

# Sensory Processing Disorder: Strategies to Support Children and Families

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## Introduction

It is challenging to parent a child with Sensory Processing Disorder (SPD). Early signs of SPD are often over-looked or misinterpreted by professionals which can be frustrating for parents seeking answers for puzzling behaviors. Many children are able to cope with SPD until the demands of school over-stress their nervous systems. Infants and children who have experienced trauma also exhibit symptoms similar to children with Sensory Processing Disorder. This poster presentation will help participants understand the differences between “willfulness” and “neurological wiring”. They will discover red flags that indicate Sensory Processing Disorder and effective strategies to address the needs of infants, children, and their parents.

## Sensory Processing

**Sensory Processing** is the way that our bodies receive input from our senses and create a reliable picture of the world, our place in it, and how we interact with the world. It takes place in every one of us, automatically and smoothly, allowing us to interact easily with others and the world around us.



For example, the underlying sensory input that allows this child to paint includes seeing the colors, smelling the paint, feeling the brush, and experiencing the movement of his arm. This sensory input is coordinated “non-consciously” by many parts of the brain and allows the child to focus on his creativity and interactions with his peers.

Which **Brain Structures** are involved in sensory processing? Many parts of the brain are involved in sensory processing but we will focus on a few key areas.

The **brainstem** is the oldest, lowest part of the brain. It is the gateway for sensory input coming into the brain from the body and the environment. The brainstem automatically controls breathing, heart rate, digestion and is the anchor for the cranial nerves that control the muscles of the eyes, mouth, face and upper chest. Some scientists refer to the brainstem as the “reptilian” brain and the BrainWise program calls it the “lizard” brain, the part of the brain that reacts automatically without conscious thought to override its impulsive actions.

The **Limbic System**, located in the center area of the brain, consists of a number of inter-connected structures that regulate emotions, memory, and behavior. We will focus on the **amygdala**, **hippocampus**, and **hypothalamus**. The **amygdala** constantly monitors the body and environment for danger and is an integral part of the “Fight, Flight, or Fright” reaction. In utero, the development of the amygdala is impacted by hormones and tends to be larger in males. Its development is also negatively impacted by maternal stress and trauma which can lead to hyper-vigilance by the baby after they are born.

## Sensory Processing continued

The **hippocampus** is important in memory, especially memory associated with emotions. The hippocampus is also impacted by estrogen and is more active in females. This can lead to challenges with memory during and following pregnancy and menopause when estrogen levels fluctuate or decrease.

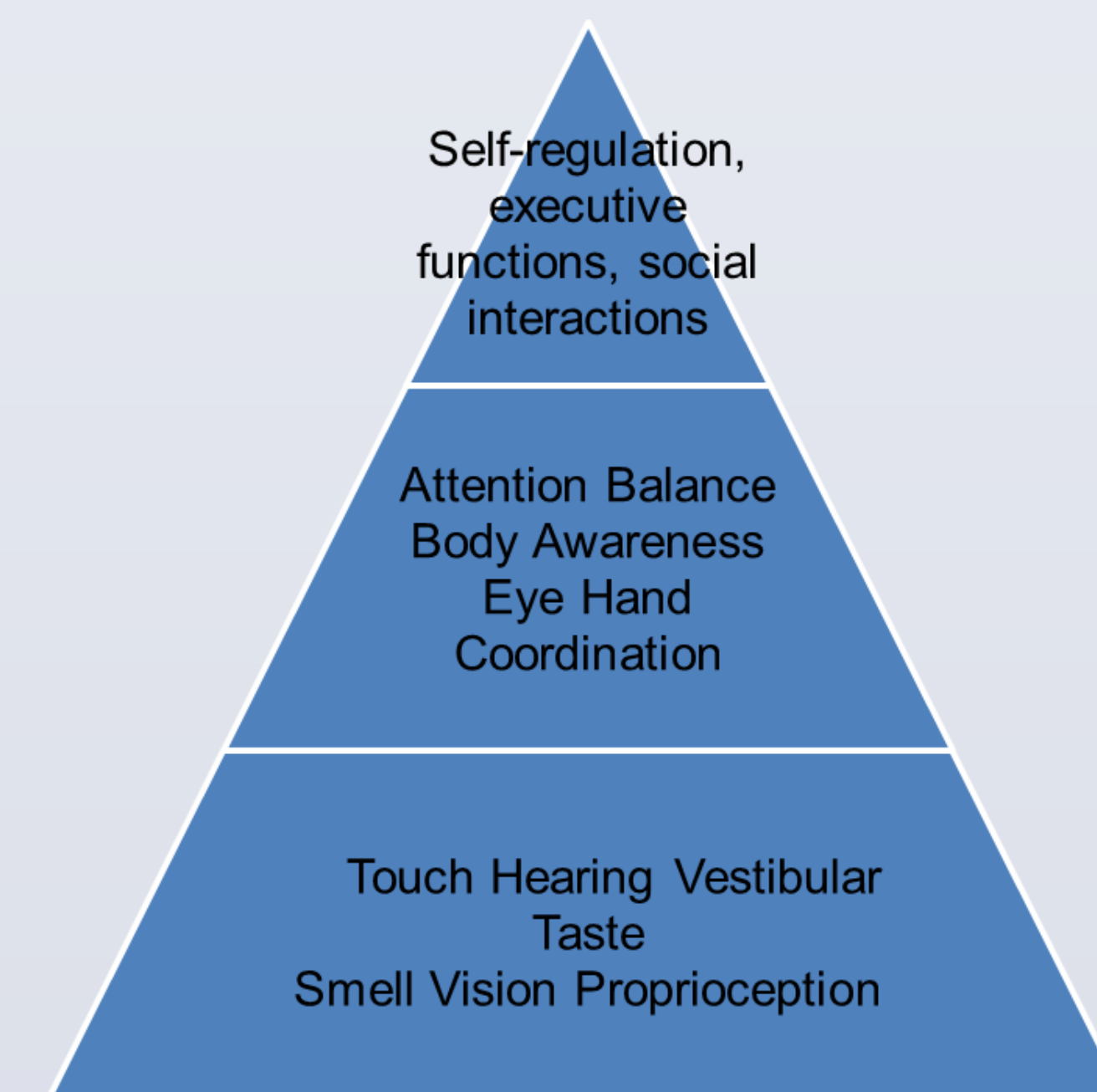
The **hypothalamus** is the link between the nervous system and the endocrine system. The hypothalamus is responsible for certain metabolic processes and other activities of the autonomic nervous system. The hypothalamus controls body temperature, hunger, important aspects of parenting and attachment behaviors, thirst, fatigue, sleep, and circadian rhythms.

The **cerebral cortex** is the top, outermost layer of the brain and is divided into two halves, the right and left hemispheres. The cerebral cortex plays a key role in executive functions such as memory, attention, perceptual awareness, thought, language, and consciousness. This is referred to as the “Wizard Brain” as the cerebral cortex allows children to make conscious decisions about their behavior, depending on where they are along the development continuum.

The **Autonomic Nervous System** is a control system that acts largely unconsciously and regulates the heart rate, digestion, respiratory rate, pupillary response, urination, and sexual arousal. This system is the primary mechanism in control of the fight-or-flight response and its role is mediated by two different components, the **sympathetic** and the **parasympathetic** nervous systems.

## Developmental Perspective

If we think about development from a sensory motor perspective, it gives us insight into how Sensory Processing Disorder (SPD) can impact a child’s behavior and interactions with others.



The seven senses provide information to a child’s brain about what is going on inside and outside of his or her body. The sense of smell goes directly to the limbic system as it plays a key role in attachment and bonding as well as safety awareness. The other senses travel through the brainstem where they are organized for use by the brain. The brain relies heavily on visual sensory input but all sensory input is critical for developing accurate body awareness and coordination.

The sense of touch is one of the first to develop in utero. The tactile receptors are in the skin with the highest concentration in the face, hands, genitals, and feet (which is why every child hates having their nose wiped!) Touch is protective, such as pulling away from a light tickle, as well as discriminatory such as picking up a Cheerio from the table. Enjoying touch is a critical component of bonding with caregivers and peers.

Vestibular refers to the sense of movement. The receptors are in the inner ear and allow a child to recognize movement in all different directions as well as respond to gravity. Proprioception refers to sensory input from joints and muscles that promote the development of balance and body awareness.

All of the sensory inputs integrate to develop foundational skills such as attention, balance, body awareness, and eye hand coordination. Attention requires the ability to alert to a stimulus, maintain and shift focus as needed. Good balance requires the intricate coordination of visual, vestibular, and proprioceptive sensory inputs. Body awareness is the non-conscious awareness of where one’s body is in space. This includes awareness of the front and back, top and bottom, and both sides of the body. The development of good eye hand coordination is dependent on coordinated vision and proprioception.

All of these skills provide the basis for the development of self-regulation and executive skills such as planning and organizing, attention to detail, inhibit impulsive actions.

## Sensory Processing Disorder

A Sensory Processing Disorder (SPD) occurs when sensory signals are not organized into effective responses and a person’s daily routine and activities are disrupted. Pioneering occupational therapist and neuroscientist A. Jean Ayres, PhD, likened SPD to a neurological “traffic jam” that prevents certain parts of the brain from receiving the information needed to interpret sensory information correctly. A person with SPD finds it difficult to perform everyday tasks and may have challenges with motor clumsiness, behavioral problems, anxiety, depression, and school failure if the disorder is not treated effectively.

Symptoms of Sensory Processing Disorder, like those of most disorders, occur within a broad spectrum of severity. While most of us have occasional difficulties processing sensory information, for children and adults with SPD, these difficulties are chronic, and they disrupt everyday life. Some studies suggest that as many as 1 in 20 children struggle with SPD. Children who have experienced extreme stress or trauma often show signs of SPD

Sensory Processing Disorder can affect people in only one sense—for example, just touch or just movement—or in multiple senses. One person with SPD may over-respond to sensation and find clothing, physical contact, sound, light, or other sensory input to be unbearable. Another person might under-respond and show little or no reaction to stimulation, even pain or extreme hot and cold. Some children crave sensory input that is non-stop. These kids often are misdiagnosed - and inappropriately medicated - for ADHD. Misdiagnosis is common because many health care professionals are not trained to recognize sensory issues.

### **Sensory Strategies**

The focus of therapy for children with sensory processing challenges is to help them develop self-regulation strategies. Children mirror the adults around them, both in brain processing and behavior, so it is critical that therapists, parents, and caregivers assess their own sensory needs and use healthy coping strategies. For example, a parent driving in rush hour traffic with kids in the car can be a great role model by taking some deep belly breaths or chewing gum to calm their stress reaction. It is helpful to reframe children’s behavior from the perspective of “wiring” versus “willfulness”. For example, a preschooler that throws a tantrum every time the class gets ready to go to the gym may be over-sensitive to the noise and physical contact that happens in the gym and is trying to avoid it. Creating a “quiet” space for that child or using noise-dampening headphones may alleviate the problem.

Calming strategies for children include: turning off or turning down the lights, creating a “safe space” such as a tent or beanbag chair, calming smells such as vanilla, twiddle your thumbs, taking a big breath. Activities that help “organize” the nervous system through proprioceptive sensory input include “Heavy Work” activities that involve pushing, pulling, lifting, and carrying. Having kids pull each other in a wagon or push a basket full of toys is a great way to provide proprioceptive sensory input.

## Red Flags for SPD

Red flags are indicators that a child may be having challenges integrating sensory input. Behavioral symptoms of Sensory Processing Disorder can often overlap with other conditions so it is important that children be evaluated by an occupational therapist experienced in working with SPD.

### **Infants and Toddlers**

Has difficulty consoling self, is unusually fussy, is slow to roll over, creep, sit, or stand, has difficulty tolerating being on his or her stomach, resists being held or becomes tense when held, dislikes being cuddled, is unable to settle down, has sleep difficulties, has difficulty sucking from breast or bottle

### **Preschoolers**

Says “I can’t” or “I won’t” to age-appropriate self-care or play activities, is clumsy, falls frequently, has difficulty focusing attention or over-focuses and is unable to shift to the next task, overreacts to touch, taste, sounds, or odors, avoids playground activities, has delayed language development

### **Grade-schoolers**

Has difficulty making friends, poor handwriting skills, difficulty paying attention in class, is clumsy, is overly talkative, fearful of new situations



## References and Resources

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- Stamm, J. (2007). Bright From the Start. New York: Gotham Books.

- www.spdfoundation.net – excellent resource on Sensory Processing Disorder
- www.brainrules.com – fun resource to understand the brain and development
- www.zerotothree.org – excellent resource for parents and therapists with infants and toddlers
- www.FunandFunction.com – great resource for sensory motor toys and therapy equipment
- www.brainwise-plc.org – a curriculum to help children learn critical thinking and decision making skills

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