Making Sense of the Sensory Story in five parts

- Our 5 senses, and just a couple more ...
- Sensory Integration
- Sensory Processing Disorder
- Sensory Screening, Assessment and Evaluation
- Sensory Interventions

Sensory Differences
Sensory processing is a person’s way of noticing and responding to sensory events in everyday life. We all perceive sensory information differently. However, our students experience sensory differences to a greater degree.

Students with impaired sensory systems (sensory processing disorders) who you may encounter at various sites include students with Attention Deficit Hyperactivity Disorder, Fetal Alcohol Spectrum Disorder, Intellectual Disability, Dyspraxia/Communication Disorders, Learning Disabilities, Emotional Disturbance, Autism Spectrum Disorder which includes high functioning Autism.

Sensory processing disorders may manifest into challenging behaviors in the classroom, which are commonly mistaken for non-compliance, attention seeking, or escaping/avoiding a task. Many maladaptive behaviors (hitting, biting, screaming, slamming body against hard surfaces, self-injurious behaviors) exhibited by students, particularly those with ASD serve the purpose of regulating their internal sensory processing systems.
**Sensory Spectrum**

- **Not Sensitive**
- **Very Sensitive**

**Seekers**: Less sensitive/Active, seeking reflects high thresholds that need to be met through the surrounding environment. Seekers make noise, fidget, touch, feel, hang on others, and taste things.

**Low Registration (Under responders)**: Less sensitive/Passive, do not notice what is going on around them, may seem bored, dull, uninterested, difficult to engage, easily exhausted, appear apathetic.

**Sensitivity (Over responders)**: Very sensitive/Active, notice more things than their peers, easily upset, seem hyperactive, distracted, difficulty learning from experiences because their routine is often interrupted.

**Avoiding**: Very sensitive/Passive, actively try to prevent sensory input, experience discomfort quickly, develop rituals control their sensory environment.

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**Objectives**

- Understand the two "hidden" movement senses: vestibular and proprioception
- Gain a basic understanding of the components of sensory integration
- Gain a basic understanding of Sensory Processing Disorder
- Identify signs of Sensory Processing Disorder
- Have a basic knowledge of Sensory Integration therapy and sensory interventions
Our 5 senses; and just a couple more ...

Our 5 Senses

Visual
sight

Gustatory
taste

Olfactory
smell

Auditory
sound

Tactile
touch

+ 2 more

Vestibular
movement

Proprioception
body awareness
Vestibular System

- movement sense

- helps with vision by stabilizing the eyes when our heads and bodies are moving
- tracking
- focusing
- body movement: helps us plan our actions
- speed and direction
- if we are moving or still
- if things around us are moving or still
- like auditory, responds to vibrations

Vestibular system movement sense

- helps with vision by stabilizing the eyes when our heads and bodies are moving
- tracking
- focusing
Vestibular System
movement sense

- informs us of our relationship to gravity; if we are upright or upside down
- helps maintain our balance
- helps maintain posture and muscle tone -- the readiness of a muscle to work

- spinning
- tumbling
- wheeling
- circular & angular movement
- Merry-go-round
- back and forth
- up and down
Proprioception
the sense of body awareness

- unconscious awareness of our body
- helps create body scheme or body map
- tells us the relationship of our body parts to each other, to other people and to objects
- adjusts the amount of muscle force needed for the given situation
- like the vestibular system it responds to movement and gravity

Proprioception

joints
muscles
muscle spindles

Heavy Work

lifting
pulling
force
position
Our 7 senses

Gustatory
- taste

Auditory
- sound

Visual
- sight

Tactile
- touch

Olfactory
- smell

Proprioception
- body awareness

Vestibular
- movement

The Theory of Sensory Integration

part two  
Dr. A. Jean Ayres, Ph.D., OTR

Dr. Ayres developed the theory in the 1950's and 1960's while practicing as an occupational therapist in a children’s center, and then while earning her doctoral degree.

Steps to Sensory Integration (SI)

1. Registration - become aware of sensory input
2. Orientation - brain decides how to pay attention to input through modulation
3. Interpretation - brain decides the quality of the input
4. Organization of a response - is a response necessary; physical, emotional, cognitive?
5. Execution of a response - an action results, physical, emotional, cognitive
Sensory Integration/Sensory Processing

Register sensory information through the nervous system

Person responds with an action, an emotion or a behavior

Outcomes of Sensory Integration

- Sensory Modulation
  - How the brain regulates the sensory input it receives and therefore regulates how we respond to sensory information
  - If information is too intense (loud concert) it is inhibited—"turned down" in the brain
  - If information is too mild (quiet speaker) it is facilitated—"turned up" in the brain
**Modulation/Volume Control**

- too loud
  - turn it down
- not important
- too low
  - turn it up
  - important, needs more attention

**Two Types of Responses to Sensory Input**

- Protective
  - The "Uh Oh!" system
  - alerts us
  - fright, flight or fight
  - reflexes
- Discriminative
  - The "Ah Ha." system
  - determines big and subtle differences in what we are experiencing

Neurotypical individuals with intact sensory processing have access to both systems; whereas individuals with sensory processing disorder respond in the protective mode most of the time.
What causes Sensory Processing Disorder?

- Not known for sure
- Atypical development of the nervous system
- Misfiring of information within the nervous system

How Does SPD Affect Behavior?

<table>
<thead>
<tr>
<th>Problems with Self Regulation</th>
<th>Problems with Motor Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>over aroused, high activity level, hyper-vigilant</td>
<td></td>
</tr>
<tr>
<td>easily distracted</td>
<td></td>
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<tr>
<td>seeks sensory input</td>
<td></td>
</tr>
<tr>
<td>under aroused, low activity level, passive</td>
<td></td>
</tr>
<tr>
<td>avoids sensory input</td>
<td></td>
</tr>
<tr>
<td>poor coordination, inconsistent motor performance, hard to learn new skills</td>
<td></td>
</tr>
<tr>
<td>unsure of body position</td>
<td></td>
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<tr>
<td>flight, fright or fight at inappropriate times</td>
<td></td>
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<tr>
<td>unable to determine differences and sameness</td>
<td></td>
</tr>
</tbody>
</table>

Case Study Activity

- Listen to the descriptions of the different types SPD
- Find a partner (or two)
- Read the descriptions of the three students with SPD
- Determine what type of SPD each of the students have based on the following information.
James

- doesn’t like outdoor play
- gets upset easily, may even tantrum
- FUSSY
- covers his ears when the other children get a little loud
- picky eater

Troy

- when he falls or bumps himself he doesn’t complain
- VERY QUIET PERSONALITY
- doesn’t seem to be bothered by loud or sudden sounds
- likes circle time best when there is music and singing
- responses are delayed

Pamela

- bumps into everybody and everything, all the time
- ACTION PACKED
- likes to spin, never gets dizzy
- will not sit down for lunch, takes a bite then gets up to do something else
- likes to touch everything
- can stay with an activity for at the most... a minute
Sensory Over-Responsiveness

- also called Sensory Defensiveness or hypersensitivity
- children respond more quickly, intensely and for a longer periods of time
- protective system kicks in easily – fright, flight or fight
- fussy, anxious, controlling, aggressive or withdrawn, picky, inflexible
- distress with certain sounds, sensitive to light, discomfort with certain textures, aversion to certain tastes and smells, irrational fear of heights and movement

Examples of Sensory Defensiveness (Over-Responsive)

- Tactile Defensiveness - avoids touch from others; dislikes messy play; irritated by certain clothing texture and labels

- Gravitational Defensiveness - fear and dislike of movement and changes in body position; discomfort with changes in head positions; fear of having feet off the ground

Examples of Sensory Defensiveness (Over-responsive)

- Auditory Defensiveness - over-sensitivity to loud, unexpected or specific sounds; fearful of appliances such as vacuum cleaners, hair dryers

- Oral Defensiveness - combination of over-sensitivity to touch, smell and taste; dislikes certain food textures and types; difficulty with brushing teeth and face washing
Sensory Under-Responsiveness

- exhibit less of a response than the situation demands
- take longer to react
- require intense and/or longer lasting sensory messages
- child may fail to notice or take longer to notice pain
- are often quiet, alone, prefer solitary play; appear self-contained
- this subtype is often undetected

Examples of Under Responsive

- decreased alertness and arousal level
- not as sensitive to changes in the environment
- slow working, playing, eating, dressing... pace
- seem indifferent to scolding or negative feedback
- decrease social engagement, withdrawn

Sensory Seeking

- actively seek sensation, appear to be impulsive
- bumping, crashing into the wall, thrill seekers
- crowd people and knock other children over without being aware of their actions
- can be demanding and even aggressive
- food is never too spicy, the TV or music is never too loud
- often get labeled as trouble makers
Reasons for Sensory Seeking

- under responsive to proprioception: child may seek out additional input to increase their body awareness and sense of security
- may not adequately register or modulate proprioceptive input
- may not adequately register or modulate vestibular input
- movement helps child stay alert and organized
- movement helps screen out uncomfortable sensations from other sensory systems

James
- doesn’t like outdoor play
dislikes play dough and finger painting
gets upset easily, may even tantrum
- FUSSY
- covers his ears when the other children get a little loud
- picky eater
- sensory over-responsive

Troy
- when he falls or bumps himself he doesn’t complain
likes circle time best when there is music and singing
- VERY QUIET PERSONALITY
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- sensory under responsive
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Evaluation of Sensory Integration

- Sensory History and Profile
- Screening and Checklists
- Assessments

Screenings and check lists
Guiding Principles of Sensory Integration Program

- Tailor the learning environment to fit a child’s sensory needs so they can better integrate sensations.
- Ensure that the child interacts with the environment so that development and learning occurs.
- Respond appropriately to a child’s sensory needs by changing the child’s behaviors which are motivated by their need to regulate their sensory systems. Creating a more socially appropriate replacement behavior that can still regulate their sensory system is the best bet.

Guiding Principles (continued)

- Provide choices to a child so that they can direct their own actions, feel empowered, and learn to independently regulate their sensory needs.
- Practice sensory interventions during play.
- Measure a child’s progress by his/her response to previously challenging situations.
- Collect data to track whether or not a sensory intervention is successful.

Some Ways Sensory Intervention Can Improve Learning

- Improve ability to attend; decrease distractibility.
- Improve alertness level.
- Self regulation of emotions and behavior.
- Decrease anxiety.
- Increase social interaction.
- Improve play skills.
Sensory Diet: an intervention for challenging behavior

- planned and scheduled activities provided throughout the day; designed to meet a child’s specific sensory needs
- “main course” – movement, deep pressure, heavy work
- “snacks” – oral motor, auditory, visual, smell experiences

Sound Adaptive Strategies

- Move the person away from the offending sound
- Offer earplugs and headphones
- Reduce environmental noises
- Background or white noise
- Tennis balls on bottom of chair legs

Smell Adaptive Strategies

- Avoid the use of products and perfumes with heavy smells
- Have a plan if distracting smells are identified
- Have the person sit next to an open door, window or fresh air source
### Visual Adaptive Strategies

**Alerting**
- Bright lights
- Colorful graphics on the walls
- Brightly painted walls

**Calming**
- Use low light and natural lighting
- String of lights that gradually change colors
- Copy worksheets onto colored paper to minimize glare
- Study carrels

### Oral/Taste Adaptive Strategies

**Picky Eaters**
- Rewards for trying new foods
- Follow a new food with a preferred food
- Provide foods of the same consistency
- Provide foods of the preferred temperature

**Alerting**
- Sour, bitter, and spicy foods

**Calming**
- Sweet and bland foods

### Tactile Adaptive Strategies

- Provide sitting options that allow for space between children, use carpet squares to designate space
- Give verbal cue before touching a person
- Use a firm, kind touch— not a light tap
- Seating locations that minimize people approaching from behind
### Calming Techniques

**Main Course Menu**
- Relaxing in a sleeping bag, blanket, or under large pillows or mat
- Slow rocking in a rocking chair or on stomach in head-to-toe direction
- Lycra/Spandex clothing, body sock, or cocoon sensory swing
- Calming sequence

**Snack Menu**
- Sucking through a straw
- Lavender, vanilla, banana smells (be careful)
- White noise or musical movement with a steady beat
- Reduce noise and light levels—eliminate fluorescents, add white holiday lights or natural light

### Organizing Techniques

**Main Course Menu**
- Lifting heavy objects
- Hanging, pushing, pulling
- Swimming
- Rhythmic activity

**Snack Menu**
- Vibration—a toy, pillow, squiggly pen
- Chewing and blowing
- Wiggle cushions for seats
- Fidgets

### Alerting Techniques

**Main Course Menu**
- Quick unpredictable movement like a run, stop and go game
- Fast swinging
- Sitting/bouncing on a yoga ball
- Hopping and jumping

**Snack Menu**
- Bright lights
- Strong odors
- Cold water play
- Loud, fast music
- Strong tastes like citrus, cinnamon
- Ice to eat
Self Regulation

Self regulation in relation to sensory processing is the nervous system’s ability to attain, maintain and change levels of arousal or alertness appropriate to the task or situation.

(“How Does Your Engine Run;” Williams and Shellenberger, 1994)

Self regulation allows us to:

• Attend to task
• Control impulses
• Tolerate frustration
• Regulate emotional reactions

How Does Your Engine Run? (The Alert Program)

The Alert Program is designed to:

• teach children, parents, and teachers how to recognize arousal states as they relate to attention, learning, and behavior.
• help children recognize and expand the number of self-regulation strategies they use in a variety of tasks and settings.
• give therapists, parents, and teachers a framework (vocabulary, activities, and environments) to help children recognize and regulate their own arousal states.
• help parents and teachers understand that behavior may reflect the student’s best attempt to respond adaptively and efficiently to the demands of the situation or task.

My Resources
The End