On the go: sensory kit manuals for families of children with autism spectrum disorders

Sarah Dahlhauser
University of North Dakota

Holly Frolek
University of North Dakota

Follow this and additional works at: http://commons.und.edu/ot-grad

Part of the Occupational Therapy Commons

Recommended Citation
http://commons.und.edu/ot-grad/49
ON-THE-GO: SENSORY KIT MANUALS FOR FAMILIES OF CHILDREN WITH AUTISM SPECTRUM DISORDERS

by

Sarah Dahlhauser, MOTS and Holly Frolek, MOTS

Advisor: Gail Bass, Ph.D., OTR/L

A Scholarly Project
Submitted to the Occupational Therapy Department
of the
University of North Dakota
in partial fulfillment of the requirements
for the degree of
Master’s of Occupational Therapy

Grand Forks, North Dakota
May, 2010
This Scholarly Project Paper, submitted by Sarah Dahlhauser and Holly Frolek in partial fulfillment of the requirements for the Degree of Master’s of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

____________________________________
Faculty Advisor

____________________________________
Date
PERMISSION


Department: Occupational Therapy

Degree: Master’s of Occupational Therapy

In presenting this Scholarly Project in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, we agree that the Department of Occupational Therapy shall make it freely available for inspection. We further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised our work or, in her absence, by the Chairperson of the Department. It is understood that any copying or publication or other use of this Scholarly Project or part thereof for financial gain shall be given to us and the University of North Dakota in any scholarly use which may be made of any material in our Scholarly Project.

Sarah Dahlhauser, MOTS

Date

Holly Frolek, MOTS

Date
# TABLE OF CONTENTS

**LIST OF FIGURES** ........................................................................................................... vii

**ACKNOWLEDGEMENTS** ..................................................................................................... viii

**ABSTRACT** ............................................................................................................................ viii

**CHAPTERS**

I. **INTRODUCTION** .................................................................................................................. 1

II. **REVIEW OF LITERATURE** ............................................................................................... 4

   Introduction .......................................................................................................................... 4
   Definition and Symptomology ......................................................................................... 5
   Evaluation ............................................................................................................................ 11
   Intervention .......................................................................................................................... 17
   Family Impact ....................................................................................................................... 25
   Summary ............................................................................................................................... 32

III. **METHODODOLOGY** ....................................................................................................... 33

IV. **PRODUCT** ....................................................................................................................... 35

   *On-The-Go: Sensory Kit Manual* .................................................................................. 38

V. **SUMMARY** ....................................................................................................................... 67

**REFERENCES** ........................................................................................................................ 71
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>10</td>
</tr>
</tbody>
</table>

1. Presentation of Sensory Processing Behaviors
ACKNOWLEDGEMENTS

The authors would like to thank our advisor, Dr. Gail Bass, for her expertise and resources during this scholarly project. Thank you to our friends and family that supported us and encouraged us to keep working hard. Finally, we would like to thank Beth Werner DeGrace, whose article presented us with the foundation for creating our final product.
ABSTRACT

In the past 10 years the prevalence of autism spectrum disorders (ASD) has increased to 1 in every 150 children (Case-Smith & Arbesman, 2008). According to Greenspan and Wieder (1997), 95% of these children diagnosed with ASD experience sensory modulation problems. Having a child with ASD can have a significant impact on family dynamics during the first years post-diagnosis. The findings of a qualitative study by Werner Degrace (2004) suggest that family life revolves around the preoccupation with the child’s behaviors. The findings further indicate that social and leisure involvement are sacrificed to manage the child’s behaviors at the cost of the family’s health and well-being. Case-Smith and Arbesman (2008) surmised that sensory integration is effective when individualized to the child’s unique sensory needs. Occupational therapists can provide the family of a child diagnosed with ASD sensory integration strategies to help fulfill their child’s sensory needs, which should facilitate management of disruptive behaviors.

An extensive literature review of the quality of life for families with a child diagnosed with Autism Spectrum Disorder was completed as part of this project. The literature reviewed included: symptomology of ASD, sensory related evaluations, interventions with ASD, and the impact on the family’s quality of life. This review of literature indicated that there is a need for families to engage in their community in order...
to bond and feel “normal”. The product of this scholarly project was the development of a manual for parents. The On-The-Go manual was designed as a supplement to the Sensory Profile© (Dunn, 1999). It is intended that occupational therapists will use Sensory Profile© to identify a child’s sensory needs and then use the On-the-Go manual with parents to allow them to create their own sensory kit for their child’s unique needs. It is anticipated that an On-The-Go sensory kit for families to use when bringing their child(ren) with ASD into the community setting will help facilitate their community involvement while giving them the tools to help manage their child’s unique symptoms and behaviors.
CHAPTER I

INTRODUCTION

According to Ayres (2005), a child under the age of 7 “senses things and gets meaning directly from sensations” (p. 7). This means that it is a part of natural development that a child seeks sensory input and learns from it. When the body does not process sensory information in an appropriate manner, the child may be diagnosed with a Sensory Processing Disorder (SPD). According to Greenspan and Weidel (1997), ninety-five percent of children with Autism Spectrum Disorder (ASD) experience sensory modulation problems, and currently 1 of every 150 children is diagnosed with ASD (CDC, 2002). Because of this, sensory integration intervention with the ASD population is a rapidly growing area of OT practice.

Because they cannot process sensory stimuli appropriately, children with ASD may respond to stimuli in their non-routine environments with adverse behavior. This may limit the selection of contexts that the child allows himself or herself to enter, which in turn limits the number of places to which the rest of the family may go. The review of literature in Chapter II of this project has shown that families with a member diagnosed with ASD experience a strain in their community roles and decreased quality of life secondary to a lack of community involvement.
The focus of this project is to develop strategies for regulating the child’s behavior while in the community context through sensory-based tools and activities that are travel friendly. It is important for occupational therapists to collaborate with families to create methods of sensory regulation that are individualized to the child’s unique needs. Collaborating with families, which provides an atmosphere for dialogue and support, has evidenced positive outcomes in parental quality of life and attitudes regarding their child’s intervention (Whitaker, 2002).

Several factors may influence the application of the intervention proposed in this scholarly project. The primary factor of concern is the severity of symptoms presented by the individual with ASD. Although sensory-based strategies may help increase a child’s presentation of positive behavior, a child with severe symptoms may be unable to cope with new stimuli or environments, thus a sensory kit alone may not be a permanent solution. Another factor that may influence the implementation of this project is the family’s compliance with the intervention.

The development of the product was guided by the Occupational Adaptation model (Schkade & Schultz, 2003) and Sensory Integration frame of reference (Ayres, 2005). The Occupational Adaptation model focuses on the individual, occupation, and environment; how it affects performance; and how to adapt the three areas to achieve optimal performance. The model measures success in occupational performance by relative mastery, an individual’s ability to master the occupations in every context to optimize his or her overall
performance (Schkade & Schultz, 2003). The basis behind this project is adapting how the child perceives the environment based on their sensory experiences. The tools and activities used for the product are based on sensory integration interventions and are effective in eliciting or inhibiting behavioral responses. It is anticipated that the sensory activities and tools will help integrate play and positive sensory experiences to improve a child’s sensory processing.

Summary

The remaining chapters of this project provide a theoretical basis and research evidence supporting the project, the product itself, and the intended use of the product. Chapter II contains a review of current literature regarding the presentation of ASD, commonly used interventions used with young children diagnosed with ASD, and the impact of ASD on the family. The methods used for developing this scholarly project, as well as the theoretical basis used to develop the product, are described in Chapter III. Chapter IV contains the complete product to be used by skilled occupational therapists. Chapter V proposes the intended application of the product, recommendations for future research, and limitations of the project.
CHAPTER II
REVIEW OF LITERATURE
Introduction

The research in this chapter indicates that families of a child with ASD have a decreased quality of life due in large part to involvement of their child’s symptoms and responses. Because of this, families do not experience what is considered “normal” bonding leading to high rates of stress and lack of social supports. This creates a dysfunctional family system which leads to further difficulties. Occupational therapists often work with these children and their families at some point in their lives. Occupational therapists are skilled in assessing and providing proper interventions to reduce the child’s responses and for the family to adapt. The manual developed as part of this scholarly project was designed to help occupational therapists and parents address disruptive behaviors that interfere with community involvement.

In order to achieve validity, a literature review was completed through online data bases, text books, websites and workshop materials. The focus of the searches was on ASD symptomology, common sensory evaluations, interventions utilized by occupational therapists for children with ASD, and the family impact.

The following is the subsequent review of literature beginning with the definition and symptomology of ASD. Next is an overview of occupational
therapy evaluations used to determine sensory responses. Then, commonly implemented interventions provided by the occupational therapist, are described. Finally, literature dealing with the impact ASD has on the family’s quality of life was reviewed.

Definition and Symptomology

Autism Spectrum Disorder [ASD] is an umbrella term used to acknowledge the varying degrees of severity encapsulated in Pervasive Development Disorders [PDD]. The two terms are used interchangeably in the literature (Dodd Inglese & Elder, 2009), but this scholarly project will refer to the term ASD for the sake of consistency. The American Psychiatric Association [APA] (2000) classifies the following disorders as Pervasive Development Disorder: Asperger’s Disorder, Autistic Disorder, Childhood Disintegrative Disorder, Rett’s Disorder, and Pervasive Development Disorder Not Otherwise Specified. The characteristic impairments of PDD are usually evident in the first three years of life and involve reciprocal social interaction skills, communication skills, and stereotyped behavior and interests. As the diagnoses are unique and differ in severity, the symptoms that are experienced vary on a spectrum. The National Institute of Mental Health [NIMH] (2009) indicates three core characteristics of ASD, which include difficulties with social participation, communication and repetitive behaviors or restricted interests as well as unusual sensory responses.

The APA (2000) describes the essential features of ASD as “the presence of markedly abnormal or impaired development in social interaction and
communication and a markedly restricted repertoire of activity and interests” (p. 70). The impairment in reciprocal interaction may be evident in a child’s lack of nonverbal communication with others, the appearance of limited interest in developing peer relationships, nonexistent emotional expression, or a preference for solitary rather than social activities. The communication impairment may be manifested in delayed language development, repetitive language, minimal variance in voice quality and speech rate, and limited language comprehension. The last core feature of ASD is the presence of stereotyped behavior, activity, and interest patterns. This may involve abnormal intensity or focus on specific interests, a preoccupation with rituals or routines, and repetitive or stereotyped mannerisms (APA, 2000).

Sensory Issues and ASD

The core features described above are definitive in diagnosing ASD, but they are not the only characteristics of the disorder. Tomchek and Dunn (2007) evaluated 281 children with ASD using the Sensory Profile© (Dunn, 1999) and found significant differences in scores when compared to the 281 “typically developing” children on 92% of the test items. This study indicates a prevalence of sensory processing disorder in ASD. As the term implies, children with sensory processing disorders have difficulty regulating input via the sensory systems: tactile, proprioceptive, auditory, vestibular, visual, gustatory, and olfactory. Due to the overlap of the different systems, there is potential that sensory processing impairment in one system will affect processing in another sensory system.
The tactile system is the largest sensory system and receives input from the skin to provide feedback related to touch (Ayres, 2005). Some of the children are selective about which tactile sensations are acceptable and which are not. According to Yack, Aquilla, and Sutton (2002), some children can tolerate touching others but are unable to tolerate a touch from others. The authors also state that in pursuit of a tactile sensation, the child may act on impulse without contemplating dangers that may result. An example of this may be a child who is hyporesponsive to touch; they may require an intense stimulus to alert the system. According to Kranowitz (2005), this child may be in danger of injuries such as burns or cuts due to their pursuit of harmful but stimulating sensation. Children could also be harmful to others, especially during periods of dressing and undressing; a child who is hyperresponsive may become overly aggressive during dressing times due to discomfort with tactile sensations involved (Kranowitz, 2005).

Negative responses to touch could also lead to difficulty in social relationships. Ayres (2005) explains that simple friend gestures, such as shaking hands or a pat on the back, may be negatively received by the child's tactile system. Family is not immune to this behavior either; a hug or kiss could be considered threatening. Ayres goes on to relay the discomfort childhood games like tag could impose on a child who is tactiley defensive. Not all responses to touch are negative, however; some children seek hugs and kisses, but, as previously noted, they can also seek harmful stimuli.
The skin is not the only element of the body that relays information to the brain. The proprioceptive system also relies on the feedback of touch by utilizing the muscles and joints to supply input related to the body’s position in space (Ayres, 2005). Children with an affected proprioceptive system often have poor body awareness, motor control, grading of movements, postural stability, and praxis (Kranowitz, 2005). These difficulties can result in emotional insecurity due to the child’s lack of confidence. Like with the tactile system, children who are hyporesponsive can be prone to inflicting harm on themselves, such as head banging or crashing into things while walking in order to stimulate their system (Kranowitz, 2005). Due to their poor gradation of movements, these children often involuntarily break objects, such as toys or pencils (Yack, Aquilla & Sutton, 2002; Kranowitz, 2005). On the other end of the spectrum, children with hyperresponsivity may appear to be picky eaters, avoiding things that are crunchy or crispy leading to difficult meal times (Kranowitz, 2005).

According to Ayres (2005), all the systems are interconnected; however, the auditory, vestibular, and visual systems are the most entwined. The auditory and vestibular systems have receptors that are located in the inner ear. The auditory system identifies and refines sounds in the environment. The vestibular system utilizes two receptors in the inner ear to relay information regarding the force of gravity and direction and speed of movement. The visual system utilizes the retina in the eye to receive its input from the environment and thus “forms our basic awareness of the environment and the location of things in it.” (p. 39). Deficits in these areas can create insecurity with movement, thereby eliminating
many of the activities that normal children enjoy and learn from. Ayres (2005) states that a child’s development involves a relationship between the body and gravity; from them first picking their heads up to playing on a playground with friends. Activities with movement are fundamental to children’s occupation and their socialization with others. If a child avoids moving in their environment, they lose social opportunities as well the development of fine and gross motor skills (Yack, Aquilla & Sutton, 2002). The authors also address the opposing side of the reactive spectrum, stating that children who are hyporesponsive are constantly on the go, thus decreasing their attention span.

Symptomology

The symptomology that accompanies a dysfunction in each sense differs depending on if the child is hyperresponsive, which includes sensory sensitivity and sensory avoiding or hyporesponsive, which includes low registration and sensory seeking. Winnie Dunn (2001) places these four responses on a continuum based on the sensory threshold, high and low, and the strategies used when a child encounters a sensory event, passive and active (see Figure 1).
Hyperresponsivity is defined as “A disorder…which the individual is overwhelmed by ordinary sensory input and reacts defensively or withdraws from it…” (Ayres, 2005, p. 200). Children who are hyperresponsive can be either sensory avoiding or sensitive to sensory input. Children with the sensory avoiding response “find ways to limit sensory input throughout the day” in order to actively avoid sensations they find unpleasant (Dunn, 2001, p. 612). In an attempt to create a more predictable environment, these children tend to develop rigid routines (Dunn, 2001). According to Kranowitz (2005), sensory avoiders are prone to meltdowns, due to their body’s response to stimuli as being harmful or threatening. Dunn (2001) describes a child with sensory sensitivity as “notic(ing) sensory stimuli quite readily and more sensory events in daily life than do others.” (p. 612) While these children are more prone to experiencing these sensory events stronger than others, they tend to just “let things happen” thus, responding passively.
Hyporesponsivity is defined as “underreactivity to typical sensory information that may result from poor sensory processing…” (Ayres, 2005, p. 200). Children who are hyporesponsive are either sensory seeking or have low registration. Dunn (2001) describes children who are sensory seekers as “enjoy(ing) sensory experiences and find(ing) ways to enhance and extend sensory events…” (p.612). When these children cannot find a sensory experience in their environment that is strong enough, they will often resort to supplying their own sensory stimulation (Dunn, 2001). Sensory seekers are viewed as troublemakers due to their impulsive and energetic nature (Kranowitz, 2005). Children with low registration “do not notice sensory events in daily life that others notice readily” and are therefore unable to respond appropriately to sensory stimulation from the environment (Dunn, 2001, p. 612). Kranowitz (2005) describes children with low registration as needing a lot more stimulation just to achieve ordinary arousal or alertness. These children tend to have difficulties understanding non-verbal expressions due to their inattentiveness to their environment.

Evaluation

The process of diagnosing ASD should be completed only by clinicians who are experienced in this specialty area. This process involves observation of the child in their environment, standardized testing, and completion of questionnaires by the child and caregivers (Filipek, et. al, 2000). Once diagnosed, a child with ASD may be evaluated by an occupational therapist if he or she demonstrates deficits in occupational performance in the areas of self-
care, play and leisure, socialization and/or education. During the evaluation, an occupational therapist assesses the child’s ability to perform these occupations, as well as the child’s sensorimotor abilities including: gross and fine motor skills, sensory processing skills, sensory modulation, self-regulation, praxis, and stereotyped or unusual mannerisms (Filipek, et al., 2000; Watling, Tomchek, & LeVesser, 2005). Several standardized assessment instruments are used by occupational therapists to measure the child’s performance compared to that of typically developing children of the same age.

**Sensory Profile**

The Sensory Profile is a one-hundred twenty-five-item judgment based assessment that measures sensory processing as determined by a child’s caregiver (Dunn, 1999). Based on responses to items on a five-point Likert scale, the caregiver provides information regarding the frequency of observed sensory responses and self-regulation strategies in three categories: “Sensory Processing,” “Modulation,” and “Behavioral and Emotional Responses” (p. 1). A child with abnormal sensory processing patterns is placed into one of four quadrants: 1) sensation seeking, a high sensory threshold with active response to stimuli, 2) sensation avoiding, a low sensory threshold with active response, 3) sensory sensitivity, a low sensory threshold with passive response, and 4) low registration, a high sensory threshold with passive response. In addition, nine principal-component factors have been identified that characterize children based on their multisensory responses to stimuli. The information gained from the category, quadrant, and factor scores indicates a child’s candidacy for sensory
processing intervention. This questionnaire is indicated for children aged three to ten, but adult and infant/toddler versions are also available.

Brown, Leo, and Austin (2008) examined the Sensory Profile’s ability to discriminate sensory processing patterns between children with ASD and typically developing children. Mothers of twenty-six typically developing children and twenty-six children with ASD were recruited for this study. One child from both groups was paired according to chronological age in months and gender. After all mothers completed the Sensory Profile, the scores for each pair were compared, and then the cumulative differences between the two groups were analyzed. Children with ASD scored significantly lower in all scoring criteria, with the exception of one of the nine Sensory Profile factors (sensory sensitivity). This indicates that the sensory processing deficits that exist among children with ASD can be detected through the Sensory Profile assessment when compared to typically developing children of the same age and gender. As this study was conducted in Australia, the researchers concluded that using the Sensory Profile might help clinicians discriminate sensory processing differences in cross-cultural contexts.

*Sensory Processing Measure*

The Sensory Processing Measure (SPM) is a tool developed in 2007 that measures an elementary school-aged child’s sensory processing, social participation, and praxis skills at home and in several school environments. This tool classifies a child into one of three sensory processing ranges: “typical,” “some problems,” or “definite dysfunction” (Henry, Ecker, Glennon, & Herzberg,
It contains items that require rating the child’s performance on a four-point Likert scale by the child’s parent, classroom teacher, recess monitor, cafeteria assistant, music teacher, art teacher, physical education instructor, and bus driver. The purpose of examining performance in several environments is to acquire a comprehensive view of the child’s sensory processing across contexts (Miller-Kuhaneck, Henry, Glennon, & Mu, 2007).

The SPM-Home form is a seventy-five-item questionnaire to be completed by the child’s parent or home-based care provider (Miller-Kuhuneck, Henry, Glennon, Perham, & Ecker, 2007). The SPM-Main Classroom assessment contains sixty-two items relating to the child’s performance in the classroom, to be completed by the classroom teacher. The aforementioned assessments yield standard scores in the following performance areas: “Social Participation, Vision, Hearing, Touch, Body Awareness (proprioception), Balance and Motion (vestibular function), Planning and Ideas (praxis), and Total Sensory Systems” (p.1). The SPM-School Environments form contains ten items for the school bus setting and fifteen items for the art class, music class, physical education class, recess/playground, and cafeteria settings. The school personnel in each respective environment are the raters for the School Environments forms. Due to its ability to assess sensory-related behaviors in several contexts, Henry, Ecker, Glennon, and Herzberg (2009) report that “the SPM can facilitate a team approach, help guide discussion, and provide a quantifiable picture of the child’s sensory processing, with statistical assurance that the SPM is measuring sensory processing” (p. 10), regardless of the setting. These authors further
propose the applicability of the SPM in clinical and school settings to be quite clear.

A demographically representative sample of 1,051 typically developing children in Kindergarten through sixth grade was used to standardize the SPM-Home and SPM-Main Classroom forms (Miller-Kahuneck et al., 2007). Respectively, the forms yielded median internal consistency estimates of .85 and .86 and median test-retest reliability estimates of .97 and .97 (p. 1). The researchers used a separate sample of 345 students receiving occupational therapy services to verify that the SPM can differentiate children with sensory processing deficits from typically developing children.

In a pilot study conducted by Glennon, Henry, Kuhaneck, Parham, and Ecker (as cited in Miller-Kuhaneck, Henry, Glennon, & Mu, 2007), twenty-six typically developing children and twenty-five children receiving occupational therapy services in a school setting were tested using the SPM-School form to determine sensory processing issues presented in various school environments. The children receiving OT services had been identified as having sensory processing difficulties based on their scores on the Sensory Integration and Praxis Test, the Sensory Profile, or behavioral observations that the therapists considered to present sensory processing deficits. The researchers conducted a discriminant analysis to determine whether the SPM-School could accurately discriminate the typically developing children from those with sensory processing deficits. The SPM-School discriminated 82.4% of the cases accurately, classifying typically developing children as typical in 92.3% of the time and the
children with sensory issues as non-typical in 72% of cases (p. 173).

**Sensory Integration and Praxis Tests**

Another standardized assessment used to determine sensory processing deficits is the Sensory Integration and Praxis Test [SIPT] (Ayres, 1989). This test was derived from two standardized tests developed by Ayres, the Southern California Sensory Integration Test [SCSIT] (1980) and the Southern California Postrotary Nystagmus Test [SCPNT] (1975). These two tests had been used widely by occupational therapists but evidenced questionable reliability. Ayres took reliable parameters measured by the SCSIT and the SCPNT to develop the SIPT, which focused on sensory processing and integration in addition to the process and function of praxis. The test items used from the SCSIT and SCPNT were changed to improve reliability and facilitate the administration process. The SIPT was standardized based on scores from a demographically representative sample of children aged 4 years 0 months to 8 years 11 months. The data collected from these studies revealed strong interrater reliability and test-retest reliability, as well as construct, content, and concurrent validity (Cermak & Murray, 1991; Mailloux, 1990).

The SIPT consists of a series of tests that take a total of two hours to administer. The subtests of the SIPT assess seventeen sensory integration and praxis functions: space visualization, figure-ground perception, manual form perception, kinesthesia, finger identification, graphesthesia, localization of tactile stimuli, praxis on verbal command, design copying, constructional praxis, postural praxis, oral praxis, sequencing praxis, bilateral motor coordination,
motor accuracy, standing and walking balance, and postrotary nystagmus (Mailloux, 1990). This comprehensive evaluation of sensory integrative function and praxis can only be administered by occupational therapists, physical therapists, or speech-language pathologists certified in sensory integration through a series of four five-day courses presented by the University of Southern California Division of Occupational Science and Occupational Therapy and Western Psychological Services (Western Psychological Services, n.d.). The reliability, validity, and theoretical basis supporting the SIPT have made it a valuable tool in evaluating sensory integrative and praxis function in children with ASD (Schaaf & Smith Roley, 2006, from Bodison, Watling, Miller Kuhaneck, & Henry, 2008).

Intervention

Occupational therapy intervention for children with ASD is based on evaluation results, which typically involves fostering the child’s growth in occupational performance skills. This may be directed by the child, task, or context (Watling, Tomchek, & LeVesser, 2005). Routine occupational therapy interventions for this population include sensory integration, environmental modification, sensory-based therapy, relationship or interaction based therapy, biomechanical treatment, and behavior modification (Watling, Tomchek, & LeVesser, 2005; Case-Smith & Miller, 1999).
Sensory Integration

Sensory Integration (SI) is a therapeutic intervention guided by the principles of the sensory integration theory. This theory provides a framework for understanding the underlying sensory integration issues resulting in stereotypic behaviors exhibited by children with ASD (Yack, Aquilla, & Sutton, 2002). SI intervention is geared toward facilitating development of normal responses to sensory stimuli and improving organization of sensory input. This is done through purposeful activity that stimulates specific sensory systems: auditory, visual, olfactory, gustatory, tactile, proprioceptive, and vestibular. Since occupational therapists (OTs) have extended education in SI (Bundy, Lane, & Murray, as cited in Case-Smith & Arbesman, 2008), they are able to provide the highest level of expertise in SI interventions to children with ASD. Watling, Deitz, Kanny, and McLaughlin (1999) suggest that a majority of occupational therapists providing intervention to children with autism address sensory processing deficits through a variety of sensory-based techniques.

Literature on the efficacy of SI intervention on functional outcomes for children with ASD illustrates modest positive effects of SI therapy (Baranek, 2002; Roberts, King-Thomas, & Boccia, 2007). Roberts, King-Thomas, and Boccia (2007) found that aggressive behaviors, object mouthing, and need for intensity in managing maladaptive behaviors had decreased significantly after applying SI therapy in intervention for a five-year-old boy with sensory modulation disorder. The researchers in this study also found that the child’s engagement in the classroom had increased from thirty to ninety percent (p.
In her systematic review of empirical studies focused on SI, Baranek (2002) found that specific functional outcomes (i.e. social interaction, mastery play, response to holding) support SI therapy; however, positive outcomes were not apparent in each subject of these study designs. As the studies used small samples without control groups, conclusive evidence for generalizing this data to larger populations is limited but does suggest that SI may benefit children with sensory processing issues or ASD in terms of functional performance.

**Sensory-Based Therapy**

Sensory-based interventions, derived from the SI theory, are aimed toward incorporating an individualized program of sensory activities into daily living to help enhance responses to sensory stimuli (Yack, Aquilla, & Sutton, 2002). Modern sensory-based techniques include the Sensory Diet, Alert Program and Auditory Integration Training (AIT).

**Sensory Diet**

The term “sensory diet” was established by Patricia Wilbarger and refers to “those experiences an individual's system 'needs' in order to self-organize and function” (OT-Innovations, 2006, ¶1). Since children with ASD have difficulty self-organizing, it is up to the therapist or parents to assist them in this task. Sensory diets can aide a child with ASD to calm, organize or alert the systems when appropriate (Anderson, 1998).

Yack, Aquilla & Sutton (2002, p. 77) define calming techniques as those that “help relax the nervous system and can reduce exaggerated responses to sensory input.” Many of the strategies involve applying a tactile or proprioceptive
input such as, deep pressure massage, lycra/spandex clothing, weighted vests and bear hugs. Soothing smells, swinging in a blanket, and low light and noise levels are additional techniques outside of the tactile and proprioceptive systems (Yack, Aquilla & Sutton, 2002). Other calming techniques include, speaking in a monotone or whisper, wall push-ups, blowing bubbles, and drinking from a straw (Anderson, 1998).

Organizing techniques are similar to the calming techniques that were described above. Organizing techniques assist the child to become more focused, regardless of sensory responsively. These techniques can include, sucking on hard candy, vibration, pushing heavy objects and swimming (Yack, Aquilla & Sutton, 2002).

According to Yack, Aquilla and Sutton (2002), alerting techniques help children who are hyporesponsive become more focused. Activities or environments that are loud, busy and/or abrupt tend to be the most awakening to the senses. Examples of these activities would be bright lights, running games, fast music, strong smells and visually stimulating rooms. Anderson (1998) adds that eating foods that are crunchy, salty or sour are alerting as well as items that are cold such as, washcloths, ice water and popsicles. It should be noted that these activities, if used in excess or inappropriately, may over stimulate the child (Yack, Aquilla & Sutton, 2002).

**Alert Program**

Barnes, Vogel, Beck, Schoenfeld, and Owen (2008) studied the effects of the Alert Program, a sensory-based protocol aimed at helping children adjust
their arousal states in a school setting on children with self-regulation and behavioral disturbance. This group of researchers used teacher and student self-report, the Sensory Profile, and the Devereux Behavior Rating Scale (DBRS) – School Form to measure pre- and post-intervention differences in self-regulation in two groups of children with emotional disturbance. According to items measured by both the Sensory Profile and DBRS the group of children receiving Alert Program intervention demonstrated significantly better post-treatment ratings of sensory processing than the control group. Teachers of both groups reported significant increases in self-regulation among children in the intervention group, whereas children in the control reportedly decreased. This evidence supports use of sensory-based intervention for children who have difficulty with self-regulation and behavioral responses to sensory stimuli; this may also support use of this program for children with ASD who present similar symptoms.

**Auditory Integration Training**

Auditory Integration Training (AIT) is therapeutic use of electronically modified sound to help diminish auditory processing deficits and improve concentration (Sinha, Silove, Wheeler, & Williams, 2006). The protocols for most AIT programs involve the child listening to modulated music through headphones several times daily for at least ten days (Case-Smith & Arbesman, 2008). In their systematic review of evidence-based research on AIT, Case-Smith and Arbesman found data suggesting that listening to modulated music through headphones may help children with ASD improve aberrant behaviors, sound sensitivity, and eye contact. However, data from several studies also suggested
that the use of modulated music was no more effective than unmodulated music or that AIT created positive but weak improvements in behavioral outcomes (Case-Smith & Arbesman, 2008; Dawson & Watling, 2000).

Sinha et. al (2006) completed a similar systematic review of randomized control trials measuring the effect of AIT on children and adults with ASD. The authors reported difficulty in finding conclusive evidence to support the use of AIT because the outcome measures used, the age range of participants, and the duration of follow-up were highly variable among the research articles analyzed. With significant heterogeneity of the research literature on AIT, there is little evidence indicating long-term effects of this type of sensory-based intervention.

**Relationship and Interaction Based Therapy**

Relationship-based or interactive play intervention is a non-sensory-based intervention administered to children with autism spectrum disorder by occupational therapists. This type of intervention focuses on the child's social and emotional growth through interaction and play with the occupational therapist, the child's peers, and the child's parents (Case-Smith & Arbesman, 2008).

In a survey conducted by Case-Smith and Miller (1999), 292 occupational therapists revealed the intervention approaches they utilize with children with PDD and the success of such approaches. This sample of occupational therapists was selected from the list of AOTA’s Sensory Integration or School System Special Interest section to complete an eight-section questionnaire regarding the types of problems that these therapists observe in children with
PDD, the frequency and methods of addressing such problems, and the perceived effectiveness of such methods of intervention. Although most therapists reported sensory integration and environmental modification as the most frequent intervention approach, many therapists also used child-centered play to address significant delays in play and social skills presented by their clients. The therapists that used play-based intervention reported improvement in social and play skills more than with the other intervention approaches: sensory integration, environmental modification, cognitive training, and behavioral modification. This evidence indicates that a moderate portion of therapists that work with children with PDD use and value play-based therapy. It also shows that intervention focused on play and interaction during play may be instrumental in a client’s development of social and play skills.

In Case-Smith and Arbesman’s (2008) systematic review of interventions used for children with ASD, relationship-based and interaction interventions were merited as being highly effective in several areas. From the eleven research reports regarding relationship-based therapy examined, several themes evolved. In applied relationship-based interventions that focused on imitating the child’s behaviors, adapting the environment, and providing naturalistic reinforcement, many children demonstrated improvement in social behavior such as joint attention and eye gaze. Structured play activities involving reinforcement and prompting was evidenced to help children with ASD improve turn-taking, interaction duration, and sharing. Three studies analyzed were focused on social
support and social-emotional growth. Evidence from these studies showed that the intervention had a positive effect on the child’s social-emotional growth.

Although several aspects of social and emotional development may be enhanced by relationship-based or interaction-based therapies, the literature does not suggest improvement in sensory processing. The literature also suggests that success is evident with children with high-functioning autism and whose parents have the resources and energy to be intensely involved with the intervention process (Case-Smith and Arbesman, 2008). However, it does not necessarily suggest that children who are moderate to low on the spectrum will achieve success with this type of intervention. Nor does it suggest that parents who cannot be highly involved (due to financial strain or other family obligations, for example) will still be able to make this social growth possible with relationship-based intervention.

### Applied Behavior Analysis

Applied Behavior Analysis (ABA) is a method of breaking tasks down into small steps and using a specific method of training in order to elicit appropriate responsive behaviors (Lovaas, Ackerman, Alexander, Firestone, Perkins, & Young, as cited in Spreckley & Boyd, 2009). This method is widely accepted and researched, true ABA practice is outside of the scope of occupational therapy practice.

Spreckley and Boyd (2009) completed a systematic review of ABA utilized in preschool children with autism. Four studies that met criteria for outcome measures were analyzed. Cognitive and adaptive behavior outcomes in three of
the four studies indicated improved cognitive functioning after behavioral intervention. Expressive and receptive language scores, however, were not consistently in favor of ABA, as one study favored the control group for each language outcome.

Family Impact

The children with ASD are not the only ones experiencing this disorder; the families are impacted as well. A family with a child with ASD commonly experiences financial and employment difficulties due to their child’s overwhelming need for attention and high priced interventions. Support and family time may also be affected by the decrease in social and leisure participation (Benson, 2006). The focus of the product of this scholarly project is to facilitate and support family social and leisure participation due to the fact that family dynamics and quality of life are significantly impacted when a child in the family has a diagnosis of ASD.

Family Education

Parental and caregiver education and support are vital in achieving behavioral outcomes in children with ASD. Caregiver education involves teaching the parents/guardians and childcare providers about autism spectrum disorders, the etiology of the child’s symptoms, and a review of the treatments to be employed for facilitating development and improving behavior. In general, support provided by occupational therapist may include, but is not limited to: seeking parental feedback, validating parental concerns, advocating for the child and family, guiding parents to therapy options best suited for the child and family,
and fostering a support network of families who experience similar day-to-day challenges of caring for a child with ASD (Whitaker, 2002; Jocelyn, Casiro, Beattie, Bow, and Kneisz, 1998).

Whitaker (2002) researched the outcomes of an education and support program for parents of preschool-aged children with ASD, using the National Autism Society’s EarlyBird package and ongoing home services. Shortly after diagnosis of an autism spectrum disorder, parents were recruited for participation in the program to help them acquire an immediate understanding of the disorder and of what the family could expect to face in the future. The families were visited at least once weekly by their appointed support worker in addition to participating in the EarlyBird Programme, which involved eight three-hour workshops and interspersed home visits. Mothers who participated in this program were interviewed upon completion of the program in order to identify family satisfaction outcomes of the program. From the reports given from these mothers, Whitaker found that “the most frequently expressed, unmet need at the point of diagnosis was for information – about autism spectrum disorders in general, but particularly its specific manifestation in their child, and the local educational and support options available” (2002, p. 414). Parents suggested that several strategies fostered success for the families during the intervention: (a) providing objectives that were clear, few in number, and embedded in the child’s natural context and routines; (b) availing moral and practical support from immediate and extended family members; and (c) support and encouragement from the support worker (p. 411).
Jocelyn, Casiro, Beattie, Bow, and Kneisz (1998) compared the effect of a twelve-week parent and caregiver education program to daycare provision alone. Thirty-five child participants with autism or PDD were selected randomly to participate in either the experimental group, whose parents and childcare providers would receive lectures and consultations regarding the child’s disorder and therapeutic strategies, or the control group, receiving daycare services alone. Greater improvements in the child’s language abilities were found in the experimental group. The parents of this group also presented better knowledge of ASD, greater satisfaction, and higher perception of control on part of the mothers.

Social

According to Pearlin (as cited in Benson, 2006), parents experienced what was called “stress proliferation”, where one stressor has the propensity to evoke stressors in other aspects of an individual’s life. Benson (2006) identified the child’s symptom severity, stress proliferation and lack of informal social supports as contributing factors to parental depression. Approximately half of the sixty-eight parents surveyed rated at or above the cut-off point for clinical depression on the Center for Epidemiologic Studies- Depression Scale. The researcher found that when parents viewed their child’s symptom severity to be higher, the more stress proliferation occurred. Stress proliferation was found to decrease when parents had informal support in the form of friends, family and other non-professionals. This decrease, however, was found to more significant in those parenting a child with a lower severity of symptoms. The researcher also noted
that the children with the lower severity of symptoms were actually considered to have moderate symptomology on the ASD scale. Benson (2006) concluded that no matter the level of severity of the child’s symptoms, the inability to interact socially was a cause for concern for parents.

Using the *Spence Social Skills Questionnaire* and the *Social Competence with Peers Questionnaire*, Knott, Dunlop and Mackay (2006) studied the perceived social skills of nineteen children with ASD and compared the results to the perceptions of the parents. The results from both questionnaires indicated dissociation between how the children with ASD viewed the relationships and how the parents viewed them. The children rated their social skills and social competence higher than their parents rated them. The researcher also found that only approximately half of the children identified being invited to a social gathering with peers (Knott, Dunlop & Mackay, 2006). Because of this lack of involvement with friends, the children with ASD are spending more time at home with the family.

*Quality of Life*

In a study done by Lee, Harrington, Louie and Newschaffer (2007), families of children with ASD (438 children), children with ADD/ADHD (6,319 children) and typically developed children (58,953 children) ages 3-17 were surveyed and interviewed about their perceived quality of life (QOL). The three sample groups were then broken down into subgroups: early childhood ages 3-5, childhood ages 6-11, and adolescence ages 12-17 (p. 1149). Parents of the 65,810 children were asked questions which were further divided into ten
variables, all relating to the child’s perceived QOL. This was done to determine the degree of parental concern in the areas of achievement, self-esteem, stress-coping, learning difficulties and being bullied by classmates. Parents were asked to rate the five questions based on if they were a lot, a little or not at all concerned. The data indicated that, in contrast to the two comparison groups, parents in the autism group reported a higher degree of caring burden in all age groups. When church service attendance was compared, families in the autism group attended a significantly less number of services than did the families of adolescents in the normally developing group. Parents of children in the autism group reported that their children were more likely to miss school or repeat a grade than children in the other 2 groups. With the exception of area of self-esteem in the ADD/ADHD group, parental concerns in the autism group were significantly higher in every area for the childhood age group. Parents of children in the adolescent autism group showed significantly more concern with learning and bullying than the ADD/ADHD group and more concern in all areas than the normally developing group. Overall, the QOL with a child diagnosed with autism is perceived to be lower and parental concerns are perceived to be higher.

Werner-DeGrace (2004) sought to examine the family experiences incorporating daily activities with a child with severe autism. Five of the families that the researcher had worked with previously were chosen to be interviewed in order to ensure that their experiences in therapy were similar. The 2 hour interviews included questions that focused on the structure, significance, and meaning of daily activities as well as having the participants recalling moments of
feeling like a family. Themes that were revealed through this process included the following: “(a) whole family life revolves around autism, (b) robbed as a family, (c) occupy and pacify, and (d) fleeting moments of feeling like a family.” (Werner DeGrace, 2004, p. 545). The general consensus of the families was that they spent so much time meeting the needs of the child with autism that the needs of the parents themselves and the needs of the family unit as a whole were neglected. The constant anxiety over the child decreases satisfaction with the family unit and day to day activities. The families also shared a decreased motivation to engage in social outings, vacations, share family photographs, etc. due to the behaviors of the child.

**Family Dynamics**

Kelly, Garnett, Attwood and Peterson (2008) sought to explore the impact that family conflict and peer support had on the child with ASD. 322 children, ranging from 6 to 16 years in age with a diagnosis of Asperger disorder participated in the study. The researchers examined four hypotheses to find associations between family dynamics, child anxiety/depression, and ASD symptomatology. Data was compiled from various assessments and examined for variables to place them in models that tested the corresponding hypotheses. The comparisons found that there was a positive correlation between the child’s anxiety/depression and the severity of symptoms. The study’s findings further indicated that negative peer and family relationships impacted the child’s anxiety/depression more than positive relationships due to the distressing nature of conflict and their decreased capacity to utilize peers. Another hypothesis that
was confirmed by the study data was that “there was a significant relationship between family conflict and anxiety/depression and between anxiety/depression and ASD symptomatology” (p. 1076). The final finding was that “family cohesion significantly and negatively predicted anxiety depression and anxiety/depression significantly predicted ASD symptomatology” (p. 1076). This study showed a dichotomy between the child’s symptoms and familial stress. The symptoms ebb at the family cohesion creating stress, thus increasing the symptoms. If the symptoms were to be reduced before the family dynamic becomes agitated, then there would be a greater likelihood of managing the symptoms (Kelly, Garnett, Attwood & Peterson, 2008).

The findings in a qualitative study by Cohn, Miller and Tickle-Degnen (2000), showed parental concerns not only for their children with sensory modulation disorders but, for themselves and the family unit. Through structured interviews with parents, the researchers identified two themes of child-focused outcomes and parent focused outcomes. The child-focused outcomes related to the parent’s hopes for therapy outcomes for their children. These outcomes were for the child to demonstrate the ability to behave appropriately in school, home and community settings; the ability to recognize their feelings and either regulate or seek assistance; and that the children would feel self-confident with who they were. The parent-focused outcomes related to what the parents wished to gain from their child’s therapy. These outcomes were the ability to collaborate and participate in therapies as well as for the therapist to understand and accept the hardships families are faced with. It is with all these outcomes
that parents felt would “facilitate sustainable family routines” (Cohn, Miller & Tickle-Degnen, 2000, p. 40).

Summary

The studies reviewed on the impact on families of having a child diagnosed with ASD support the product of this scholarly project which was the development of a manual to be used under the direction of an occupational therapist by parents to create an On-The-Go Sensory Kit to use with their child while they are in community settings. It is anticipated that the use of this type of kit would allow families to engage in the community without fear of outbursts, thus, facilitating bonding with their child in a way that would be conducive with “normal” family functions. These routines are critical for the well-being of the family unit and if the routines are disrupted, the family unit does not function optimally and therefore cannot provide the best care that is needed for a child with ASD. The methodology used to develop the manual can be found in Chapter III of this document, and the On-The-Go manual can be found in its entirety in Chapter IV. Chapter V of this document contains a summary and recommendations.
CHAPTER III
METHODOLOGY

During the occupational therapy pediatric coursework, the author’s became interested in ASD. An initial review of literature was performed to find out more about interventions for ASD and how sensory issues are evaluated by occupational therapists. Online data bases, websites, books and workshop materials were utilized to gather information. The author’s came across an article that discussed the occupations of families that had a child with ASD. This prompted a more extensive review of literature to find out about family quality of life and if there was anything assisting the families in maintaining a more “normal” cohesion. The author’s found a lack of research regarding interventions or techniques specifically being given to the families to improve their quality of life.

The literature review and experience in sensory integration through fieldworks, provided authors with information necessary to compile enough interventions for the manual. Our product was also guided by the Occupational Adaptation model and Sensory Integration frame of reference. The Occupational Adaptation model (Schkade & Schultz, 2003) assisted the authors in focusing on the environment, occupation and the individual. The basis behind this product is adapting how the child perceives the environment based on their sensory experiences. The Sensory Integration frame of reference (Ayres, 2005) was
foundational for developing activities and items for the sensory kit. The frame of reference implements the use of play and sensory experience to improve a child’s sensory processing. Jean Ayres, the originator of this model, observed that children that had difficulty with sensory processing had deficits in motor and academic learning (Kielhofner, 2009). With difficulties in these areas, the main occupations of play and education are severely disrupted.

The manual is intended to be used by a sensory integration trained occupational therapist when working with a child and his or her family after completing the Sensory Profile© (Dunn, 1999). It is intended that the therapist will review the manual with the caregivers and highlight the areas of focus based on the results of the assessment. There are note pages placed at the end of each section where the therapist and caregivers can make further suggestions about activities and items for that specific child. Chapter IV contains the On-The-Go Sensory Kit Manual in its entirety, and Chapter V includes recommendations for this project’s use and a summary of the project.
CHAPTER IV

PRODUCT

The review of literature revealed that families often sacrifice leisure, social or community participation due not only to the amount of time and effort needed to care for their child with ASD, but also due to the need to avoid environments or situations that may disturb the child. This lack of participation outside the family home leads to increased stress, social isolation and decreased family cohesiveness. The intent of our product, an *On-The-Go Sensory Kit Manual*, is for families to use when bringing their child(ren) with ASD into the community setting. The authors believe this will facilitate the family’s community involvement while giving them the tools to help manage their child’s unique symptoms and behaviors. It is also the hope that this product will create a sense of control and freedom by involving the parent’s in the process.

It is intended that the *On-The-Go Sensory Kit Manual* will be used in conjunction with Winnie Dunn’s Sensory Profile© (Dunn, 1999). Once the test has been administered and scored, it is the intended purpose that the therapist will review the results with parents as well as go through the *On-The-Go* manual indicating the areas that the child may experience difficulty with while in the community. The manual is arrange by sensory systems (i.e. tactile, visual, auditory, proprioception and vestibular) and is designed to allow the therapist to indicate if the child is hyper- or hyporesponsive for the response. Under each
response, there are suggestions of activities or items that will meet the child’s needs when in the community. This process will provide a guide for parents when they are deciding what to put in the *On-The-Go Sensory Kit*.

The design of this product follows a sensory integrative frame of reference (Ayres, 2005). The *Sensory Profile©* (Dunn, 1999) that is used in correlation with and as the basis for the activities or items is focused on the child’s sensory needs. The sensory integration frame of reference pays particular attention to the way children process their sensory environment, how they respond to that environment, and what can be done to adapt their environment to meet their needs (Kielhofner, 2009). The actual product is constructed around possible sensory scenarios that could be encountered in the child’s environment and what items or activities would help to regulate their response. These items and activities were chosen based off sensory integration interventions and what works best in eliciting or inhibiting certain behavioral responses.

The occupation-based model utilized in the creation of this product was Occupational Adaptation. This model was chosen because it focuses on what is unique about a person, occupation and environment, how it is impacting performance, and what can be done to adapt the three areas to achieve optimal performance (Schkade & Schultz, 2003). These features were reviewed and considered in the creation of the manual. Each family functions in different manners, has a different environment, and participates in different occupations. When raising a child with ASD, the family function, environment, and occupations can be limited. The Occupational Adaptation frame of reference, in this case, is
used to achieve adaption in these areas in order to enhance the overall family unit. This model also takes into account the ability for the individual to perform a task efficiently, effectively and have satisfaction with themselves (Schkade & Schultz, 2003). This is termed “relative mastery” and can be difficult for children with ASD to achieve limiting their engagement in new occupations and environments while conversely limiting the caregiver’s engagement in those same areas.
On-The-Go Sensory Kit Manual

By: Sarah Dahlhauser and Holly Frolek
Welcome

This is an *On-The-Go Sensory Kit Manual* for you, the caregiver, to use with the assistance of your occupational therapist to help bridge the gap between your child and the surrounding world. In this manual, you will find a description of the sensory systems and ways the environment may be affecting your child’s sensory systems. You will also find a list of travel-size sensory tools and activities to help satisfy your child’s sensory needs while in the community. Depending on your child’s needs, the activities and tools will provide a calming or alerting experience to help your child manage the sensory stimuli from the environment in a calm manner. Each section is a notes page where you and your OT can write down ideas about items and activities specifically for your child. At the end of the manual is an addition resources page that lists websites, books and videos that may be informative and helpful in understanding Autism Spectrum Disorder.
Sensory Processing and Your Child

Children with Autism Spectrum Disorder are likely to have difficulty processing the sensations in their environment (Ayres, 2005). The child may present high or low sensitivity to sensory input, either of which can be problematic in certain settings. They may also present preoccupation with certain sensations and routines, which may limit their willingness to participate in specific activities in the community. Your occupational therapist is an expert in sensory processing issues and therefore will be your guide in achieving success in meeting your child’s unique needs. To understand these two extremes, we shall examine each type of sensory processing difficulty and the ways that they may be presented in your child’s behavior. The diagram below illustrates the sensory processing phenomenon that may occur in a child with Autism Spectrum Disorder.
Hyperresponsive

When a child has high sensitivity to sensory stimuli, everyday sensations in his or her environment may seem distracting, bothersome, or frightening to the child. The child will present behavior that is called hyperresponsive. Two types of hyperresponsive behavior may occur: passive or active. Passive hyperresponsive behavior is displayed as a high sensitivity to all sensations within one’s environment. As this child is constantly noticing even subtle stimuli, he or she will have difficulty blocking out unimportant stimuli for focusing on desired objects or activities. A child who is active hyperresponsive may overreact to everyday sensations, presenting behavioral outbursts even with normal stimuli. Everyday sensations that do not bother you and me could induce fear, pain, or irritation in this child, thus causing him or her to react accordingly (Ayres, 2005; Dunn, 2001).

For children who are hyperresponsive to sensory stimuli, sensory tools that facilitate calming and organization of the sensory systems are imposed to improve the child’s overall sensory experience and behavior. Depending on the sensory system addressed, this may involve rhythmic, soothing, or predictable activities that help the child feel a sense of ease and focus.
Hyporesponsive

Children who are hyporesponsive to sensation have a high threshold for sensory stimuli. This means that, in order for a sensation to register in the child’s brain, it must be quite strong. This child might not process the everyday sensations that you and I notice readily.

Like hyperresponsive behavior, hyporesponsive behavior is presented in either an active or a passive manner. Children with passive hyporesponsive sensory processing present a lack of interaction with the world around them. They may appear inattentive, confused, or bored during everyday activity not only because they are lacking the ability to process what is going on around them, but also because they do not seek to find out what is going on in their environment. Those who present active hyporesponsive sensory processing have a craving for sensation. Since they are unable to process subtle stimuli, they will feed their craving by seeking strong, intense stimuli.

Children with hyporesponsive sensory processing may benefit from alerting and organizing sensations. Activities that provide a range of sensory intensity are imposed to help children with low sensory registration. They can alert the child of sensory input at its strongest points, and once the child is oriented to the stimulus, the child can begin processing stimuli at a lower range of intensity. Once the child has improved sensory registration, he or she can gauge his behavior to fit the social expectations of every setting (Ayres, 2005; Dunn, 2001)
The tactile system is the sense of touch. We feel pressure, texture, pain, and temperature through our skin which helps us interpret the stimuli around us. We can sense the difference between harmful stimuli, such as a thorn, and nonthreatening stimuli, like a feather.
Hyperresponsive

Children who are hyperresponsive to touch may feel threatened by any type of touch, even if it is nontreating (Ayres, 2005). When we have felt a non-threatening tactile sensation long enough, we begin to modulate that sensation, meaning, we become accustomed to it and no longer sense it consciously. For example, immediately after you put on a heavy sweater, you can feel the fibers on your skin; after a while, you no longer pay attention to the sensation and nearly forget that you are wearing it. A child with hyperresponsive tactile processing will feel the heavy sweater constantly and may become agitated with the constant tugging and rubbing of the fibers on his or her skin.

Here are some items that can provide a hyperresponsive child with the input he or she needs to modulate stimuli appropriately:

- Teddy bear
- Sticky ball
- Lotion to rub on skin
- Chew toy
- Surgical brush
- Soft/smooth fabric swatches

On-The-Go activities to help a hyperresponsive child calm through touch:

- Give a self-hug
- Roll up in blanket
- Drawing on arms, legs, and back with finger with pressure
- Apply the child’s favorite character stickers to skin
**Hyporesponsive**

A child who is hyporesponsive to touch, on the other hand, will have difficulty noticing tactile sensations on his or her skin, even if it is threatening. As we all need touch to some degree to feel comfort or safety in our environment, a tactilely hyporesponsive child also needs to fill his or her craving for touch. This child will seek firm, sharp, extremely hot/cold, and even dangerous stimuli to satisfy his or her need. This places the child at risk for burns, cuts, and other such injuries (Kranowitz, 2005).

**Some tactile items that may help a hyporesponsive child:**

- Play-Doh
- Koosh ball
- Rice
- Terry cloth washcloth
- Rough/coarse fabric Swatches
- Feather duster
- Sandpaper
- Hand-held fan
- Various paint brushes

Here are a few travel-friendly activities that you can enjoy with a hyporesponsive child:

- Quickly rub skin along arms and legs
- Play with ice
- Write messages to each other using light touch on the palm of the hand
Our sense of vision helps us to identify objects in our environment and observe movement. We can sense where safe and unsafe objects in our environment are and whether our bodies are too close or not close enough to other objects in space. As visual ability comes into play when making eye contact during social participation, it is important to address this sensory system for the children who may have difficulty in social situations (Yack, Aquila, & Sutton, 2002).
Hyperresponsive

A child who is hyperresponsive to visual stimuli may respond to sight of everyday objects negatively. They have difficulty dealing with bright colors, where there is significant contrast of light and dark, or watching fast-moving objects because these things are viewed in a way that may be painful for the child’s eyes or frightening to the child. This child may also use peripheral vision when viewing objects or peers because looking directly at things may cause added stress to the visual system (Yack, Aquila, & Sutton, 2002).

To help calm a hyperresponsive child when exposed to adverse visual stimuli, use these objects:

- Sleeping eye mask
- Blurring goggles
- UV Filter sunglasses
- Goggles that block side view

Here are a few activities that may help calm a visually hyperresponsive child:

- Color pictures with “cool” colors (pastels, blues)
- Have them close their eyes and think about their favorite place
Hyporesponsive

Children who are visually hyporesponsive may have a slower reaction to moving objects in their environment. They may not be able to scan the environment in order to locate a hazard or desired object, and they may not be able to distinguish foreground objects from the background. This child may have a slow reaction time to objects that are moving toward them or toward objects that they are about to run into (Dunn, 2001). For example, a hyporesponsive child may not be able to catch a ball that is darting toward his or her head, or the child might not notice the curb when running full speed to greet his or her family after school.

Some items that may help the visual processing of a hyporesponsive child are:

- Light-up bouncing ball
- Kaleidoscope
- Flashlight with colored cover
- Where’s Waldo book
- “I Spy” book

Here are a few on-the-go activities that you can try with a visually hyporesponsive child:

- Moving a flashlight on the ground and have them follow it with their eyes.
- Play a game where you have them look for certain items in the environment.
- Color pictures with vibrant colors (hot pink, orange, yellow)
- Investigate the details of objects with a magnifying glass
- Search for distant object with binoculars
Our sense of hearing helps us to interpret communication and to listen to the sounds in our environment. Sounds that we subconsciously deem harmless and unimportant can be modulated, or “ignored,” so that we can focus our attention on the more important sounds or tasks. We are aware of noises in the environment that may indicate danger, such as a smoke alarm, or alert us of something important, like a telephone ringing.
Hyperresponsive

A child who is hyperresponsive to sound responds adversely even to harmless and unimportant sounds. Therefore, he or she may not be able to shut out white noise in the environment in order to pay attention to important sounds. For example, the buzzing of electricity transmitted by a light fixture may irritate the child so much that he or she cannot focus on engaging in a classroom lesson. A hyperresponsive child may present behavioral outbursts lasting several minutes when there are sudden noises in the environment (Yack, Aquila, & Sutton, 2002).

Here are some travel-friendly items you can bring to the community with a child who is hyperresponsive to sound:

- Noise cancelling earphones
- Ear plugs
- Ear muffs
- Dog squeak toy
- Rain maker stick
- “Out of Order” sign to place on a hand dryer when using a public restroom, to prevent hand dryer noise from frightening the child

Some activities you can try with a child who is hyperresponsive to sound are:

- Read a book in monotone
- Rhythmic clapping games such as patty cake
- Humming their favorite song
Hyporesponsive

A child who is hyporesponsive to sound may have difficulty interpreting communication due to a lack of ability to process the spoken word. This child might not be able to respond appropriately to alerting stimuli, or they may not be able to wake up from sleep with alerting sounds, such as a smoke alarm. This child may also find it difficult to adjust the volume of his or her voice to meet the social expectations of the particular setting. For example, one is expected to use a different vocal volume when at a football game versus the volume used in a library.

Travel size objects that can help a child who is hyporesponsive to sound:

- Music player with fast song
- Songs with varying pitch and volume

On-The-Go activities that may help a hyporesponsive auditory child:

- Sound/listening games
- Read a book using a variety of voices for different characters
- Write on chalk board
Vestibular/Proprioception

The vestibular system is our sense of balance and motion. It is located within the mechanisms of our inner ear, which sense our head’s tilt in space. This is where we get our equilibrium. We can sense if we are about to fall, in which case our body produces a natural reaction to protect ourselves with an outreached arm.

Proprioception is our brain’s sense of where our body parts are in space. Our nervous system’s connection with muscles and joints helps us to determine the movements that our body parts are making.

These two systems work together to keep our bodies steady and balanced during movement. If the vestibular system detects imbalance, the proprioceptive system kicks in to tell our muscles and joints to correct our posture in order to return to equilibrium (Yack, Aquilla & Sutton, 2002).
Hyperresponsive

Children who are hyperresponsive to movement have a tendency to shy away from physical activity. They may have gravitational insecurity, which is an unreasonable fear of falling. They may also demonstrate protective movement patterns so as not to tilt, lean, shake, or come near objects in their surroundings. This lack of participation in movement play may lead to delayed fine and gross motor development (Yack, Aquilla & Sutton, 2002).

A child who is hyperresponsive to movement may benefit from using these objects:

- Vibrating pen or toy
- Weighted toy
- Portable hole punch
- Beanie animals

The following On-The-Go activities are designed to help children who are hyperresponsive to movement:

- Rocking
- Gentle swinging
- Blow through a straw
- Push their own stroller
- Wall push ups
- Chair push ups
Hyporesponsive

Children who are hyporesponsive to proprioceptive and vestibular stimuli are just the opposite. They may be viewed as the “clumsy child” because they are unaware of the excessive movements they make during physical activity. This child has a tendency to seek rough play and accidentally collide with objects and other children, which may cause bodily harm (Kranowitz, 2005).

Try using these objects with a child who is hyporesponsive to movement stimuli:

- Scooter board
- Stress ball
- Silly Putty
- Hard bubble gum
- Legos
- Velcro Strips
- Snap beads

These activities may help a hyporesponsive child to improve vestibular and proprioceptive processing:

- Hand stand
- Superman soaring
- Rhythmic movement
- Tear paper
- Punch a pillow
- Write on chalk board
- Heavy jumping
Oral-Motor

The oral-motor sense allows us to feel textures and taste flavors with our mouths, as well as move our facial muscles for communication and feeding. We can taste different flavors and temperatures of food: sweet, sour, hot, cold, spicy, sweet, salty, and bitter. Different foods have different consistencies also: thick, thin, dry, crunchy, chewy, chunky, etc. We all have unique preferences for the flavor and texture of our food.
Hyperresponsive

Some children cannot tolerate the sensation of food or certain textures and flavors in their mouths. A hyperresponsive child may present as a fussy eater or may gag on certain foods that they cannot tolerate. Some children are unable to allow even non-food items in their mouths, making a trip to the dentist quite a hassle. Oftentimes this child will also present behavioral outbursts when any object comes near their face or mouth (Yack, Aquila, & Sutton, 2002).

Some On-The-Go tools to increase oral-motor tolerance in a hyperresponsive child are:

- Chewy tubes
- Toothbrush
- Tongue depressor
- Bubbles
- Sippy cup with lid
- Peppermints
- Chewy candy

A child who is hyperresponsive to oral-motor input may benefit from the following activities:

- Kissing rough or coarse food items
- Blowing on food
- Smelling a variety of foods
- Copy each other making funny faces
- Have a contest to see who can blow the biggest bubbles with chewing gum
- Using surgical gloves, massage the child’s lips, inner cheeks, and gums
Hyporesponsive

Hyporesponsive children have a high threshold for oral-motor input. They have a tendency to seek sensory input to the mouth by placing non-food items in their mouths, eat very quickly and messily, and bite others. A child with hyporesponsive oral-motor processing will not notice that his or her mouth is open and may drool unknowingly (Yack, Aquila, & Sutton, 2002; Kranowitz, 2005). This child needs oral-motor sensory input on a regular basis to help calm their craving for stimuli.

Children who are hyporesponsive may benefit from these tools:

- Sour candy
- Spicy candy
- Pop rocks
- Juice box
- Wacky straws
- Crunchy food

Some activities you can try with an orally hyporesponsive child are:

- Blowing through straw into liquid
- Blow objects on a table with a straw
- Sip thickened liquid through straw
- Puff out cheeks while pretending to be a chipmunk or swimming
- Suck on ice
Schedules and Routines

Children with Autism Spectrum Disorder may have preoccupation with routines and rituals (American Psychiatric Association, 2000). When a routine is not followed or when a child is unaware of changes in the schedule, he or she might not respond readily, resulting in an upset emotional response or refusal to engage in outing activities. For this reason, it is important to schedule daily activities prior to leaving on an outing and to communicate the planned schedule to your child. The use of activity schedules can be helpful during the transition process so that your child knows what to expect during an outing (Krantz, MacDuff, & McClannahan, 1993). The photographic activity schedule chart on the following page can facilitate the transition to new activities in the community.
To Do

1
2
3
4
5

All Done

1
2
3
4
5
Additional Resources

The following are books, videos and websites that will be helpful for learning more about ASD, what to expect and intervention ideas that can be implemented at home.

Websites:

*Overview of the brain and its role in our senses*
  http://www.hhmi.org/senses/

*Information about Sensory Processing Disorder, occupational therapy and sensory activities*
  http://www.sensorysmarts.com/index.html

*General Autism information and Autism advocacy*
  http://www.autismspeaks.org/index.php

*Involvement*
  http://www.autism-society.org

Books:

*A first-hand point of view on Autism and Asperger*
  “The Way I See It” by Temple Grandin, Ph.D

*Case study of children with Autism and Asperger*
  “A Mind Apart: Understanding Children with Autism and Asperger Syndrome” by Peter Stazmari, Ph.D

*In-depth look at Sensory Processing Disorder with case studies*
  “Sensational Kids: Hope and Help for Children with Sensory Processing Disorder” by Lucy Jane Miller, Ph.D., OTR

*Sensory Processing Disorder background, symptoms and interventions*
  “The Out-of-Sync Child: Recognizing and Coping with Sensory Processing Disorder” by Carol Stock Kranowitz, M.A.

*At home intervention strategies and a simple review of the sensory systems*
  “Building Bridges Through Sensory Integration: Therapy for children with Autism and Other Pervasive Developmental Disorders” by Ellen Yack, B.Sc., M.Ed., O.T., Paula Acquilla, B.Sc, O.T. and Shirley Sutton, B.Sc, O.T.

Videos:

“Temple Grandin” directed by Mick Jackson


CHAPTER V

SUMMARY

This scholarly project was designed because the authors are interested in helping improve the quality of life of children with ASD and their families. A literature review revealed that many children with autism spectrum disorders have difficulty processing sensory stimuli, especially in non-routine environments. This causes the child to display adverse behavior when traveling outside the home, therefore limiting the family’s involvement in the community. The product designed for this scholarly project is a guide for occupational therapists and parents of children with ASD to create a kit of sensory tools to help the child regulate his or her behavior while in the community.

The individualized *On-The-Go* sensory kit is to be developed through the collaborative effort of the skilled occupational therapist and the parents. The manual is meant to be an interactive workbook, with space for notes and observations from the parents, as well as for notes and further suggestion from the occupational therapist. Parents can use tools in the sensory kit to help calm or stimulate the child when he or she is presented with adverse stimuli in community environments. Once the sensory tools have been tried in a safe environment and approved as effective for the child, the parents can begin gathering all items for the kit for use in the community. The sensory kit intervention should be provided in conjunction with developmental, relationship-
based, and other sensory-based intervention provided by the occupational therapist.

Prior to utilizing the product in intervention, the parents or guardians of the child with ASD should complete the Sensory Profile© (Dunn, 1999) to identify the child’s sensory processing function. The results of the Sensory Profile© (Dunn, 1999) will identify whether the child presents hypo- or hyper-responsiveness to sensory stimuli, which will indicate the types of sensory tools that should be utilized in the On-The-Go sensory kit. To test the efficacy of this product, the authors recommend that a pre- and post- intervention quality of life questionnaire be completed by the family receiving the intervention. This questionnaire should be completed prior to initiating trials with the On-The-Go sensory tools and again after three months of using the On-The-Go sensory kit in the community. The authors recommend creating a quality of life questionnaire that addresses the areas of psychological health, social relationships, and leisure participate.

The authors' intent for the On-The-Go Sensory Kit Manual is that skilled pediatric occupational therapists with sensory integration training use the product to guide the development of an individualized On-The-Go sensory kit for appropriate pre-school and school-aged clients with ASD. Based on the sensory processing deficits indicated by the child’s scores on the Sensory Profile© (Dunn, 1999), the occupational therapist and the child’s family are to collaborate to develop a sensory kit tailored to the child’s unique needs. This will involve identification appropriate tools that are feasible for the family to acquire, as well as appropriate sensory alerting or calming activities, that will help the child to
alleviate any adverse behaviors while in the community context. The authors intend to market the manual to pediatric occupational therapists to complete research on the product’s effectiveness in improving the quality of life of families with a child diagnosed with ASD over time.

This scholarly project is intended to increase family cohesiveness in those families with a child who has ASD. However, there are limitations to this project. The first limitation is that the product of this scholarly project is intended for pre-school aged to elementary aged children with ASD; it cannot be generalized to other populations, as this population has been the primary focus. The second limitation is that the effectiveness of this product has not been researched. Finally, research in autism spectrum disorders has not yet evidenced full support of sensory-based intervention for children with ASD. Although the research indicates that sensory integration and sensory-based intervention has positive outcomes when used with this population, the outcomes remain inconsistent due to a broad range of sensory techniques and outcome measures used. Further research in sensory-based intervention with the childhood ASD population is recommended, particularly with increased rigor in outcome measures and study criteria.

When searching for literature regarding the effects of ASD on family dynamics, the authors found evidence primarily in qualitative research. Oftentimes the outcomes of qualitative research provide in-depth descriptions of the true experience of the study’s participants, but these outcomes may be subject to researcher or participant bias. Furthermore, it is difficult to measure the
effects of an intervention over time through qualitative methods. The use of qualitative methods may limit a researcher’s ability to analyze the effects of an On-The-Go sensory kit over time, therefore quantitative methodology is highly recommended to measure the effects of this product.
REFERENCES


73


