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What is Sensory Integration?

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.

The Senses

Touch - The **tactile 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.

Hearing - We use our **auditory 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.

Sight - Our **visual 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.

Taste and Smell - The **gustatory and olfactory 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.

Body Awareness - **Proprioception**, or information from the muscles and joints, contributes to the understanding of body position. This system 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.

Movement and Balance - Located in the inner ear, the **vestibular 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.

Integrating Information from the Senses

Considering all of the sensory modalities involved, it is truly amazing that one brain can organize all of the information flooding in simultaneously and respond to the demands of the environment. The complex nature of this interaction is illustrated in the following example:

Michael receives the instruction "Please put on your coat." In order to comply, he must

- focus his attention on the speaker and hear what that person says
- screen out incoming information about other things going on around him
- see the coat and adequately make a plan for how to begin
- see the armholes and sense muscle and joint positions in order to put his arms into the openings
- feel, with touch awareness, that the coat is on his body correctly
- use motor planning, touch awareness, and fine motor skills to zip or button the coat

In order to accomplish this seemingly simple task, the nervous system must integrate (focus, screen, sort, and respond to) sensory information from many different sources. Imagine the amount of sensory integration needed to ride a bicycle, participate in a soccer game, or pay attention in an active classroom. Individuals who have difficulties with all or part of this process face significant challenges when engaging in daily functional activities.