Sensory Integration: A Way to Help Achieve Optimal Learning for Children with Sensory Processing Disorder

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A Seminar Paper

Presented to

The Graduate Faculty

University of Wisconsin-Platteville

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In Partial Fulfillment of the

Requirement for the Degree

Master of Science in Education

Cross Categorical Certification

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By

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2013
ACKNOWLEDGEMENTS

I would most like to thank my wonderful husband and four handsome boys for understanding my personal goal of working towards my master of science in education. As I reach the completion of the program, their patience and willingness to allow me time to study and spend so many long hours away from them has been appreciated. I would like to thank my parents and in-laws, as well, for their unconditional support. Without them, it would have taken me years to complete this ultimate goal. They have assisted in many hours of daycare!

In addition, I wish to thank my instructors who have challenged me throughout my graduate school experience. I would also like to thank my principal from the district in which I previously taught, Mrs. Michelle Savatski, Darlington Elementary Middle School principal. She was the driving force, encouraging me to pursue my masters while my children are young. She explained life only gets busier. I may think life is busy now, but wait until my four boys are participating in multiple extracurricular events.

As well, I would like to gratefully acknowledge Dr. William McBeth who has offered me valuable suggestions during the process of writing this research paper. Dr. McBeth’s knowledge, expert instruction and insightful feedback have been greatly appreciated.

Furthermore, I would especially like to thank one very important professor for whom I am very grateful, Dr. Rea Kirk. She made me realize I can push myself and be successful. Dr. Kirk has been an extraordinary mentor and helped me so much through this process. I couldn't have stayed focused on the right path without her
constant guidance and involvement.

Lastly, I thoughtfully appreciate all my students and parents of students with special needs. They were my inspiration behind my desire to delve into this important research in the field of sensory integration. I have gained a better awareness of how I can aid in providing successful optimal learning and in offering proven suggestions to my colleagues.
Abstract

This paper is about the use of sensory integration therapy for elementary students with special needs. The desired objective of this study was each student achieving optimal learning. Findings of how sensory activities in the classroom can increase performance were cited, as well as other benefits of incorporating multi-sensory exercises into the classroom.
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SENSEORY INTEGRATION: A WAY TO HELP ACHIEVE OPTIMAL LEARNING FOR CHILDREN WITH SENSORY PROCESSING DISORDER

CHAPTER I:
Introduction

A walk by the elementary special education teacher’s room led to an observation of how differently some children react to movement. The teacher was conducting vestibular and proprioceptive movement activities with her morning group of young elementary students. While some children were saying, “Go faster,” others were saying, “I don’t want to spin.” When they were instructed to jump off a bench onto some mats and pillows, one child asked if he could do a somersault while another child was not sure about even climbing up on top of the bench. It was interesting to see one child being very fearful of movement while the other child had no fear at all!

Would it be easy to remain on task, focus and cooperate with the expectations the teacher is asking if the dripping sound from the classroom sink seemed to be getting progressively louder? Or, imagine, sitting at a desk, trying to get work completed when the t-shirt’s tag is continuously irritating the neck. Think about the persistent sound of the classroom clock, tick, tick, tick. Furthermore, the aroma of the cafeteria food being prepared for the day is contributing to a nauseous feeling resulting in a distraction from the teacher’s lesson. Children with sensory processing disorder (SPD), formally known as sensory integration disorder (SID) and/or dysfunction in sensory integration (DSI) live with these challenges every second of the day. These sensory related problems include sensitivity to certain sounds, smells, tastes, sights and/or textures.
Additionally, they include the vestibular and the proprioceptive senses.

Understanding the impact of SPD is a challenging task. For some, sensory items take over everyday life, which can lead to a disruption in normal function. This is the time when the sensory processing disorder diagnosis is given (Kranowitz, 2005).

**Statement of the Problem**

What exactly is sensory processing disorder (SPD)? How is it known if a child may have SPD rather than attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD) or fall on the autism disorder spectrum?

While researching autism and Asperger’s Syndrome, it became evident that Sensory Integration Dysfunction (SID) and Sensory Processing Disorder (SPD) are possible contributing factors of the autism diagnosis. SID and SPD are synonymous. Research states, “It is estimated that between 5-13% of children entering school have SPD. Of these, three out of four are boys” (http://www.thespiralfoundation.org/pdfs/ed_factsheet.pdf). This common thread encourages a reflection of students, past and present. Until recently, many educators, parents, and doctors have not recognized SPD as a contributing factor to a child’s inability to function in the classroom, at home, and in social circles. Kranowticz (2005) states the following, “They may mistake a child’s behavior, low self-esteem, or reluctance to participate in ordinary childhood experiences for hyperactivity, learning disabilities, or emotional problems.”

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The Purpose of the Study

Since SPD is so difficult to identify, educators are discovering more and more children are being diagnosed with attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD). In turn, these children are being placed on medication to assist with their attention difficulties. However, these children may not need medication because they could possibly have SPD instead.

The following questions guided my research and purpose of the paper:

1. Can sensory integration help a child with special needs achieve optimal learning?
2. What are the possible causes of sensory processing disorder?
3. Will sensory integration techniques benefit most or all students in a general education classroom?

Significance of the Study

This study was designed to allow for a better explanation and understanding of the daily obstacles faced by students with sensory processing disorder (SPD). To better serve all students, it is important to gain an understanding of a teacher’s role in meeting the needs of students with SPD. It is highly recommended to look at all the child’s characteristics before assuming a diagnosis of ADD or ADHD. In doing so, fewer children will need to be medicated. Furthermore, studied resources, such as articles and strategies, can be shared with colleagues and parents of students. Sensory processing disorder is a fascinating, as well as misunderstood, disorder. The objective of this study
is to develop an inservice for staff, and possibly parents, on SPD.

**Delimitations of the Study**

References used for the review of literature in this study were collected over a six-month period of time. The resources of the Karrmann Library at the University of Wisconsin-Platteville, along with the search engines of EBCOHOST, were used, as well as Google advanced search for scholarly journals. As the SPD grows and more research is completed on SPD, more resources will become available.

**Definition of Terms**

**Sensory Diet:** The therapeutic use of sensation incorporated into daily activities.

**Sensory Integration (SI)/Sensory Processing (SP):** A term referring to the way the nervous system receives messages from the senses and turns them into appropriate motor and behavioral responses. Whether biting into a hamburger, riding a bicycle, or reading a book, a successful completion of the activity requires processing sensations or sensory integration (Sensory Processing Disorder Foundation, 2012).

**Sensory Processing Disorder (SPD)/Sensory Integration Dysfunction (SID):** Occurs when the brain inefficiently processes sensory messages coming from a person’s own body and environment. The individual has difficulty responding in an adaptive way to everyday sensations which others hardly notice or simply take in stride (Kranowitz, 2006).
CHAPTER II: Review of Literature

Sensory Processing Disorder, Sensory Integration and The Causes

For most people, sensory integration occurs automatically. Therefore, the majority of people take it for granted. The brain receives messages through touching, seeing, hearing, smelling and tasting. There are two other senses, the vestibular sense and the proprioceptive sense. Vestibular input is the sense of movement, centered in the inner ear. Any type of movement will stimulate the vestibular receptors; however, spinning, swinging and hanging upside-down provide the most intense, longest lasting input. In contrast, proprioceptive input, sensations from joints, muscles and connective tissues that lead to body awareness, can be obtained by lifting, pushing and pulling heavy objects. Many do not think much about what the brain is telling the body to do. Instead, automatic function occurs because the brain is designed to process incoming messages and then transmit the results to the rest of the body. However, people with sensory processing disorder (SPD) react differently, for instance, to the sound of a fire drill, to the smells in the environment or to the textures of different foods.

Research by Koomar & May-Benson (2006) states sensory processing disorder (SPD), first identified by Dr. A. Jean Ayres, is a problem in how children use sensory information for self-regulation and skill development. The term SPD is also known as sensory integration disorder (SID). Through Koomar & May-Benson’s research, it was found children with SPD have a more challenging time than their peers in many situations, such as handling anxiety, managing high-stress situations, staying on task to completion and effectively using fine and gross motor skills.
In addition, there are other diagnoses with which SPD is often related. Specific learning disability (SLD), attention deficit disorder (ADD), pervasive developmental disorder (PDD), the autism spectrum, language disorders, depression and behavioral disorders are all identifications which may be associated with SPD.

Children with sensory processing disorder (SPD) often have problems with motor skills and other abilities needed for school success and childhood accomplishments. As a result, they often become more socially isolated and suffer from low self-esteem and other social/emotional issues. Sue Bakley (2001), author of “Through the Lens of Sensory Integration: A different way of analyzing challenging behavior” shared several signs of a child who might have sensory integration disorder (see Appendix A for the signs).

These difficulties put children with SPD at high risk for many emotional, social and educational problems, including the inability to make friends or be a part of a group. Poor self-concept, academic failure and being labeled “clumsy,” uncooperative, belligerent, disruptive, or “out-of-control” are also effects of SPD. As a result of these actions, anxiety, depression, aggression, or other behavioral problems can follow.

The exact causes of SPD are still unknown. However, the literature suggests SPD is often inherited. “If so, the causes of SPD may be coded into the child’s genetic or hereditary predisposition, through prenatal circumstances, prematurity, birth trauma, or postnatal circumstances, in addition, environmental factors may be involved (Sensory Processing Disorder Foundation, 2012).”

It is consistently reported these children are not purposefully misbehaving. As
stated by Ramirez (1998):

A child with a sensory integration dysfunction can’t automatically compensate for the inadequacies on their own. They need the help and support of parents, care givers, teachers, and physical or occupational therapists. If a child is showing signs of any of these impairments, it should be recognized as a dysfunction and not a behavioral problem at home or school (p. 10).

Unfortunately, the children often get the “bad boy/girl” image before they have been recognized as having a true brain-based impairment.

Types of sensory integration and characteristics of the dysfunction

There are seven senses that make up our body: the five external senses are most commonly taught in early elementary (touching, seeing, hearing, smelling, and tasting). In addition, there are two internal senses (vestibular and proprioception). Sensory processing disorder (SPD) can affect people in multiple senses or in only one sense; for example, just touch or just sight or just movement. A person with SPD may over-respond to sensation and may find clothing, physical contact, light, sound, food or other sensory input to be unbearable. On the other hand, one might under-respond to SPD and show little or no reaction to stimulation, even pain or extreme hot and cold.

Understanding each of the seven senses will aid in determining what type of sensory integration difficulties a child may have. Additionally, this understanding will assist in determining which activities a teacher should use with the child to create optimal learning.
An over-responsive child is sensory-responsive and can be known as the avoider. These children are often hyperactive or hypersensitive and need calming activities. An under-responsive child may be known as the unmotivated, hypoactive, and/or hyposensitive and benefit from alerting or stimulating activities. A child who seeks extra sensory is a thrill seeker and is constantly on the move. Knowing the ins and outs of each of the senses will aid in determining from which types of activities the child will benefit.

Touch (the Tactile Sense): Touch can be basic awareness of where and how a person has been touched, or it can involve more discriminative touch as a base for the development of a skill. The tactile system is the largest sensory system and plays a vital role in human behavior, both physical and mental. As stated by Ayres (2007), the skin has many different kinds of receptors for receiving sensations of touch, pressure, texture, heat or cold, pain and movement of the hairs on the skin. According to Kranowitz (2006), there are many characteristics of a child with tactile dysfunction which vary depending on the type of tactile dysfunction. A few of these include oversensitivity to unexpected light touch, rubbing off kisses or casual touches and pushing others away to avoid closeness. (See Appendix B1 for the entire list of over-responsive to touch stimuli).

A child who is under-responsive to touch sensations, for example, may seem unaware of touch unless it is intense. (See Appendix B2 for the entire list of under-responsive to touch stimuli).

The child who seeks extra touch sensations may touch objects and people constantly, with “in-your-face” behavior as well as many other behaviors. (See Appendix
B3 for the entire list of extra touch stimuli).

The child with poor tactile discrimination may seem out of touch with his or her hands, for example. (See Appendix B4 for the entire list of poor tactile stimuli).

Seeing (the Visual Sense): More refined visual-spatial processing skills evolve as the child matures and integrates information from the other senses, especially since it is closely related to the vestibular sense. Seeing provides foundations for bonding, spatial orientation, and movement through space, social skills and communication. Some characteristics of a child with visual dysfunction, as stated by Kranowitz (2006), include complaining of seeing double and shielding his or her eyes to screen out sights. (See Appendix C for the entire list of characteristics).

Hearing (the Auditory Sense): Hearing is the innate ability to receive sounds. It is the foundation for language development. According to Kranowitz (2006), a child with auditory dysfunction may seem unaware of the source of sounds and may look all around to locate where the sounds come from. (See Appendix D for the entire list of characteristics).

Smell (the Olfactory Sense): The nose provides information about the chemical makeup of the tiny particles suspended in the air which produce odors. Smell plays an important part in establishing and reviving memories. It creates memories and associations that influence some choices and preferences. Babies bond with their mothers through smell and recognize the secure and delightful scent. As well, food preferences are clearly guided by smell. According to Kranowitz (2006), a child with olfactory dysfunction may be a picky eater and over or under-responsive to smells. (See
Appendix E for the entire list of characteristics).

Taste (the Gustatory Sense): Taste helps with survival and provides essential information about sweet, sour, salty and bitter flavors. According to Kranowitz (2006), some characteristics of a child with gustatory dysfunction include: being over-responsive to tastes and may strongly object to certain textures and temperatures of foods. (See Appendix F for the entire list of characteristics).

Smell and taste are intertwined. Kranowitz (2006) states about 75 percent of taste perceptions depend on an efficient sense of smell. This statistic explains why a bad cold will decrease a person’s appetite, since food that is not able to be smelled tastes bland.

Vestibular Sense (Balance and Movement): The vestibular system provides a sense of where a person stands in the world. The vestibular system takes in messages from the neck, eyes, and body about balance and movement. Then it sends the messages to the central nervous system for processing.

It tells where the head and body are in relation to the surface of the earth. Whether we are upright, upside-down, or leaning; if we are moving or standing still; and whether objects are moving or motionless in relation to our body, our vestibular system lets us know where we are. Kranowitz (2006) states characteristics of vestibular dysfunction may affect a child’s active play.

The child who is over-responsive to movement may over-react, negatively and emotionally, to ordinary movement. (See Appendix G1 for the entire list of characteristics).

The child who is under-responsive to movement may not notice or object to
being moved. (See Appendix G2 for the entire list of characteristics).

The child who seeks extra movement may crave intense, fast, and spinning movement (rocking/swiveling in chairs, jumping on a trampoline, riding roller-coasters, racing around corners) – and not get dizzy. (See Appendix G3 for the entire list of characteristics).

The child with poor discrimination of movement may fall frequently from his or her seat or while moving or standing. (See Appendix G4 for the entire list of characteristics).

Proprioception Sense (Body Position): Proprioception (position sense) sends messages about whether the muscles stretch or contract and how the joints bend and straighten. It identifies the position, force, direction, and movement the body needs to move efficiently. Kranowitz (2006) states characteristics of proprioceptive dysfunction as having problems with touch or with balance and movement. (See Appendix H for the entire list of characteristics).

**Benefits of sensory integration to increase classroom performance**

“When working with children with SPD, it is essential that teachers remain flexible in their teaching styles (Chan, 1995).” Many references stated useful information for classroom teachers in working with a child who has SPD. Sue Bakley (2001) summarized it well with “Ten ways that a teacher can help.” (See Appendix I for the list).

Chan (1995) made a valid point when she stated, “A multisensory approach to learning, which is optimal for all young learners, will aid those children needing extra
sensory stimulation by providing the opportunity for children to practice integrating the use of all of the senses in learning.” When a child has sensory strategies and movement breaks built into a daily schedule, the child is given the opportunity to get up and move. In order to get the senses running effectively again a child needs to participate in sensory integration activities multiple times a day. When provided with sensory integration therapy or strategies to use when the body needs more or less input, a child may be able to overcome sensory challenges.

**Sensory diet and sensory diet activities**

While no one knows for certain just what causes sensory processing disorder, one of the most effective treatments is based on the work of A. Jean Ayres, (2005) former occupational therapist at UCLA Medical Center. Dr. Ayres examined how difficulties in sensory integration affect learning. She discovered children with SPD benefit greatly from occupational therapy (OT) services.

During treatment sessions, the therapist will utilize proprioceptive activities and linear vestibular stimulations. A “sensory diet” (coined by OT Patricia Wilbarger, 1995) is a carefully designed, personalized activity plan that provides the sensory input a person needs to stay focused and organized throughout the day. Wilbarger (1995) explains, “Our sensory diet needs are similar to our nutritional diet needs. We just need the right combination of sensory input to keep an optimal level of arousal and performance” (p. 1). A sensory diet includes a combination of alerting, organizing and calming experiences.

Occupational therapy sessions are often geared toward helping the child fill in the
developmental missing pieces, and the activity may also support practice in the academic area. “A therapist encourages and assists the child in choosing activities that provide the appropriate amount of sensory input” (Koomar, Kranowitz, Szklut, Balzer-Martin, Haber & Sava, 2007, p. 8). It has also been noted by Koomar et al. (2007) that a child’s self-confidence or attitude about one’s self is often one of the first changes a parent notices after a child has started therapy. The child develops better control of his or her body as the nervous system functions better, and therefore becomes more in command of his or her life.

Sensory activities prepare the child both physically and mentally to learn. A primary goal is to help the child become more focused and more able to adapt to changes. Any child with special needs could benefit from sensory activities. Many children have an inner drive to learn and several learn best when they can move and touch. Sensory integration activities facilitate learning so that each child can be more successful academically, socially, and emotionally.

Bakley (2001) stated, “Children with sensory integration problems often have ‘bad’ and ‘good’ days and fluctuate between craving sensory input and overreacting to it. Day-to-day inconsistencies are typical” (p. 73).

Activities for a sensory diet must be individualized for each child and modified frequently to meet changing needs. An individualized program should be created for a child with SPD and should include frequent movement breaks, an inflatable seat cushion for wiggling while remaining seated and any other manipulatives to aid in the child’s ability to remain attentive and focused.
Sensory input and activities to incorporate multisensory exercise in the classroom

Frequent movement breaks are the most important suggestion to remember when teachers are developing sensory activities for students. Children are only able to sit and stay focused for a certain amount of time. A movement break could be as simple as a quick game of “Head, shoulders, knees and toes” or jumping jacks, etc. In addition, sensory integration difficulties can easily become overwhelmed by extraneous visual and auditory input. If the teacher is able to control the classroom environment, being able to remain focused and organized can maximize the children’s ability to succeed in the classroom. Koomar et al. (2007, p. 13) shares the following suggestions for organizing sensory environment:

- As much as possible, limit the amount of extraneous visual material you have hanging from the ceiling and on the walls.
- Store fine motor and math manipulatives inside plastic containers or cubbies.
- Be sure all materials have an organized and labeled place where they belong. Help desk organization with a picture template of where each item belongs inside the desk.
- Tape a number or letter line directly on the child’s desk if she gets distracted when using the one on the blackboard or wall. Also, tape spelling words to the desk rather than to the blackboard, if necessary.
- Limit extraneous auditory input from the hallway by closing your classroom door. Seat the child who has sensory sensitivities and
distractibility away from open windows and doors.

- If the loud speaker in your room has static or is very loud when announcements are made, remove the cover and line it with an old tee shirt or newspaper. This will reduce the loud surprise factor.
- As much as possible, prepare the child who is sensitive to noise for clean-up bells, fire drills, and morning announcements.

Children with sensory integration difficulties will benefit from a predictable schedule. Koomar et al. (2007, p. 13) provided the following suggestions to best assist children with SPD:

- Each morning, outline the schedule for the day with the class. Highlight any changes from the typical routine which will occur that day.
- Discuss or create a story about unexpected events before they occur (e.g., fire drills or assemblies) to help children prepare for these potentially overwhelming situations.
- Help younger children make transitions between activities by creating a clean-up song or new game song.
- Assist older children in keeping a homework organizer for their schedule and homework assignments. Check this after each class to make sure the homework assignments are correct and the child understands what the homework entails.
- Color-code notebooks and book covers to assist the child in having the correct materials for each class (e.g., red for math, blue for science).
When creating the optimal learning environment for children, it is important to keep in mind what works best to keep the children’s attention, focus, and interest.

Research by Johnson & Stokes (2006) states some suggestions/activities/ideas teachers can use to develop sensory integration in the classroom for tactile, vestibular, proprioception, olfactory, auditory and visual. Hats, arm bands, head bands, and other spandex-type material to provide “deep pressure” and work well for tactile/touch. Using a swing, hammock, and/or blanket are multiple suggestions for vestibular movement. For proprioception, kicking a ball is a great recommendation. Placing food items in plastic containers is a suggestion to use for the sense of smell. With auditory/hearing, the use of a music corner (an area to listen to CDs, audiotapes) is one idea. Last, for the visual/seeing sense, playing flashlight games and dimming the lights work seamlessly. (See Appendix J for the entire list of characteristics stated above).

When trying to determine the antecedent of a child’s behavior, it is best to use a worksheet upon which the teacher can record and track when and how often the child’s behaviors occur. It is best if the teacher focuses on one behavior at a time. Implementing a sensory technique/strategy for a particular behavior would then take place. Next, track the particular behavior once the technique has been implemented. This will aid in determining if this particular strategy is successful or if a new technique needs to be implemented.
CHAPTER III: Conclusions

In summary, as I was researching sensory integration, I found myself thinking of several students in my district. After reviewing all of my findings, I believe there are many misidentified students. Additionally, I propose several teachers and parents who have asked questions about a student need to look into sensory integration. Providing strategies in the classroom not only benefits children with SPD; all children may benefit.

In response to my research question number one, “Can sensory integration help a child with special needs achieve optimal learning?” I can summarize my findings in the following ways. First of all, the use of a sensory diet in the classroom has a positive impact on students. I have found students are less disruptive, more willing to be a part of a group interaction, and demonstrate more on-task behavior time when a sensory diet is utilized with the children. Thus, when a child is having a difficult day, I now will have more options of how to address the student’s needs. Finally, I have found, as Bakley (2001) states, “Children with sensory integration problems often have bad and good days and fluctuate between craving sensory input and over-reacting to it. Day-to-day inconsistencies are typical” (p. 73). I am now more comfortable with these day-to-day inconsistencies.

What are the possible causes of sensory processing disorder? As my second research question, the answers are yet to be determined. Research gives us suggestions and ideas on what are believed possible reasons for SPD, without a true diagnosis. The literature I reviewed suggests SPD is often inherited. If so, the causes of SPD are coded
into the child’s genetic or hereditary predisposition, prenatal circumstances, prematurity, birth trauma, or postnatal circumstances, and environmental factors may be involved (Sensory Processing Disorder Foundation, 2012).

Following up with my last research question, “Will sensory integration techniques benefit all students in a general education classroom?” Research shows benefits of integrating sensory strategies and activities into every child’s daily routine will aid in maintaining attention and focus. As a professional, my experience with this research assignment has changed the way I will develop my lesson plans and conduct daily routines. As well, I will try to influence my colleagues to do the same. I intend to share my findings with colleagues and hope teachers will feel free to try the researched techniques will all children in their classrooms. Additionally, I plan to further research how the brain processes information to better help all children function in the educational setting.

**Recommendations**

Scheduled sensory breaks and a variety of multisensory activities are now an important part of my daily routine. When a child with SPD starts to feel more in control of the environment, the less likely the student will act out or worry others (Kranowitz, 2005). In addition, I realize the significance of posting and following schedules to better suit the needs of my students. I have learned to read the students’ body language and assist them in choosing appropriate sensory activities which would support them through otherwise difficult situations. As well, I have gained a much better insight into what SPD
is, as well as the possible benefits of occupational therapy. Since there is not a standardized test to identify children with SPD, the use of screenings and checklists are available to doctors, educators and parents in determining if a child has SPD. In the future, I plan on using the checklists from the Koomar et al. (2007) workbook on students when a parent or teacher feels a child could benefit from occupational therapy services. Additionally, I will continue to implement new strategies and techniques until finding one which works best for a particular student. Perhaps most important, I will keep in mind every child is an individual. What works best for one child may not work for another.

I have noticed how crucial continuity is for the children between school settings and home. It is important the children receive the same message from all the adults whom they come in contact with throughout the day. I have learned to look further into reasons for outbursts rather than simply dealing with the behavior at hand. Research has also shown me some days are more difficult than others for no apparent reason. While I may not be able to pinpoint the exact sensory need, I can do my best to keep the students safe and provide a positive educational experience. Like any diagnoses, the earlier the findings the better.

In closing, many students, parents and educators will benefit from this research. My students hopefully will have a more successful day. My colleagues will be encouraged to have a greater appreciation for the needs of students with SPD. I have gained an understanding of my role in meeting the needs of students with SPD. As an added bonus, I have found myself more eager to expand my colleagues’ knowledge to
work more effectively with students with SPD.

I have provided an informative visual entitled “Signs of Sensory Processing Disorders,” obtained from (http://www.keystonepediatric.com), to show the many areas which can be affected by SPD.

It is a vivid reminder of how every child is different, and the child may not purposely mean to be acting in a particular way. Rather, SPD could be the cause, and neither the parents nor the teachers are aware of it, yet.
REFERENCES


APPENDIX A

Sue Bakley (2001) (as cited by Ayres, (1979) & Kranowitz, (1998), shared the following signs of a child who might have sensory integration disorder:

- Shies away from touch or wants affection only on his or her own terms.
- Dislikes getting hands dirty and avoids messy materials, or in contrast, seeks out messy experiences.
- Hits and pokes others, bumps into objects and people.
- Easily distracted by visual or auditory stimuli, covers ears and complains about loud noises or makes excessive noises.
- Avoids eye contact, especially when being reprimanded.
- Has language processing problems (gives answers unrelated to questions; has difficulty following directions).
- Has poor balance (sits in “W” position; leans against others); avoids gross-motor activities requiring balance.
- Runs, swings, spins, paces excessively, or flaps hands when excited.
- Has difficulties interacting and playing with peers (play is often immature) so may prefer to play alone.
- Restless, inattentive, and disruptive; may not participate at group times.
- Has immature grasp; switches hands during a task; avoids visual motor tasks.
- Hyperactive or underactive; exhibits anger; falls apart or loses control easily.
- Has difficulty maintaining attention and completing tasks.
- Has difficulty with transitions.
- Objects to changes in routine; falls apart during transitions.
APPENDIX B1

The child who is over-responsive to touch stimuli may:

- Experience oversensitivity to unexpected, light touch, observed as rubbing off kisses or casual touches and pushing others away to avoid closeness.
- Instantly and intensely exhibit a “fight or flight” response or a “flight or freeze response” to harmless touch sensations.
- Dislike messy activities (cooking, painting, using chalk or tape).
- Be bothered by certain types of clothing, and particularly sensitive to sock seams, shoes, and tags in shirts.
- Prefer wearing long sleeves and pants, even in summer, or dress lightly, even in winter.
- Become anxious or aggressive.
- Be a picky eater; avoid some foods (rice, chunky peanut butter, lumpy mashed potatoes, and vegetables) because of texture, or preferring food to be the same temperature, hot or cold.
- Dislike swimming, bathing, brushing teeth, or having a haircut.
- Have poor peer relationships.
APPENDIX B2

The child who is under-responsive to touch sensations may:

- Seem unaware of touch unless it is intense, showing little reaction to pain and getting hurt without realizing it.
- Not realize an item has been dropped.
- Have poor body awareness.
- Disregard whether clothes are on straight or face is messy.
- Physically hurt other people or pets, not comprehending pain.
APPENDIX B3

The child who seeks extra-touch sensations may:

- Touch objects and people constantly, with no recognition of personal space behavior.
- Seek certain messy experiences, often for long durations.
- Rub or bite own skin; twirl hair in fingers; prefer being barefoot.
- Chew on inedible objects (fingernails, collars, cuffs, toys, pencil).
The child with poor tactile discrimination may:

- Seem out of touch with own hands.
- Have trouble holding and using tools (pencils, scissors, forks).
- Not touch or pick up items that appeal to others.
- Not perceive objects’ properties (texture, shape, size, density).
- Need visual cues to identify body parts or familiar objects.
- Prefer standing to sitting to ensure visual control of surroundings.
APPENDIX C

Some characteristics of a child with visual dysfunction, as stated by Kranowitz (2006), include:

- Shields eyes to screen out sights, closes or covers one eye, or squint.
- Complains of seeing double.
- Has difficulty shifting gaze from one object to another, such as looking from the blackboard to own paper.
- Turns or tilts head as reads across a page.
- Turns or tilts body as watches television or the teacher.
- Has difficulty tracking or following a moving object, such as a table-tennis ball or following along a line of printed words.
- Fails to comprehend what is being read or quickly loses interest.
- Confuses likenesses and differences in pictures, words, and objects.
- Omits words or numbers and loses place while reading and writing.
- Has difficulty with schoolwork involving the size constancy of letters, the spacing of letters and words, and the lining up of numbers.
- Has difficulty with fine motor tasks involving spatial relationships, such as fitting pieces into jigsaw puzzles and cutting along lines.
- Orient drawings poorly on the page, or writes uphill or downhill.
- Misjudges spatial relationships of objects in the environment, often bumping into furniture or mis-stepping on stairs and curbs.
- Confuses right and left and has a poor sense of direction.
- Does not understand concepts such as up/down and before/after.
- Fails to visualize what is read.
- Is uncomfortable or overwhelmed by moving objects or people.
- Becomes fatigued easily during schoolwork.
- Withdraws from classroom participation and avoids group activities.
APPENDIX D

According to Kranowitz (2006), some characteristics of a child with auditory dysfunction include:

- Seems unaware of the source of sounds, may look all around to locate where the sounds come from.
- Has trouble identifying voices or discriminating between sounds, such as the difference between “bear” and “bore.”
- Is unable to pay attention to one voice or sound without being distracted by other sounds.
- Is distressed by noises that are loud, sudden, metallic, or high-pitched, or by sounds that do not bother others.
- Has trouble attending to, understanding, or remembering what is read or heard. May misinterpret requests, ask for repetition, and able to follow only one or two instructions in sequence.
- Looks to others before responding.
- Has trouble putting thoughts into spoken or written words.
- Talks off topic – talks about shoes when others are discussing soccer.
- Has trouble closing circles of communication – trouble, responding to others’ questions and comments.
- Has trouble correcting or revising words to be understood.
- Has a weak vocabulary and use immature sentence structure – poor grammar and syntax.
- Has difficulty reading aloud.
- Has trouble making up rhymes and singing in tune.
- Has difficulty speaking and articulating clearly.
- Improves speaking ability after experiencing intense movement.
APPENDIX E

According to Kranowitz (2006), some characteristics of a child with olfactory dysfunction may include:

- Is over-responsive to smells and objects to odors, such as a ripe banana, that other children do not notice.
- Is under-responsive to smells and ignores unpleasant odors, such as dirty diapers.
- Is a picky eater.
APPENDIX F

According to Kranowitz (2006), some characteristics of a child with gustatory dysfunction include:

- Is over-responsive to tastes and may strongly object to certain textures and temperatures of foods.
- May gag often when eating.
- May lick or taste inedible objects, such as Play Doh and toys.
- May prefer spicy or very hot foods.
APPENDIX G1

The child who is over-responsive to movement may:

- Over-react, negatively and emotionally, to ordinary movement.
- Dislike physical activities such as running, biking, sledding, or dancing.
- Avoid playground equipment, such as swings, slides, jungle gyms, and merry-go-rounds.
- Be cautious, slow-moving, and sedentary, hesitating to take risks.
- Not like head to be inverted, as when being shampooed over the sink.
- Be very tense and rigid to avoid changes in head position.
- Be uncomfortable on stairs, clinging to walls or banisters.
- Feel seasick when riding in a car, airplane, escalator or elevator.
- Appear to be willful, manipulative, uncooperative, or meek.
- Demand continual physical support from a trusted peer or adult.
- Have gravitational insecurity, a great fear of falling experienced as primal terror.
The child who is under-responsive to movement may:

- Not notice or object to being moved.
- Seem to lack inner drive to move actively.
- Once started, swing for a long time without dizziness.
- Not notice sensation of falling or being off-balance and not protect self well.
APPENDIX G3

The child who seeks extra movement may:

- Crave intense, fast, and spinning movement (rocking/swiveling in chairs, jumping on a trampoline, riding roller-coasters, racing around corners) – and not get dizzy.
- Be a thrill seeker and daredevil, enjoying riding over speed bumps and jumping from high places.
- Need to move constantly (rocking, swaying, spinning, jiggling, shaking her hands or head, fidgeting) in order to function. The child may have trouble staying seated.
- Enjoy being in upside-down positions.
- Enjoy swinging very high and/or for long periods.
APPENDIX G4

The child with poor discrimination of movement may:

- Fall frequently off seat or while moving or standing.
- Become easily confused when turning or changing directions.
- Be unable to tell when swinging should be halted, possibly continuing until feeling sick.
APPENDIX H

Kranowitz (2006) states characteristics of proprioceptive dysfunction, as:

- Has a problem with touch or with balance and movement as well.
- Has a poor sense of body awareness.
- Is stiff, uncoordinated, and clumsy, falling and tripping frequently.
- Leans, bumps or crashes against objects and people, and invades others’ personal space.
- Has difficulty carrying out unfamiliar and complex motions, such as putting on ice skates for the first time.
- Is unable to do familiar tasks without looking, such as get dressed.
- Manipulates hair clips, lamp switches, etc., so hard they break.
- Pulls and twists clothing; stretches T-shirt, over knees.
- Chews cuffs, collars, pencils, and other inedible objects.
- Has difficulty ascending and descending stairs.
- Slaps feet when walking, sits on knee, stretches limbs, pokes cheeks, pulls on fingers, and cracks knuckles.
- Avoids participation in ordinary movement experiences because they result in an uncomfortable or inadequate feeling.
- Is dyspraxic, always chooses familiar activities and resisting new challenges.
- Has eating, speaking and other oral-motor problems.
Sue Bakley (2001) summarized it well with these “Ten ways that a teacher can help”:

- Remember behavior is communication. Ask, “What is the child trying to say?”
- Validate children’s feelings by translating them into words.
- Transform classroom into an environmental protection package.
- Offer choices.
- Pay attention to appropriate behaviors.
- Provide physical support during group time.
- Provide a secluded area away from the mainstream.
- Help children get off on the right foot each day.
- Provide the security of routine, ritual, and predictability.
- Structure transitions.

APPENDIX I
APPENDIX J

The following are some suggestions/activities/ideas teachers can use to develop sensory integration in the classroom for tactile, vestibular, proprioception, olfactory, auditory and visual. According to Johnson & Stokes (2006):

**Tactile/touch:**

- Hats, arm bands, head bands, and other spandex-type material to wear to give deep pressure.
- Pizza pocket sandwich (put child between two gym mats or bean bags).
- Ball bath (create your own by filling a stock tank with balls).
- Feelie box (small items in a box or bag which the child can try to identify by touch).
- Hideout (large box or confined space for the child to crawl in and play).
- Quiet space to decrease sensory overload and increase self-calming (a specified location/area which is void of excessive sensory stimuli and is sensory calming to the child).
- Beanbag chair, cushions, or pillow area.
- Wrap up (afghan, blanket, or quilt for the child to wrap in).
- Water play with toys.
- Hugs.
- Vibration.
- Massage (can use lotions and powders or just a large towel to rub).
- Rolling heavy bolsters or therapy balls over a person.
- Koosh balls or other textured items.
- Tactile bin (large bin filled with textured substances like water, sand, beans, rice, etc.).
- Using a spa or a shower head with adjustable sprays.
- Sitting in front of a fan.
- Sitting on hands or feet.
- Having hair brushed.
- Body Sock.
- Ace bandage wraps for “deep pressure.”
- Weighted vest/blanket/backpack.
- Mummy sleeping bag.
- Finger painting, shaving cream or foam drawing, Play-Doh.
Vestibular (Balance and Movement):

- Swinging (hammock, blanket, swing).
- Riding bike.
- Bouncing on large balls, mattress, or mini-trampoline.
- Dancing, walking, running, swimming.
- Rocking in a rocking chair.
- Hanging up laundry.
- Stocking shelves.
- Riding toys (tricycle, bicycle, Big Wheel, Scooter board).
- Using a glider.
- Spinning (merry-go-round, Sit ‘n’ Spin, hammock swing, tire swing, swivel chair).

Proprioception (Body Position):

- Kicking (kick ball, soccer ball).
- Catching and throwing (large ball, small beanbags, pillows).
- Hitting (punching bag, tetherball).
- Pounding (Play-Doh, hammer).
- Pulling (wagon, tug-of-war, disassembly of objects like Legos, snap beads, or access to a supply cart).
- Pushing (another person, against a wall, trying to lift self while sitting in a chair, wheelbarrow).
- Alternative seating choices (therapy balls, T-stools, cushioned seats).
- Swimming.
- Carrying (weighted items, groceries, books, laundry, taking out trash).
- Exercise (push-ups, pull-ups).
- Stretch breaks.
- Nature walks or rides over uneven terrain.
- Putting dishes away.
- Folding laundry.
- Weighted articles (vest, backpack, blanket, ankle/wrist weights). Weighted articles should only be used for a maximum of 20-25 minutes. If the weighted item is worn too long, the child may get used to the additional weights thus decreasing their effectiveness.
Olfactory/Smell:

- Smell box (candle, bar of soap, cheese, lemon slice).
- Spice cabinet.
- Scratch and sniff books.
- Food items in plastic containers.
- Perfume shelf.

Auditory/hearing:

- Music corner (area to listen to CDs, audiotapes).
- Headset or IPods.
- Bells.
- Musical instruments (horns, whistles, percussion like tambourine or maracas).
- Musical keyboard.
- CDs, audiotapes or IPods of environmental sounds, stories.
- See ‘n’ Say.
- Computer games or apps.

Visual/seeing:

- Flashlight games.
- Dimming lights.
- Color wheels.
- Wearing glasses with various lens colors.
- Watching various movements (ceiling fan, revolving music box, pinwheel).
- Bland clutter free environment.
- Use a visual schedule.
- Use visual times to assist children in understanding how much time is left for an activity.