

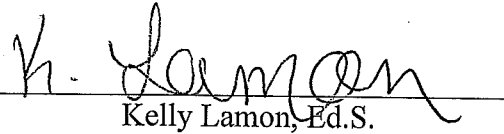
The Effects and Benefits of Sensory  
Integration Therapy on a  
Student with Autism

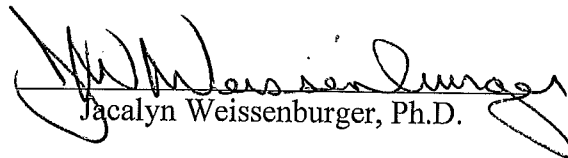
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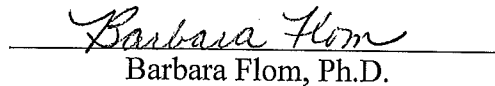
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ABSTRACT

Children with autism or Pervasive Developmental Disorder (PDD) often have difficulty regulating sensory input from the environment. These sensory related problems include increased sensitivity to certain sounds, smells, tastes and touch. Many in the field of occupational therapy believe that these sensory issues are related to inappropriate behaviors, and they use the term *sensory dysfunction* to describe the behaviors that come from one's inability to process and regulate environmental stimuli. As the prevalence of autism continues to rise, it is important for teachers, staff, and parents to utilize techniques which improve the quality of students' daily functioning. The purpose of this research was to examine the effects of sensory diet interventions on a child with autism to determine whether the intervention program was successful in decreasing a target behavior of *aggressive outbursts* using a modified alternating treatment (ABAC) design. Results showed a decrease in aggressive outbursts after the first

series of techniques were implemented, but it is not clear whether the decrease was a result of the intervention. Further, results show the second series of techniques did not have a positive impact on the behavior, yet extraneous variables may have impacted the data. Implications for future research and practice are discussed.

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## Chapter I: Introduction

### *Rationale*

The prevalence of autism has increased dramatically in recent years (Wisconsin Department of Public Instruction, 2005). In the state of Wisconsin in 1992-93, the number of autistic children receiving special education service was 203. By 1997-98 school year, the number had risen to 1,052. Data from 2004-2005 indicate that approximately 4,361 children received services under the autism label. Furthermore, Wisconsin data from 2008-2009 indicate that approximately 3,802 elementary age children alone were identified and received services under the autism label.

The increasing prevalence of autism or Pervasive Developmental Disorder, raises concerns for not only parents, but educators and clinicians as well. Pervasive Developmental Disorder (PDD) can affect a person on many levels (Newschafter, Falb & Gurney, 2005). Children with autism can struggle with symptoms that can especially interfere with a child's functioning within a school setting: behavior problems; developmental delays with fine and gross motor skills; avoidance of touch or seeking an inappropriate amount of touch; academic problems; difficulty establishing and maintaining relationships with peers; fear and anxiety in unfamiliar settings; stereotyped repetitive behaviors (verbal and non-verbal); a need for routine/structure; and increased sensitivity to certain sounds, smells, tastes. Autism is often defined as a spectrum disorder; therefore, the severity varies considerably between persons with the disorder (Newschafter et al., 2005).

Because of the increasing numbers of children being diagnosed as autistic, and because the disorder is multidimensional in nature, educators and parents seek interventions which can help children reach their potential. Even though there are many interventions and programs

available to children with autism, finding successful interventions and treatments to meet the needs of a particular child remains a difficult challenge. Interventions tend to focus on behavioral therapy with rewards and punishment, sensory input, and teaching through early childhood curriculum. The goal of many interventions tends to focus on increasing the child's positive behavior and decreasing negative behavior.

Diagnostic criteria from the Wisconsin Department of Public Instruction (DPI, 2006) states that sensory processing difficulties are one of the symptoms used for the identification of autism within educational settings. The criteria state, "The child exhibits unusual, inconsistent, repetitive or unconventional responses to sounds, sights, smells, tastes, touch or movement. The child may have a visual or hearing impairment or both in addition to sensory processing difficulties associated with autism" (DPI, 2006). Clinical research has indicated that the majority of children with autism have unusual responses to sensory stimuli and can become over-stimulated by high levels of visual stimuli, sound, and touch. It is believe that sensory input often cannot be regulated or is perceived differently by children with autism (Rogers & Ozonoff, 2005).

Because students identified with autism seem to have issues related to sensory regulation and stimulation, interventions have been developed to help them regulate themselves and calm themselves more appropriately through Sensory Integration. Sensory Integration is the process by which people register, modulate, and discriminate sensations received through the sensory systems to produce purposeful, adaptive behaviors in response to the environment (Ayres, 2005). The therapy is often recommended for difficulties with sensory integration, and is commonly referred to as sensorimotor play, sensory play, or sensory therapy. Another commonly known strategy is that of the "Sensory Diet." This strategy consists of carefully planned practical

sensory activities scheduled according to each child's individual needs throughout the day (Dimatties & Sammons, 2003). Similar to a diet designed to meet a child's nutritional needs, this diet contains certain elements designed to meet their sensory integration needs and is based on the notion that controlled sensory input can affect one's functional abilities (Wilbarger & Wilbarger, 2002). A Sensory Diet is not necessarily a separate program, as it can be inserted into the child's already existing treatment plan.

Even though most clinicians agree that children with autism have symptoms related to sensory stimulation, the therapies and interventions that focus on sensory integration are controversial (Shaw, 2002). Proving the effectiveness of these treatments has been difficult, and therefore, resistance is present. The National Association of School Psychologists (NASP) is one organization which has been resistant to sensory therapy due to the inconsistency of the research on the effectiveness, and because of the concerns with fidelity.

A position paper from the NASP reports the following:

“There is no evidence that SI therapy is or has ever been an effective treatment for children with learning disabilities, autism, or any other developmental disability. There is no study that uses a quality research design (e.g., random assignment of subjects, matched control groups, consideration of the effects of maturation, evaluators blind to treatment condition) that finds SI therapy to be effective in reducing any problem behaviors or increasing any desired behaviors.” (Shaw, 2002, p.1)

#### *Purpose of the Study*

As the prevalence rate of autism continues to increase, parents and educators need to be well equipped with techniques and strategies to help children with autism overcome their difficulties. Because research on sensory therapy is inconsistent and often has fidelity issues,

further research needs to be conducted to determine the true effects on autistic children who have sensory regulation or stimulation issues. Through a single-subject research design, the purpose of this study is to examine the effectiveness of a sensory diet program on the behavior of a child with autism.

### *Research Questions*

The following questions guide the research:

1. Does the mean level of the target behavior increase, decrease, or remain stable across baseline and treatment phases of the research design when using a sensory diet program?
2. Does the target behavior show trends during baseline and treatment phases of the research design when using a sensory diet program?
3. Do the mean levels and trends indicate effectiveness of the intervention of sensory diet of the target behavior?

### *Limitations of Study*

The proposed study will be a single-subject design. Sensory therapy will be applied as an intervention to a single child, and measurement of behavior change will be conducted.

Therefore, the results will be difficult to generalize to other children with autism. However, the study can still serve as a framework for measuring the success of other interventions with autistic children.

Other limitations may include breaks in the quantitative data collection due to school vacations, the child being sick, or the examiner not being present daily, etc. Although these external variables cannot be controlled, they should be taken into consideration when analyzing the final results. Because of these factors, the reliability and validity of the study may be altered.

*Definition of Terms:*

*Autism-* A developmental disability significantly affecting a child's social interaction and verbal and non-verbal communication, generally evident before age 3, which adversely affects learning and educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance (DPI, 2005).

*Pervasive Developmental Disorder (PDD) -* A disorder characterized by severe and pervasive impairment in several areas of development: social interaction skills; communication skills; or the presence of stereotyped behavior, interests, and activities (DSM-IV-TR, 2000).

*Sensory Diet-* The therapeutic use of sensation incorporated into daily activities (Wilbarger & Wilbarger, 1991).

*Sensory Integration-* The neurological process that organizes sensation from one's own body and from the environment and makes it possible to use the body effectively within the environment; the entire sequence of central nervous system events from reception to the display of an adaptive environmental interaction (Bundy, Lane & Murray, 2002).

*Sensory Integrative Based Therapy-* A program of intervention involving meaningful therapeutic activities characterized or enhanced by sensation, especially tactile,

vestibular, and proprioceptive active participation, and adaptive interaction (Bundy et al., 2002).

*Sensory Integrative Dysfunction-* Difficulty with CNS processing of sensation, especially vestibular, tactile, or proprioceptive, manifested as poor praxis, poor modulation or both.

*Single-Subject Research Design-* A study on one subject which measures the effect of an independent variable on a dependent variable, the subject (Kerr & Nelson, 2002).

## Chapter II: Literature Review

### *Sensory Integration Theory*

#### *Review of sensory integration theory and intervention*

Sensory Integration (SI) is defined as “the neurological processes that organizes sensation from one’s own body and from the environment and makes it possible to use the body effectively within the environment” (Bundy et al., 2002). Sensory Integration is the way human brains interpret and organize information from the senses and allows people to use that information to function in their world. One cannot observe Sensory Integration as it takes place in the brain. Instead, observers can only see at the product or outcome, which is the behavior or mood change a child exhibits as he/she is integrating or organizing sensory input from the environment. It is said that “we hypothesize that it occurs on the basis of evidence from neuroscience. However, although we observe deficits in behavior, we only hypothesize that these deficits are the result of poor sensory integration” (Bundy et al. 2002, p. 3).

Human senses include the commonly known systems of touch (tactile), taste (gustatory), sight (visual), sound (auditory), and smell (olfactory) (Dimatties & Sammons, 2003). However, practitioners who believe in sensory integration also define two other powerful senses: vestibular, which includes movement and balance, and proprioception, which includes joint and muscle senses. According to SI theory, behavior and learning are optimized when input from these senses are being effectively organized by the brain.

Sensory integration dysfunction is commonly defined as the "inability to modulate, discriminate, coordinate or organize sensation adaptively” (DiMatties & Sammons, 2003, p.1). Certain signs of a sensory integration dysfunction include, but are not limited to, hyper-or hypo-sensitivity to touch, poor coordination, and poor behavioral control (Ramirez, 1998). For

example, a child with autism who has sensory dysfunction may not have the same response to touch, taste, and sounds that as a typically developing child. Often times, an autistic child may become irritated with the noise of the television in the background and complain that the television is too loud, even though others believe it is at a comfortable volume. “Sensory dysfunction is widely believed to affect individual’s performance in daily life roles and tasks” (Bundy et al. 2002, p. 169). Even though sensory dysfunction is believed to affect the child on a regular basis, the type of sensory issues he/she experiences may be different day to day.

Persons who struggle with sensory dysfunction often receive therapy to overcome their difficulties. Therapists engage clients in sensory activities which illicit positive responses (Bundy et al. 2002). The response could be any type of reaction, such as an unexpected interaction, a change in temperament, an ability to concentrate on a task, or initiation of an activity. Sensory activities can vary from a bear hug, trying foods, looking through a telescope, listening to music, or smelling something new. The goal of intervention based on SI theory is to engage the child in an activity that produces a positive response and allows him/her to change a negative behavior and reduce anxiety and stress to optimize positive behavior.

#### *History and development of sensory integration theory*

Sensory Integration Theory was developed over 25 years ago by an occupational therapist named A. Jean Ayres to “explain the relationship between deficits in interpreting sensation from the body and the environment and difficulties with academic or motor learning” (Bundy et al., 2002, p.3). Ayres was not only was an occupational therapist, but had advanced training in neuroscience and educational psychology (Dimatties & Sammons, 2003). In 1975, Ayres began to examine the integration of vestibular stimulation with other sensory input in adults. She was highly criticized by many in her field, but published her research anyway (Bundy et al. 2002).

Through many years working with this assessment, the theory we now call Sensory Integration was born. According to Bundy and colleagues (2002), Ayres believed that the results of her studies provided initial support for her hypothesis that improving sensory integration resulted in enhanced learning for those utilizing it as an intervention, especially for those working with children with learning disabilities and sensory integrative dysfunction as well as those with auditory-language problems. Also, Ayres concluded that the results of her studies were valid, and believed in her hypothesis that “improving sensory integration resulted in enhanced learning” (Bundy et al., 2002, p. 21).

#### *Research on SI and Efficacy of Interventions*

There is a great deal controversy surrounding the research on interventions based on SI theory. Many in the field, as well as parents and educators, believe in the effectiveness of sensory integration therapy. However, many believe there is not valid research to support the use of intervention based on the theory. Below describe studies which demonstrate both the usefulness of sensory therapy on persons with sensory dysfunction, as well as studies that show the ineffectiveness of sensory therapy.

One study (Cohn, 2000) utilized parent interviews to look at perceptions of the benefits of sensory integration therapy for their children Results indicate that this group of parents believed they were able to understand their children's behavior in new ways, bringing about new ways to support and advocate for their children.

Ottenbacher (1982) used a literature review process to examine 49 studies which measured the effectiveness of sensory integration therapy. Of the 49 studies, eight of these studies were used for further analysis because they met the following criteria: (a) they investigated the effect of sensory integration therapy; (b) they included dependent measures of

academic achievement, motor or reflex performance, and/or language function; (c) they included a comparison between at least two groups; and (d) they reported quantitative results of the effect of sensory integration therapy. The eight studies contained a total of 47 statistical hypotheses that evaluated the effectiveness of sensory integration therapy. After an analysis of these tests using quantitative reviewing methods, the results revealed that subjects participating in sensory integration therapy performed significantly better in the areas of academic achievement, motor or reflex performance and/or language function than members in the control groups who did not receive sensory integration therapy (Ottenbacher).

A case study done by Case-Smith and Bryan (1999) explored the effectiveness of sensory integrative treatment on the play and social interaction behaviors of autistic preschoolers. An AB single subject design was used. During three weeks of baseline and 10 weeks of intervention, four five-year-old males and one four-year-old male were videotaped during their free play to measure their social interaction behaviors. During the intervention phase, therapy was facilitated by an experienced and certified sensory integration therapist. One child left at eight weeks due to uncontrollable events. The results found that two of the remaining four boys “displayed significant increases on measures of adult interaction” (p.494). The authors linked sensory integration with positive behavioral changes for autistic children.

A study conducted by Linderman and Stewart (1999) examined the efficacy of sensory integrative approaches and treatments on the behaviors of children with PDD. These behaviors included: social interaction, functional communication during meal times, approach to new activities, response to holding, and response to movement. A single subject AB design using two preschool-aged males was conducted using direct observation and parent interviews to measure the affects of sensory integration treatment on functional behaviors at home. The results

concluded that both subjects showed significant improvements and had increases in the following areas: spontaneous speech, purposeful play, attention to activities and conversation. The frequency of disruptive behaviors, such as aggressiveness, appeared to decrease as well. Even though the researchers could not control extraneous variables, such as other interventions, they still contend, “this investigation reveals the positive effects of sensory integration therapy for children with autism” (p.208). However, replication of this study is needed for future generalization.

Some researchers believe that there is not sufficient evidence to be able to reasonably conclude that SI therapy has ever been an effective treatment for children with learning disabilities, autism, or any other developmental disability (Shaw, 2002). The National Association for School Psychologists takes a stance that the lack of evidence supporting its use is not simply because there is not enough information to effectively evaluate the treatment. This organization purports there are many methodological flaws in the research designs which report the effectiveness of sensory therapy (Shaw, 2002). NASP believes that SI therapy has not shown to be effective in reducing any problem behaviors or increasing any desired behaviors.

Many also believe that sensory integration disorder is a myth, and, that if left alone, a child will outgrow these issues, and that they are behaving the way they do to get attention or manipulate situations (Schriber, 2007). In addition, according to Schriber (2007), it is believed that children who display difficulties regulating sensory input have emotional or behavioral disabilities or have low ability levels, which is the reason for the problematic behaviors.

Vargas and Camilli (1999) used meta-analysis to examine 16 studies which researched the efficacy of sensory therapy and alternative treatments. Considering many factors, the results concluded that when comparing sensory integration effects to no treatment at all, sensory

integration was more effective in the earlier studies compared to the later studies. When comparing the effects of sensory integration to alternative treatments, there was not a significant difference between treatments. In other words, Vargas and Camilli found that the alternative methods were just as effective as interventions based on SI theory.

There remain great difficulties in measuring behavior change and many methodological issues have been found within the studies themselves. One article (Dawson & Watling, 2008) states that: “In the case of sensory integration therapy and traditional occupational therapy, there exist so few studies that conclusions cannot be drawn. These researchers recommend future research on the prevalence of sensory and motor abnormalities in autism is needed, and whether specific abnormalities are associated with other behaviors or diagnostic criteria (p. 419).”

Looking at the design flaws of studies is important when looking at sensory integration procedures and how they are carried through. The advantage of a single-subject design often goes overlooked within sensory integration studies (Cooper, Heron, & Heward, 2007). “A single-subject design utilizes a form of experimental reasoning called baseline logic to describe the effects of the independent variable on the behavior of individual subjects” (p. 704). Therefore, by looking at the subject’s progress in response to various interventions, researchers can get a clear picture of what is being measured and how it is working or not. Again, there are disadvantages to utilizing this design because often they do not produce results that can be generalized to other children (Cooper et al., 2007).

*Limitations of the theory and current views* Ayres’ theory was criticized early in its development and continues to have limitations today. Much of the criticism stems from the fact that SI theory can’t explain why positive changes happen within a child when given sensory therapy, even though the behavioral outcomes are often positive. Sensory Integration was

originally developed to “describe the difficulties of a particular group of individuals” (Bundy et al., 2002, p. 12). Furthermore, it is possible that as sensory integration has grown in popularity, the applications of it may be used in ways that exceed the theory. Some say that the term sensory integration is sometimes used inappropriately where intervention is concerned (Bundy et. al, 2002). When looking at the functions of the brain, it is easy to misinterpret the theory. Ayres originally hypothesized that sensory integration dysfunction was related to the central nervous system processing of sensation and not intended to explain the neuromotor deficits. When speaking of the vestibular and proprioception senses, this can easily be misconstrued since they primarily deal with movement (Bundy et. al, 2002).

Sensory integration theory is primary focused on children. Although many in the field may assume it still applies only to children, it can also be used with adults who continue to exhibit the dysfunction from childhood. This is a possible limitation because the theory is not geared towards adult-onset deficits in general.

One other possible misinterpretation of SI therapy is that some believe it is a single tool to utilize when working with children with sensory deficit issues. However, SI is meant to be used in an already existing therapy program or treatment plan for a child. It should be used in conjunction with behavioral therapy and academic support (Hyatt, et. al., 2009)

### *Autism*

Therapy based on SI theory is often used to treat certain characteristics of autism. By definition, “Autism is one of the pervasive developmental disorders which are characterized by an impairment in the development of reciprocal social and communicative skills, abnormal language development, and a restricted repertoire of behaviors and interests” (Mash & Barkely,

1996, p. 311). Autistic disorder is the most widely known of all of the PDD spectrum disorders (Batshaw, 2002).

*Characteristics and Diagnosis* Basic characteristics that define autism include the following: difficulty developing relationships with people; delayed speech acquisition and inability to use speech once it develops; repetitive and stereotypical behaviors; lack of imagination; good rote memory; obsessive insistence on sameness of routine; normal physical appearance (Turnbull, Turnbull, Shank, & Leal, 1995).

According to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000), the diagnostic criteria for autistic disorder is laid out more clearly in three groups. Group One includes the following: “marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction; failure to develop peer relationships appropriate to developmental level; a lack of spontaneous seeking to share enjoyment, interests or achievements with other people; lack of social or emotional reciprocity” (p. 369). In Group Two, the following characteristics are included: “delay in, or total lack of the development of spoken language; marked impairment in the ability to initiate or sustain a conversation with others (in those who have adequate language); stereotyped and repetitive use of language or idiosyncratic language; lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level” (p. 369). Finally, Group Three includes the following: “an encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus; apparently inflexible adherence to specific nonfunctional routines or rituals; stereotyped and repetitive motor mannerisms; persistent preoccupation with parts of objects” (p. 369).

In order to meet the criteria for diagnosis, one must meet a total of six or more items from these three groups/lists. In addition, delays or abnormal functioning prior to the age of three must be met in at least one of these areas: social interaction, language used in social communication, and symbolic or imaginative play (DSM, 2000). Lastly, Rett disorder and childhood disintegrative disorder must be ruled out as causes of the symptoms.

From another perspective, DPI sets the following criteria for autism taken directly from the checklist: “a developmental disability significantly affecting a child’s social interaction and verbal and non-verbal communication, generally evident before the age of three that adversely affects learning and educational performance.” It also goes on to state more specific characteristics often associated with the disorder, including “engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences” (DPI).

Even though a criterion has been set for a diagnosis of autism, autism is a multidimensional disorder. Characteristics vary greatly from one person to another (DPI, 2005). Often the term autism is associated with children with many behavior problems or someone who has a very specific talent in one specialized area. These may be true to someone with autism, but may not be the case for all. Some children are very high functioning and one may not be able to tell that they have the disorder.

*Etiology* While the causes of autism are not fully known, there are many speculations and research on the etiology. “It now appears clear that PDD's are the product of developmental brain abnormalities with a significant genetic influence” (Batshaw, 2002, p. 371). It was previously believed that the causes were attributed to parenting styles, environmental

circumstances, vaccinations, and social learning. It is unlikely that autism is a result of maternal stress, poor nutrition, or an infection of some sort (Batshaw, 2002).

Genetics, perhaps, play the largest role in the onset of autism. Research on family studies, especially with a direct correlation between twins, is convincing. The evidence shows that “the rate of autism is much greater among identical twins (70-90%) than among fraternal twins, as well as the rate being much higher among siblings of children with autism than the general population” (Batshaw, 2002, p. 371). In many epidemiological studies, the pooled frequency of autism in siblings with autism was approximately three percent, which is 50 times greater than the prevalence in the general population (Mash & Barkely, 1996). In addition to this, the risk increases for those parents who have previously had a child diagnosed with the disorder (Batshaw, 2002).

Research studying the brains of those who have died with autism shows abnormalities in the cerebellum and cerebral cortex (Turnbull et al., 1995). There is also reason to believe that some imbalances occur within the brains of these individuals in relation to neurotransmitters, and in particular, serotonin. According to Turnbull and colleagues, the levels of serotonin are typically higher in the brains of those with autism, as compared to those without autism. However, although this has been examined by researchers, along with other possibilities like dopamine and norepinephrine, the results are inconsistent due to methodological differences (Mash & Barkely, 1996). In exploring the most recent research, the push is toward looking at the biomedical factors when examining the causes of PDD and/or autism.

### *Intervention*

There are proven effective in-home and school therapy programs for autistic children. The long-term prognosis for an autistic child is very good when an intervention is implemented

soon after diagnosis and in the early years of a child's life. "With the advent of better diagnostic instruments and a better ability to recognize autism within the first two years of life, there will be a greater demand for interventions designed for toddlers and preschoolers" (Mash & Barkley, 1996). Early signs of sensory impairments need to be treated "because a child with sensory integration dysfunction cannot automatically compensate for the inadequacies on their own" (Ramirez, 1998, p. 10). According to Ramirez, a child's sensory issues should not be seen as a problem at home or school, but rather as a dysfunction which should be evaluated and treated by a professional. A child will need support from caregivers, teachers, and occupational therapists once the treatment is underway.

Many existing programs, such as the Wisconsin Early Autism Project (2005), concentrate on an extremely intensive in-home technique centered on the child. This consists of routine and structure, dependent on the age and severity of the diagnosed child, and it is based on the Lovaas principles of therapy for young children with autism (Connor, 2003). Other behavioral programming is available to children with autism around the state, as well as the country. These include the following: the Early Intensive Behavioral Intervention (EIBI), Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH), and Applied Behavior Analysis (ABA). Other programs, such as "Early On" stem off of this framework and have been established in schools, Head Start Centers, and daycares for children on the PDD spectrum. Common to all of these programs is the emphasis on early intervention, one-on-one attention, and behavioral modification techniques.

Other simple interventions include environmental modifications. Some experts suggest reducing distracting visual materials from the classroom and/or child's bedroom at home (Dimatties & Sammons, 2003). Others suggest adapting the child's daily routines to avoid

stressful activities and altering how others interact with the child as to reduce irritating stimulation (Wilbarger & Wilbarger, 1991).

Therefore, sensory activities and therapy are often used with children with autism. Studies thus far on this population are limited because of their emphasis on single case research. However, Bundy et. al. believes the limited research is positive. “Some of the findings ranged from decreases in tension and anxiety or self-stimulatory behavior to increases in social interaction, new approach to activities child engages in and being more receptive to holding, hugging and movement by others” (p. 13).

From an intervention standpoint, SI would be most easily incorporated as sensorimotor activities. These activities, which concentrate on the five senses (touch-pressure, olfactory, visual, vestibular and auditory), would be “applied to, rather than sought by, the individual” (Bundy, et.al., 2002, p. 13). In other words, the sensations are appropriately given to the child before he/she needs to seek them inappropriately. This can be most easily accomplished through the Sensory Diet. Sensory activities are added or modified throughout the child’s day while the existing treatment plan continues to be implemented.

### *Sensory Diet*

A variety of intervention methods or models have been utilized to address sensory processing disorders in children identified with autism (Eynat, 2007). Some of these may include direct behavioral intervention, caregiver consultation, environmental adaptations, or the implementation of what are known as Sensory Diets (Eynat). A Sensory Diet is designed to follow specific sensory techniques that have been developed for an individual based on sensory preferences and areas of defensiveness (NeuroRehabilitation, 2008). According to the NeuroRehabilitation Institute, a Sensory Diet is able to provide unique, appropriate controlled

sensory stimulation to support optimal functioning while at the same time works to prevent sensory overstimulation that is often found in children with autism. The goal is to promote an individual's well-being while also serving as a calming, enjoyable, or stimulating activity, depending on what is needed at the time that techniques are implemented.

There are many different models and practices used in education that are all essentially Sensory Diets. However, those who practice within education strongly believe that to be successful, the diet or type of therapy used should align with the child's motivation in selecting which techniques or activities are beneficial to them (Miller, 2007). According to Miller, this active part that a child can take in their own Diet allows them to become regulators of their own sensory information. Not all children who benefit from a sensory diet are autistic. These same techniques are often utilized with children who have attention and focus issues or other types of inappropriate behaviors. An individualized diet may help children find ways to meet those sensory needs in a more socially acceptable or safe way, while at the same time learn about the social rules of space and boundaries of their peers and staff members.

A Sensory Diet may include any of the following techniques:

- Push-ups on the wall or chair
- Use of "theraband" to receive pressure on legs
- Shoulder weights/vest
- Large arm movements
- Use of body sock
- Therapy ball that "sandwiches" student on the floor
- Wheelbarrow walk
- Use of headphones with calming music

- Weighted blanket

- Tent for student to have a dark small space to be in

Sensory Diets should be implemented and supervised by a familiar adult. Activities should also not be forced and many of the activities may be used together. A Sensory Diet is mostly student driven, but some amount of guidance and direction is given for what is appropriate for the individual's needs.

### *Summary*

Sensory therapy is an intervention which is derived from sensory integration theory. Children with autism are thought to have issues regulating sensory input. Therefore, educators have turned to sensory therapy to help children with autism reduce stress, calm themselves, decrease negative behavior, and increase positive behavior. The research on sensory therapy is controversial. Even though there is a body of research which shows it can be effective, many believe there are methodological flaws with these studies. Other studies show the technique is not effective. Single or small-group design are often used to study the behavior change from sensory therapy methods, and further studies are needed to determine the effectiveness of sensory therapy with children diagnosed as autistic.

### Chapter III: Methods

The purpose of this study was to examine the effectiveness of a sensory diet which was implemented into the existing individualized education plan of a child identified with autism. The goal was to identify whether these techniques were a successful intervention for this student. This chapter specifically discusses those techniques used in a single-subject design. The details for selecting a subject, the research design, and the data collection and analysis techniques are outlined. In addition, limitations of the study are discussed.

*Subject* The chosen subject was an eight-year-old male student with autism whom staff describe as having many sensory needs, including sensory sensitivity to sound and touch. The researcher, a school psychologist in the district, inquired about possible students who might benefit from some sensory techniques that could be integrated into the child's day. The researcher conversed with the district's program support teacher, occupational therapist, and the CARE program teacher, and asked them to nominate a child with the following criteria: he/she must have an autism or PDD spectrum label, he/she be receiving special education services in some capacity, he/she must exhibit some behavioral challenges (examples may include, but are not limited to, inappropriately touching peers or teacher/aggression toward others, exiting seat often to cause a distraction to others, speaking too loudly or talking at inappropriate times, outbursts during transitions, avoidance of social interactions, etc.), and he/she must appear to have difficulties with sensory dysfunction. After the special education teachers nominated a student for the study, the researcher contacted the parent for written consent. No research was conducted until permission was granted by the parent, school administrator, and UW-Stout's

Human Subject Review Committee. This approval by all three of the above mentioned parties was given in December of 2008. Data collection began in January of 2009.

Parent and teacher reports indicated the subject had adverse reactions to certain environments, unanticipated events, and specific sounds such as music class, the loudspeaker, and fire drills. The behaviors demonstrated as a result of these stimuli were a raised voice, throwing objects, running away, or falling to the floor. The more extreme and aggressive behaviors included screaming, hitting, kicking, head butting, and/or scratching staff members and/or students at times. According to the staff, these were behaviors that interfered with this child's learning as well as the learning of his peers. Sensory dysfunction in the classroom appeared in behaviors such as the following: an inappropriate amount of touch-seeking or not wanting to be touched at all; unresponsiveness to trying new things that involved a sense in any way, and exaggerated responses to sounds or visual stimuli that other children did not display.

The student received one-to-one academic support and did well with academic tasks when they were predictable and when the student was able to achieve expectations with minimal prompting from staff members. Reportedly, new academic tasks were often difficult and they may have taken the student multiple attempts to complete. According to staff, when the child was in a highly structured environment with minimal stimulation, this child was most successful. This student also utilized a visual schedule at school and was observed to work through this independently when motivated. The student worked towards reinforcers for not fleeing the classroom or acting aggressively. He sometimes became aggressive with students and staff and displayed this aggression through hitting, biting, scratching, and kicking. These acts of aggression often occurred as a reaction to feeling overwhelmed and stressed. He utilized breaks when in need of time to cool down.

This student demonstrated sensory differences in the areas of auditory, touch, and oral processing. Staff reported that if he was provided with various opportunities for sensory activities and the use of sensory materials throughout the day (such as walking, biking, “squeezes” from staff, the ball, weighted blanket), he was often more successful. This student made verbal requests for these activities in addition to them being a structured part of his day. This student also demonstrated delays in receptive/expressive language and was working on ways to appropriately interact with others. He was able to verbalize his need for a break or for students/staff to move away from him. However, as mentioned earlier, he would flee stressful situations or act aggressively.

*Research Design and Data Collection* The first step of this research study was to operationalize several target behaviors in which the subject’s special education teacher believed he struggled with the most. In order to operationalize these behaviors, the researcher spoke with the teacher to determine what difficult behaviors he displayed. The target behavior selected for measurement in this study was aggressive outburst, which was defined as the following. *An incident of aggressive behavior in which the subject did one or more of the following in a five minute period: hitting, scratching, kicking, biting, or pinching.* Operationalizing the behavior in measurable terms allowed the researcher to count the frequency of the behavior during the observation periods (Cooper, 2007).

An alternating treatment design (ABAC) was used to measure the effects of two different interventions. An additional baseline was added to examine the affects of withdrawing the phase B intervention and also to clear the effects of the B phase. The use of alternating treatments allowed the researcher to examine the effects of both treatments, compared to baseline, and additionally compare the two treatments to each other.

The first phase, 'A,' was a baseline. It is an observation period without any intervention. The 'B' phase was a treatment phase where the subject was involved in one version of the sensory diet approach. The third phase, 'A,' is a second baseline, and the final phase, 'C,' is a second treatment phase, which was a different version of the sensory diet.

The sensory integration techniques for both phases were implemented by the child's special education teacher or aide who were both trained by the occupational therapist in the techniques chosen for the child's sensory diet. The first treatment phase (B) consisted of a variety of techniques that utilized "deep pressure" at the beginning of each school day. These techniques included the body sock, co-op blanket, or making a "sandwich." The body sock involved the student climbing into a large sock that fit tightly around him to provide pressure. The co-op blanket was a heavy blanket used by the student for pressure and the sandwich involved the student lying on the floor or on top of a blanket and a large ball rolled over him or another blanket being placed on top of him.

The second treatment phase (C) utilized proprioceptive techniques which consisted of stomping, chair push-ups, and crab-walking. Stomping involved having the student sit on a chair or standing up and stomping his feet. The chair push-ups involved the student sitting on chair and utilizing his arms to lift his body off of the chair for a few seconds at a time. Crab-walking was when the student lay on the floor and a staff member would lift up his legs and walk him around the room. These particular techniques were chosen because of the child's needs and preferences, based on past effectiveness.

Observation and recording of the child was done by the child's teacher and teacher assistant. These individuals were trained by the researcher on the observation sheet, which was adapted from a previous observation system familiar to the teacher. Observations were done

continuously, during the whole school day, for each day of the study. The teacher and teacher's assistant carried around the observation sheet and recorded every time the student had an *aggressive outburst*. Therefore, the frequency of aggressive outbursts could be counted each day.

### *Data analysis*

Once the data was collected, it was analyzed by the researcher in partnership with her advisor. The information gathered from the observation system was graphed. Visual analysis was used to determine whether the two interventions of sensory diet were beneficial to the child. If the behavior improved during treatment phases, in comparison to the baseline phases, the sensory diet would be deemed effective.

When interpreting graphically displayed behavioral data, visual analysis is used (Cooper, 2007). Visual analysis is a “systematic approach for interpreting the results of behavioral research and treatment programs that entails visual inspection of graphed data for variability, level, and trend within and between experimental conditions” (p. 708). By looking at the graphs, determinations are made by using two visual analysis techniques: mean level lines and linear trend lines.

Mean level lines are horizontal lines drawn through the series of data points for the different research phases. They are used to see the summary of average performance within a phase (Cooper, 2007, p. 151). In this case, mean level lines were used in all phases so they could be compared to each other.

Trend lines were also used within this study. Trend lines describe the overall direction that is taken by a data path (Cooper, 2007). According to Cooper, in a given data set, trend lines can be drawn using a linear regression formula, which describes the overall trend of the data.

The direction of the line indicates whether the target behavior is decreasing or increasing. The slope of the line indicates the rate in which the behavior is increasing or decreasing. Since this study is an alternating treatment method, trend lines were drawn in for each research phase to determine whether two interventions had an impact on the behavior and at what rate, compared to the other phases. The Microsoft Excel linear regression line was used for the purposes of this study.

### *Summary*

An alternating treatment design (ABAC) was used to determine whether two different sensory diet techniques were effective in reducing the target behavior of *aggressive outburst* on a nine-year-old student with autism. Continuous recording of aggressive outbursts were recorded across four research phases. Visual analysis was conducted using trend lines and mean level lines to make determinations about behavior change.

## Chapter IV: Results

The purpose of this study was to examine the effectiveness of a sensory diet program on the behavior of a nine-year-old student with autism. An alternating treatment design (ABAC) was used to determine whether two different sensory diet techniques were effective in reducing the target behavior of *aggressive outbursts*. After data were collected, visual analysis was used to assess the effectiveness of the sensory diet program with the identified subject by examining the mean levels and trend lines across all four phases. This chapter will discuss the results of the study and will be guided by the three research questions proposed in the introduction.

***Research Question 1: Does the mean level of the target behavior increase, decrease, or remain stable across baseline and treatment phases of the research design when using a Sensory Diet program?***

Figure 1 and Table 1 display the mean level lines in each phase of the sensory diet program. The first baseline (A) measured a mean level of one. The first treatment phase (B) included a sensory diet of pressure techniques, and the mean level is .6. The second baseline (A) had no intervention, and the mean level was 0.4. Finally, the last treatment phase (C) included a sensory diet of proprioceptive techniques, and had a mean level of one. These mean level lines indicated the average number of *aggressive outbursts* the child exhibited per day in the different phases of intervention.

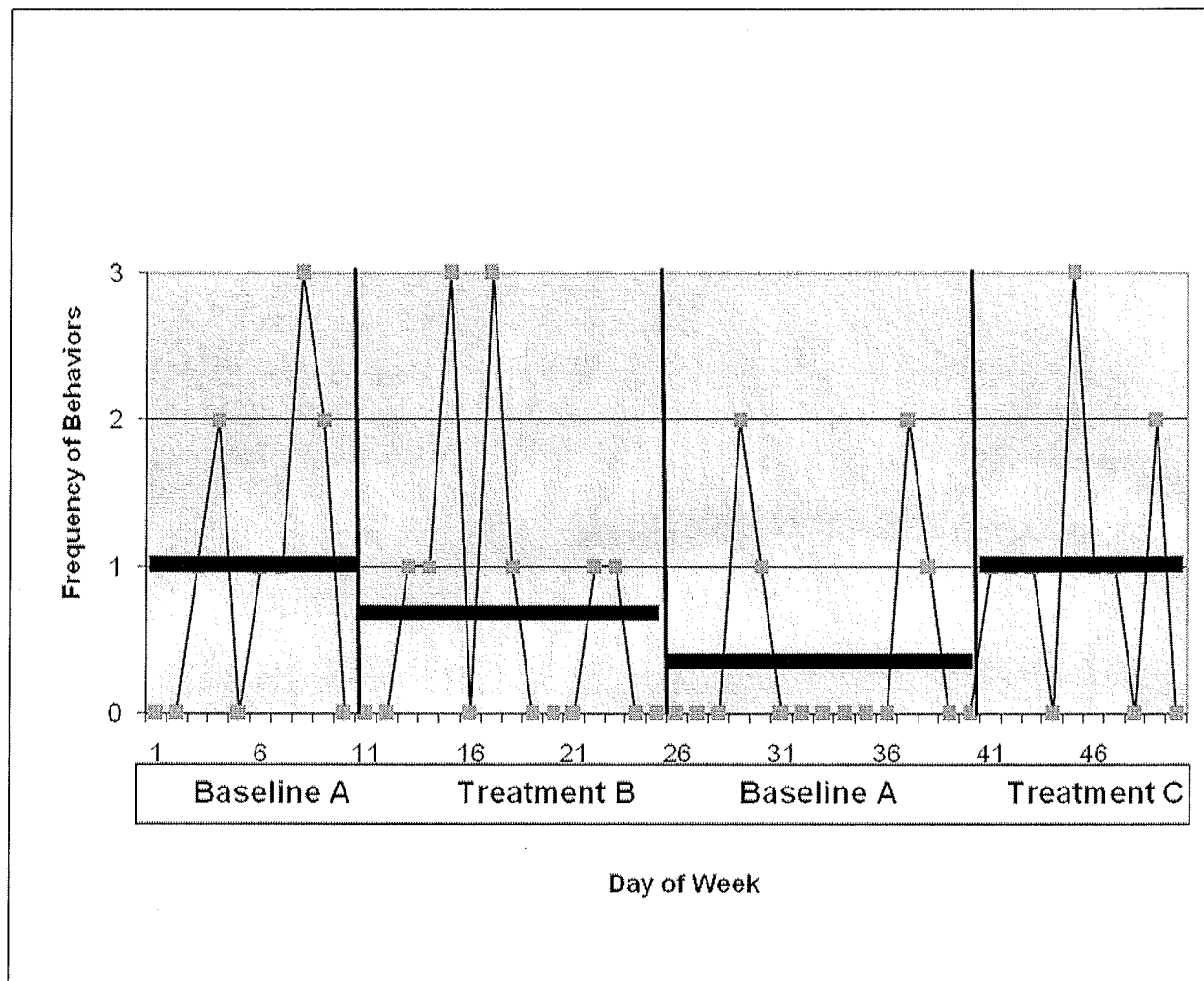


Figure 1. Line graph displaying the mean level of each phase of measuring *aggressive outbursts*

**Research Question 2 : Does the target behavior show trends during baseline and treatment phases of the research design when using a Sensory Diet program?**

Trend line data for the sensory diet program can be found in Figure 2. As with the mean level lines, a visual inspection of each phase was conducted. The first Baseline (A) indicated an upward trend in the amount of *aggressive outbursts*. When the first intervention/treatment phase was implemented (B), the trend showed a decrease in the target behavior. When going back to Baseline (A) the trend line showed a slight increase, with the target behavior remaining lower

than the first measured baseline. The second treatment phase (C) showed a slight decrease, but the amount of *aggressive outbursts* had also increased as compared to the other treatment phase.

Figure 2 displays the trend lines for each phase of the study.

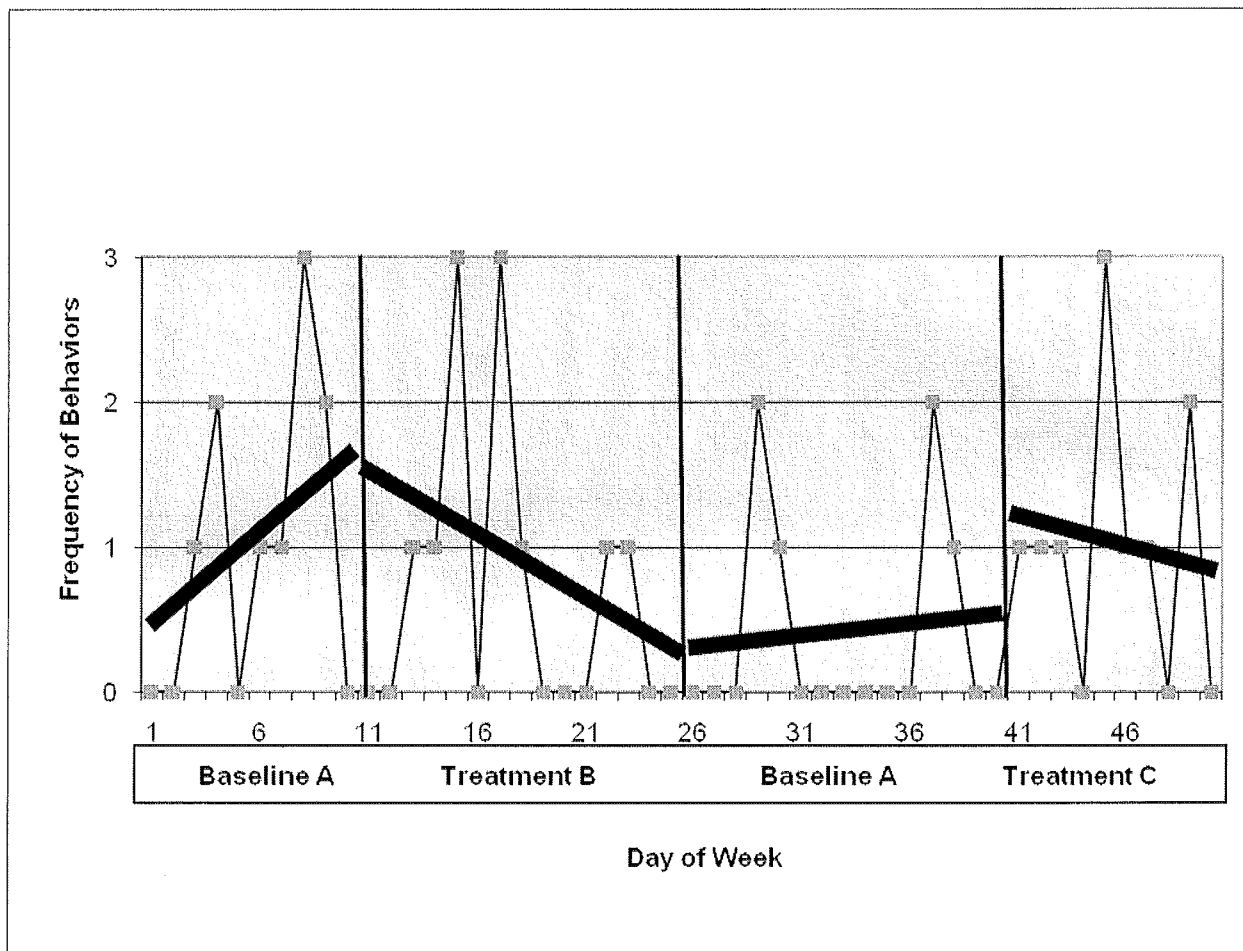


Figure 2. Line graph displaying the trend lines within each phase of measuring frequency of aggressive outbursts

***Research Question 3: Do the mean levels and trends indicate the effectiveness of the intervention of sensory diet of the target behavior?***

Initially, when looking at phases A and B in Figure 2, it appears that the intervention in B was effective. The mean level line reduced during intervention phase B, when comparing it to the first baseline. In addition, the trend in phase A was showed an increasing level of *aggressive*

*outbursts*, but once intervention started, the trend reversed and there was a decreasing level of the target behavior. However, the second baseline is important to examine when determining whether the decrease of target behavior was actually due to the intervention. Reversing the design and going back to baseline can indicate whether the researcher actually had experimental control of the behavior (Cooper, 2007). One would expect that if the intervention were working as intended, the behavior would increase again when the teacher removed the intervention. That was not the case in this study. In fact, the mean level is at the lowest during the second baseline. Therefore, either the effects of the intervention lingered into the second baseline, or other factors influenced the behavior change across the A, B, and A phases. Generally, the data are inconclusive for the sensory diet of deep pressure.

The data are clearer for the second phase of intervention (C) when proprioceptive techniques were implemented. Even though there was a slight downward trend in that phase, the behavior actually increased during the intervention phase. The data indicates the second intervention was not as successful for the behavior of *aggressive outbursts* as compared to the first intervention or the baseline period.

## Chapter V: Discussion

The purpose of this study was to examine the effectiveness of a sensory diet program on the behavior of a nine-year-old student with autism. An alternating treatment design (ABAC) was used to determine whether two different sensory diet techniques were effective in reducing the target behavior of *aggressive outbursts*. Visual analysis was then used to examine the data and look at the subsequent effectiveness of the sensory diet program with the identified subject using mean levels and trends across all four phases. This chapter will discuss the major conclusions of the study as well as its limitations, suggestions for future research, and implications for practice.

### *Conclusions*

The literature review showed conflicting results regarding the efficacy of sensory integration interventions. Some studies showed favorable results. For example, Ottenbacher (1982) revealed that subjects participating in sensory integration therapy performed significantly better in the areas of academic achievement, motor or reflex performance and/or language function. Other studies show less favorable results. Vargas and Camilli (1999), for example, concluded that when comparing sensory integration to alternative treatments, there was not a significant difference between treatments. In addition, the NASP has taken a position against the use of sensory techniques because of methodological flaws in the research which showed sensory integration techniques are beneficial (Shaw, 2002).

The current study used an operationalized definition of *aggressive outbursts* and measured this class of behavior to determine whether a sensory diet helped to reduce this target behavior. Because staff reported the student to have difficulties related to sensory input, the chosen techniques were aimed to help the student based on his preferences and past history of

what staff reported as effective. This study examined the number of target behaviors occurring per day for several weeks. Mean levels and trend lines were used to analyze the frequency of the data and determine whether the interventions were successful.

The data are inconclusive for the intervention consisting of deep pressure techniques. Aggressive outbursts did decrease during the phase when these techniques were used. However, when a second baseline was introduced and the intervention was taken away, the behavior continued to decrease. There are two plausible conclusions for this finding: Either the intervention of deep pressure techniques was effective and the effects lingered into the second baseline period, or the intervention was not the cause of the decrease during the B phase. Since there is not any evidence to pick one of these conclusions over the other, the effects of the intervention are determined to be inconclusive.

The data for the consisting of proprioceptive technique intervention indicate that this technique was not effective. The target behavior actually increased during the phase of intervention when proprioceptive techniques were used.

### *Limitations*

While the researcher attempted to obtain as much control as possible over this study, there were several limitations that may have interfered with obtaining clear and accurate results. These limitations included, but are not limited to, a lack of control over the classroom environment, inconsistent data collection due to breaks or absences, changes in schedule, the researcher not being in the building every day, and using a third party for data collection. In addition to the above, the results of this study should not be generalized to a larger population due to the single-subject design of the study.

This study was conducted with the subject in his familiar classroom environment, which is important for many reasons. However, this environment also contained several variables that could not be controlled. In a classroom, it was natural for the subject's special education teacher or aide to implement the intervention, rather than the researcher herself. While these staff members were trained in the implementation of the sensory diet program by an occupational therapist, it is unknown whether unconscious biases may have interfered with the implementation of the program. For example, because the teacher or aide knew they had to collect data, they may have approached the subject differently during the treatment phases. Additionally, the researcher did not record the behavior directly. The teacher and teacher's assistant were trained in the behavioral recording using a modified observation sheet they had previously used to document the child's behavior. Just as they may have had unconscious biases which affected the way they implemented the intervention, these possible biases may have influenced the data recording. Having a second observer periodically record the behavior would have ensured inter-rater reliability. Because this study was conducted in the school environment with adults that the student has long formed relationships with, it is difficult to determine the implications of those relationships on the student's overall response to the techniques.

A factor that may have affected the data included a few inevitable breaks that occurred during the time of the data collection. Spring break in the public school was a week in which the school was not in session. This period of time occurred between the second baseline and the second phase of intervention. This particular student had difficulty transitioning back to school after weekends and breaks, as reported by his teachers and parent. The spring break variable may have accounted for the increase of behavior during the final phase of intervention when the proprioceptive techniques were used. The student was also absent a few times. Documenting

extraneous variables which may have interfered with the child's behaviors would have given insight into whether these variables impacted the student's behavior. The following is a list of possible variables which could have been recorded: changes in the student's schedule, sleeping patterns, breaks/weekends, absences, and diet. These factors could have had significant impact on the subject's frequency and severity of behavior.

The range of the data was only 1-3 for the frequency of aggressive outbursts per day. Because this is a rather small range, there was limited variability to determine behavior change. In addition, with a range of 1 to 3, the data really does not indicate the severity of the outbursts from day to day. Measuring of the duration of aggressive episodes could have given the researcher additional information, given it appeared the episodes may have differed not only in how many per day, but also in how long they lasted. Duration data would have enhanced the inferences regarding the behavior change. In addition, having a longer period per phase would have reduced the chance that extraneous variables would have impacted the trend line, in turn making the trend lines more stable.

Finally, the results of this study may not be generalized to a larger population due to the single subject nature of the design. "Use of a single participant, or a small number of participants, each of whom is considered an intact experiment, stands in sharp contrast to the group comparison designs traditionally used in psychology and the other social sciences that employ large groups of subjects" (Cooper, 2007, p. 164). This study examined the effects of a sensory diet on an elementary age child with sensory difficulties. In order to make the results more generalizable, additional studies would need to be conducted with subjects with similar needs, using similar interventions in order to confirm the generalizability of these findings.

### *Suggestions for Future Research*

There is controversy around the use of sensory techniques in the schools. Both proponents and opponents point to studies which show support for their stance. Both groups believe their literature is conclusive, but the controversy in itself would be reason to conduct further research. The following are suggestions for future research topics.

Many practitioners within the field of education stand by sensory techniques even with mixed results reported in the literature. But this is not an easy thing to study, especially given the criticism of the methodology of the studies to date. The use of the techniques is wide-spread, making it appear that practitioners intuitively know *something* is working, though it is difficult to determine what exactly it is. A future study might involve survey research to identify the current techniques educators find appealing and reasons they think these techniques are effective. The survey could probe practitioner's familiarity with the research and how they have come to know about implementation.

Children with autism have taught us a great deal about sensory input and how they deal with sensory stimulation from the environment. Educators cannot ignore the fact that children with autism have more difficulty with input and often use self-soothing techniques to regulate themselves as compared to children who are able to self-regulate appropriately. Children who engage in rocking, hand flapping, and finger movements are examples of how children with autism respond to the stress in their lives. Inappropriate as these behaviors may be in the school environment, what do they tell us about how movement can decrease one's overall stress level? Future research might focus on movement and determine how children with autism use movement to deal with environmental stimulation.

A different approach to determining effective interventions is conducting a Functional Behavioral Assessment (FBA). FBAs analyze the triggers and maintaining consequences of target behaviors to help educators develop intervention plans (Crone & Horner, 2003). Identifying the function of a target behavior allows educators meet the child's needs while reducing inappropriate behavior. In this study, the researcher modified a recording sheet the staff was already using with the subject. This recording sheet allowed staff to record triggers and maintaining consequences. Therefore, the researcher had data available which may have allowed the team to develop a FBA summary statement and draw interventions from it. Implementing an FBA would be fairly simple when using the data recording sheet that was already in place. Future research might focus on the use of FBAs and whether the function of *obtaining or escaping sensory input* is a reasonable conclusion for summary statements. Additionally, research could focus on whether sensory techniques influence interventions when teams indicate *sensory input* as a function of the behavior.

#### *Implications for Practice*

While the nature of this study appears to be more applicable to the field of occupational therapy, it is also an important topic for school psychologists. Sensory integration issues are highly prevalent in children identified with educational autism and who are diagnosed medically as having autism spectrum disorder. With the increasing prevalence of this diagnosis in the United States, and in Wisconsin, it is important that school psychologists as well as general and special education staff who are a part of individualized education plan (IEP) teams are aware of effective interventions for these students. A collaborative approach to meeting these students' needs is crucial for creating successful school experiences for them. Sensory integration is just one of the growing interventions being used in public school settings. Proponents of sensory

therapy have consistently supported the use of the techniques in combination with other behavioral and educational approaches (Murray, et al., 2009).

Occupational therapists are trained as practitioners, and studying the implications of their practice through research may not necessarily be part of their skill sets. However, school psychologists are trained in research design and single-subject studies. School psychologists and occupational therapists can cooperatively work together to set up systems which measure effectiveness of interventions on behaviors. School psychologists can collaborate with occupational therapists to design single-subject studies which confirm or refute the use of specific techniques with specific children.

Another area of ambiguity is looking at the purpose and usage of sensory techniques within the context of schools. There appears to be a certain level of disconnect between how school staff are utilizing the techniques and the actual techniques referenced in the literature. Educators may hear different language used, such as “sensory breaks” or “need for relaxation,” as compared to the words "sensory diet" and "sensory therapy." These later terms have evolved more from the field of occupational therapy than from educational perspectives. However, the field of psychology has known that giving children breaks from stimulation and using calming techniques are often effective and can produce an increase in positive behaviors. It is possible that education has adopted the terms used by occupational therapists to describe something as simple as providing time for students to calm themselves and relax when overstimulated.

### *Summary*

Since the identification of Sensory Integration as a disorder in the 1970s (Ayres, 1972), occupational therapists have tried to find interventions to help children with problematic

behaviors related to sensitivity of sensory input and regulation. Therefore, the purpose of this study was to examine the effectiveness of a sensory diet program on an elementary aged child with autism. Results of this single-subject study proved to be inconclusive. The subject's target behaviors decreased during the first treatment phase and second baseline period, but increased again during the last treatment phase. It is unclear whether the decreases in *aggressive outbursts* occurred due to the intervention or other variables affected the student at the time of the study.

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## **UW-Stout Signed Consent Form for Research Involving Human Subjects Consent to Participate In UW-Stout Approved Research**

Title: The Effects and Benefits of Sensory Integration Therapy on a Student with Autism

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**Description:**

Through the use of deep pressure and proprioceptive sensory techniques, certified school staff will attempt to decrease several problematic behaviors that this child displays. Over a course of 6 to 8 weeks, various techniques will be used and data will be collected to determine if the techniques utilized at a regular interval of time every day will indeed accomplish a positive change. These techniques were mutually agreed upon by school staff (school psychologist, special education teacher, program support teacher, and occupational therapist). The techniques are within the typical interventions used in the district, and examples of techniques include the following: use of body sock, co-op blanket, making a "sandwich" or "burrito," crab-walking, stomping, and chair push-ups.

**Risks and Benefits:**

As with any intervention plan, there is always a risk that the behavior (s) will get worse, especially in the first stages. If the behavior(s) becomes unmanageable, the study will be revised. Risks include possible discomfort for the student because there will be someone he is unfamiliar with observing him. This is not a natural part of his school environment. The examiner will try to be as discreet as possible, but it could be construed as an invasion of privacy to a certain extent. There is also a behavioral risk for the student during the intervention phases, if different techniques are tried with the student for data collection purposes.

The goal of this study is to help the subject of this project reduce behaviors related to suspected sensory integration dysfunction. The subject will likely benefit from the assessment and intervention, and his behaviors of concern will likely be reduced as a result. Furthermore, this study is important to the field of autism, occupational therapy, and educational psychology. Sensory integration theory provides the notion that particular sensory experiences when used in a controlled manner can reduce sensitivity and/or defensiveness and improve/decrease problematic behaviors. The data could be generalized to other children on the autism spectrum when the examiner is looking at the benefits that sensory integration may provide.

**Special Populations:**

The subject for this project is your child, a minor. Therefore, signed consent is needed from you, the parent.

**Time Commitment and Payment:**

There is no payment or time commitment needed from you. However, your child will be involved and will participate in the techniques described on a regular basis every day for 6 to 8 weeks between January and March of 2009. The school district and examiner will have a time commitment in gathering data. Data is collected on your child when behavioral incidences occur as part of his current programming, so this will only change slightly.

**Confidentiality:**

You, your child, and the school district will not be identified by name on any documents held by the investigator. This informed consent will not be kept with any of the other documents completed with this project. In addition, any documents for this project with the child's name will be kept in a confidential file secured by this examiner.

**Right to Withdraw:**

Your child's participation and the school district's participation in this study are entirely voluntary. Without any adverse consequences to you or the district, the school district or you, the parent, may choose not to have the investigator participate in the evaluation. Should either party choose to have the investigator participate and then later wish to terminate her from the project, the school district or you, the parent, may discontinue her participation at this time without incurring adverse consequences.

**IRB Approval:**

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

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**Statement of Consent:**

By signing this consent form you agree to have Sara Gardner conduct the sensory integration research project with: fill in name later. You also are consenting to allow Sara Gardner the ability to write up the project entitled, The Effects and Benefits of Sensory Integration Therapy on Children with Autism, for her Education Specialist (Ed.S) thesis.

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Parent Signature

Date

ABC Behavior Documentation

Student Name: [REDACTED]

Behaviors targeted: hitting, scratching, kicking, biting

Date	Time and Duration / Location	Antecedent- What specific activity or event happened before the behavior?	Behavior- What specifically did the child say or do?	Consequence- What happened after or as a result of the behavior?	Possible Function?
1/23	3:00 CARE	Computer was turned off, because it was time to go and [REDACTED] left computer.	repeatedly hit staff on back	[REDACTED] was given squeezes and asked if he needed a break.	
1/28	9:30 CARE	working on computer -	hit other student working next to him repeatedly	[REDACTED] directed to break area.	
1/29	11:00 music room	music was over -	took gym phone books - punched out names - kicked music teacher	directed to break area. Took a break for 15 min.	
1/29	10:00 CARE ROOM	Yoga over other student in computer area.	Squeezed other students face	directed to break area. Took break for 15 min.	