

Introduction to Sensory Integration

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What is Sensory Integration?

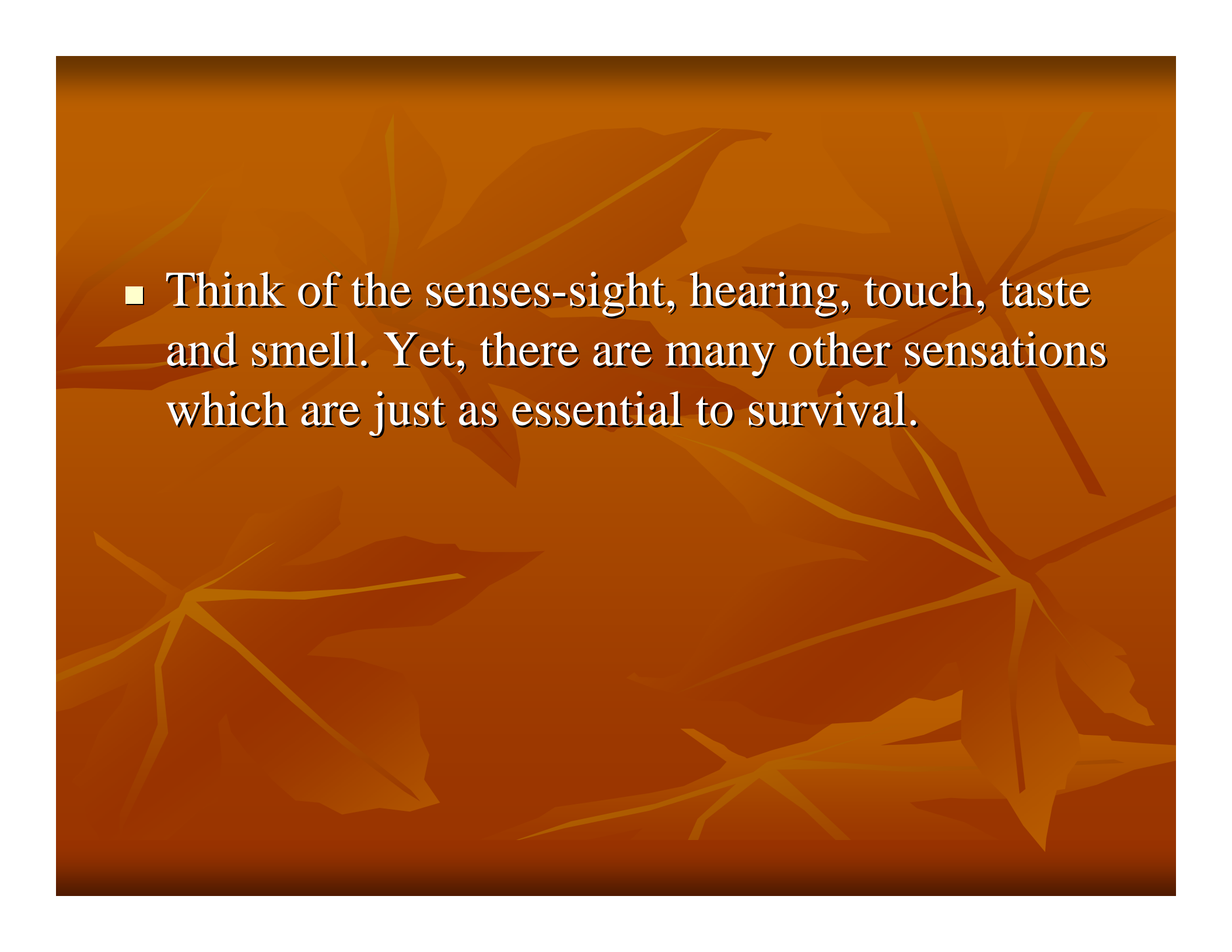
- Sensory experiences include touch, movement, body awareness, sight, sound and the pull of gravity. The process of the brain organizing and interpreting this information is called sensory integration. Sensory integration provides a crucial foundation for later, more complex learning and behavior.

- For most children, sensory integration develops in the course of ordinary childhood activities. Motor planning ability is a natural outcome of the process, as the ability to adapt to incoming sensations. But for some children, sensory integration does not develop as efficiently as it should. When the process is disordered, a number of problems with learning, development or behavior may become evident.

- The concept of sensory integration comes from a body of work developed by A. Jean Ayres, PhD, OTR. As an occupational therapist, Dr. Ayres was interested in the way in which sensory integration and motor planning disorders interfere with daily life function and learning. This theory has been developed and refined by the research of Dr. Ayres as well as other occupational and physical therapists. In addition, literature from the fields of europsychology, neurology, child development, and psychology has contributed to theory development and intervention strategies.

The Senses

- Everyday we receive a great deal of information from our senses. We use this information to organize our behavior and successfully interact in the world. Our senses give us information about the physical status of our body and the environment around us.

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- The background of the slide is a solid dark brown color with a pattern of lighter brown, semi-transparent autumn leaves scattered across it. The leaves vary in size and orientation, creating a textured, naturalistic feel.
- Think of the senses-sight, hearing, touch, taste and smell. Yet, there are many other sensations which are just as essential to survival.

Vestibular

- Vestibular information tells a person where his or her head and body are in relation to the surface of the earth. This system takes in sensory messages about movement and balance and then sends these messages to the central nervous system for processing; and then helps generate muscle tone that generates normalized muscle tone, which allows a person to move smoothly and efficiently.

Proprioception

- The proprioceptive system is responsible for telling the brain about the position of one's body. This is also referred to as kinesthesia. Receptors from the muscles and joints take the information to the central nervous system which gives a person a concept of body awareness and the ability to grade force and pressure during functional activities.

Tactile

- Tactile information is processed through receptors in the skin and the mouth. The tactile sense tells one's body about texture, temperature, size and shape of items in the environment. There are two components to the tactile system, protective and discriminative. The protective system is important for safety (not washing hands in scalding hot water) and the discriminative system is important for awareness (holding a pencil or loose coins in one's hand).

Auditory

- Auditory processing involves the central nervous system's ability to take in, register, discriminate, and process sound from the environment. A well functioning auditory system is able to distinguish between foreground and background input, and is able to be alert for important auditory input throughout the environment. A child with poor auditory processing is unable to “block out” unimportant noises.

Visual

- The vision system is responsible for taking in information through the eyes and producing an image. The vision system is often the strongest and most reliable sensory system for children with sensory processing dysfunction.

Suck-Swallow-Breathe

- The suck-swallow-breathe synchrony (SSB), serves as the earliest primary motor mechanism, and is the rhythmical, coordinated pattern of sucking, swallowing and breathing. Being the first motoric pattern that requires timing and sequenced movements, the development of an intact SSB is an important precursor for further sensorimotor and cognitive development including speech and language development, state regulation, postural control, feeding, eye/hand coordination and social/emotional tone.

Core

- The “core” is the sense of verticality in space as needed for orientation. Deep core musculature is needed for antigravity control, is regulated by breath, and provides stability, postural control, midline awareness and bilaterality. It is the muscle action needed for perception and motor planning.

- What happens if one or more of our senses are not being interpreted properly? A child with vague or hazy feedback about his sensory of touch, body position, or movement and gravity is in a world totally foreign to our. Imagine yourself in a world where something as basic and reliable as the pull of gravity or other children's touch upon you is perceived as unreliable, inconsistent or threatening. The child would not feel the usual security, safety and fun that other children experience. When the process of sensory integration is disordered, a number of problems in learning, motor development or behavior may be observed.

The background of the slide is a solid dark brown color with a pattern of lighter brown, stylized autumn leaves scattered across it. The leaves have various shapes and sizes, some with prominent veins.

- Overly sensitive to touch, movements, sights or sounds

- Behavior issues: distractible, withdrawal when touched, avoidance of textures, certain clothes, foods
- Fearful reaction to ordinary movements/ activities such as playground play
- Sensitive to loud noises
- May act out aggressively with unexpected sensory input


- Under reactive to sensory stimulation

- Seeks out intense sensory experiences such as body whirling, falling and crashing into objects
- May appear oblivious to pain or to body posture
- May fluctuate between over and under responsive

The background of the slide is a solid dark brown color with a pattern of lighter brown, stylized autumn leaves scattered across it. The leaves have prominent veins and are in various orientations, creating a textured, seasonal feel.

- Unusually high or low activity level

- Constantly on the move
- May be slow to get going and fatigues easily

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- The background of the slide features a pattern of stylized autumn leaves in various shades of brown and orange, set against a darker brown gradient background.
- Coordination problems
 - May have poor balance
 - May have great difficulty learning and performing new task that requires motor coordination
 - Appears awkward, stiff, clumsy

- Delays in academic achievement of activities of daily living

- May have problems in academic areas despite normal or above average intelligence
- Problems with handwriting, scissor use, tying shoes, buttoning and zippering clothes

- Poor organization of behavior

- May be impulsive, distractible, lack of planning in approach to tasks, does not anticipate result of actions
- May have difficulty adjusting to a new situation or following directions
- May get frustrated, aggressive or withdraw when they encounter failure

The background of the slide is a solid dark brown color with a pattern of lighter brown, stylized autumn leaves scattered across it. The leaves have prominent veins and are in various orientations, some overlapping. The overall aesthetic is warm and seasonal.

- Poor self-concept

- May appear lazy, bored or unmotivated
- May avoid tasks and appear stubborn or troublesome

Some Signs of SI Dysfunction

- *Typically, a child with sensory integration dysfunction will show more than one of these signs:*
 - Overly sensitive to touch, movement, sights, sounds
 - Easily distracted
 - Activity level that is unusually high or unusually low
 - Impulsive, lacking in self-control
 - Inability to unwind or calm self
 - Poor self-concept
 - Under-reactive to touch, movement, sights or sounds
 - Social and/or emotional problems
 - Physical clumsiness or apparent carelessness
 - Difficulty making transitions from one situation to another
 - Delays in speech, language or motor skills
 - Delays in academic achievement

Sensory Modulation Disorder

- Defensive kids
- Tend to be very over-responsive to sensory input
- Biggest issue is that they can't recover

Sensory Discrimination Disorder

- Vestibular/Proprioceptive/Ocular
 - Bilateral integration
 - Timing/sequencing
 - Personal space
 - Safety awareness/overly cautious
 - Gravitational insecurity
 - Ocular motor control
 - Posture
 - Lateralization

Sensory Discrimination Disorder

- Somatosensory (Tactile and Proprioception)
 - Body scheme/awareness
 - Rate of production/speed
 - Supine flexion
 - In-hand manipulation
 - Finger sequencing
 - Muscle memory
 - Praxis (oral, postural, motor, articulation)
 - Spatial/temporal perception
 - Mental manipulation/rotation of objects
 - Frustration tolerance/anxiety

What Can Be Done?

- If a child is suspected of having sensory integration dysfunction, a qualified occupational or physical therapist can conduct an evaluation. Evaluation usually consists of both standardized testing and structured observation of responses to sensory stimulation, posture, balance, coordination and eye movements. After carefully analyzing test results and other assessment data along with information from other professionals and parents, the therapist will make recommendations regarding appropriate therapy.

- If therapy is recommended, the child will be guided through activities that challenge his or her ability to respond to sensory input by making a successful, organized response.
- Training of specific skills is not usually the focus of this kind of therapy. One important aspect of therapy that uses a sensory integrative approach is that the motivation of the child plays a crucial role in the selection of the activities. Most children tend to seek out activities that provide sensory experiences most beneficial to them at that point in development. It is this active involvement and exploration that enables the child to become more mature, efficient organizer of sensory information.

- The most important step in promoting sensory integration in children is to recognize that it exists and that it plays an important role in the development of a child. By learning more about sensory integration, parents, educators and caregivers can provide an enriched environment that will foster healthy growth and maturation.

Self Regulation

- A major focus of therapy is to teach the child with SID to understand his or her sensory processing abilities and independently select activities that help them achieve that “just right” level of alertness. This can be done in many ways and is individualized to the child. Some children use pictures to help them identify items, others can use icons, words or even verbal prompts from therapist, teacher and parents.
- It is critical that the child learns to select activities that are appropriate to his or her current level of alertness, meet the frequency, intensity and duration needed for effective modulation, and are socially appropriate.

Sensory Diet

- A sensory diet is a comprehensive and individualized list of activities that the child should participate in throughout the day in order to achieve and maintain an optimal level of arousal. After assessing a child's sensory processing and his or her ability to register, modulate and integrate specific sensory inputs, the therapist will develop a list of activities to be used throughout the day.

- The key to a sensory diet is that the child needs continual participation in these activities. It is the job of the therapist to assess, develop and monitor the activities, but any teacher or parent who has been trained by the occupational therapist can provide these therapeutic opportunities for the child.

- Regular monitoring is performed by the occupational therapist and the parents and teachers must provide ongoing feedback as to the efficacy of the sensory diet. Sensory diets are dynamic and should be changed regularly as the child's ability to process and modulate this input improves.

Equipment?

- A well-designed sensory diet should include activities that do not require any special therapy equipment as well as activities that can be performed in a variety of settings. Therapy equipment, while very necessary for the treatment process, is quite expensive and oftentimes many items found in the home/classroom can be used just as effectively.

- As a parent or teacher, you may need to allow yourself to consider non-conventional uses for some of the things in your home/classroom.
- In some rare circumstances, a therapist may recommend that you purchase a specific piece of equipment if your child requires a specific intensity level.

Recommended Readings

- **A Parents Guide to Understanding Sensory Integration (1991)*. Torrance, CA: Sensory Integration International.
- **The Out of Sync Child (1998)*. Carol Stock Kranowitz, M.A. New York, NY: Skylight Press.
- **The Out of Sync Child Has Fun (2003)*. Carol Stock Kranowitz, MA. New York, NY: Penguin Putnam, Inc.
- **Raising a Sensory-Smart Child (2005)*. Lindsay Biel. New York, NY: Penguin Books.
- **Too Loud, Too Bright, Too Fast, Too Tight (2003)*. Sharon Heller. New York, NY: Harper Collins Books.