

Sensory Processing

Charlotte Blewitt, M.S.



Definition

Sensory processing is the way in which sensory information is received and interpreted. Information from the five senses (sight, sound, taste, touch and smell) is considered **sensory input**. Hyperactivity or hypoactivity of sensory input are considered **sensory processing disorders**.

Dunn's Model of Sensory Processing

Dunn proposed a **four quadrant model** of sensory processing which is still very widely used to understand sensory processing disorders today.

4 patterns of sensory processing:

1. **Low Registration**
2. **Sensation Seeking**
3. **Sensory Sensitivity**
4. **Sensation Avoiding**

Dunn's research suggested people with disabilities had distinct patterns of sensory processing that were considerably more intense than their peers and impact their daily living.

Sensory Processing Disorder

Sensory Processing Disorder (SPD) occurs when the brain cannot comprehend sensory information as expected, resulting from **behavioral and motor abnormalities**.

SPD is highly prevalent in the pediatric population (5-15%) and affects learning, behavior, coordination and increases the risk of stress and anxiety.

SPD is often associated with other disorders such as **Autism Spectrum Disorder (ASD)** and **Attention Deficit and Hyperactivity Disorder (ADHD)**



Sensory Integration

The diagnosis and treatment of SPD is informed by a the "Sensory Integration" framework.

Ayres' Sensory Integration (ASI) interventions are based on the theory that engagement in **sensorimotor activities** can alter brain function through changes made possible by **neuroplasticity**.

This framework is widely used in occupational therapy practices.



Sensory modulation

Sensory modulation disturbances affect both the **vestibular system** and the **proprioception system**. Ayres' suggested that the vestibular system is responsible for determining whether a sensory stimuli elicits a reaction from an individual.

This is somewhat encapsulated by the term "**sensory modulation**" which describes the ability of an individual to register sensory stimulus, and then behave accordingly to the stimulus.

Sensory considerations for students at iBrain

Many of our students at iBrain suffer from sensory processing disorders. Treatment for SPD should be **individualized** to each student and **sensory integration goals** should be decided upon and worked towards with their occupational therapist.

Sensory Processing Infographic References

Brown, A., Tse, T., & Fortune, T. (2019). Defining sensory modulation: A review of the concept and a contemporary definition for application by occupational therapists. *Scandinavian journal of occupational therapy*, 26(7), 515–523. <https://doi.org/10.1080/11038128.2018.1509370>

Camarata, S., Miller, L. J., & Wallace, M. T. (2020). Evaluating Sensory Integration/Sensory Processing Treatment: Issues and Analysis. *Frontiers in integrative neuroscience*, 14, 556660. <https://doi.org/10.3389/fnint.2020.556660>

Crasta, J. E., Salzinger, E., Lin, M. H., Gavin, W. J., & Davies, P. L. (2020). Sensory Processing and Attention Profiles Among Children With Sensory Processing Disorders and Autism Spectrum Disorders. *Frontiers in integrative neuroscience*, 14, 22. <https://doi.org/10.3389/fnint.2020.00022>

Delgado-Lobete, L., Pértega-Díaz, S., Santos-Del-Riego, S., & Montes-Montes, R. (2020). Sensory processing patterns in developmental coordination disorder, attention deficit hyperactivity disorder and typical development. *Research in developmental disabilities*, 100, 103608. <https://doi.org/10.1016/j.ridd.2020.103608>

Dunn, W. (1997). The Impact of Sensory Processing Abilities on the Daily Lives of Young Children and Their Families: A Conceptual Model. *Infants and Young Children*, 9, 23-35. <http://doi.org/10.1097/00001163-199704000-00005>

Dunn, W. (2007). Supporting Children to Participate Successfully in Everyday Life by Using Sensory Processing Knowledge. *Infants & Young Children*, 20, 2. <https://doi.org/10.1097/01.IYC.0000264477.05076.5d>

Galiana-Simal, A., Vela-Romero, M., Romero-Vela, V. M., Oliver-Tercero, N., García-Olmo, V., Benito-Castellanos, P. J., Muñoz-Martinez, V., & Beato-Fernandez, L. (2020). Sensory processing disorder: Key points of a frequent alteration in neurodevelopmental disorders. *Cogent Medicine*, 7, 1. <http://doi.org/10.1080/2331205X.2020.1736829>

Guardado, K. E., & Sergent, S. R. (2023, July 31). Sensory Integration. In StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559155/>

Lane, S. J., Mailloux, Z., Schoen, S., Bundy, A., May-Benson, T. A., Parham, L. D., Smith Roley, S., & Schaaf, R. C. (2019). Neural Foundations of Ayres Sensory Integration®. *Brain sciences*, 9(7), 153. <https://doi.org/10.3390/brainsci9070153>

Metz, A. E., Boling, D., DeVore, A., Holladay, H., Liao, J. F., & Vlutch, K. V. (2019). Dunn's Model of Sensory Processing: An Investigation of the Axes of the Four-Quadrant Model in Healthy Adults. *Brain sciences*, 9(2), 35. <https://doi.org/10.3390/brainsci9020035>