Sensory Processing in Autism

What is Sensory Processing?

Sensory processing refers to the process in which people receive sensory input from their senses, interpret that sensory information, and form a response.

Each one of us have our own perception of the world around us based on our own unique sensory processing.

Sensory Processing

The process of taking in information from our senses and organizing it in a way that allows us to respond appropriately.

Requires that we are able to shift our attention to what is the most significant input at the time.

Requires we are able to modulate or inhibit the less important sensory input.

Difficulties in regulation can result from people not being able to filter out stimuli, or being overly reactive or under reactive to a stimuli. Ie. The child who is over reactive to movement may become dizzy when his head is down picking up a dropped pencil. Another child may not notice directions written on the board.

Gating/ Threshold/ Attention/ Registration

Each one of our senses have receptors. Each of those receptors have a threshold that must be met before the impulse from that receptor produces a signal that travels to the brainstem. At the brainstem there is another mechanism that determines if the signal is important enough to get through to the conscious areas of the brain. This is called gating and it determines what we pay attention to. 2 exceptions are the Optic Nerve and Olfactory Nerve which have a direct connection to the Cerebellum.

The threshold at which a sensory receptor sends an impulse determines when and how intensely we receive that sensory input.

Gating allows us to disregard unimportant stimuli. It also allows us to disregard repeat messages from our sensory system.

8 Senses

- Vision
- Auditory
- Olfactory (smell)
- Gustatory (taste)
- Tactile
  - Protective
  - Discriminatory
- Vestibular
- Proprioception
- Interoception

Vision

-Differences in color

-Details vs the big picture - Visual discrimination

-Overwhelmed by too much visual input “I can’t be in there, there is just too much detail” said by a student with Autism about the fun run set up (before the run)

Attending to the wrong piece of information. Example- navigating by landmarks and using movable objects.

Use of visual supports to teach what to attend to.

Auditory

Auditory sensitivity

Sensitive to loud sounds

Difficulty localizing sound

Difficulty with background noise

Language processing

Auditory Discrimination

Gustatory

How intensely we experience flavor.

If a child has poor awareness of the mouth sometimes giving intense flavors can help develop awareness and oral motor skills.

Olfactory

-Related to taste

- can be over- responsive or under-responsive

-can be calming or alerting

-individual differences, aroma therapy should be used carefully as not everyone may react the same way.

Tactile

2 systems

Protective

Discriminative

Localization of touch

Stereognosis

In the hand, the ability to conform your palm and fingers to the object being held or touched.

Vestibular

Detects movement and position of your head.

Works closely with the eyes.

Lets you know if you are off balance, upside down, which direction you are moving.

Receptors are in the ears- the semicircular canals and otoliths.

Otoliths are activated by being upside down.

Proprioception

Receptors are in muscles and joints.

Allows you to know where your arms and legs are in relation to your body.

Force against your muscles, either passive or active provides input to the proprioception receptors.

Imitation of postures

Interoception

Information from our internal organs

- Hunger, thirst
- Heart beat
- Need to use the bathroom
- Temperature
- Fatigue

The next slide has a short video to illustrate what Sensory Defensiveness might feel like to someone with Sensory Processing Disorder.

Generally the senses that are over responsive are auditory, tactile, and visual.

Too much Too little

Sometimes the senses of a person with Sensory Processing Disorder can be too responsive, but they can also be under responsive.

The senses that are generally under responsive are vestibular, and proprioception.

Body Image/ Body Map

Vestibular, tactile and proprioception together give us our body image, or body map. It is from that sense of our body that we develop directionality, bilateral skills, visual perceptual skills, and the ability to plan movement.

Motor Planning is a complicated process of planning and moving our bodies to accomplish a motor task. It is the response to sensory input.

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Interpreting sensory information- Bottom Up

- Input is compared with other input from different sensory systems.
- Past experience
- Emotion
- Social cues
- Thoughts

Top down

Those same things can affect how strongly we receive sensory input and how much attention we give to it.

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- Past experience
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A person with a trauma may be over sensitive to sounds behind them, unexpected touch, loud noises.

Adaptive Response

In order to make an adaptive response, the sensory information needs to be received correctly, interpreted accurately, and acted on with an appropriate motor plan.

Motor plans start out needing conscious thought and with practice develop into automatic plans. Learning a skill takes practice. Vision helps motor planning- if you can watch someone else do an action it is easier to figure it out.

We all have motor memory- type in your password- the route to get to work/home -writing letters/words.

Motor Planning Cont

-Sometimes things get added to motor plan that really are not part of executing the motor task.

- a batter getting ready to swing

- Michael Jordan sticking his tongue out

-Gymnast walking out shaking their arms- they are activating the proprioception receptors to help them know where their bodies are.

-Ideation, or coming up with a response is part of motor planning.

Autism

Often have difficulty with Motor Planning

-wrong automatic plan can be activated- student who always turned into the gym when walking that way.

-extra movements get added to the motor plan- touching things, kicking the door as walking by.

-Arm and body movements to try and improve sense of body awareness.

-Difficulty writing, holding a tool, petting a dog or cat.

How do we help?

Sensory Input

-Use noise cancelling headphones in noisy environments.

-Allow gloves in art classes or when doing messy activities.

-Limit visual clutter.

-Provide frequent proprioceptive input.

-Work on discriminatory skills for each of the senses

-Use visuals to teach what environmental cues are important to attend to.

Interpretation

Bottom Up

Calming and Alerting Input

Top Down

Red/Green thoughts

Social cues

Motor Planning

-Provide frequent proprioception breaks.

-Use video or demonstration to help with motor planning.

-When a student is stuck in the wrong automatic motor plan, change the plan. (change the motor task somehow- a different seat, different route, different sequence of activities- use visuals to support the change)

-Use alternatives to writing if needed.

Thank- you for caring about people with Autism!