SENSORY PROCESSING IN THE CLASSROOM

Learn about sensory processing and sensory-based strategies you can use in the classroom to support regulation and skill development.

Created by Chelsea Rodi, OTS

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WHAT IS SENSORY PROCESSING?

Your body is always taking in information from the world around you. This includes what you feel through touch, how your body moves and where it is in space, what you see, smell, hear, and taste.

All of this information travels to your brain. Your brain organizes it, interprets it, and helps your body respond appropriately for what you are doing. This process is called sensory integration.

Sensory integration begins in the womb and continues to develop as children play, move, explore, and interact with others.

8 SENSES:

VISION

PROPRIOCEPTION

Sensations from joint and muscle movement, particularly stretch and compression Allows us to adjust the force, direction, and speed of movements.

TASTE

TACTILE

Sense of light touch and deep pressure.

INTEROCEPTION

Sense of what our internal organs are feeling, including feelings of hunger, temperature, and need to use the bathroom

AUDITORY

VESTIBULAR

Sensations of movement, specifically about changes in head position. This contributes to balance and spatial orientation.

SMELL

SENSORY MODULATION

Throughout the day, the body receives a constant stream of sensory input of varying types and intensities. Sensory modulation is how a person's body and brain respond to this sensory input.

Some people have sensory modulation differences. They may react very strongly to certain types of sensory input (over-responsive) or may not notice it as much as others (under-responsive). A person can be very sensitive to some types of sensory input while being less sensitive to others.

SENSORY OVER-RESPONSIVITY

For children who are sensory over-responsive, their response to sensory input is greater than would be expected.

This can look like:

- Adverse reactions to light touch or messy play with paints or slime
- Being bothered by background noises, such as children talking in the halls
- Hesitation to climb, slide, or swing on the playground
- Strong reactions to scents (unable to tolerate being in the cafeteria or the bathroom)

SENSORY UNDER-RESPONSIVITY

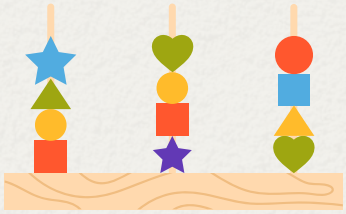
For children who are sensory under-responsive, their response to sensory input is less than expected.

This can look like:

- Not noticing food on his/her face or hands
- Not noticing bumps and scrapes
- Not noticing smells that other people notice
- Not responding to his/her name being called or directions being given

SENSORY DISCRIMINATION

Sensory discrimination is the ability to notice and understand details of sensations (sights, sounds, feelings, etc.). This ability provides us with quick and precise details such as the location, size, and other qualities of sensations. Sensory discrimination allows us to identify the difference between sensations and understand what they mean. It also helps us move our bodies in a smooth and controlled way and stay organized in our daily activities.



EXAMPLES OF HOW WE USE SENSORY PERCEPTION EVERYDAY:

Tactile:
- Reach into a backpack and pull out the correct item without looking
- Effectively manipulate fasteners or other manipulatives
- Identify when there is food on the face and where it is located

Vestibular:
- Identify the direction and speed of movement with vision occluded
- Maintain posture and balance (prevent slouching at desk)

Proprioceptive:
- Use the correct amount of force when shutting a door or coloring
- Know the position of your arm in space when throwing a ball

Interoceptive:
- Identify the cause (thirst, temperature, bathroom needs, etc.) when the body is feeling uncomfortable
- Identify body signals related to emotional responses

Auditory:
- Distinguish between sounds to listen for your name or follow verbal directions
- Identify where a noise is coming from

Visual:
- Spot the difference between two similar images or objects
- Locate an item on a messy desk
- Read letters and recognize reversals

Taste and smell:
- Check if milk has expired based on smell alone

Poor sensory discrimination can result in heightened emotional responses due to not having a good sense of self and/or one's environment

SENSORY-BASED MOTOR OUTCOMES

Sensory processing, especially body-based systems (proprioceptive, vestibular, and tactile) help children learn how to move and use their bodies.

When children have trouble integrating this sensory information, they often have challenges with posture, coordination, and motor planning (praxis)

PRAXIS

Praxis refers to the ability to think of, plan, and do new types of movement. Praxis, also called motor planning, is needed for everyday skills like getting dressed, writing, and riding a bike.

When these skills are practiced, they usually become automatic. But for children with sensory differences who struggle with praxis, this can take more effort and time. Dyspraxia is the term for the developmental disorder characterized by poor motor planning and coordination.

COMPONENTS OF PRAXIS INCLUDE:

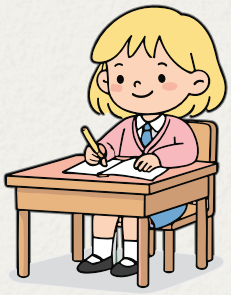
- **Sequencing:** Completing the movements required to complete a task in the correct order.
  - Important for: bathroom routine, climbing from one piece of playground equipment to another, completing multi-step crafts
- **Imitation:** The ability to copy body positions and movements from another person.
  - Imitation is a developmental foundation for learning and social engagement
- **Ideation:** The ability to generate ideas for how to interact with objects and move the body.
  - Having trouble coming up with new or different play ideas is a sign of less-developed ideation skills (may follow other student's in play)
- **Constructional (visual) praxis:** Planning and executing motor skills required to build, draw, or copy a visual design. This involves visual-spatial processing and motor coordination.
  - Examples include replicating a model to complete a craft, completing puzzles, copying a design onto graph paper
- **Modifying motor plans:** The ability to identify when a movement is not working as intended and change the motor plan (force, direction, timing) based on that information
  - If you throw short of the basket, you will use more force next time

POSTURAL DEVELOPMENT

Postural development relates to the ability to hold the body in upright positions. This includes the development of postural reactions, which are automatic adjustments the body makes to stay balanced.

Children also develop the ability to keep their head and body stable while their eyes move and to keep their eyes focused while their body moves (postural-ocular coordination).

THESE AREAS CONTRIBUTE TO THE ABILITY TO:



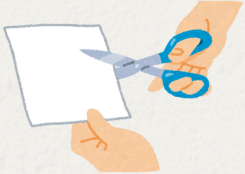
- Comfortably sit unsupported and maintain upright posture whiled seated at a desk (children with poor postural development may W- sit on the floor and slump at their desk)
- Rotate your body to turn towards someone when they call your name
- Control eye movements while the head and neck remain still during reading
- Clearly view surroundings while walking through the halls
- Develop ball skills
- Adequately scan a room to locate people or objects

BILATERAL INTEGRATION

Bilateral integration is the ability to use the left and right, upper and lower, and front and back of the body together in coordination. This is a foundational area that supports many academic, self-care, and play skills. Rhythm is essential for many bilateral coordination tasks as it provides timing and sequencing cues that allow sides of the body to work together smoothly and efficiently. Rhythmic movement also organizes and regulates the nervous system.

BILATERAL AND RHYTHMIC ACTIVITIES FOR THE CLASSROOM

- Tracing or using a ruler
- Projects with cutting and tearing
- Lacing or bead stringing
- Playdough, especially with tools
- Catching a large ball
- Encourage climbing, jumping rope, skipping, and hopscotch at recess
- Imitating clapping rhythms
- March to the beat of a song
- Movement break with repetitive coordinated movements: opposite knee touches, jumping jacks, sequential jumps



SENSORY-BASED MOTOR CHALLENGES MAY LOOK LIKE:

- Appears clumsy or frequently trips, bumps into things, and knocks things over
- Can complete familiar movements, such as running, but requires more time and instruction than expected to learn new motor skills
- Challenges with rhythmic tasks
- Difficulty coordinating sides of the body for tasks such as jumping with both feet, skipping, or using both hands to string beads
- Frequently repeats familiar activities instead of trying new ones
- Trouble generating ideas for what to make or build with craft supplies or blocks
- Difficulty imitating sounds, movements, positions, and facial expressions
- Delays in self-care skill development, such as dressing, bathing, and brushing teeth
- Fails to complete tasks with multiple steps
- Finds it challenging to carry multiple objects at the same time
- Shows poor timing when catching or kicking a ball
- Does not change their approach after an unsuccessful attempt
- Decreased efficiency and quality of movement in fine and gross motor tasks
- Difficulty generalizing a skill across different settings and tasks
- Avoids play activities that require high degrees of coordination

COMMON BEHAVIORAL CHARACTERISTICS

- Low self-esteem
- Easily frustrated
- May take on a “class clown” role, turning clumsiness or falling into a joke
- May take on a “director” role so that they can have an increased sense of control and lead the group towards activities they are comfortable with, also seen with other sensory differences

SENSORY PROCESSING AND AROUSAL

Sensory processing also affects attention and arousal (level of alertness). There is a "just-right" level of alertness where a child is most ready to learn or play. In this "just right" state, children can better take in sensory information and control their own emotions and behaviors.

For kids with sensory processing challenges, it is harder to find and stay within this "just-right" level of alertness. This makes it harder to stay focused and regulated enough to complete tasks or socialize. Motor planning challenges can also increase stress at the nervous system level, making regulation even more difficult for kids with sensory processing challenges,

SENSORY INPUT AFFECTS AROUSAL

Different types of sensory input have different effects on the body's nervous system. Some types of sensory input have an alerting effect on the nervous system and increase arousal. Other kinds of sensory input have a calming effect on the nervous system and decrease arousal.

ALERTING

- Light touch increases arousal. For children who are tactile defensive, it can cause dysregulation and aggression.
- Dysrhythmic/irregular, fast, and rotary (spinning) vestibular input increases arousal
- Fast, loud, irregular music

CALMING

- Deep pressure has a calming effect on the nervous system
- Slow, rhythmic, linear (back and forth movement, such as swinging or rocking) vestibular input decreases arousal and has a calming affect
- Soft lights
- Slow, rhythmic music

ORGANIZING

- Proprioceptive input is considered organizing for the nervous system. It can help bring the nervous system closer to optimal arousal.
- Self-initiated movements against gravity or resistance (pushing, pulling, lifting, weight-bearing, etc.) activate the proprioceptive system.

CONSIDERATIONS FOR OVER-RESPONSIVITY

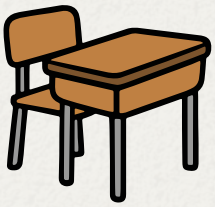
For students with sensory over-responsivity, the sights, sounds, and tactile sensations at school can feel too intense. This, combined with fewer opportunities for regulating movement, can make the school environment challenging. These students' bodies may react as if something is wrong, even when it is safe. The "fight or flight" system turns on and releases stress chemicals. This leads to a higher baseline stress level that makes it harder to manage emotions.

DEEP PRESSURE AND HEAVY WORK

Deep pressure tactile input and proprioceptive input cause the brain to release dopamine and serotonin. These neurotransmitters work together to activate the parasympathetic nervous system (known as the “rest and digest” system) and counter the “fight or flight” effects of the sympathetic nervous system. This provides a calming effect for the body.

- Deep pressure can come in the forms of giving/ receiving a bear hug, massage, weighted blankets, or compression
- Heavy work, such as pushing, pulling, lifting, and carrying heavy objects, provides organizing proprioceptive input

Activities to try include:



HELP MOVE DESKS

LIFT BOXES OR BOOKS

BEAR CRAWL OR CRAB WALK

PUSH THE SUPPLY CART

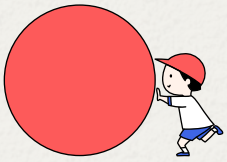
RICE OR BEAN BIN

CHEW GUM

TIGHT HUGS

CARRY A HEAVY BACKPACK

WEIGHTED BLANKET OR STUFFED ANIMAL



ROLL A WEIGHTED BALL

SIT IN BEAN BAG CHAIR

CLASSROOM SUPPORTS FOR REGULATION

Environmental modifications

- Use fluorescent light covers and dimmable lamps
- Encourage noise-canceling headphones
- Use unscented cleaning products and soaps
- Have flexible seating options that allow for more regulating proprioceptive and vestibular input throughout the day (bean bags, rocking chairs, yoga ball chair, placing an exercise band around the legs of a chair)
- Providing your students with warnings in advance before going into environments that may be over-stimulating

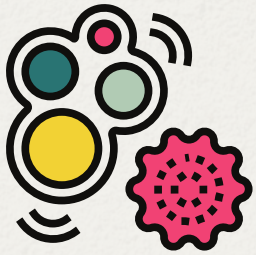
Movements & Mindfulness Breaks

- Incorporate frequent movement breaks and add movement to activities
- Guided meditations on youtube: Meditation YouTube link
- Breathing breaks: Kids' Breathing Exercises Link
- 5 sense mindfulness

"Regulation Station"

A designated space in the classroom that allows students to meet their sensory needs. Can include a bin of sensory items, a weighted blanket, regulation strategy cards, and posters related to any social-emotional programs you use.

For ideas of sensory-based items to include, refer to this link: https://docs.google.com/document/d/e/2PACX-1vSLAnEZqxwRJVzHjQT4_UNy5tG46aDqRe-UXmWojfaTePDqQh8O6O_viKdxpk9EYAmvNKoPmdmRogNf/pub



STUDENT-SPECIFIC SUPPORTS

Consultation with the school-based occupational therapist and caregivers is recommended to determine the best classroom supports for students with sensory processing challenges.

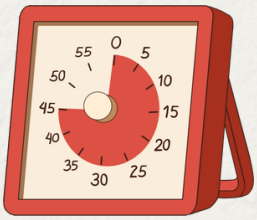
Examples of classroom supports include:

Use of visuals:

- Visual schedule (can draw out plan on white board or use velcro cards): free templates https://www.socialworkerstoolbox.com/printable-visual-schedules-and-daily-routine-charts-for-children/#google_vignette
- Social stories help kids understand expectations for new situations: free downloads https://autismbehaviorservices.com/social-stories/#library
- Regulation strategy cards
- Using real photos for visual sequencing supports breaking activities into smaller steps (morning routine, lunch room procedures, stations, etc.)

Modifications for transitions:

- If extra staff is available, transition student before or after the rest of the class
- Visual timers: https://visualtimer.com/, Amazon link
- Provide regulating sensory input before transition (deep pressure, heavy work)
- Emphasizing preferred aspect of the next activity instead of the transition itself
  - Ex: “You have to put away your coloring now.” vs “It’s time for music now, let’s put away our coloring so we can find out what fun songs we’ll do today.”
- Look for patterns and identify triggers for particularly challenging transitions

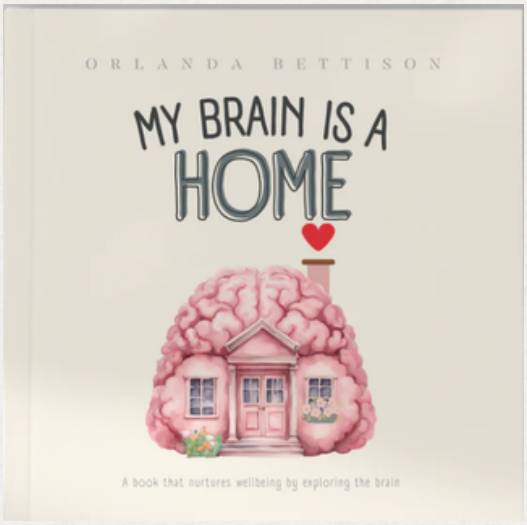


Classroom jobs

Try giving students with sensory processing challenges classroom jobs that give them opportunities for movement (proprioceptive and vestibular input)

- Examples include:
  - Pushing the supply cart
  - Handing out materials
  - Desk/ chair mover
  - Returning library books
  - Bag carrier

BOOKS TO READ WITH YOUR CLASS

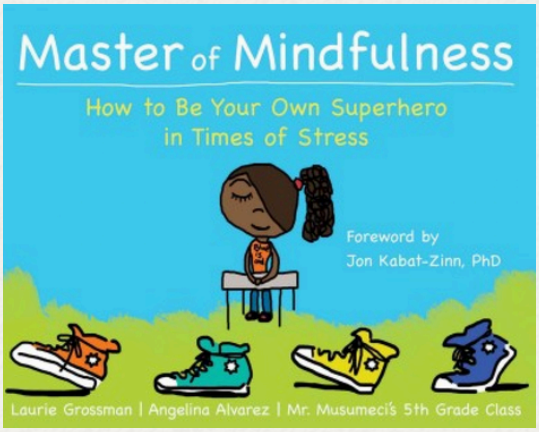


My Brain is a Home
By Orlanda Bettison
Ages 5-12

This book teaches children about 3 major parts of the brain that control our thinking, emotions, and behaviour.

Master of Mindfulness
By Laurie Grossman & Mr. Musumeci's 5th Grade Class
Ages 5-12

A book about managing stressors and regulating emotions written by kids for kids.



Superflex series
A part of the Social Thinking Curriculum
K-5th grade

This series teaches students about flexible thinking and self-regulation through superhero-themed stories.

Here is a blog post with additional emotional regulation books for kids written by occupational therapist Claire Heffron:
https://theinspiredtreehouse.com/emotional-regulation-books-kids/

RESOURCES TO CONTINUE LEARNING

Websites:

- Collaborative for Leadership in Ayres Sensory Integration (CLASI) has informative resources for parents: https://www.cl-asi.org/parents-en
- The STAR institute website has useful resources under the “resources tab”: https://sensoryhealth.org/basic/resources-for-parents-and-professionals
- Spiral Foundation website has downloadable guides and fact sheets under the resource tab: https://www.thespiralfoundation.org/about-spd

Books:

- *Sensory Integration and the Child: 25th Anniversary Edition* by Jean Ayres
- *Sensory Integration and Learning Disorders* by Jean Ayres
- *Ayres Dyspraxia Monograph* by Sharon Cermak and Jean Ayres

Podcasts:

- All Things Sensory Podcast https://harkla.co/blogs/podcast
- Sensory Chats Podcast https://www.sensoryintegrationeducation.com/pages/sensory-chat-podcasts

CITATIONS

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