

# Understanding Disabilities: Sensory Processing Disorder

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## Introduction & Definition

Sensory Processing Disorder (SPD) is a condition of the brain that makes it difficult to interpret and respond to information gathered from the senses. Children with SPD experience the condition differently based on the type of SPD they have. For example, some may be overwhelmed by information that comes in through the senses, while others may crave intense sensory experiences. Those with SPD respond to uncomfortable sensory information by showing emotional outbursts, hyperactivity, avoidance behaviors and, in some cases, self-harm behaviors, such as headbanging, pinching oneself, pulling hair and crashing or bumping into walls.

## Sensory Systems

In order to fully understand SPD, it is important to know about the different sensory systems. There are at least eight senses that help us navigate the world. Usually information enters through one or more senses and it is organized by the brain to form an appropriate response to the information. Those with SPD have difficulty dealing with information from one or all of the following sensory systems:

1. **Visual:** ability to see and think about objects when they are out of sight.  
*Example: Retrieving an out-of-sight toy during play.*
2. **Auditory:** ability to hear, vocalize and repeat sounds.  
*Example: Turning your head when name is called and responding back.*
3. **Tactile:** ability to touch and manipulate items.  
*Example: Putting in and taking out a toy from a container.*
4. **Olfactory:** ability to smell and identify different scents.  
*Example: Showing preference for sweet over bitter smells.*
5. **Taste:** ability to detect different tastes and textures.  
*Example: Showing a preference for cooked carrots over raw carrots.*
6. **Vestibular:** ability to balance and reposition yourself in response to imbalances.  
*Example: Standing or hopping on one foot.*
7. **Proprioception:** ability to recognize and maneuver your body within the space around you.  
*Example: Throwing a ball without having to look at the arm.*
8. **Interoception:** awareness of what is going on inside one's body.  
*Example: Knowing when you have to go to the bathroom.*

### Javier's Case

Seven-year-old Javier has always struggled with loud and sudden sounds. Most often, the triggers for his hour-long meltdowns are firetruck sirens, his parents' use of the blender or vacuum or surprises, such as the time when his school classmates sang the "Happy Birthday" song to celebrate his birthday. He fears flushing the toilet and runs away when someone flushes it for him. The sound and sight of the toilet flushing are too much for him. He has become extremely shy of public places and usually refuses to go in to places that are loud and full of noise. Javier is overwhelmed with noisy sensory information, a type of Sensory Processing Disorder (SPD) known as Sensory Over-Responsivity.

## Types

Sensory Processing Disorder is divided into three types, including:

**Sensory Modulation Disorders:** these disorders involve difficulty in adjusting to sensory input.

- **Sensory Under-Responsivity:** Individuals may be unaware of information gathered from the senses and show delays in responding appropriately to sensory information.
- **Sensory Over-Responsivity:** Individuals may respond in intense ways to sensory information that leads to inappropriate or harmful behaviors.
- **Sensory Craving:** Individuals may be driven to seek out sensory stimulation. The effort may be intense and disorganized.

**Sensory-based Motor Disorders:** these disorders include difficulty with balance and motor coordination.

- **Postural:** Individuals may experience poor perception of body position affecting posture.
- **Dyspraxia:** Individuals experience difficulty planning and executing movement.

**Sensory Discrimination Disorder (SDD):** this disorder involves poor awareness and difficulty interpreting qualities of the environment based on sensory input. SDD varies in regard to each sensory system. Each affected system presents unique difficulties.

## Symptoms

Parents and teachers may notice the signs of Sensory Processing Disorder in children as young as toddlers. Some of the behaviors below may indicate SPD if occurring repetitively and often.

Toddlerhood	Preschool/Early Elementary	Late Elementary/ Pre-Adolescence	Adolescence
<ul style="list-style-type: none"> <li>• Irritable when being dressed</li> <li>• Uncomfortable in clothes</li> <li>• Resists cuddling</li> <li>• Has difficulty calming self</li> <li>• Parent is the only source of comfort</li> <li>• Motor delays</li> <li>• Problems eating or sleeping</li> </ul>	<ul style="list-style-type: none"> <li>• Over-sensitive to touch, noises, smells and/or other people</li> <li>• Frequent temper tantrums</li> <li>• Issues with personal space</li> <li>• In constant motion without regard to personal space</li> <li>• Difficulty dressing, eating or sleeping</li> <li>• Poor or delayed motor skills</li> <li>• Difficulty making friends</li> </ul>	<ul style="list-style-type: none"> <li>• Over-sensitive to touch, noises, smells and/or other people</li> <li>• Easily distracted</li> <li>• Needs to be in constant motion; fidgets</li> <li>• Craves movement</li> <li>• Difficulty with motor activities (includes fine motor such as writing)</li> <li>• Difficulty making friends</li> <li>• Unaware of pain in others</li> </ul>	<ul style="list-style-type: none"> <li>• Over-sensitive to touch, noises, smells and/or other people</li> <li>• Poor self-esteem</li> <li>• Slow; lethargic</li> <li>• Has difficulty completing tasks</li> <li>• Fears failure at new tasks</li> <li>• Clumsy or poor motor skills (including fine motor such as writing)</li> <li>• Difficulty with attention and staying focused</li> <li>• Low motivation</li> </ul>

### Josie's Case

Josie is a typical, generally good-natured 12-year-old. Josie has a few quirks that, until recently, have amused her parents. Every morning, Josie has difficulty getting dressed. Although she is nearly a teenager, she requires the help of her mother to get dressed as she doesn't possess the motor coordination to properly place clothing on her body, particularly in tying shoes, buttoning pants or using zippers. She has always been clumsy, with poor hand-eye coordination, and struggles in gym class games that involve running, throwing or catching a ball. Her handwriting is nearly illegible as she lacks the fine motor skills to write legibly. Josie is diagnosed with a type of SPD known as Dyspraxia.

## **Causes & Prevalence**

A lesser-known disorder, SPD is fairly prevalent and affects between 5 to 16 percent of school-aged children. In the past, SPD was commonly misdiagnosed as a developmental delay, autism spectrum disorder or related disorder involving sensory problems. Yet researchers and clinicians are starting to understand SPD to be a separate diagnosis. While it remains unclear the exact cause, most understand SPD to be biological, pointing to differences in how brain matter (i.e., cells, etc.) move about the brain. Environmental factors, such as birth defects or brain injuries, may also contribute to the condition.

## **Co-Occurring Conditions**

While SPD exists independently of other conditions, it is commonly present along with the following conditions:

- Attention Deficit/Hyperactivity Disorder
- Autism Spectrum Disorder
- Learning Disabilities, especially Dysgraphia
- Fragile X Syndrome
- Generalized Anxiety Disorder

## **Intervention and Treatment**

### ***Therapy***

Once diagnosed, children with SPD will often be referred to an occupational therapist or another trained professional for treatment. Since SPD is a disorder of the brain in processing sensory information, “brain training” therapies are most effective. Sensory Integration (SI) therapy is the most common approach to treatment. In SI, the child is exposed to the sensory trigger in a controlled, progressive and repetitive manner in order to train the brain to respond appropriately. The type of sensory system and intensity-level are carefully controlled by the therapist.

### ***Environmental Changes***

In addition to therapy, other ways to help lessen the intensity of SPD is to change the environment at home or at school to lessen sensory triggers. Finding an accommodating school specializing in SPD or related conditions can benefit the child and family in managing SPD.

### ***Medication***

Medication therapies can also benefit those diagnosed with SPD. Depending on the type of SPD, medications will work to either increase or decrease the brain’s response to sensory information.

## **How to Help**

- Keep a running list of the sensory needs of the child and ways to accommodate those needs. Share this list with new caretakers.
- Make sure the environment is appropriate to the needs of the child.
- Consider limiting unstructured time which may be over-stimulating for the child.
- Provide the child freedom to move as necessary within safe boundaries of the activity.
- Consider making shared rules that respect each other’s needs and space requirements.
- Create a sensory kit to help manage sensory triggers and encourage self-soothing skills. Sensory kits include items like stress balls, weighted blankets, pillows, fidgets, calming scents, sound-proof headphones, sunglasses, bubble wrap and more that are tailored to the sensory needs of each child.
- Join an advocacy group to stay informed about SPD. Some examples include:
  - STAR Institute: <https://www.spdstar.org/>
  - Understood: <https://www.understood.org/>
  - SPD Foundation: <https://www.spdfoundation.net/>
  - Sensory Processing Disorder Support – Private Parent and Educator Support Group on Facebook: <https://www.facebook.com/groups/2217476670/>

## Where can I find more information?

If you are interested in learning more, find additional fact sheets as part of our **Understanding Disabilities** series.

[W 947-A Understanding Disabilities: An Introductory Guide](#)

[W 947-B Understanding Disabilities: Behavioral Health FAQ Sheet](#)

[W 947-C Understanding Disabilities: Intellectual and Learning Disabilities](#)

[W 947-D Understanding Disabilities: Screening for Disabilities in Children](#)

[W 947-E Understanding Disabilities: Respectful Etiquette and Language Guidelines](#)

[W 947-F Understanding Disabilities: Responsive Care](#)

[W 947-G Understanding Disabilities: Anxiety in Children and Youth](#)

## References

- American Occupational Therapy Association (n.d.). Sensory integration: Resources for occupational therapy practitioners. Retrieved from <https://www.aota.org/Practice/Children-Youth/SI.aspx>
- Crtiz, C., Blake, K., & Nogueira, E. (2015). Sensory processing challenges in children. *The Journal for Nurse Practitioners*, 11, 710-716. <https://doi.org/10.1016/j.nurpra.2015.04.016>
- Galiana-Samal, A. et al. (2020). Sensory processing disorder: Key points of a frequent alteration in neurodevelopmental disorders. *Cogent Medicine*, 7, 1-12. <https://doi.org/10.1080/2331205X.2020.1736829>
- Miller, L. J., Schoen, S. A., Mulligan, S., & Sullivan, J. (2017). Identification of sensory processing and integration symptom clusters: A preliminary study. *Occupational Therapy International*, 2017, 1-10. <https://doi.org/10.1155/2017/2876080>
- Owen, J. P. et al. (2013). Abnormal white matter microstructure in children with sensory processing disorders. *NeuroImage: Clinical*, 2, 844-853. <https://doi.org/10.1016/j.nicl.2013.06.009>
- STAR Institute (n.d.). Red flags for SPD. Retrieved from <https://www.spdstar.org/basic/red-flags-for-spd>
- STAR Institute (n.d.). Understanding sensory processing disorder in children. Retrieved from <https://www.spdstar.org/basic/understanding-sensory-processing-disorder>



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