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Your Guide to Sensory Integration

Source: The Spiral Foundation

Understanding Sensory Integration

By: Marie E. DiMatties and Jennifer H. Sammons

Sensory Integration and Autism

By: Linda Palmstrom, MS, OTR/L

Sensory Integration

By: Cindy Hatch-Rasmussen, M.A., OTR/L

Occupation Therapy Checklists

Preschool

School Age

Child

Adolescent and Adult

Source: Occupation Therapy Associates

Fact Sheets for Parents, Educators, Physicians

Source: The Spiral Foundation

Sensory Smart School Solutions

By: Lindsey Biel, OTR/L

Classroom Tips

Source: Cooley Dickinson Hospital—Occupation therapy Department

Glossary of Sensory Integration Terms

Sensory Integration Therapists and Resources

Occupational Therapy Games and Toy List

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for children and adults with developmental disabilities since 1952*

Your Guide to Sensory Integration

Sensory integration is the ability to take in information from our senses and effectively utilize the information to respond to the demands of our environment. All day, every day, we receive information from our senses--touch, hearing, sight, taste, smell, body position, and movement and balance. Our brains must organize this information so that we can successfully function in all aspects of daily life-at home, at school, at play, at work, and during social interactions. Sensory integration is an important part of our nervous system functioning.

The Senses

- ◆ The **tactile (touch) system** provides information about the shape, size, and texture of objects. This information helps us to understand our surroundings, manipulate objects, and use tools proficiently. When you put your hand in your pocket and select a quarter from an assortment of change, you are using tactile discrimination.
- ◆ We use our **auditory (hearing) system** to identify the quality and directionality of sound. Our auditory sense tells us to turn our heads and look when we hear cars approaching. It also helps us to understand speech.
- ◆ Our **visual (sight) system** interprets what we see. It is critical to recognizing shapes, colors, letters, words, and numbers. It is also important in reading body language and other non-verbal cues during social interactions. Vision guides our movements, and we continually monitor our actions with our eyes in order to move safely and effectively.
- ◆ The **gustatory (taste) and olfactory (smell) systems** are closely linked. They allow us to enjoy tastes and smells of foods and cause us to react negatively to unpleasant or dangerous sensations.
- ◆ **Proprioception (Body Awareness)** provides information from the muscles and joints, contributing to the understanding of body position. It also tells us how much force is needed for a particular task, such as picking up a heavy object, throwing a ball, or using a tool correctly.
- ◆ Located in the inner ear, the **vestibular (movement and balance) system** is the foundation for the development of balance reactions. It provides information about the position and movement of the head in relation to gravity and, therefore, about the speed and direction of movement. The vestibular system is also closely related to postural control. For example, when the brain receives a signal that the body is falling to the side, it, in turn, sends signals that activate muscle groups to maintain balance.

Components of Sensory Processing

- ◆ **Sensory modulation** is the ability to take in sensory information, decide what is relevant, and make an appropriate behavioral response. Difficulties in this area can result in avoidance or fear of normal sensations or unusual sensory-seeking behaviors. Sensory modulation problems can impact behavior and emotional development.
- ◆ **Sensory discrimination** allows us to learn about the specific qualities of sensory information such as size, shape and texture, direction of a noise, and body position and movement in space. Sensory discrimination difficulties most always result in motor related difficulties such as lack of coordination or delayed motor skill development.
- ◆ **Praxis** or motor planning is the ability to plan and sequence the steps of a new or non-habitual task and is dependent on effective sensory discrimination. Children with dyspraxia have difficulty executing motor tasks, developing organizational skills, and interacting with objects in a playful and imaginative way.

What is Sensory Integration Dysfunction?

Development occurs in spirals, each curve laying a foundation for the next. With effective intervention and complete understanding, children with disabilities can build the scaffolding needed to support an upward spiral of development.

- ◆ Imagine you are a bright kindergarten boy whose ears fill with pain whenever the school fire alarm rings. While the other children line up to leave the room, all you can do is hide in the corner with your hands over your ears.
- ◆ Imagine you are a 10 year-old girl who is friendly and has a wonderful imagination but cannot kick a soccer ball, learn the steps in dance class, or ride a bike.
- ◆ Imagine you are an adult who has become socially isolated because the slightest touch feels threatening, and the smells and sounds of restaurants, malls, and movie theaters are intolerable.
- ◆ Imagine you are a parent of a young child who struggles with sleeping and eating and is irritable much of the day. You hope that it is only a stage, but each day becomes a difficult trial.

Sensory integration dysfunction is an often unrecognized disorder that is seen in otherwise typically functioning individuals as well as those with autism, attention deficit disorder, learning disabilities, and other neurological conditions. These individuals are not able to effectively process information from their senses (touch, hearing, sight, taste, smell, and movement), resulting in delays in motor skills and problems with self-regulation, attention, and behavior.

Occupational and physical therapists specializing in sensory integration are able to identify and treat these problems. Through therapy, children, adolescents, and adults with sensory integration dysfunction can master skills, develop self-confidence, and find increased ease and comfort in their daily lives.

Individuals with sensory integration dysfunction are not able to effectively process information from their senses and, therefore, have difficulties with tasks such as putting on their coat. Imagine yourself in a world where something as basic as the pull of gravity or the touch of other people is perceived as unreliable, inconsistent, or threatening. You would not feel secure and safe, you might not be able to have fun, and your self-esteem might be compromised as you realized that you were not able to do things as well as your peers.

Sensory integration dysfunction can result in delays in motor skills and problems with self-regulation, attention, and behavior that can affect performance in school, at home, with peers, and during leisure and work activities.

How Do I Know if an Individual Has Sensory Integration Dysfunction?

An individual may need to be referred for an occupational therapy evaluation if difficulties are seen in several of these areas or if one area causes major functional problems.

1. Was unusually fussy, difficult to console, or easily startled as an infant
2. Has difficulty regulating sleep/wake cycle--settling for sleep, staying asleep, and waking without irritability
3. Is over-sensitive to stimulation--over-reacts to touch, taste, sounds, or odors
4. Strongly dislikes baths, haircuts, or nail cutting
5. Uses an inappropriate amount of force when handling objects, coloring, writing, or interacting with siblings or pets
6. Has poor muscle tone, fatigues easily, leans on people, or slumps in a chair
7. Was slow to roll over, creep, sit, stand, or walk, or to achieve other motor milestones
8. Is clumsy, falls frequently, bumps into furniture or people, and has trouble judging position of body in relation to surrounding space
9. Has difficulty learning new motor tasks; experiences frustration when attempting to follow instructions or sequence steps for an activity
10. Avoids playground activities, physical education class, and/or sports
11. Does not enjoy age-appropriate motor activities such as jumping, swinging, climbing, drawing, cutting, assembling puzzles, or writing
12. Finds it difficult to make friends with peers; prefers to play with adults or younger children

Frequently Asked Questions

General

What is the correct diagnostic label for difficulties with sensory integration?

This is referred to as both *dysfunction in sensory integration* (DSI) and *sensory processing disorder* (SPD). *Sensory processing disorder* is currently used more commonly in the context of research, while clinicians often use the term *sensory integration dysfunction*.

How do I know if my child has SI problems?

Use one of OTA Watertown's checklists to determine whether an OT or PT sensory integration-based evaluation might be useful. Speaking to a therapist certified in sensory integration can also assist you in determining if problems might exist.

What are the causes of sensory integration problems?

We do not have verifiable research in this area yet, but it appears that there may be a variety of causes, such as genetics, prematurity, birth trauma, exposure to toxins, etc.

Can sensory integration dysfunction be cured?

When occupational or physical therapy is given using a sensory integration framework, the problems can be minimized. The nervous system can be changed, and the ability to process

sensation can be improved. Biological research has shown that with therapy, the interference of sensory processing dysfunction with daily life tasks will be greatly minimized.

Will sensory processing issues go away as my child grows up?

No, it has not been found that these issues go away with time. However, they can appear to be minimized due to the greater flexibility most adults enjoy in choosing daily activities in comparison to children. Adults can also receive sensory integration intervention, and many report making gains with therapy.

Relationship Between Sensory Integration and Other Diagnoses

How is sensory integration dysfunction related to diagnoses such as ADHD, ADD, NVLD, autism, LD, etc.? If a child has another diagnosis, will he or she still benefit from sensory integration intervention?

Sensory integration difficulties can occur alone or can occur in conjunction with many other diagnoses. Children with other diagnoses will likely be receiving a variety of services (speech therapy, ABA, tutoring, etc.). They may also be using medications. Sensory integration intervention is an appropriate service for children who, in addition to their other difficulties, have problems with sensory processing that impact their everyday, functional performance.

How are ADHD and ADD similar and different from sensory integration disorder? Can ADD be cured with SI intervention?

There can be problems with arousal, attention, and excessive movement with each disorder. Sensory integration intervention could help to reduce these problems. Some behaviors usually attributed to ADD or ADHD may in actuality indicate sensory integration dysfunction. For example, a child who is sensitive to touch or noise might be easily distracted, and poor postural stability or poor processing of vestibular input from the inner ear could result in constant movement when sitting.

Do all children with autism have sensory integration difficulties?

No, it is estimated that approximately 70% of children with autism experience sensory integration problems, and yes, the intervention can help to reduce the devastating effects of autism.

How is sensory processing disorder related to anxiety disorder?

Research is needed in this area, but it appears that individuals with sensory integration dysfunction are often prone to anxiety due to the constant frustration in leading one's life. Anxiety may also result from the tension related to being over-sensitive to touch, taste, smell, noise, and/or movement.

Can SI intervention help children learn to talk or to read?

If the basis for the lack of speaking clearly or reading well is rooted in sensory processing problems, then, yes, it can help develop those abilities. Many children with speech and language problems have difficulty with cerebellar functioning. The cerebellum is the center in the brain where vestibular (movement), ocular (visual), and proprioceptive (body position) input is organized. Occupational and physical therapy with a sensory integration focus can address these issues, resulting in improved language skills and reading abilities. In addition, skills addressed through this

therapy, such as regulation of arousal level, postural control, and motor planning, are foundation abilities that are needed to support learning of any kind.

Sensory Integration Intervention

What happens during an occupational or physical therapy session where sensory integration techniques are used?

The therapist typically structures the session using ideas and leads from the child to make the activities as meaningful as possible. Frequently the use of an imaginative play theme can enhance the child's willingness to engage in desired activities for longer periods of time. The rapport that the therapist and child develop is central to the therapy. The therapist is always working to provide the "just right challenge," while giving the child ample opportunities for enhanced sensory input to build a stronger foundation for skill.

What is the difference between OT and PT?

Occupational and physical therapists have very similar training, however, the OT receives more training in oral and hand skill interventions and the PT receives more training in postural and gross motor development.

What is the training for a sensory integration specialist? Is SI certification necessary?

Occupational and physical therapists who specialize in sensory integration assessment and intervention must already have a bachelor's or master's degree in their field. In order to become certified in SI, the therapist must take four, five-day courses covering sensory integration theory, assessment techniques, interpretation of test results, and intervention/treatment. Some qualified therapists are not SI certified, but have had a direct mentoring relationship with an SI certified therapist. It is ideal to be both assessed and treated by a therapist who has this type of background and who has experience in both evaluation and treatment of sensory integration difficulties.

What do the letters after the therapists' names mean?

The letters stand for the degree the therapist has earned and whether he or she is registered and licensed. All therapists have to pass an examination in order to become registered. For example, *MS, OTR/L* means "master of science in occupational therapy, a registered and licensed therapist." Some therapists have *FAOTA* after their credentials. This means that they have been asked to be a Fellow of the American Occupational Therapy Association. This distinction is awarded to therapists in recognition of their skill and knowledge, which has resulted in the growth and improvement of occupational therapy.

How often should my child have therapy and for how long?

The length of therapy varies depending on what set of difficulties the child experiences, but it is common for children to need 50 to 80 sessions of therapy. In some cases therapy is given two to three times per week, which may shorten the number of months of therapy.

What is a sensory diet? How is it different from treatment?

A sensory diet is a daily or weekly list of activities that the child can engage in during regular

routines to help maintain an optimal state of arousal. Sensory diet activities can also provide greater body awareness prior to performing skilled tasks. Although a sensory diet is developed by a therapist trained in sensory integration and can be an adjunct to treatment, it can also be implemented by parents, teachers, or clients themselves.

How is clinic therapy different from school-based therapy?

In a clinic, the goal is to provide therapy to address all aspects of a child's life (e.g., sleeping, eating, playing), including functioning in the home and community, as well as at school. In the school setting, the intervention must be related to specific difficulties in school functioning only.

Does insurance cover SI intervention? Do schools provide SI intervention?

Many insurance plans do provide coverage for occupational and physical therapy using a sensory integration approach. Each plan is different, however, making it necessary to talk with an insurance representative for your particular plan prior to initiating services. Some schools will provide OT or PT with a sensory integration emphasis within in the school setting, and occasionally a school will pay for outside services involving sensory integration. It is most likely for a school to fund outside services if the addition of sensory integration based intervention can help keep a child in a regular classroom or regular education setting.

Educating Others

How do I begin talking to the school about my child's sensory issues?

If you have an evaluation report that outlines your child's sensory issues, it is important to share it with the school. It can also be helpful to have your child's teacher fill out a sensory integration teacher checklist highlighting issues related to school performance. When the teacher has made his or her own observations, it is often easier to begin a dialogue. Clinics specializing in sensory integration often give informational talks and lectures that school personnel can attend.

My special education department says SI intervention doesn't work for kids over eight. Is this true?

No, this is absolutely not true. This myth seems to have arisen from an early study by pioneer A. Jean Ayres, in which she compared two groups of children receiving sensory integration based therapy. In one group the children were six to eight years of age; in the other they were eight or older. In this study, the younger group made better gains over a sixth month period. However, both groups made gains.

How do I educate my child's doctor and get a referral?

It can be helpful to provide your doctor with short written explanations of sensory integration dysfunction.

My child's grandparents think my child has a behavioral or disciplinary problem. What resources can I use to help them understand?

This is a common problem. It can be helpful to have them read books written for laypersons, such

as *The Out of Sync Child* by Carol Kranowitz or *Sensory Integration and the Child* by A. Jean Ayres. Clinics often hold evening overviews, which can also be informative and allow the grandparents to ask questions.

How do I explain my child's behavior to other people? For example, how do I explain why I appear to let my child get away with so much?

It is important to tell people that your child processes sensation differently than others do and that this difference causes your child to be constantly stressed. It can be helpful to compare your child's reactions to the reactions we all have when undergoing a great deal of stress. People also tend to respond well to the fact that your child has a physiological problem and is not always in control of his or her behavior. It is also important to recognize changes in your child's behavior during the course of therapy and to modify your responses accordingly.

Source:

The Spiral Foundation at OTA Watertown
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Understanding Sensory Integration

Authors: Marie E. DiMatties and Jennifer H. Sammons (May 2003)

Michael is a third grade student who is waiting for the school bus. He is challenged by sensory experiences during everyday activities that most of us don't even think about. While he's still reeling from the battle with mom over brushing his teeth (that peppermint toothpaste tastes like fire in his mouth) the school bus pulls up. Michael runs past the bus monitor's haze of perfume and sits at the back of the bus. In his heightened state, he becomes even more aware of his new school shirt with its stiff label and that awful feeling like a wire brush being poked into the back of his neck. The sensory experiences of the movement of the bus, the sound of his excited classmates laughing and yelling above the roar of the bus engine all contribute to his increased agitation. By the time Michael arrives at school he is wound up and ready to unravel. There is no time to wait for the bus monitor's direction...getting off the bus quickly becomes a matter of survival and he resorts to pushing, shoving and finally kicking his way out. Unfortunately, there is a price to pay for this seemingly outward aggression...he can expect another trip to the principal's office.

This digest defines sensory integration and sensory integration dysfunction (DSI). It outlines evaluation of DSI, treatment approaches and implications for parents and teachers, including compensatory strategies for minimizing the impact of DSI on a child's life.

What is Sensory Integration?

Sensory Integration is a theory developed over more than 20 years by A. Jean Ayres, an occupational therapist with advanced training in neuroscience and educational psychology (Bundy & Murray, 2002). Ayres (1972) defines sensory integration as "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" (p. 11). The theory is used to explain the relationship between the brain and behavior and explains why individuals respond in a certain way to sensory input and how it affects behavior. The five main senses are:

- Touch - tactile
- Sound - auditory
- Sight - visual
- Taste - gustatory
- Smell - olfactory

In addition, there are two other powerful senses:

- vestibular (movement and balance sense)-provides information about where the head and body are in space and in relation to the earth's surface
- proprioception (joint/muscle sense)-provides information about where body parts are and what they are doing.

What Is Sensory Integration Dysfunction (DSI)?

Dysfunction in sensory integration is the "inability to modulate, discriminate, coordinate or organize sensation adaptively" (Lane et al., 2000, p. 2).

How efficiently we process sensory information affects our ability to:

- **discriminate sensory information** to obtain precise information from the body and the environment in order to physically interact with people and objects. An accurate body scheme is necessary for motor planning, i.e., being able to plan unfamiliar movements. It involves having the idea of what to do, sequencing the required movements, and executing the movements in a well-timed, coordinated manner.

Michael frequently bumps into others and drops items on the way to class because of his poor body scheme. He often hands in crumpled assignments that reflect the challenges of holding a pencil in his hand and making precise movements to achieve legible handwriting. Concentrating on his school work intensely may lead him to fall off his chair. To most people, Michael appears to be a sloppy, clumsy, and forgetful child. In gym class, Michael cannot master jumping jacks, somersaults make him feel sick, and he has given up on ever being able to connect with a baseball. His timing was always off. He resorts to being the class clown to cover up for his difficulties. Michael certainly doesn't feel good about himself. He can't do what other kids seem to do so effortlessly-and then there is the teasing...

• **modulate sensory information** to adjust to the circumstances and maintain optimum arousal for the task at hand. Sensory modulation is the "capacity to regulate and organize the degree, intensity and nature of responses to sensory input in a graded and adaptive manner" (Miller & Lane, 2000).

Sensory defensiveness, a type of sensory modulation problem, is defined by Wilbarger and Wilbarger (1991) as "a constellation of symptoms related to aversive or defensive reactions to non-noxious stimuli across one or more sensory systems" (Wilbarger & Wilbarger, 2002a, p. 335) It can affect changes in the state of alertness, emotional tone, and stress (Wilbarger & Wilbarger, 2002a).

Michael demonstrates many symptoms of sensory defensiveness, which affect his attention, learning, and behavior. His teacher's instructions get lost in competition with a clock ticking, the echo of peers walking and talking in the hall. He is off task and he finds solace in humming or chewing on the end of his pencil, sensory seeking behaviors that help ease the discomfort. Fortunately, he has gym class before lunch. Running bases in gym class gives him a legitimate opportunity for the "heavy work" that his body needs. It sure makes him feel better and prepares him for the biggest challenge of all-eating lunch in the school cafeteria.

How is DSI Identified?

DSI is identified through evaluation by an occupational therapist who has advanced training in sensory integration, using one or more of the following practices:

- Gathering information about the child's performance in daily life tasks within the context of the classroom, school, and/or home environment.
- Skilled observation of the child: the therapist sets up a play environment and observes the child's responses to different types of sensory input and motor planning ability.
- Parent/caregiver sensory questionnaires /standardized checklists, e.g., Sensory Profile (Dunn, 1999), non-standardized checklists.
- Parent/caregiver interview: the therapist identifies specific functional problems related to problems with sensory processing.
- Standardized tests of general development and motor functioning, e.g., Sensory Integration and Praxis Test Battery (SIPT) (Ayres, 1989).
- Clinical observations of posture, coordination, etc.

Intervention for DSI

Fostering the child's participation in normal everyday childhood activities or "occupations" is the main goal of occupational therapy. Intervention starts when teachers and parents are taught about DSI and intervention so they can develop strategies that help with adaptation or compensation for dysfunction (Bundy & Koomar, 2002). Based on information gathered, the therapist collaborates with teachers and parents to design an intervention plan to address the child's sensory integration problems.

Interventions Based on Sensory Integration Theory

Therapist consultation aims to educate teachers, parents, and older children about sensory integration and to develop strategies to adapt to and compensate for dysfunction such as:

- Environmental modifications
- Adaptations to daily routines
- Changes in how people interact with the child (Wilbarger & Wilbarger, 2002)

Examples are reducing distracting visual materials in the classroom, giving the child an alternative to a messy art activity, or refraining from wearing perfume or bright, floral clothing.

A sensory diet is a strategy that consists of a carefully planned practical program of specific sensory activities that is scheduled according to each child's individual needs. Like a diet designed to meet an individual's nutritional needs, a sensory diet consists of specific elements designed to meet the child's sensory integration needs. The sensory diet is based on the notion that controlled sensory input can affect one's functional abilities (Wilbarger & Wilbarger, 2002b). A sensory diet can help maintain an age appropriate level of attention for optimal function to reduce sensory defensiveness.

Wilbarger & Wilbarger's (200b) comprehensive approach to treating sensory defensiveness includes education and awareness, a sensory diet, and other professional treatment techniques. One such technique is the Wilbarger Protocol, which uses deep pressure to certain parts of the body followed by proprioception in the form of joint compressions. It is critical that this protocol is not used in isolation and that it is initiated and monitored by an appropriately trained therapist.

The "How Does Your Engine Run?" Program (Williams & Shellenberger, 1994) is a step-by-step method that teaches children simple changes to their daily routine (such as a brisk walk, jumping on a trampoline prior to doing their homework, listening to calming music) that will help them self-regulate or keep their engine running "just right." Through the use of charts, worksheets, and activities, the child is guided in improving awareness and using self-regulation strategies.

Traditional Sensory Integrative Therapy

Traditional sensory integrative therapy takes place on a 1:1 basis in a room with suspended equipment for varying movement and sensory experiences. The goal of therapy is not to teach skills, but to follow the child's lead and artfully select and modify activities according to the child's responses. The activities afford a variety of opportunities to experience tactile, vestibular, and proprioceptive input in a way that provides the "just right" challenge for the child to promote increasingly more complex adaptive responses to environmental challenges. The result is improved performance of skills that relate to life roles, e.g., player, student, (Schaaf & Anzalone, 2001). This type of intervention may be used along with other treatment approaches.

Summary

DSI can have a profound effect on a child's participation in everyday childhood "occupations," including play, study and family activities. Collaboration between the therapist, teacher, and parent is the most efficient way to understand the child's behavior and unique sensory needs. Together, they can implement strategies to support the child's performance in roles and occupations across multiple environments.

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The Sensory Integration Resource Center provides links to Internet resources and research about Sensory Integration Dysfunction (DSI) for parents, educators, occupational therapists and physicians. Available: www.sinetwork.org/



SENSORY INTEGRATION AND AUTISM

By Linda Palmstrom, MS, OTR/L

What types of sensory processing problems can children with autism experience?

Three aspects of poor sensory processing may be seen in autistic children:

1. Sensory "registration". When sensory input is not registered correctly in the child's brain, the child often pays very little attention to things, while at other times, he overresponds.
2. The child may not modulate sensory input well, especially sensations from touch and movement. The child may experience gravitational insecurity, the overwhelming reaction of fear or distress to ordinary movement that occurs when input to the gravity receptors in the inner ear (vestibular system) are not inhibited or modulated in the normal way. The child may also experience oversensitivity to the usual sensory experiences of daily life. Since the part of the brain that helps to inhibit or modulate is not working in the way that it should, the child reacts to ordinary sensation with a "flight, fright or fight" response.
3. The part of the brain that makes the child want to do things, especially new and different things, is not operating normally, and so the child has little or no interest in doing things that are purposeful or constructive.

How does sensory integration therapy help the child with autism?

- Sensory integrative therapy offers the child with autism the opportunity to experience touch and movement sensations at the intensity and level that the child can handle. This helps to facilitate the child's "inner drive" to feel and interact with the environment. The therapy provides the "just right" challenge and the "just right" amount of sensory input needed for alerting and arousal to encourage the child's sense of "I want to do it".
- Poor sensory processing limits the normal development of motor planning, the ability to think of, organize and carry out a sequence of unfamiliar actions. The autistic child often needs help to engage in purposeful activity or to try anything new or different. Since organizing simple adaptive responses are difficult, the child with autism frequently experiences significant difficulty in mastering the daily activities of communication, self-care, play, learning and interacting with others.

What is sensory integration?

Our senses of touch, movement and information from our joints and muscles begin to function early in life, even before birth. These basic senses work closely together and interconnect with other systems in the brain. We use this information from our senses to organize our behavior and successfully interact in the world. This organization of the senses for purposeful activity is termed *sensory integration*.

How does sensory integration relate to learning?

Our brains must organize all the information from our senses in order that we may function in everyday situations in the classroom, at home, at the playground and in social interactions. The nervous system is constantly alerting to, focusing, screening, sorting and responding to sensory information from both the internal receptors and the external environment. This allows us to filter out unimportant sensory information and organize ourselves for performing useful activity.

How do I know if my child has a problem in sensory integration?

- The overly sensitive child may show irritability or withdrawal when touched, avoidance of certain textures of food or clothing, distractibility, or a fearful reaction or upset to the normal movement or jostling in the classroom, while standing in line or at the playground.
- The child who is under-responsive may seek out intense twirling, swinging or crashing activities. The child may push other children too hard or may not react to bumps and bruises.
- The child's activity level may be unusually high or low. The child may be constantly active, lethargic or fatigue easily. Some children may vary from one extreme to the other.
- Difficulty in coordination, delays in speech and language skills, poor organization and poor self esteem may also be signs of a sensory integrative problem.

- Sensory integrative treatment may help to improve the autistic child's registration and modulation of sensory information and encourage motor planning. Increased awareness about sensory integration may help parents and teachers better understand the behaviors of the child with autism. In addition, the home and learning environment may be adapted to best provide the "sensory diet" that allows for the child's ability to learn and to manage activities of daily living.

What can the parent/teacher do to help the child with SI problems at home or in the school?

- Keep visual and auditory distractions to a minimum to help facilitate the child's attention to homework or class work.
- Give frequent breaks from table top work, provide opportunity for movement or change in position.
- For the child that is under-responsive to movement or muscle input (proprioception) offer opportunities to swing, twirl, bounce or jump. Sometimes, swinging or jumping for 10 or 15 minutes before leaving for school helps the child. At school the child could erase the chalkboard, run an errand or carry the milk crate for snack time.
- If the child seems overly aroused and unable to focus, provide a quiet space to regroup.

- For children with difficulty in organization, give simple step by step directions. Develop routines and strategies to help the child stay on track. Sometimes, the "buddy" system works at school. For homework, some mothers have asked an older student to help for an hour each day after school.

- To improve handwriting: Use a pencil grip to increase the surface of the writing tool for better pencil grasp and increased control. Review letter formation and spacing. Begin large on a chalkboard, then decrease the size of the letters and use lined paper as the child's skills improve.

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*The ASC's Resource Library has additional information on sensory integration.
For a list of S.I. providers, please call the Autism Support Center at # 508-777-9135.*

Sensory Integration

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Children and adults with autism, as well as those with other developmental disabilities, may have a dysfunctional sensory system. Sometimes one or more senses are either over- or under-reactive to stimulation. Such sensory problems may be the underlying reason for such behaviors as rocking, spinning, and hand-flapping. Although the receptors for the senses are located in the peripheral nervous system (which includes everything but the brain and spinal cord), it is believed that the problem stems from neurological dysfunction in the central nervous system--the brain. As described by individuals with autism, sensory integration techniques, such as pressure-touch can facilitate attention and awareness, and reduce overall arousal. Temple Grandin, in her descriptive book, *Emergence: Labeled Autistic*, relates the distress and relief of her sensory experiences.

Sensory integration is an innate neurobiological process and refers to the integration and interpretation of sensory stimulation from the environment by the brain. In contrast, sensory integrative dysfunction is a disorder in which sensory input is not integrated or organized appropriately in the brain and may produce varying degrees of problems in development, information processing, and behavior. A general theory of sensory integration and treatment has been developed by Dr. A. Jean Ayres from studies in the neurosciences and those pertaining to physical development and neuromuscular function. This theory is presented in this paper.

Sensory integration focuses primarily on three basic senses--tactile, vestibular, and proprioceptive. Their interconnections start forming before birth and continue to develop as the person matures and interacts with his/her environment. The three senses are not only interconnected but are also connected with other systems in the brain. Although these three sensory systems are less familiar than vision and audition, they are critical to our basic survival. The inter-relationship among these three senses is complex. Basically, they allow us to experience, interpret, and respond to different stimuli in our environment. The three sensory systems will be discussed below.

Tactile System: The tactile system includes nerves under the skin's surface that send information to the brain. This information includes light touch, pain, temperature, and pressure. These play an important role in perceiving the environment as well as protective reactions for survival.

Dysfunction in the tactile system can be seen in withdrawing when being touched, refusing to eat certain 'textured' foods and/or to wear certain types of clothing, complaining about having one's hair or face washed, avoiding getting one's hands dirty (i.e., glue, sand, mud, finger-paint), and using one's finger tips rather than whole hands to manipulate objects. A dysfunctional tactile system may lead to a misperception of touch and/or pain (hyper- or hyposensitive) and may lead to self-imposed isolation, general irritability, distractibility, and hyperactivity.

Tactile defensiveness is a condition in which an individual is extremely sensitive to light touch. Theoretically, when the tactile system is immature and working improperly, abnormal neural signals are sent to the cortex in the brain which can interfere with other brain processes. This, in turn, causes the brain to be overly stimulated and may lead to excessive brain activity, which can neither be turned off nor organized. This type of over-stimulation in the brain can make it difficult for an individual to organize one's behavior and concentrate and may lead to a negative emotional response to touch sensations.

Vestibular System: The vestibular system refers to structures within the inner ear (the semi-circular canals) that detect movement and changes in the position of the head. For example, the vestibular system tells you when your head is upright or tilted (even with your eyes closed). Dysfunction within this system may manifest itself in two different ways. Some children may be hypersensitive to vestibular stimulation and have fearful reactions to ordinary movement activities (e.g., swings, slides, ramps, inclines). They may also have trouble learning to climb or descend stairs or hills; and they may be apprehensive walking or crawling on uneven or unstable surfaces. As a result, they seem fearful in space. In general, these children appear clumsy. On the other extreme, the child may actively seek very intense sensory experiences such as

excessive body whirling, jumping, and/or spinning. This type of child demonstrates signs of a hypo-reactive vestibular system; that is, they are trying continuously to stimulate their vestibular systems.

Proprioceptive System: The proprioceptive system refers to components of muscles, joints, and tendons that provide a person with a subconscious awareness of body position. When proprioception is functioning efficiently, an individual's body position is automatically adjusted in different situations; for example, the proprioceptive system is responsible for providing the body with the necessary signals to allow us to sit properly in a chair and to step off a curb smoothly. It also allows us to manipulate objects using fine motor movements, such as writing with a pencil, using a spoon to drink soup, and buttoning one's shirt. Some common signs of proprioceptive dysfunction are clumsiness, a tendency to fall, a lack of awareness of body position in space, odd body posturing, minimal crawling when young, difficulty manipulating small objects (buttons, snaps), eating in a sloppy manner, and resistance to new motor movement activities.

Another dimension of proprioception is praxis or motor planning. This is the ability to plan and execute different motor tasks. In order for this system to work properly, it must rely on obtaining accurate information from the sensory systems and then organizing and interpreting this information efficiently and effectively.

Implications: In general, dysfunction within these three systems manifests itself in many ways. A child may be over- or under-responsive to sensory input; activity level may be either unusually high or unusually low; a child may be in constant motion or fatigue easily. In addition, some children may fluctuate between these extremes. Gross and/or fine motor coordination problems are also common when these three systems are dysfunctional and may result in speech/language delays and in academic under-achievement. Behaviorally, the child may become impulsive, easily distractible, and show a general lack of planning. Some children may also have difficulty adjusting to new situations and may react with frustration, aggression, or withdrawal.

Evaluation and treatment of basic sensory integrative processes is performed by occupational therapists and/or physical therapists. The therapist's general goals are: (1) to provide the child with sensory information which helps organize the central nervous system, (2) to assist the child in inhibiting and/or modulating sensory information, and (3) to assist the child in processing a more organized response to sensory stimuli.

For further information, contact: Sensory Integration International, P.O. Box 9013, Torrance, CA 90508, USA



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How do I know if my preschool child (3 to 5 years) needs occupational therapy services?

- 1. Says "I can't" or "I won't" to age appropriate self-care or play activities.
- 2. Low muscle tone; seems weak or floppy.
- 3. Clumsy, falls frequently.
- 4. Bumps into furniture or people, has trouble judging body in relation to space around him/her.
- 5. Breaks toys or crayons easily.
- 6. Does not enjoy jumping, swings or having feet off the ground.
- 7. Dislikes coloring in lines, doing puzzles or cutting with scissors.
- 8. Delayed language development.
- 9. Overly active, unable to slow down, moves quickly from one toy to another.
- 10. Difficulty focusing attention, or over-focused and unable to shift to the next task.
- 11. Dislikes bathing, cuddling, or haircuts.
- 12. Over-reacts to touch, taste, sounds, or odors
- 13. Avoids playground activities.
- 14. Unable to settle down, sleep difficulties.
- 15. Needs more practice than other children to learn new skills.

If your child is experiencing 3 or more problems on this checklist, occupational therapy intervention may be helpful.

Please call Occupational Therapy Associates-Watertown, P.C. for more information (617) 923-4410.



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How do I know if my school-age child needs occupational therapy services?

- 1. Difficulty focusing attention or over-focused and unable to shift to the next task.
- 2. Low muscle tone; tends to lean on arms or slumps at desk.
- 3. Needs more practice than other children to learn new skills.
- 4. Reverses letters such as *b* and *d*; can't space letters on the lines.
- 5. Breaks pencils frequently or writes with heavy pressure.
- 6. Does not enjoy jumping, swings or having feet off the ground.
- 7. Dislikes handwriting, tires quickly during written class work.
- 8. Difficulty paying attention or following instructions.
- 9. Overly active, unable to slow down.
- 10. Poor self-esteem, lack of confidence.
- 11. Dislikes swimming, bathing, hugs, and/or hair cuts
- 12. Over-reacts to touch, taste, sounds, or odors
- 13. Avoids physical education or sports activities.
- 14. Finds it difficult to make friends with children of the same age, prefers to play with adults or younger children rather than peers.
- 15. Difficulty following several step instructions for motor tasks.

If your child is experiencing 3 or more problems on this checklist, occupational therapy intervention may be helpful.

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How do I know if my infant/toddler needs occupational therapy services?

- 1. Easily startled (birth to 3 months)
- 2. Poor muscle tone
- 3. Difficulty consoling self, unusually fussy
- 4. Unable to bring hands together and bang toys
- 5. Slow to roll over, creep, sit or stand
- 6. Difficulty babbling
- 7. Failure to explore
- 8. Cries or becomes tense when moved through space.
- 9. Frequent fisting of hands after six months
- 10. Difficulty tolerating a prone (on stomach) position
- 11. Dislikes baths
- 12. Difficulty playing with age appropriate toys.
- 13. Resists being held, dislikes being cuddled, becomes tense when held
- 14. Sucking difficulties
- 15. Overly active, seeks excessive movement
- 16. Unable to settle down, sleep difficulties

If your young child is experiencing 3 or more problems on this checklist, occupational therapy intervention may be helpful.

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When would occupational therapy services be helpful to an adult?

- 1. Difficulties with balance, becomes disoriented and/or fearful on elevators or escalators.
- 2. Fatigues easily; tends to lean on arms or slump at desk.
- 3. Accident-prone, clumsy or awkward in daily activities.
- 4. Dislikes crowds or accidental jostling in public situations (standing in line at the movie theater or shopping in store aisles).
- 5. Low tolerance for approach from behind or unexpected touch.
- 6. Difficulty in maintaining intimate relationships, difficulty with physical closeness, hugs or cuddling.
- 7. Disorganized in work or home activities.
- 8. Difficulty following several step instructions for motor tasks.
- 9. Difficulty with driving, parking, shifting gears or entering freeways.
- 10. Poor self-esteem, lack of confidence.
- 11. Difficulty focusing attention or over-focused and unable to shift to next task.

If you or an adult you know are experiencing 3 or more of these problems, occupational therapy intervention may be helpful.

Please call Occupational Therapy Associates - Watertown, P.C. for more information at (617) 923-4410

Parent Fact Sheet

Signs and Symptoms of Sensory Processing Disorder

What is Sensory Processing Disorder?

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.

Also known as Sensory Integration Disorder (DSI), children with **SPD** may demonstrate behaviors characteristic of one or more types of sensory processing problems, listed below.



Children with SPD may not enjoy common childhood experiences.

It is estimated that between 5—13 % of children entering school have **SPD** and that 3 of 4 are boys.

Children with SPD often demonstrate problems with:

- + Attention and behavior
- + Social skills or self-esteem
- + Play Skills
- + Fine,/gross/oral motor skills
- + Daily living skills (i.e. eating or dressing)
- + Sleep/ eating/ elimination

In addition, **SPD** is often associated with other diagnoses such as:

- + Learning disabilities
- + Attention deficit disorder
- + Pervasive developmental disorder/ autism spectrum
- + Language disorders
- + Anxiety disorder/ depression
- + Behavioral disorders
- + In Post-institutionalization

Signs of Sensory Processing Disorder

Sensory Modulation Disorder

Common Signs

- Easily distracted by noises
- Overly sensitive to sounds
- Dislikes nail/ hair cutting
- Dislikes clothing of certain textures/ fits/ or styles
- Upset about seams in socks
- Difficult time falling or staying asleep
- Reacts defensively to tastes/ textures of food
- Easily distracted by visual stimuli

Definition

A problem in regulating responses to sensory inputs resulting in withdrawal or strong negative responses to sensations that do not usually bother others. Problems are often seen in fluctuating emotions that are made worse by stress, and vary with the situation.

Sensory Discrimination Disorder

Common Signs

- Jumps a lot on beds
- Bumps or pushes others
- Grasps objects too tightly or uses too much force
- Frequently drops things or knocks things over
- Mouths, licks, chews, or sucks on non-food items
- Craves movement, e.g. likes to spin self around
- Afraid of heights/ swings or slides
- Has poor balance

Definition

A problem in recognizing/ interpreting differences or similarities in qualities of stimuli. It is commonly seen with problems in processing body sensations from touch, muscles and joints (proprioception) and head movements (vestibular— inner ear sensations).

Postural-Ocular Disorder

Common Signs

- Seems weaker than other children
- Fatigues easily
- Frequently moves in and out of seat
- Slumps while sitting
- Difficulty making eye contact/ tracking with the eyes, e.g. reading
- Falls and tumbles frequently
- Feels heavier than anticipated when lifted
- Has flat feet

Definition

A problem with control of posture or quality of movements seen in low muscle tone or joint instability and/ or poor functional use of vision. It is often seen with vestibular and proprioceptive problems.

Dyspraxia

Common Signs

- Problems with daily life tasks like dressing or using utensils
- Eats in a sloppy manner
- Difficulty following multi-step directions
- Strong desire for sameness or routines
- Has an awkward pencil grasp
- Has poor handwriting
- Dislikes or reluctant to participate in sports

Definition

A problem with planning, sequencing & executing unfamiliar actions resulting in awkward & poorly coordinated motor skills typically seen with a sensory processing deficit. It is usually seen with difficulty doing new activities or those that are done infrequently. (May-Benson, Teasdale, & Koomar, 2006)

SPD Facts

Developmental Information (May-Benson, Koomar, & Teasdale, 2006)

- **SPD** is typically identified in early childhood or adolescence but may be seen throughout the lifespan.
- Problems may be seen in natural or adoptive children living in birth, foster, or adoptive families.
- Children do not “outgrow” the problem. Difficulties persist into adulthood, although sometimes severity of symptoms may appear less as individuals learn coping strategies.
- Children with **SPD** often demonstrate difficulties in developmental activities. A recent study indicates parents report that:
 - * 47% did not go through the “terrible two’s” or did so late
 - * 37% have a brief or absent crawling phase
 - * 33% have strong positioning preferences as infants
 - * 32% have sleep problems
 - * 31% have feeding problems
 - * 28% were hesitant/delayed going down stairs
- **SPD** impacts many areas of children’s emotional and physical functioning:
 - * Children’s sensory processing problems have a strong relationship to their behavior difficulties.
(Cohen, May-Benson, Teasdale, Callahan, 2006)
 - * Children with **SPD** have significantly poorer coping skills than typical peers. Their sensory processing problems are significantly related to coping abilities. (May-Benson, 1999)
 - * Children’s motor coordination problems are highly related to decreased participation in leisure activities.
(Koomar & May-Benson, 1999)

Birth History Information (May-Benson, Koomar, & Teasdale, 2006)

- Children with **SPD** often had difficulties during labor and delivery. Conservatively estimated prenatal and birth problems are:
 - * 42% had complications during labor or delivery
 - * 32% delivered by assisted delivery methods
 - * 25% mothers had infections or illnesses during pregnancy
 - * 18% mothers had unusual stresses during pregnancy
 - * 13% were pre-term, ≤ 37 weeks
 - * 5% had cord wrap/ prolapse at birth
- Children with **SPD** appear to be at a greater risk for early childhood health problems. A recent study found:
 - * 62% had chronic ear infections
 - * 40% had allergies/ asthma
 - * 27% experienced serious injuries or illnesses
 - * 25% had jaundice at birth
 - * 20% had colic as infants

Parent Information (Cohen, May-Benson, Teasdale, Callahan, 2006)

- Parents of children with **SPD** are impacted as well. Parent sense of competence is moderately related to their child’s sensory processing and strongly related to their behavior.
 - * 1 of 3 parents report being tense, frustrated, & anxious about parenting their child with **SPD**.
 - * 2 of 5 parents report feeling they cannot always figure out what is troubling their child with **SPD**.
 - * 2 of 3 parents feel that parenting their **SPD** child is often difficult and sometimes not manageable.

References and Resources

Research Articles

Ahn, R., Miller, L., Milberger, S., & McIntosh, D. (2004). Prevalence of parents' perceptions of sensory processing disorders among kindergarten children. *Am J Occup Ther*, 58(3), 287-302.

Cohen, E., May-Benson, T., Teasdale, A., Callahan, M. (2006). *The Relationship Between Behaviors Associated with Sensory Processing and Parents' Sense of Competence*. The Spiral Foundation. 124 Watertown St., Watertown, MA 02472.

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Klass, P. & Costello, E. (2003). *Quirky Kids*. New York: Ballentine Books.

Kranowitz, C. (2005). *The Out-of-Sync Child*. New York: Perigee.

Miller, LJ (2006). *Sensational Kids*. New York: Putnam.

Websites

www.spdnetwork.org
www.quirkykids.com

For More Information
www.thespiralfoundation.org
617-923-4410

Educator Fact Sheet

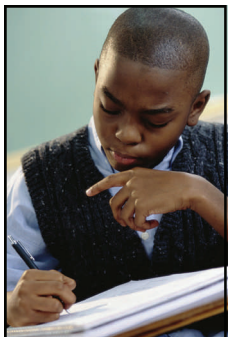
Signs and Symptoms of Sensory Processing Disorder



What is Sensory Processing Disorder?

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.

Also known as Sensory Integration Disorder (DSI), children with **SPD** may demonstrate behaviors characteristic of one or more types of sensory processing problem, listed below.



Children with SPD may not be successful in school.

It is estimated that between 5—13 % of children entering school have **SPD** and that 3 of 4 are boys.

Have you ever taught children like Sam and Anna? They have SPD.

Sam is unable to be with his class during circle time without rocking in his chair, chewing on his shirt & twirling his hair. He has trouble standing in line and often complains that others are hurting him. He dislikes the sound of the school bells ringing.

Anna often breaks her pencil by pressing down too hard. She is often falling out of her chair and she dislikes physical education class, although she loves the swings at recess. She has a hard time organizing her desk and homework and gets easily frustrated.

Signs of Sensory Processing Disorder

Sensory Modulation Disorder

Common Signs

- Easily distracted by noises
- Overly sensitive to sounds
- Difficult time falling or staying asleep
- Reacts defensively to being touched lightly or unexpectedly
- Easily distracted by visual stimuli
- Overly active
- Strong outbursts of anger

Definition

A problem in regulating responses to sensory inputs resulting in withdrawal or strong negative responses to sensations that do not usually bother others. Problems are often seen in fluctuating emotions that are made worse by stress, and vary with the situation.

Sensory Discrimination Disorder

Common Signs

- Bumps or pushes others
- Grasps objects too tightly or uses too much force
- Frequently drops things or knocks things over
- Mouths, licks, chews, or sucks on non-food items
- Craves movement, e.g. likes to spin self around
- Afraid of heights/ swings or slides
- Has poor balance

Definition

A problem in recognizing/ interpreting differences or similarities in the qualities of stimuli. It is commonly seen with problems in processing sensations from touch, muscles and joints (proprioception) and head movements (vestibular or inner ear sensations).

Postural-Ocular Disorder

Common Signs

- Seems weaker than other children
- Fatigues easily
- Frequently moves in and out of seat
- Slumps while sitting
- Difficulty making eye contact/ tracking with the eyes, e.g. reading
- Falls and tumbles frequently
- May seek quantities of swinging or spinning

Definition

A problem with control of posture or quality of movements seen in low muscle tone or joint instability and/ or poor functional use of vision. It is often seen with vestibular and proprioceptive problems.

Dyspraxia

Common Signs

- Difficulty following multi-step directions
- Strong desire for sameness or routines
- Has an awkward pencil grasp
- Has poor handwriting
- Dislikes or reluctant to participate in sports
- Intense and easily frustrated
- Problems with daily life tasks like dressing or using utensils

Definition

A problem with planning, sequencing & executing unfamiliar actions resulting in awkward & poorly coordinated motor skills typically seen with a sensory processing deficit. It is usually seen with difficulty doing new activities or those that are done infrequently. (May-Benson, Teasdale, & Koomar, 2006)

SPD Facts

Developmental Information (May-Benson, Koomar, & Teasdale, 2006)

- **SPD** is typically identified in early childhood or adolescence but may be seen throughout the lifespan. They do not “outgrow” the problem. Difficulties persist into adulthood, although sometimes severity of symptoms may appear less as individuals learn coping strategies.
- Problems may be seen in natural or adoptive children living in birth, foster, or adoptive families.
- Children with **SPD** often demonstrate difficulties in developmental activities. A recent study indicates parents report that:
 - * 47% did not go through the “terrible two’s” or did so late
 - * 37% have a brief or absent crawling phase
 - * 33% have strong positioning preferences as infants
 - * 32% have sleep problems
 - * 31% have feeding problems
 - * 28% were hesitant/delayed going down stairs
- **SPD** impacts many areas of children’s emotional and physical functioning:
 - * Children’s sensory processing problems have a strong relationship to their behavior difficulties.
(Cohen, May-Benson, Teasdale, Callahan, 2006)
 - * Children’s motor coordination problems are highly related to decreased participation in leisure activities.
(Koomar & May-Benson, 1999)
- **SPD** is often associated with other diagnoses such as:
 - * Learning disabilities/ attention deficit disorder
 - * Pervasive developmental disorder/ autism spectrum
 - * Language disorders
 - * Anxiety disorder/ depression
 - * Behavioral disorders
 - * Attachment and post-institutionalization

Coping Inventory Information (May-Benson, 1999)

- Children with **SPD** have a harder time than **typical peers**:
 - * Handling anxiety
 - * Managing high stress situations
 - * Handling frustration
 - * Staying on tasks to completion
 - * Effectively using fine and gross motor skills
- The more significant the sensory processing, motor skill & planning difficulties, the more poorly the child copes with both environmental and individual challenges.
- When comparing children’s sensory processing problems with coping abilities, the sensory processing problems were most strongly related to the children’s difficulty with their ability to:
 - * Handle new situations
 - * Shift plans
 - * Apply learning to new situations
 - * Balance independence and dependence
 - * Use self-protecting behaviors effectively
 - * Have an appropriate activity level
 - * Control impulses

For More Information
www.thespiralfoundation.org
617-923-4410

References and Resources

Research Articles

Ahn, R., Miller, L., Milberger, S., & McIntosh, D. (2004). Prevalence of parents' perceptions of sensory processing disorders among kindergarten children. *Am J Occup Ther*, 58(3), 287-302.

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Miller, LJ (2006). *Sensational Kids*. New York: Putnam.

Websites

www.spdnetwork.org
www.alertprogram.com
www.quirkykids.com

Physician Fact Sheet

Sensory Processing Disorder

Signs and Symptoms



What is Sensory Processing Disorder?

Sensory Processing Disorder (SPD), first identified in the 1960's by Dr. A. Jean Ayres, is a developmental disorder in:

- processing and organizing sensory information
- assigning meaning to what is experienced
- acting or responding to situations in an adaptive, purposeful manner
- also known as Sensory Integrative Dysfunction (DSI) (Ayres, 1982)



Children with SPD may not enjoy common childhood experiences and may be at increased risk for injury.

Estimated Prevalence

- 73% are male
- 5-13% for children entering school. (Ahn, et al, 2004)
- 40-88% for children with autism (Talay-Ongan & Wood, 2000)

Associated Disorders

SPD is commonly associated with:

- Learning disabilities
- Pervasive developmental disorder/ autism spectrum
- Attention deficit disorder
- Language disorders
- Developmental coordination disorder
- Anxiety disorder/ depression
- Post-institutionalized children
- Post-traumatic stress disorder
- Some behavioral disorders

Functional Problems Associated with SPD

- Behavioral/ attentional/ affective organization, e.g. decreased social skills
- Delayed fine/gross/oral motor skill development
- Delayed daily life skills including participation in play
- Impaired self esteem
- Impairments in sleep/ eating/ elimination patterns

(Interdisciplinary Council on Developmental & Learning Disorders, 2005)

Features of Sensory Processing Disorder

Essential Features
SPD has distinct behavioral patterns characteristic of one or more **subtypes**:

- + Sensory modulation disorder
- + Sensory discrimination disorder
- + Postural-ocular disorders
- + Dyspraxia

Essential features are:

- Marked impairment in processing & integration of sensory inputs
- Impairment not due to general medical condition or overt damage to receptors, neural pathways or cortical areas
- Impairment interferes with functional skills, social-emotional health, & behavioral regulation.

- Usually identified in early childhood or adolescence
- Variable course as compensatory behaviors may be developed, however, underlying deficits persist.
- Empirical evidence of physiologic measures shows:

- * Atypical sympathetic nervous system activity in abnormal electrodermal (EDA) response to sensory stimulation. (McIntosh, Miller, Shyu, & Hagerman, (1999)
- * Lowered vagal tone and parasympathetic activity associated with stress, developmental/ cognitive delays, emotional/ behavioral over-reactivity. (Schaaf, Miller, Sewell, O'Keefe, 2003)

Associated Features

A study of 1000 children with *SPD* conservatively estimated prenatal and birth problems:

- 42% complications during labor or delivery
- 32% delivered by assisted delivery methods
- 25% mothers had infections or illnesses during pregnancy
- 13% were pre-term, ≤ 37 weeks
- 5% had cord wrap/ prolapse at birth

Estimated early childhood health problems:

- 62% chronic ear infections
- 40% allergies or asthma
- 27% experienced serious injuries or illnesses
- 25% jaundice at birth
- 20% colic as infants

Developmental Features

This study also estimated:

- 47% did not go through the "terrible two's" or did so late
- 37% reported by parents to have a brief / absent crawling phase
- 33% had strong positioning preferences as infants
- 32% had sleeping problems
- 31% had feeding problems
- 28% were hesitant/ delayed learning to go down stairs
- 24% reported by parents to be early walkers

(May-Benson, Koomar, & Teasdale, 2006)

For More Information
www.thespiralfoundation.org
617-923-4410

Subtypes of Sensory Processing Disorder (Interdisciplinary Council on Developmental & Learning Disorders , 2005)

| Sensory Modulation Disorder | Sensory Discrimination Disorder | Postural-Ocular Disorder | Dyspraxia |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Problems in regulating the intensity & nature of responses to sensory input. | Problems discerning & assigning meaning to qualities of specific sensory stimuli. | Problems with quality of control or stabilization of the body during movement or at rest. | Deficit in the ability to plan, sequence & execute novel or unfamiliar actions. |
| <p>Common Signs & Symptoms:</p> <ul style="list-style-type: none"> • Withdraw from light & unexpected touch such as stroking • Gagging, refusal to eat some textured foods leading to limited diet • Dislike of activities such as teeth brushing, hair washing, or hair/ nail cutting • Avoidance of messy or textured materials such as sand, grass or lotion • Strong preferences for clothing types, textures and fits • Oversensitivity to sounds or visual inputs | <p>Common Signs & Symptoms:</p> <ul style="list-style-type: none"> • Difficulty manipulating or finding objects in a pocket or when out of sight • Difficulty distinguishing between similar sounds • Problems finding pictures in a cluttered background • Difficulty with directions • Problems with using too much or too little force, e.g. holds a pencil too tight or pushes too hard • Demonstrates poor balance • Poor sense of speed of movements | <p>Common Signs & Symptoms:</p> <ul style="list-style-type: none"> • Poor postural control or strength, e.g. sitting tolerance • Poor righting or equilibrium • Avoids upper extremity weight bearing • Difficulty isolating head/eye movements or poor ocular control in tracking or visual shifting, e.g. when reading • Discomfort climbing/ fear of heights • Poor crossing midline or establishment of hand dominance • Fatigues quickly | <p>Common Signs & Symptoms:</p> <ul style="list-style-type: none"> • Poor daily life tasks like dressing or using utensils • Problems playing sports • Tends to be accident-prone and clumsy • Resists trying new activities • Poor play skills, often prefers younger peers • Poor handwriting or pencil use • Poor articulation • Poor body schema or awareness of body in space • Poor automatic adaptation when performing actions • Poor ball skills |
| <p>Diagnostic Features:</p> <ul style="list-style-type: none"> • Strong negative responses to sensory stimuli that is not usually aversive to others • Responses may be emotional or behavioral • May involve over-responsivity to all senses but most commonly tactile and auditory stimuli. • Problems exacerbated by stress, may fluctuate over time and may be situationally dependent. | <p>Diagnostic Features:</p> <ul style="list-style-type: none"> • Poor recognition & interpretation of essential characteristics of sensory stimuli • Poor detection of differences or similarities in qualities of stimuli, e.g. temporal / spatial qualities • May involve all senses but most commonly tactile, vestibular, or proprioceptive • Often co-occurs with dyspraxia & poor skill performance | <p>Diagnostic Features:</p> <ul style="list-style-type: none"> • Hypo- or hypertonic muscle tension/ tone or joint instability • Poor muscle co-contraction for resistance or movement against gravity or postural control • Difficulties in oculo-motor control or functional use of vision • Often co-occurs with vestibular, proprioceptive, and/ or visual-motor problems. | <p>Diagnostic Features:</p> <ul style="list-style-type: none"> • Awkward, poorly coordinated motor skills which must co-occur with a deficit of sensory processing • Often co-occurs with perceptual, visual-motor, or language problems • Poor ability to generalize learned skills to other similar motor tasks • Poor sequencing, timing, or rhythm of motor action |

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Websites:

www.thespiralfoundation.org
 www.kidfoundation.org
 www.spdnetwork.org

Books:

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ASK THE EXPERTS



Sensory Smart School Solutions

by Lindsey Biel, OTR/L

Q. My child has sensory issues that interfere with his learning and behavior at school. How can we better meet his sensory needs in this environment?

School can be heaven or just the opposite for a student with sensory issues. So much depends on how “sensory smart” the school is: are staff members willing and able to implement sensory diet activities throughout the day? Is the environment reasonably comfortable for a student with sensory issues? Most general education and many special education programs expect students to sit still, be quiet, and to look and listen carefully - and to tolerate what may be noxious sensory experiences. This can be a major problem for children with autism spectrum disorders.

If a student is anxious about being touched unexpectedly or uncomfortable with how the table, chair, or her clothing feel, she will be preoccupied and not available for learning. If he is overwhelmed by noise on the school bus, playground, or in the cafeteria, he may act out or tune out. If she has visual difficulties, letters may jiggle on the page and lights may hurt her eyes. One child may learn better if she is able to move constantly, while another child may be so intolerant of vestibular sensations that he focuses on avoiding movement rather than what is being taught. Many children with autism and Asperger’s need to turn off one or more “sensory channels” in order to focus. For example, a child may need to block off his visual sense in order to hear effectively. Such children learn best through a multisensory approach that taps into their most reliable senses.

To make certain that your child’s school environment is one in which he can learn, you’ll need to educate yourself and school staff about your child’s unique sensory challenges. Assuming your child receives sensory-based occupational therapy, the OT should work closely with you, your child, the classroom teacher(s) and any other involved school staff (gym teacher, lunchroom aides, bus driver, and so on) to identify your child’s sensory preferences and intolerances. Obviously, if he can communicate his sensory likes and dislikes, it will be much easier to come up with the right solutions. If he can’t, you’ll need to be patient and creative as you

take a trial and error approach. Quite often, a simple accommodation or behavioral strategy can be worked out informally with an understanding teacher. In other cases, a sensory solution may need to be added to your child’s IEP.

Some Sensory Smart School Solutions

A student may have difficulty with the seating arrangement itself. Sitting in badly designed or wrong-sized chairs or on the floor is especially difficult for kids with low muscle tone, poor strength and endurance, decreased body awareness, and those who physiologically *need* to move in order to stay alert and on task. Make sure that when sitting at a desk the child’s feet can be flat on the floor, that her hips are bent at a comfortable angle, and that her elbows can rest on the tabletop. If a child has difficulty filtering out extraneous noise and sights, you may need to change *where* he is sitting. Some kids can more easily pay attention if they sit close to the teacher. However, if a child is easily distracted by noise, he may end up turning around often to look at who’s making noise behind him. Also consider distractions from air vents, windows, and the door.

For a child who needs to move a bit, consider an inflated seat cushion like the Disc’O’ Sit, which lets him squirm in his chair or on the floor while remaining seated. A cushion or pillow from home might also do the trick. You can also try a weighted lap pad which gives reassuring sensory input as well as an external cue to stay in his chair. Some students do best on a different type of seat altogether, such as a beanbag chair or ball chair. Vibration can be extremely calming and organizing for some children. The child might be more attentive while sitting on a vibrating pillow, wearing a Vibrating Snake or using a Vibramat (a quiet vibrating mat that can be used beneath a chair, for sitting on the floor, under a mattress, etc.). Hand fidgets may improve the child’s concentration and reduce tension. Some good ones are Koosh balls, squishy balls, the Tangle puzzle, and fidget pens. If your child has weak hands, consider a hand-strengthening fidget like the Theraband Hand Exerciser. Deep pressure can make a huge impact on her ability to pay attention. Depending on the student’s preference, a weighted vest, shoulder wrap, fanny pack or other weighted item may be very calming. Another child might prefer the tightness of a pressure vest or snug lycra bicycle shorts and tee-shirts which can be worn beneath other clothing.

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Many kids self-calm and stay on task better when they suck or chew on something. Redirect oral needs away from things like clothing collars and cuffs to acceptable items such as a Chewlery necklace or bracelet, a Chewy Tube, or a chewable Pencil Topper, and provide chewy and crunchy snacks like low-sugar dried fruit, carrot sticks, and hard pretzels. Chewing gum can also be very calming and organizing, but you may have difficulty convincing the school to allow it. These items also help students with speech and eating-related issues by desensitizing and strengthening the jaws and inside and around the mouth.

Auditory issues play a big role at school. If your child has problems with auditory distractibility or processing spoken language, ask an audiologist, SLP, or OT about an FM unit. With this device, the teacher speaks into a transmitter and the receiver sits on the student's desk or is installed nearby, or the child wears headphones that pick up the signal. The FM unit brings the teacher's voice to the foreground so the student can't miss what she is saying. Also, ask the teacher to provide copies of notes instead of just talking, and request written instructions for exams and assignments.

Respect a child's auditory hypersensitivity by protecting her ears. When a child says certain sounds hurt her ears, they really do hurt! Have the child use noise-blocking headphones, earmuffs or earplugs. If she uses earplugs, make sure they are clean and fit safely. However, don't let a child wear earplugs all the time because her ears will habituate and they won't be effective. Save the earplugs for specific situations such as fire drills (which the child should be warned about in advance) and outdoor recess.

Many classroom underachievers have undiagnosed vision problems. A child with diminished visual acuity, impaired binocularity, or other visual issues who can't clearly see the teacher or the board, can't refocus from the front of the room to her notes, or read what's on a page will have understandable trouble paying attention. If you suspect the child has a visual acuity or processing problem, get a comprehensive vision evaluation from a developmental optometrist and ask your OT about modifying printed materials.

Because they are cheap and effective, most schools use fluorescent lights. Not only does this increase indoor glare, but many kids with visual and auditory hypersensitivity can actually see and hear the flicker. Look into replacing these fluorescents with incandescent or full spectrum lighting or use Cozy Shades, magnetic shades that attach to fluorescent fixtures to soften the light. You can also use a non-fluorescent lamp at eye level to help reduce glare.

Handwriting can be a big problem for lots of reasons. Some people can't tolerate the feel and noise of using a ballpoint pen on paper on a hard desktop. Use an old-fashioned desk blotter or

simply have her write on several layers of paper. Try a WriteKlip clipboard that moderates the drag of the pen or pencil. If the child has trouble stabilizing the paper with one hand while he writes with the other, he can use a no-skid clipboard or just masking tape that anchors the paper so it doesn't move while he's writing. Many children can write more easily if they write on a non-horizontal surface such as

a slantboard or easel. Look into various molded pencil grips such as The Pencil Grip, which many students find comfortable and helpful in improving their grasp. You can also try different writing instruments such as triangular pencils, the EVO pen, and the mildly vibrating Tran-Quille pen. Some children are more willing to write using the vibrating Squiggle Wiggle Writer, although it makes writing wiggly too! Consider the paper as well. There are so many kinds of writing paper used in schools, especially in the early grades. Does the paper have lines that make it obvious where the child is supposed to write? Some children need heavy, high-contrast guidelines. You can provide tactile cues by using paper such as Guide-Write brand that has raised lines a child can feel as well as see.

Resources for all products mentioned:

- www.sensorismarts.com
- www.integrationscatalog.com; 800-622-0638
- www.earplugstore.com; 918-478-5500
- www.southpawenterprises.com; 800-228-1698
- www.sensorycomfort.com; 888-436-2622

For more information on how to make a classroom more sensory smart, how to advocate for your child at school, strategies to improve learning and organization, and practical tips for handling everyday problems such as washing hair, brushing teeth, and picky eating, see *Raising a Sensory Smart Child: The Definitive Handbook for Helping Your Child With Sensory Integration Issues*, by Lindsey Biel, OTR/L and Nancy Peske.

Look for an excerpt from *Raising a Sensory Smart Child* in the next issue of the Digest! Lindsey will return as our Expert in the Sept-Oct issue, focusing on sensory strategies and accommodations that can be incorporated into a child's IEP.



Lindsey Biel is a pediatric occupational therapist. She works with children ages 0-3 through the New York State early intervention program and with older children in her private practice. She has worked with students in elementary, middle, and high schools through the New York City Department of Education. She can be reached at Lindsey@sensorismarts.com.

COOLEY DICKINSON HOSPITAL

▲ DARTMOUTH-HITCHCOCK ALLIANCE

10 Sensory Diet Ideas to Prepare for Classwork

- ◆ Hot Seat--see how long you can hold yourself out of chair with your hands (or do as many seated chair "push-ups" as you can.
- ◆ Lock fingers and turn palms toward ceiling--push up toward ceiling 10 times, then turn palms down and pull down on head 10 times. Repeat.
- ◆ Push hands together, or push down on knees or desktop as hard as you can for 10, 20, or 30 seconds. Then shake out hands.
- ◆ Do Donkey Kicks (hands planted on desktop and kick up feet) or animal walks followed by long, hard self-hug or squeezing self into a little ball.
- ◆ "Hold up" wall with hands or feet for 10, 20, or 30 seconds. Imagine it's very heavy. Don't let it fall down.
- ◆ Do a yoga pose and try to hold for 10-20 seconds.
- ◆ Stretch up to ceiling breathing in and holding 2-3 seconds. Then stretch down to toes breathing out and hold. Repeat 3-5 times.
- ◆ Partner pull-ups (sit facing each other on floor, hold hands or wrists and pull up together) 3 times.
- ◆ "Milkshake Game"--pretend you're shaking a big milkshake hard with both hands, then with one hand, then the other, then one leg, then the other, then pour it over your head and shake out the wiggles. Finish with long self-hug squeezing into a ball.
- ◆ Jump, giant step, high march, or stamp march during transitions. Finish with quieter and quieter or smaller and smaller steps.

If you have any questions, please contact the Cooley Dickinson Occupational Therapy Department at: 413-582-2754.

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413-665-7498

COOLEY DICKINSON HOSPITAL

▲ DARTMOUTH-HITCHCOCK ALLIANCE

10 Hidden Sensory Boosts to Use During Classwork

- ◆ Use Chalkboard!!! Uses more muscles and improves visual attention.
- ◆ Do work standing--fasten paper to wall or place on easel--uses more muscles and enhances visual attention.
- ◆ Do work while lying on stomach propped on elbows--more muscles work and enhances visual attention.
- ◆ Stretch inner-tube or Theraband between desk or chair legs to push against with feet or legs for more muscle work.
- ◆ Use Artist's erasers--can be squeezed and molded for a handwork-out while doing desk work.
- ◆ Crunchy and chewy snacks are centering and help focus eyes forward for improved attention.
- ◆ Sipping drinks through a straw is also centering and focuses eyes forward.
- ◆ Classroom songs with movement (like you probably do already) help get children "just right" for the next activity.
- ◆ Some children may need to change position or location as they work--they may be more focused in soft chair, beanbag chair, or big pillow--these all provide a little deep pressure and extra body support which may be focusing.
- ◆ Increase the muscle and joint work by using crayons or chalk instead of markers; using stiffer paper, putty, clay, or straws for cutting; using big erasers; or drawing on textured paper or carpet squares or pavement instead of paper or whiteboard.

(Note: It's a great idea to increase the work, but don't make it impossible--if a child's feet can't reach the floor when sitting at the desk, then s/he will constantly be hanging onto the desk or chair legs, rocking, or falling out of the chair. It's hard to concentrate when you're hanging on for dear life!)

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▲ DARTMOUTH-HITCHCOCK ALLIANCE

10 Classroom Chores to Add to a Sensory Diet

- ◆ Erase the Chalkboard--especially standing on a chair to get high spots.
- ◆ Wash chalkboard or tables using spray bottle and big sponge.
- ◆ Run errands--especially with something heavy to carry.
- ◆ Pass out books or other materials to entire class or portion of class.
- ◆ Move chairs and tables routinely to clear space for circle time, activity time, etc.
- ◆ Stack chairs or place on desks or tables at end of day and take them down in the morning. Make this a job for only 1-3 children each time, so they get a work-out.
- ◆ Open and hold heavy outside doors for class.
- ◆ Pick up classroom waste basket in both arms and carry from table to table to collect waste after art projects or snacks.
- ◆ Move materials in class room or help get things off high or low shelves--climbing on/off chair as needed.
- ◆ Help decorate or undecorated bulletin board or room--using chair as needed to reach.

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GLOSSARY OF SENSORY INTEGRATION TERMS

The following glossary of terms is included to help parents understand words or phrases commonly utilized in testing or treatment of sensory integrative disorders.

1. **ADAPTIVE RESPONSE:** An appropriate action in which the individual responds successfully to some environmental demand. Adaptive responses require good sensory integration, and they also further the sensory integrative process.
2. **BODY IMAGE:** A person's perception of his own body. It consists of sensory images or "maps" of the body stored in the brain. May also be called body scheme or body percept.
3. **BRAIN STEM:** The lowest and innermost portion of the brain. The brain stem contains centers that regulate internal organic functions, arousal of the nervous system as a whole, and elementary sensory-motor processing.
4. **COCONTRACTION:** The simultaneous contraction of all the muscles around a joint to stabilize it.
5. **DYSPRAXIA:** Poor praxis or motor planning. A less severe, but more common dysfunction than apraxia (the lack of praxis), it is often related to poor somatosensory processing.
6. **EXTENSION:** The action of straightening the neck, back, arms, or legs.
7. **FLEXION:** The act of bending or pulling in a part of the body.
8. **GRAVITATIONAL INSECURITY:** An unusual degree of anxiety or fear in response to movement or change in head position; related to poor processing of vestibular and proprioception information.
9. **HYPERSENSITIVITY TO MOVEMENT:** Excessive sensations of disorientation, loss of balance, nausea, or headache in response to linear and/or rotary movement. Response may be delayed up to several hours after receiving the input.
10. **KINESTHESIA:** Perception of the movement of individual body parts; dependent on proprioception.
11. **LATERALIZATION:** The tendency for certain processes to be handled more efficiently on one side of the brain than on the other. In most people, the right hemisphere becomes more efficient in processing spatial information, while the left hemisphere specializes in verbal and logical processes.
12. **LEARNING DISORDER:** A difficulty in learning to read, write, compute, or do school work that cannot be attributed to impaired sight or hearing, or to mental retardation.
13. **MODULATION:** The brain's regulation of its own activity. Modulation involves facilitating some neural messages to maximize a response, and inhibiting other messages to reduce irrelevant activity.
14. **NYSTAGMUS:** A series of automatic, back-and-forth eye movements. Different conditions produce this reflex. Rotary movement followed by an abrupt stop normally produces **POSTROTARY NYSTAGMUS**. The duration and regularity of postrotary nystagmus are some of the indicators of one aspect of vestibular system efficiency.
15. **OCCUPATIONAL THERAPY:** Occupational therapy is a health profession concerned with improving a

person's occupational performance. In a pediatric setting the occupational therapist deals with children whose occupations are usually players, preschoolers, or students. The occupational therapist evaluates a child's performance in relation to what is developmentally expected for that age group. If there is a discrepancy between developmental expectations and functional ability, the occupational therapist looks at a variety of perceptual and neuromuscular factors which influence function. Based on a knowledge of neurology, kinesiology, development, medical diagnoses, and current research, the occupational therapist can identify the children who have the best potential for remediation through occupational therapy.

16. **PERCEPTION:** The meaning the brain gives to sensory input. Sensations are objective; perception is subjective.

17. **PHYSICAL THERAPY:** Physical therapy is a health profession concerned with improving a person's physical ability. In a pediatric setting, the physical therapist evaluates a child's orthopedic structure and neuromuscular functions. A physical therapist can also receive special training identical to that received by an occupational therapist to assess and remediate the disorders in sensory processing that influence learning and behavior.

18. **PRAXIS: (Motor Planning)** The ability of the brain to conceive of, organize, and carry out a sequence of unfamiliar actions.

19. **PRONE:** The horizontal body position with the face and stomach downward.

20. **PROPRIOCEPTION:** From the Latin work for "one's own." Refers to perception of sensation from the muscles and joints. Proprioceptive input tells the brain when and how muscles are contracting or stretching, and when and how the joints are bending, extending or being pulled or compressed. This information enables the brain to know where each part of the body is and how it is moving.

21. **SENSORY INPUT:** The streams of neural impulses flowing from the sense receptors in the body to the spinal cord and brain.

22. **SENSORY INTEGRATION:** The organization of sensory input for use. The "use" may be a perception of the body or the world, or an adaptive response, or a learning process, or the development of some neural function. Through sensory integration, the many parts of the nervous system work together so that a person can interact with the environment effectively and experience appropriate satisfaction.

23. **SENSORY INTEGRATION AND PRAXIS TESTS (SIPT):** A series of tests, published in 1989, designed to assess the status of sensory integration and praxis (motor planning) in children ages 4 through 8 years old. The SIPT is a revised and updated version of the original SCSIT.

24. **SENSORY INTEGRATIVE DYSFUNCTION:** An irregularity or disorder in brain function that makes it difficult to integrate sensory input effectively. Sensory integrative dysfunction may be present in motor, learning, social/emotional, speech/language or attention disorders.

25. **SOMATOSENSORY:** Body sensations that are based on both tactile and proprioceptive information.

26. **SOUTHERN CALIFORNIA SENSORY INTEGRATION TESTS (SCSIT):** A series of tests, published in 1972, designed to assess the status of sensory integration or its dysfunction. These tests were later revised, updated and republished as the Sensory Integration and Praxis Tests (SIPT).

27. **SPECIALIZATION:** In general, the process by which one part of the brain becomes more efficient at particular functions. Most specialized functions are lateralized, that is, one side of the brain is more proficient in the function than the other side.

28. SUPINE: The horizontal body position with the face and stomach upward.

29. TACTILE: Pertaining to sense of touch on the skin.

30. TACTILE DEFENSIVENESS: A sensory integrative dysfunction in which tactile sensations create negative emotional reactions. It is associated with distractibility, restlessness, and behavior problems.

31. VESTIBULAR SYSTEM: The sensory system that responds to the position of the head in relation to gravity and accelerated or decelerated movement; it integrates neck, eye, and body adjustments to movement.

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Sensory Integration Specialists

Adapted Activities Library

**200 Trapelo Rd.
Waltham, MA 02452**

Phone: **(781) 894-3600 x2518**

www.adaptedsolutions.org/adaplibrary.htm

The Adapted Activities Library is a collection of commercially available products. Products have been researched and selected for their proven usefulness. Products are loaned on a trial basis so that they can be evaluated for use by an individual in their home, day program or work environment. T

The Adapted Activities Library is a program of the Massachusetts Department of Mental Retardation (D.M.R.), Metro Region, Occupational Therapy Department.

Our occupational therapist can assist in the following ways: Matching an individual's skills and interests to the right product; Researching, purchasing and determining safety, reliability and usefulness of new products.; Developing strategies for training an individual to use a product, such as a switch or a cooking aid.; Making recommendations for adapting the home or work environment so that an individual can effectively use a product.

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Phone: **(413) 584-7234** fax: **(413) 584-1896**

S.I. Certified Physical Therapist

Children's Therapy Associates

**17 Strathmore Rd.
Natick, MA 01760-2418**

Phone: **(508) 650-0457**

A group practice providing Speech-Language Pathology, Occupational Therapy, Physical Therapy and Neuropsychology services to children of all ages. Providing individual, group and co-treatment services (as well as consultation and evaluations) to children with a wide variety of learning and developmental difficulties.

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Sensory Integration Specialists

Laurie Cecchi

Children's Therapy Center of the Pioneer Valley

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Feeding Hills, MA 01030

Phone: **(413) 786-1114**

fax: **(413) 535-1170**

www.ctcpv.com

Educational services company specializing in occupational therapy, physical therapy, and speech & language therapy. In addition to school-based services, CTC's licensed professionals offer direct services at their clinic in Feeding Hills, MA.

- parent information sessions for parents of children with autism
 - handwriting workshops, utilizing the Handwriting Without Tears program
 - playgroups for 12-24 month old children and caregivers
 - basic skills for children ages 7-9
 - sensory integration therapy
 - play attention session
-

Cooley Dickinson Hospital

30 Locust St (RT 9)

Northampton, MA 01061-5001

Phone: **(413) 582-2000**

web: www.cooley-dickinson.org/services/rehab/pt.php

Carmen Montes

HEC - Special Education / Main Office

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Phone: **(413) 586-4900x118**

fax: **(413) 586-4900**

email: **OTC@collaborative.org**

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130 Southampton Road

Westfield, MA 01085

413-572-9900

James Levine & Associates, P.C. provides an integrated array of services. We function as a team, and offer consultation based on our in-depth knowledge of schools and the developmental needs of children. At the same time, therapy services may occur in school or at their offices. While they ensure confidentiality, their goal is to coordinate interventions so that schools and families work together to ensure the educational, social, and psychological well-being of children. They provide extensive professional development training for school personnel along with mental health and family support agencies.

The Early Childhood Autism Clinic is now offering multi-disciplinary play-based comprehensive evaluations for children who may be at risk for autism spectrum disorders.

Margaret Buzzell

Mercy Centre

25 West Chester Street

Worcester, MA 01605

Phone: **(508) 852-7165**

fax: **(508) 856-9755**

email: **Pbuzzell@ccworc.org**

web: www.mercycentre.com

Mercy Centre provides services for students and adults with moderate special needs, developmental disabilities, and mental retardation. Services include a 10 month educational program for ages 6-21, summer recreation program, and a full-year adult support program. Focus on developing independence, employment skills, total communication and functional skills.

WHILE THE NAMES OF EACH OF THE FOLLOWING PROFESSIONALS HAVE BEEN PROVIDED PURELY FOR PARENT INFORMATION, CRPA DOES NOT IN ANY WAY RECOMMEND OR ENDORSE THESE PROVIDERS. IT IS IMPORTANT TO CHECK THEIR REFERENCES, REVIEW THEIR CREDENTIALS, AND INTERVIEW THEM TO UNDERSTAND WHETHER THEIR SKILLS AND APPROACH ARE A GOOD FIT FOR YOUR CHILD.

Sensory Integration Specialists

Occupational Therapy Associates

124 Watertown St.

Watertown, MA 02172

Phone: **(617) 923-4410**

email: **info@otawatertown.com**

web: www.otawatertown.com

"OTA-Watertown provides occupational and physical therapy assessment and intervention for children, adolescents, and adults experiencing sensory integration dysfunction. We work with individuals with learning disabilities, attention deficit disorder, diagnoses on the autism spectrum, fine and gross motor coordination disorders, and other psychological and neurological conditions. "

Sensory Learning Center

85 Constitution Lane; Ste. 2A

Danvers, MA 01923

Phone: **(978) 762-4400**

fax: **(978) 762-4499**

web: www.SensoryLearning-Danvers.com

Drug-free approach to developing learning abilities for people of all ages and levels of functioning. Uses simultaneous, repetitive, sensory activation integrating visual, vestibular, and auditory training to promote perception, understanding and the ability to learn.

The following books and tapes are recommended as resources on Sensory Integration.

Information on Sensory Integration

Love, Jean

A. Jean Ayres

Making Sense of Sensory Integration (CD and Booklet)

Conversation with Jane Koomar, Ph.D., OTR/L, FAOTA

and Stacey Szklut, M.S., OTR/L, moderated by Sharon Cermak, Ed.D., OTR/L, FAOTA

Sense Abilities - Understanding Sensory Integration

Mary Ann Colby Trott, M.A. with Marci Laurel, M.A., CCC-SLP and Susan Windeck, M.S., OTR/L

Sensory Integration & The Child 25th Anniversary Edition

A. Jean Ayres, Ph.D.

Sensory Integration: Answers for Parents

Teachers Ask About Sensory Integration (Tape)

Carol Stock Kranowitz, M.A. and Stacey Szklut, M.S. OTR/L

The Goodenoughs Get in Sync

Carol Stock Kranowitz, M.A.

The Out-of-Sync Child

Carol Stock Kranowitz, M.A.

The Out-of-Sync Child Has Fun

Carol Stock Kranowitz, M.A.

Screening and Intervention Programs

Answers To Questions Teachers Ask About Sensory Integration

Carol Stock Kranowitz, M.A.

How Does Your Engine Run?

Sherry Shellenberger, OTR/L and Mary Sue Williams, OTR/L

Out of the Mouths of Babes

Sheila Frick, OTR; Ron Frick; Patricia Oetter, M.A., OTR/L, FAOTA; and

Eileen Richter, M.P.H., OTR, FAOTA

Sensory Defensiveness

Patricia Wilbarger, M.Ed., OTR, FAOTA and Julie Wilbarger, M.S., OTR

Resources available from OTA-Watertown (To order call 617-923-4410, ext 102)

Sensory Integration Treatment Equipment Manual

Marsha Raredon, OTR/L; Mandy Hurwitz, OTR/L; Jane Koomar, Ph.D., OTR/L, FAOTA; and Andrew Dwyer
\$15.00

Plan for Success: A Business Workbook for OTs in Private Practice

Jane Koomar, Ph.D., OTR/L, FAOTA with Linda Palmstrom, M.S., OTR/L; Stacey Szklut, M.S., OTR/L; Kathleen Carley, M.S., OTR/L; Marsha Raredon, OTR/L; Michael Dobbin, M.B.A.; Jean Roslettie; and Phyllis Campana, M.A., OTR
\$85.00

Making Sense of Sensory Integration (DVD)

The SPIRAL Foundation
\$19.95

Accommodation Checklists (computer program)

-This super-easy-to-use computer program generates individualized accommodation checklists for preschoolers, toddlers, the classroom, handwriting, children with autism, and adults.
\$29.95

These companies offer a wide range of therapeutic equipment.

| | | |
|----------------------------------------|----------------|----------------------------------------------------------------|
| Abilitations / Kinetic Kids | (800) 850-8602 | www.abilitations.com |
| Achievement Products | (800) 373-4699 | www.specialkidszone.com |
| Equipment Shop | (800) 525-7681 | equipmentshopinc@aol.com www.equipmentshop.com |
| Integrations | (800) 622-0638 | www.integrationscatalog.com |
| Jump-In | (734) 878-0166 | jumpin@htonline.com www.jump-in-products.com |
| Mealtimes | (434) 361-2285 | www.new-vis.com |
| Pocket Full of Therapy | | www.pfot.com |
| Professional Development Products | (651) 439-8865 | www.pdppro.com |
| Sensory Comfort | (888) 436-2622 | comfort@sensorycomfort.com |
| Sensory Resources (Bell Curve Records) | (888) 357-5867 | www.sensoryresources.com |
| Southpaw Enterprises, Inc. | (800) 228-1698 | www.southpawenterprises.com therapy@southpawenterprises.com |
| Spio Works | (360) 897-0001 | spioworks@earthlink.net |

| | | |
|-------------------------------|----------------------------------|--------------------------------------------------------------------------|
| Sprint Aquatic Rehabilitation | (800) 235-2156 | www.sprintaquatics.com |
| TalkTools | (888) 529-2879 | www.talktoolstm.com |
| Therapro | (800) 257-5376 (508) 875-2062 | www.theraproducts.com |
| Weighted Wearables | (715) 235-1611 | www.weightedwearables.com |



Occupational Therapy Games & Activity List 2008-2009

Compiled by South Shore Therapies and OTA-Watertown



Children learn through play and active exploration. Many toys and games can encourage learning and develop skills in planning and sequencing, eye-hand coordination, visual perception and fine motor control. These suggestions may be helpful in choosing appropriate toys for the holidays, birthdays and other special times. They include sensory based activities to provide organizing sensation and encourage the development of body awareness, as well as games to encourage the development of specific skills. Approximate ages or skill levels have been given to help guide your choices. Many items can be purchased at toy stores or through the catalogues listed. Ask your occupational therapist for help in deciding which games or toys are the best choices for your child.

Games to Develop Coordination, Problem Solving and Visual Perception:

Younger Ages (3-6 years)

3D Labyrinth
Animal Soup Game (Learning Express)
Ants in the Pants
Bouncin' Bunnies (Highlights)
Buckaroo
Cadoo & Balloon Lagoon
Charades for Kids
Colorforms Dress-up Game (Therapro)
Cootie
Cranium Hullabaloo
Don't Break the Ice
Don't Spill the Beans
Elefun
Finders Keepers (Mindware)
Fishin' Around
Gobbler (Learning Express)
Gnip Gnop (Highlights, Back to Basics, Young Explorers)
Hidden Picture Game (Highlights)
Honey Bee Tree (Back to Basics, Highlights, Leaps & Bounds)
Hungry Hungry Hippos
I Spy Bingo (Learning Express)
I Spy Memory Game (Learning Express, Young Explorers)
Lucky Ducks
Matching Mania (Discovery Toys)
Memory Game
Monkeying Around (Young Explorers)
Mr. Mouth
Penguin Pile-up (Hearthsong)
Poppa's Pizza Pile-up (Learning Express, Leaps & Bounds)
Poppin Puzzlers (Learning Express)
Pop up Pirates (Learning Express)
Race to the Roof (Young Explorers)
Silly Faces(Therapro)
Very Hungry Caterpillar Game (Young Explorers)
Whack a Mole
Zimbbos (Learning Express)

Older Kids (7 and up)

Aftershock! (Learning Express)
Amazing Labyrinth Game (Sensational Kids, Discovery Toys)
Batik (Mindware)
Battling Tops
Battleship
Blink (Learning Express)
Blokus (Mindware, Highlights)
Bulls Eye Ball
Clue
Connect Four
Cover Your Tracks (Thinkfun Games)
Cranium Cadoo
Guess Who/ Guess Where
Jenga
Kerplunk/ Tumble
Launch Across
Mancala
Mastermind
Monster Under My Bed (Young Explorers, Learning Express)
Mousetrap
Operation/ Dino Xcavator (Sensational Beginnings)
Perfection
Pipeline (Learning Express, Mindware)
Raging Rapids
River Crossing
Rebound
Rummikub
Rush Hour (Learning Express, Mindware)
Scavenger Hunt for Kids (Young Explorers)
Screwball Scramble (Young Explorers)
Simon Trickster
Squeezed Out (Back to Basics) / Hens & Chicks (Hearthsong)
Thin Ice
Twister
What's in Ned's Head? (Young Explorers)
Zitternix Game (Hearthsong)

For Sensory Motor Development and Coordination:

Provides Organizing Sensory Input

Body Sox (Integrations)
Bop Bag (Back to Basics)
Chilly Hammock Swing
Cloud Nine Crash Pad (Southpaw)
First Jumper (Back to Basics)
Foof Chair Large Beanbag (Integrations)
Folding Trampoline (Hearthsong)
Giga Ball (Sears, Hearthsong)
Horse Tire Swing (Highlights, Back to Basics)
Inside Out Balls (Therapro, Hearthsong)
Jigglers (Therapro, Integrations)
Jumpolene (Back to Basics)
Kick Bag (Sears, Back to Basics)
Marvel the Mustang Riding Horse (Back to Basics)
My First Trampoline (Sears)
Chewies: P's & Q's, Super Teether
Play Tents (Back to Basics, Hearthsong, Integrations)
Rock & Bounce Pony (Back to Basics)
Rocking Horse (Back to Basics, Young Explorers)
Rocking Rody Rider (Therapro, Integrations)
Row Cart (Back to Basics)
Sand Digger (Constructive Playthings)
Scooter Boards
Snail Rocker (Back to Basics)
Sock en' Boppers Set (Sears)
Spring Horse (Back to Basics)
Weighted Wearables, Blankets (Grampa'sGarden,Therapro)
Whistles (I Party, Therapro)

More Skilled Coordination Needed

Air Kicks Boots
Air Pogo (Young Explorers)
Balance Board (Back to Basics)
Balance Stilts (Hearthsong)
Bungee Jumper (Learning Express, Young Explorers)
Color Explosion (Crayola)
Dance Maker 2 Dance Machine (Sears, Young Explorers)
Disc Swing (Young Explorers)
Flying Turtle (Back to Basics, Hearthsong, Hlghlights)
Fun Ride (Back to Basics, Highlights, Young Explorers)
Hop 66/ Hop Ball (Hearthsong, Young Explorers)
Jump Ropes
Junior Champ Boxing Set (Constructive Playthings)
Kick-a-Roos (Highlights)
Krazy Car/ Whirley Wheel (Back to Basics, Integrations)
Moon Shoes (Highlights, Sears)
Moon Walkers (Young Explorers)
Pedal-Power/ Fun Wheels (Back to Basics, Hearthsong)
Plasma Car (Young Explorers)
Pogo Ball
Pogo Stick (Highlights)
Razer Scooters
Romper Stompers (Learning Express)
Rope Ladder (Hearthsong)
Sit & Spin
Skip Around (Hearthsong)
Sleds & Snow Tubes
Wobbler (Highlights, Hearthsong)

Activities that Develop Eye-Hand Coordination and Visual-Spatial Planning:

Visual Control/ Eye-Hand Coordination:

Air Puck Hockey
Alfredo's Food Fight (Learning Express)
Balanko Game (Highlights)
Beamo Flying Disc (Learning Express)
Bean Bag Games
Bucket Blast Game (Hearthsong)
Dodge Discs (Learning Express)
Flip Flop Faces (Discovery Toys)
Hammer Away (Discovery Toys)
Hopscotch Mat (Highlights)
Hyper Dash (Learning Express)
Infinity Loop (Integrations)
Junior Swing Ball (Young Explorers)
Kids Croquet (Toys to Grow on)
Monster Velcro Mitts (Toy Box)
Nerf Basketball Hoop
Paddle Pool (Learning Express, Highlights)
Rack 'n' Roll Bowl (Highlights)
Remote Control Car
Safety Dart Board (Learning Express, Hearthsong)
Target Tail Ball (Hearthsong, Highlights)
Toss Across
Whistling Whirler (Discovery Toys)
Zoom Ball

Constructional Building Activities:

Aerobloks (Highlights, Integrations)
Block Buddies (Mindware)
Bright Builders (Discovery Toys)
Cast & Paint: Krazy Cars with Blo Pens (Toys R Us)
Colorforms (Sensational Kids, Back to Basics)
Delta Sand (Hearthsong)
Design & Drill Activity (Leaps & Bounds)
E-Z Build & Play (Constructive Playthings)
Floam or Play Foam
Gearations (Leap & Bounds)
Giant Constructive Blocks (Constructive Playthings)
Legos/Duplos
Lincoln Logs (Back to Basics)
Magz Construction Set (Back to Basics, Hearthsong)
Magnetic Mosaics (Highlights, Toys to Grow On)
Marbleworks (Discovery Toys)
Maze-n-Race (Realfun)
Mix & Match Motors (Discovery Toys)
Models for Beginners (Toys to Grow on)
Oogly Googly Motorized Building Set (Young Explorers)
Peg-a-Plane (Lauri)
Playmobil
Quatro Bucket (Lego)
Super Shapes (Constructive Playthings)
Zoob (Mindware)

To Support Fine Motor Development and Writing:

Pre-Writing Skills (Ages 3-5)

Art Kits (crayons, paints, etc.)/ Easels
Brush on Washable Painters (Toys to Grow On)
Colorforms (Hearthsong, Back to Basics)
Creative Clay (Back to Basics, Hearthsong)
Cranium Cariboo
Crayola Trace & Draw (Sears)
Dressing Dolls/ Woodkins
Dot Art (Learning Express)
Magnetic Art (Leaps & Bounds, Learning Express)
Pattern Block Set (Young Explorer)
Playdoh/ Silly Putty/Theraputty (Therapro)
Playful Patterns (Discovery Toys)
Ready to Print Practice Books (Toys to Grow on)
Roll on Painters (Toys to Grow on)
Sand Art
Scratch Magic (Young Explorer)
Squiggle Writer Pen (Therapro)
Stencil Kit (Hearthsong)
Tickle Bee Game (Hearthsong, Back to Basics)
Water Filled Drawing Mats
Wiggle Writer (Toys to Grow on, Therapro)
Zingo
Zoo Sticks (Hearthsong)

Drawing & Writing Skills (Ages 6 and older)

Activity Book (Hearthsong)
Arts & Crafts Projects (Hearthsong, Toys to Grow On)
Color-in Tattoos
Etch-a-Sketch
EZ Art Projector (Constructive Playthings)
Legos
Magna Doodle
Mazes
Peel & Stick Collage Boards (Constructive Playthings)
Pictionary Junior/ Pictionary
Pop Bead People (Klutz)
Puzzlemania (Highlights)
Roller Typing (Discovery Toys)
Shrinky Dinks
Spirograph
Suncatcher Kit (Highlights)
Stain Glass Coloring Book (Mindware)
Trace & Draw Projector (Toys to Grow on)
Wikki Stix Activity Set (Learning Express)
Window Art (Young Explorers)
Window Decorating Paints (Hearthsong)
Zip-Track (Discovery Toys)

Below is a list of the catalogue resources sited on this list. Other Resources for choosing toys and therapeutic activities can be found in the Parent Resource Box at South Shore Therapies. There you can find a more complete listing of companies providing therapeutic activities to support intervention.

| | | |
|---------------------------------------|----------------|----------------------------------------------------------------------------------|
| Back to Basics | (800) 356-5360 | www.basic toys.com |
| Constructive Playthings | (800) 832-0572 | www.constplay.com |
| Discovery Toys | (877) 875-9471 | www.discoverytoysinc.com |
| • Through a Discovery Toys Consultant | | |
| • Contact Kim O'Brien | (781) 740-1937 | kim@sensational-toys.net |
| Hearth Song | (800) 325-2502 | www.hearthsong.com |
| Highlights | (800) 422-6202 | www.highlights.com |
| Integrations | (800) 850-8602 | www.integrationscatalog.com |
| Leaps and Bounds | (800) 477-2189 | www.onestepahead.com |
| Learning Express (Store in Hanover) | (781) 829-8555 | www.learningexpress.com |
| Mindware | (800) 999-0398 | www.mindwareonline.com |
| Sears | (800) 488-3211 | www.sears.com/toys |
| Sensational Beginnings | (800) 444-2147 | www.sensationalbeginnings.com |
| Southpaw | (800) 228-1698 | www.southpawenterprises.com |
| Therapro | (800) 257-5376 | www.theraproducts.com |
| Toy Box | (781) 871-3650 | www.thetoyboxhanover.com |
| Toys R Us | (617) 445-5159 | www.toysrus.com |
| Toys To Grow On | (800) 987-4454 | www.ttgo.com |
| Young Explorers | (800) 239-7577 | www.YoungExplorers.com |