0016M	6
J0018M	7
J0019M	5
B0020C	5

See Figure 3 for pictorial description.

Appendix K

Tables 3, 4, 5, and 6

Data With and Without Sensory Modulation Dysfunction and Hypotonia

Table 3
Group Statistics

	SENMOD	N	**Mean**	Std. Deviation	Std. Error Mean
week1	0	6	**6.67**	.816	.333
	1	9	**6.56**	1.740	.580
week2	0	6	**6.50**	1.871	.764
	1	9	**6.56**	1.878	.626
week3	0	6	**7.250**	1.7248	.7042
	1	9	**7.333**	2.8723	.9574
week4	0	6	**10.083**	1.6857	.6882
	1	9	**9.444**	2.2837	.7612
week5	0	6	**11.583**	2.0104	.8207
	1	9	**11.333**	1.6394	.5465

This table used the averages for those with and without sensory modulation dysfunction derived from the group statistics used by SPSS software (see bold).

Table 4
Group Statistics

	HYP	N	**Mean**	Std. Deviation	Std. Error Mean
week1	0	6	**7.00**	1.673	.683
	1	9	**6.33**	1.225	.408
week2	0	6	**7.00**	2.098	.856
	1	9	**6.22**	1.641	.547
week3	0	6	**8.250**	3.1583	1.2894
	1	9	**6.667**	1.6583	.5528
week4	0	6	**11.250**	1.9685	.8036
	1	9	**8.667**	1.3229	.4410
week5	0	6	**11.667**	2.1602	.8819
	1	9	**11.278**	1.5023	.5008

This table also used the averages for those with and without hypotonia derived from the group statistics used by SPSS software (see bold).

Table 5
Independent Samples Test: Sensory Modulation Dysfunction

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	**t**	df	**Sig. (2-tailed)**	Mean Difference	Std. Error Difference	Lower	Upper
week1	Equal variances assumed	3.124	.101	**.145**	13	**.887**	.111	.767	-1.547	1.769
week2	Equal variances assumed	.043	.839	**-.056**	13	**.956**	-.056	.988	-2.191	2.080
week3	Equal variances assumed	1.435	.252	**-.063**	13	**.950**	-.0833	1.3146	-2.9233	2.7566
week4	Equal variances assumed	.080	.782	**.584**	13	**.569**	.6389	1.0932	-1.7228	3.0006
week5	Equal variances assumed	.966	.344	**.265**	13	**.795**	.2500	.9440	-1.7895	2.2895

Table 6
Independent Samples Test: Hypotonia

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	**t**	df	**Sig. (2-tailed)**	Mean Difference	Std. Error Difference	Lower	Upper
week1	Equal variances assumed	.919	.355	**.894**	13	**.387**	.667	.745	-.944	2.277
week2	Equal variances assumed	.523	.482	**.806**	13	**.435**	.778	.965	-1.306	2.862
week3	Equal variances assumed	4.672	.050	**1.278**	13	**.224**	1.5833	1.2393	-1.0939	4.2606
week4	Equal variances assumed	.984	.339	**3.059**	13	**.009**	2.5833	.8445	.7590	4.4077
week5	Equal variances assumed	1.564	.233	**.414**	13	**.686**	.3889	.9404	-1.6428	2.4205

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Table 7

Sensory Profile Data Table

ID	AGE	GENDER	SENMOD	HYP	TACTint	TASTEint	MOVEint	SEEKint	AUDFint	ENERGYint	VISint
J0001M	9	0	0	0	28	17	11	12	20	14	14
B0003C	2	0	1	0	29	11	11	22	14	30	12
B0004C	3	0	1	1	17	4	10	19	14	14	13
B0005C	14	0	1	1	27	17	10	13	15	16	16
B0007C	4	1	1	1	26	4	5	9	13	25	17
J0008M	8	0	0	1	34	16	15	26	26	27	23
B0010C	5	0	1	1	17	10	6	24	15	12	12
B0011C	2	1	0	0	21	11	9	28	20	13	17
B0012C	5	0	1	0	27	20	15	13	16	19	20
J0014M	8	1	0	1	30	12	15	29	16	23	16
J0015M	2	1	0	1	33	16	15	25	18	6	20
J0016M	6	1	1	1	19	16	3	29	23	18	15
J0018M	5	0	1	0	29	10	15	19	19	24	22
J0019M	8	0	1	0	30	10	15	26.5	23	28	24
B0020C	8	0	0	1	21	6	12	31	27	29	18

Table 7 represents the results of the initial and final *Sensory Profiles* for each individual.

TACTfin	TASTEfin	MOVEfin	SEEKfin	AUDFfin	ENERGYfin	VISfin
26	19	11	13	11	16	13
28	11	10	24	20	30	15
25	14	12	23	24	10	19
28	16	10	13	14	12	19
31	4	5	15	12	23	16
35	18	15	30	26	30	23
19	9	6	20	16	12	12
23	10	9	30	25	12	13
30	20	13	14	20	20	21
27	13	14	26	15	17	14
33	16	15	25	24	6	20
16	13	3	18	20	18	8
29	4	15	26	22.5	23	20
31	4	15	23	19	28	23
24	4	9	33	22	24	13

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Table 8

Mean Change and Average Range in Sensory Profile from Initial Parent Assessment to Final

	Tactile Sensitivity	**Taste Sensitivity**	**Movement**	**Sensory Seeking**	**Energy**	**Visual Sensitivity**	**Auditory Sensitivity**	**Overall Sensory**
Mean	***1.13***	-0.33	-0.33	***0.50***	-1.13	-0.67	***0.77***	-0.07
Minimum	-3.00	-6.00	-3.00	-11.00	-6.00	-7.00	-9.00	-27.00
Maximum	8.00	10.00	2.00	7.00	3.00	6.00	10.00	36.00

Those in **bold** represent the positive changes, which indicate improvement from the initial to the final sensory profile results gathered from the parents. The areas of tactile sensitivity, sensory seeking/aversion, and auditory sensitivity show an improvement.

Appendix K

Table 9

Overall Sensory Profile Data

ID	AGE	GENDER	SENMOD	HYP	TACTint	TASTEint	MOVEint	SEEKint	AUDFint	ENERGYint	VISint
J0001M	9	0	0	0	28	17	11	12	20	14	14
B0003C	2	0	1	0	29	11	11	22	14	30	12
B0004C	3	0	1	1	17	4	10	19	14	14	13
B0005C	14	0	1	1	27	17	10	13	15	16	16
B0007C	4	1	1	1	26	4	5	9	13	25	17
J0008M	8	0	0	1	34	16	15	26	26	27	23
B0010C	5	0	1	1	17	10	6	24	15	12	12
B0011C	2	1	0	0	21	11	9	28	20	13	17
B0012C	5	0	1	0	27	20	15	13	16	19	20
J0014M	8	1	0	1	30	12	15	29	16	23	16
J0015M	2	1	0	1	33	16	15	25	18	6	20
J0016M	6	1	1	1	19	16	3	29	23	18	15
J0018M	5	0	1	0	29	10	15	19	19	24	22
J0019M	8	0	1	0	30	10	15	26.5	23	28	24
B0020C	8	0	0	1	21	6	12	31	27	29	18
					25.87	*12.00*	*11.13*	*21.70*	*18.60*	*19.87*	*17.27*

Again, these are the results of the initial and final *Sensory Profiles* for each individual.

Those in italics are the averages for each area of sensory integration (i.e., tactile, taste, movement, sensory seeking, etc.)

TACTfin	TASTEfin	MOVEfin	SEEKfin	AUDFfin	ENERGYfin	VISfin
26	19	11	13	11	16	13
28	11	10	24	20	30	15

OVERALL INT	OVERALL FIN
126.44	126.37

These overall scores indicate degrees of **definite difference**. There is also not much change between the two – the final overall score actually decreases (gets worse), but only slightly. This may indicate inconsistency with the forms filled out by the parents.

25	14	12	23	24	10	19
28	16	10	13	14	12	19
31	4	5	15	12	23	16
35	18	15	30	26	30	23
19	9	6	20	16	12	12
23	10	9	30	25	12	13
30	20	13	14	20	20	21
27	13	14	26	15	17	14
33	16	15	25	24	6	20
16	13	3	18	20	18	8
29	4	15	26	22.5	23	20
31	4	15	23	19	28	23
24	4	9	33	22	24	13
27.00	*11.67*	*10.80*	*22.20*	*19.37*	*18.73*	*16.60*