Making Sense of Every Child:
Meeting the Needs of Diverse Learners through Sensory Integration

by Stephen Viola and Alicia Noddings

We begin with snapshots of two boys: Jack and David. Both were puzzles to their parents and teachers. By the age of 6, Jack had seen many different specialists and received a list of diagnoses including Attention Deficit Hyperactivity Disorder (ADHD), autism, Asperger's Syndrome, Oppositional Defiant Disorder (ODD), and clinical depression. By the age of 7, David too had a range of diagnoses, including ADHD, ODD, Conduct Disorder, and Bipolar Disorder. Both boys received a variety of interventions ranging from behavior modification plans to counseling and medication, but it was not until their behaviors were examined from a sensory integration perspective that a clear, consistent picture of each of them began to emerge.

DEFINING SENSORY INTEGRATION

What is sensory integration and how does it impact behavior? Sensory integration (SI) is a neurobiological activity within our bodies, defined as the way the central nervous system processes information from the senses. Countless bits of sensory information bombard our nervous systems at every moment, flowing like streams into a lake. Sensory integration is the brain and nervous system's ability to organize these stimuli. When sensations flow into the brain in an organized or integrated manner, we can use the sensations to form perceptions and create learning experiences. Dysfunction occurs when the nervous system is unable to integrate this information smoothly, resulting in the misinterpretation of information and roadblocks to creating appropriate perceptions, behaviors, and learning experiences.

Over 80% of the nervous system is involved in the processing or organizing of sensory input (Cantu, 2002), and thus the brain can be primarily viewed as a "sensory processing machine". Although we are all taught from childhood that we have five senses (hearing, sight, taste, smell, and touch), in actuality we have eight. The five well-known senses are sometimes called the "far" senses because they respond to external stimuli, or those that come from outside our bodies. Less familiar are our "near" senses, sometimes called the "hidden" senses because we are not usually consciously aware of them; these include the vestibular, proprioceptive, and tactile senses. The vestibular sense, also thought of as our sense of balance, is the way in which the position or movement of the body sends messages to the brain. The proprioceptive sense processes information about body movement related to bending, stretching, contracting, or compressing that is received through the muscles, ligaments, and joints; for example, when a child reaches his arms up to the sky, makes a muscle, or squeezes sand through his fingers, the tension that he feels in his arms and hands is his proprioceptive sense. The tactile sense is the whole-body manifestation of what we commonly consider our sense of touch. Sensory receptors all over our bodies are continually taking in information related to tactile items such as the clothing we are wearing, the type of seat we are on, or where our feet are resting.

Though we are not born with fully mature sensory systems, most children are fairly proficient at integrating sensory information by the age of six. The first of four stages of development begins at around two months of age (Kranowitz, 1998). The child must learn to take in and process necessary information from his environment and to filter extraneous information that does not require his immediate attention. However some children, like Jack and David, have difficulty effectively integrating this range of sensory input. Children such as Jack may be *hypersensitive* to certain types of sensory input; children like David may be *hyposensitive* to sensory input.

The brain of the *hypersensitive* child registers sensory sensations *too intensely*. A light touch can be misinterpreted as a life-threatening blow. Background noise cannot be tuned out. A highly decorated classroom may be too visually stimulating. To Jack, light pressure touch is very unpleasant and distracting. He hates the tags in the back of his shirts and dislikes sweaters because they are scratchy. In

the classroom, Jack is constantly distracted by incidental noises, such as the girl sitting next to him who taps her pencil on her desk. The hum of the fan from the air conditioner is hard for him to filter and ignore. He often complains about the room being too bright, and if someone walks by the open door, he is sure to notice.

Overly aroused by sensations, the hypersensitive child can react in one of two ways: avoid the situation or act out negatively. To avoid the stimulation, the child may isolate himself in the classroom, preferring to work alone in a quiet reading corner instead of at a table with other students. He may seem to dislike social interactions, steering away from play activities that could involve movement or touch. He will often prefer routine and predictable activities, perhaps appearing overly fearful or cautious. The sensory stimuli from these activities are familiar and thus can often be tolerated more easily than those from unfamiliar experiences. In situations where he is unable to avoid sensory stimuli that are too intense, this child may react strongly and negatively. He could cry, be aggressive or argumentative, seem overly anxious, refuse to do certain activities, or appear oppositional.

The brain of the *hyposensitive* child registers sensation *less intensely* than the brains of most children. This child does not receive and process enough sensory information, so he creates additional sources of stimulation to achieve average levels of arousal or alertness. When David listens to his teacher reading a story, he doesn't register enough sensation to stay focused and attend to the activity at hand. He needs more stimulation than his environment provides, so he creates it himself by fidgeting with something in his hand or squirming in his seat. He sits on his legs to get deep pressure proprioceptive stimulation. When working on a task at his desk, he often sings or hums to himself to produce additional auditory stimulation. Hearing from his parents and teachers that he needs to sit still and pay attention does no good, for he is physically and neurologically unable to do it. David does fine with activities which provide high levels of stimulation; for example, he can focus for long periods of time on computer-based learning activities that involve high levels of visual and auditory stimuli. He also does well in physical education activities in an environment with concentrated noise and movement.

The understimulated hyposensitive child often becomes overly active in order to produce the additional stimulation he needs and is subsequently described as hyperactive. Remember to note, however, that *hypersensitivities* and *hyperactivity* are **not** the same thing: in fact, they are opposites. Hypersensitivities generally evoke behaviors that are the opposite of those that manifest in hyperactive children, whereas the hyperactive child is often hyposensitive in one or more areas. **Table 1** outlines the difference between *hypersensitivities* and *hyposensitivities* for each of a child's senses.

The hypersensitive (oversensitive) child seeks less stimulation	Sensations	The hyposensitive child (undersensitive) child seeks more stimulation
The child avoids touching or being touched by objects and people. He may react with a fight-or-flight response to getting dirty, to certain textures of clothing (e.g., tags in clothes) and food, and to another person's unexpected light touch.	Touch	The child may be unaware of pain, temperature, or how objects feel. He may play in the mud, paw through toys purposelessly, chew on inedible objects like shirt cuffs, rub against walls and furniture, and bump into people.
The child may become overexcited when there is too much to look at (e.g., words, toys, other children). He may often cover his eyes, have poor eye contact, or be inattentive when drawing or doing desk work, or overreact to bright light. He may be hyper-vigilant (on the alert and ever watchful).	Sights	Although able to see, the child may touch everything to learn about it because his vision is not sufficiently coordinated. He may miss important visual cues such as another person's facial expressions and gestures or signposts or written directions.
The child may cover his ears to close out sounds or voices. He may complain about noises such as the vacuum or blender that don't bother others.	Sounds	The child may ignore voices and have difficulty following verbal directions. He may not listen well to himself and may speak in a booming voice. He may like the TV or radio playing loudly or frequently hum to himself.
The child may object to odors (such as a ripe banana) that other children do not notice.	Smells	The child may ignore unpleasant odors such as dirty diapers. He may sniff food, people, and objects.
The child may strongly object to certain textures and temperatures of food. He may gag easily and often when he eats.	Tastes	The child may lick or taste inedible objects such as Playdoh or toys. He may prefer very spicy or hot foods, and he may suck or chew things to soothe himself.
The child avoids moving or being unexpectedly moved, may be insecure about heights, or may be anxious when tipped off balance. He may be earthbound and avoid running, climbing, sliding, or swinging. He may feel motion sick in cars or elevators.	Movement (vestibular)	The child may crave fast and spinning movements such as swinging, rocking, twirling, and riding merry-go-rounds and experience them without getting dizzy. He may move constantly, fidget, enjoy getting into upside-down positions, and be a daredevil.
The child may be rigid, tense, stiff, and uncoordinated. He may avoid playground activities that require good body awareness.	Body position (proprioceptive)	The child may slump and slouch. His actions may be clumsy and inaccurate. He may bump into objects, stamp his feet, and twiddle his fingers.

Table 1 – Behaviors of the Oversensitive vs. the Undersensitive Child

WHEN SENSORY INTEGRATION DYSFUNCTION OCCURS

Why did Jack and David receive so many different diagnoses? When we look at their behaviors from a sensory integration perspective, we can start to see patterns that will help us understand the answer to this question.

- Both Jack and David were diagnosed with ADHD: Jack was diagnosed with the predominately inattentive type, while David was diagnosed with the predominately hyperactive type. Children with hyper- and hyposensitivities are often described as inattentive, though this inattention may manifest in different ways. Jack was inattentive because he was overstimulated and easily distracted, while David was inattentive because he needed additional stimulation and produced his own through "hyperactive" behaviors (when his environment didn't provide him with enough sensory input).

- Jack was diagnosed as having an autism spectrum disorder, which often manifests through difficulties engaging socially. Hypersensitivity, a core characteristic of autism spectrum disorders (Murray-Slutsky & Paris, 2000), often results in a child having difficulties engaging with others in an effort to avoid unwanted stimulation that such interactions entail.

- Both Jack and David were diagnosed with behavioral disorders, specifically ODD. Though both boys exhibited oppositional behaviors, the root cause of these behaviors were different. Jack's oppositional behaviors were generally due to his attempts to avoid stimulation, whereas David's conduct problems occurred when he needed extra stimulation.

- Both children were diagnosed with emotional difficulties: Jack with depression, and David with Bipolar Disorder. Jack was described as depressed because he did not derive pleasure from interacting with others nor in engaging in activities that others found enjoyable; however, he was actually trying to avoid sensory stimulation that he was incapable of handling. David was identified as bipolar because his behavior varied so dramatically, from calm to excessively active. An SI lens reveals that this was David's way of producing the stimulation that his nervous system needed when his environment did not provide it.

- Jack was initially prescribed a stimulant medication to improve his inattention, with negative results. The stimulant only exacerbated his already overaroused nervous system, which Jack reflected through frequent crying and aggressive behavior. When he was switched to a nonstimulant, Jack was actually better able to maintain focus. David, on the other hand, responded positively to a stimulant medication, as his nervous system needed additional stimulation. Since his body was now able to produce the stimulation that his environment didn't provide, he no longer needed to engage in hyperactive behaviors and his behaviors actually calmed. The large number of children in the United States being placed on medications, both stimulants and antidepressants (Gureasko-Moore, DuPaul, & Power, 2005), make research in this area critical. Currently behavioral researchers at the University of Missouri-St. Louis are working with pediatricians to add sensory integration assessment into the evaluation process when determining appropriate medications for children with attentional disorders.

INTERVENTIONS TO PROMOTE SI FOR ALL CHILDREN

What types of interventions are available to improve SI in young children? In order to develop an effectively functioning nervous system, children need whole-body play that stimulates all of their sensory systems. Current research shows us that at a time when recess is being removed from many American elementary schools in order to devote more time to high-stakes test preparation (Ohanian, 2002), children actually benefit cognitively from unstructured break time (Pellegrini & Bohn, 2005); they also perform better academically when they have opportunities for movement, including leaping, jumping, hopping, and running, throughout the school day (Zygmunt-Fillwalk & Bilello, 2005). Children need to slide down chutes head first, jump off of swings, crawl through tunnels, climb trees, run barefoot, ride bikes, dance, wrestle, hang by their arms, climb, and stretch. With plenty of stimulating whole-body play and activities, the vast majority of children with sensory integration difficulties naturally correct their own nervous system processing, regardless of their age.

There are countless activities that promote sensory integration, but there are also many activities that actively demote SI. Parents and teachers should first work to reduce the amount of time that their children spend in these pursuits. Limit the amount of time that children spend watching television, playing video games, and playing on the computer, substituting whole-body activities that stimulate the senses. Take special care to offer fun, accessible play that promotes the tactile, vestibular, and proprioceptive senses.

What types of sensory experiences appear to be beneficial for all children? Both deep pressure tactile stimulation and proprioceptive stimulation help individuals with either hypersensitivities or hyposensitivities. Some have referred to these types of sensory input as the "Great Mediators" because they are beneficial for everyone, not just for individuals with sensory dysfunction. Teachers and parents can work to ensure that all children are receiving these types of sensory input.

Parents can provide healthy tactile stimulation for their children from the earliest days of infancy. Deep pressure stimulation such as massage works well because it is very integrating for the nervous system. Light pressure touch such as scratching, on the other hand, is often stimulating to the nervous system and may or may not be beneficial for all children. The importance of physical touch, or tactile stimulation, with young children has become more apparent as more research has been conducted with children brought up in such historically sensory-deprived environments as neonatal intensive care units (Goddard, 1996) and eastern European orphanages (Roley, Blanche, & Schaaf, 2001). Children coming out of such environments often have issues with sensory defensiveness, meaning that they find touch stressing instead of calming. Interventions such as massage therapy or other tactile-kinesthetic stimulation have been shown to increase rate of weight gain in premature infants and to reduce stress in children with psychiatric issues. Just increasing the physical amount of touch that a person receives has been shown to increase the amount of nerve growth factor (NGF) produced by the brain, a hormone that increases nervous system and nerve net development (Hannaford, 1995).

Many parents find it easy to integrate massage into their children's bedtime routines. In fact, a three- to five-minute foot massage often actually helps children to fall asleep more quickly than they would on their own. Parents can also provide deep pressure stimulation to their child at other times. When you and your child are sitting on the sofa and watching television, rub a foot, hand, or shoulder. Massaging body parts with joints like toes, fingers, knees, and elbows has the added benefit of stimulating proprioceptive receptors in the brain. Older children can be taught to give themselves a massage when they are finding it difficult to concentrate, rubbing their own fingers or applying deep pressure to their legs when they need to refocus.

Children need to receive healthy proprioceptive stimulation on a regular basis. Sports such as gymnastics, weightlifting, and wrestling provide large amounts of proprioceptive stimulation. Karate and other martial arts provide lots of bending and stretching. Swimming forces muscles and joints to constantly move and stretch. Sports that require sitting and waiting do not provide this type of stimulation and may be better suited for children with hypersensitivities.

Teachers can improve the focus and concentration of all their students, not just students with sensory issues, by increasing the amount of proprioceptive stimulation that students receive during the school day. Students need opportunities for recess and physical education so that they can create their own proprioceptive and vestibular stimulation. Providing stretch breaks for children by having them stand up to bend and stretch can help them to "reset" their attention and attend more effectively. Having them stand on their tiptoes for a few additional seconds gives an additional proprioceptive boost. Many middle and high school teachers report that having their students do a thirty-second stretch break every fifteen minutes can be very effective at helping them to attend and focus (Williams, 2001). Elementary teachers often report that providing a palm-sized squeeze ball during group gathering time can aid a fidgety child in keeping focus (Roley, Blanche, & Schaaf, 2001). Be creative in allowing students to get the proprioceptive stimulation they need, and involve the students in coming up with new ideas for the class. For example, have students do one or more of the following:

- Give themselves hugs for fifteen seconds;
- Bend and unbend their fingers for twenty seconds;
- Press their hands together tightly for five seconds; or
- Press against their desks or chairs for five seconds.

When they are waiting in line, have them:

- Open and close their hands slowly;
- Walk down the hall on tiptoe; or
- Stretch or bend in a way that won't disturb their neighbors.

Children who lack good motor planning skills can benefit from exploring obstacle courses or practicing rhythm activities, while those who need proprioceptive stimulation can enjoy activities involving carrying heavy loads, pushing or pulling heavy objects, or hanging by their arms (Kranowitz, 1998). Fine motor proprioception can be enhanced by work with Playdoh or clay (Roley, Blanche, & Schaaf, 2001). Finally, providing varying levels of visual and auditory stimulation in different areas of the classroom can allow a child who needs extra stimulation to find it, while allowing a child who needs a quiet moment to refocus a space in which to do just that (Bakley, 2001).

INTERVENTIONS TO HELP ADDRESS SENSORY INTEGRATION DYSFUNCTION

For the child like Jack who has hypersensitivities (the child who is distractible and avoids stimulation), provide activities to help him calm his nervous system. At school, provide him a peaceful space with reduced visual stimulation in which he can work and allow him to work alone or in a small group. In the classroom, seat him next to quieter peers who do not engage in a great deal of movement. At home, ensure that he has a quiet place to do his homework and an area to which he can retreat for "down time" if he needs to recover from overstimulation. At the same time, the hypersensitive child also needs to work to build tolerance to sensory sensations. The process of building this tolerance is often referred to as *systematic desensitization* and involves gradually increasing an individual's tolerance to unpleasant sensations, beginning with experiencing a sensation in small, manageable amounts. The desensitization is enhanced by pairing the presentation of a sensitive stimulation with a calming activity: for example, a child who is hypersensitive to noise can be exposed to gradually increasing sound while he simultaneously does something that calms his nervous system. Jack would regularly grip a squeeze ball while participating in a noisy music class, providing him with calming proprioceptive stimulation at the same time that he was building his auditory tolerance.

For the child with hyposensitivities like David (the child who displays hyperactive behaviors), choose activities to stimulate the nervous system. Promote and allow frequent movement, even

encouraging the child to stand or sit in a rocking chair while working. Provide a headset with music at school or allow him to play background music at home when he is working on his homework. When this child is having trouble concentrating, do not send him to a cubicle, give him a "time out" in isolation, or ask him to do his work away from stimulation. He needs stimulation in order to attend and concentrate and will generally work more effectively in a busy environment.

We have clarified how proprioceptive stimulation is beneficial for all children, but what about vestibular activities? A variety of children can benefit from these activities, but remember that a formal sensory treatment program or *sensory diet* should be custom designed for the needs of a particular child who has been formally diagnosed by an occupational therapist or other SI specialist (Blythe, 2004). Sensory integration therapy, as practiced by occupational therapists, has been used with many children diagnosed with these difficulties for over thirty years (Ayres, 1979; Ottenbacher, 1982). For children who are diagnosed with hyposensitivities, provide them with the activities that follow on a regular basis. For children diagnosed with hypersensitivities, utilize these activities as part of a systematic desensitization program:

- A big balloon with handles, therapy ball, or physio ball is wonderful for bouncing up and down. Let the child try it first on the grass or a rug before trying it on the sidewalk or floor.

- Biking promotes the sense of balance as well as motor planning and motor coordination.

- When at the playground, encourage the child to swing and spin, perhaps using the tire swing or merry-go-round. Avoid rapid spinning, which can quickly overstimulate.

- Get a large playground ball for the child to sit on while watching television. The ball's diameter should equal the distance between the child's buttocks and the floor when his knees are bent at a right angle and his feet are flat on the floor. Sitting on this can help him to improve his balance.

The following proprioceptive activities can be used with children regardless of their sensitivities:

- Oral activities such as sucking on candy, a bottle, or a finger are very calming. Chewing gum is found to be very organizing and can greatly help the child who has difficulty getting dressed on time or completing homework and schoolwork.

- Provide the child with opportunities for tumbling. Pile several large cushions, beanbag chairs, or down comforters in a corner and invite your child to dive, jump, roll, stretch, and burrow in the cushions.

- Give the child a "joint squeeze". Place one hand on your child's forearm and the other hand on his upper arm. With slow, firm pressure, push his forearm and upper arm toward the elbow and then pull them away. Push and pull the muscles near his knees, shoulders, and hips. To activate his proprioceptors in other ways, press both hands down on his head and shoulders, then slowly straighten and bend his fingers, wrists, elbows, knees, ankles, and toes. These extension and flexion techniques will provide traction and compression to his joints.

- Gently squeeze the child's fingers / toes. Gently grasp each finger / toe separately between your thumb and index finger. Slide your fingers from the base to the tip of the finger / toe using a gentle rolling and squeezing motion. Repeat this motion for each finger / toe in order.

- Give your child a "body squeeze". A good bear hug will stimulate the proprioceptors throughout his body. Sit on the floor behind the child and straddle him with your legs. Wrap

your arms around his knees, draw them towards his chest, and squeeze. Holding tight, rock him forward and backward. Also remember that all kids need at least twelve hugs a day.

- Roughhousing that involves pushing, pulling, rolling, and tumbling with an adult or friend can feel good all over and provide excellent proprioceptive stimulation, as well as tactile and vestibular stimulation. However, this activity must be carefully supervised so that no one gets hurt or overloaded with sensory stimulation. Two important reminders: never pull on each other's clothing and never tickle.

- The practice of yoga dates back more than 5,000 years, and modern medical and scientific research indicates that yoga has positive physical and mental effects (Shealy, 1996). Yoga develops a child's musculoskeletal system, improves his posture, and provides him with integrating tactile, vestibular, and proprioceptive sensory experiences, promoting the healthy development and functioning of his nervous system. The benefits of yoga for children have been recognized in Europe and Asia, where yoga activities are part of the curriculum in many primary schools (Tummers, 2005). Yoga can be used as both a preventative and a corrective health activity as well as an activity that children can use when they need to regain control or refocus their concentration.

A HAPPY ENDING

So what happens to children like Jack and David when their sensory needs are met? For Jack, receiving healthy proprioceptive stimulation on a regular basis helped him to develop and condition his nervous system. He began to be able to tolerate sensory sensations that he previously could not. He learned strategies to help him gain control in situations in which he was getting overstimulated. He no longer needed to isolate himself from others and was therefore able to interact more with both peers and adults. In addition, his ability to effectively learn improved considerably. His teachers no longer reported that he was oppositional or avoiding work. Family life improved as he began having positive shared experiences with his parents.

Once David, his teachers, and his parents began to recognize his hyposensitivities, his behaviors were no longer seen as conduct or discipline problems but as his attempt to get the extra stimulation he needed. Over the next few years, he and the adults in his life worked together to help him find ways that he could get the stimulation he needed in socially appropriate ways. He learned to move in ways that were not distracting to others and began doing yoga-related stretches prior to activities that required concentration and focus. He found that listening to music helped him to do his homework. Most importantly, he learned ways to effectively monitor his own behavior.

Montessori early childhood and elementary classrooms provide an ideal environment for attending to children's sensory needs, as they are already structured to respect and promote the differentiated needs of diverse learners. Our classrooms teach young students to become attuned to their own needs so that they can learn to effectively regulate their own sensory processing, moving or interacting with others when they need additional stimulation or withdrawing to a quiet, solitary activity when they become overstimulated. We as educators can assist diverse learners in this process by ensuring that we provide environments and activities that appeal to a variety of sensory profiles, model tools for effective self-regulation, and respect the needs of children who may need our help in developing integrated sensory systems.

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References

Ayres, A.J. (1979). *Sensory integration and the child.* Los Angeles: Western Psychological Services.

Bakley, S. (2001, November). Through the lens of sensory integration: A different way of analyzing challenging behavior. *Young Children 56(6),* 70-76.

Blythe, S. Goddard (2004). *The well balanced child: Movement and early learning*. Stroud, United Kingdom: Hawthorn Press.

Cantu, C.O. (2002, November). Self-regulation and stress management. *The Exceptional Parent 32(11),* 41-47.

Goddard, S. (1996). *A teacher's window into the child's mind: And papers from the Institute for Neuro-physiological psychology*. Eugene, OR: Fern Ridge Press.

Gureasko-Moore, D.P., DuPaul, G.J., & Power, T.J. (2005). Stimulant treatment for attention-deficit / hyperactivity disorder: Medication monitoring practices of school psychologists. *The School Psychology Review 34(2),* 232-245.

Hannaford, C. (1995). *Smart moves: Why learning is not all in your head*. Alexander, NC: Great Ocean Publishers.

Kranowitz, C.S. (1998). *The out-of-sync child: Recognizing and coping with sensory integration dysfunction.* New York: Skylight Press.

Murray-Slutsky, C. & Paris, B. (2000). *Exploring the spectrum of autism and pervasive developmental disorders.* San Antonio, TX: Therapy Skill Builders.

Ohanian, S. (2002). *What happened to recess and why are our children struggling in kindergarten?* New York: McGraw-Hill.

Ottenbacher, K. (1982, September). Sensory integration therapy: Affect or effect? *American Journal of Occupational Therapy, 36(9),* 571-578.

Pellegrini, A.D. & Bohn, C.M. (2005, January / February). The role of recess in children's cognitive performance and school adjustment. *Educational Researcher 34(1),* 13-19.

Roley, S.S., Blanche, E.I., & Schaaf, R.C. (2001). *Understanding the nature of sensory integration with diverse populations.* San Antonio, TX: Therapy Skill Builders.

Shealy, C.N. (1996). *The complete family guide to alternative medicine: An illustrated encyclopedia of natural healing*. London: Element Books Limited.

Tummers, N. (2005). Yoga for your students. *Strategies 19(2),* 35-37.

Williams, M.S. (2001). *Take five!:Staying alert at home and school*. Albuquerque, NM: TherapyWorks.

Zygmunt-Fillwalk, E. & Bilello, T.E. (2005, Fall). Parents' victory in reclaiming recess for their children. *Childhood Education 82(1)*, 19-23.