A CAREGIVER'S GUIDE TO SENSORY PROCESSING

Learn about sensory processing and sensory-based strategies you can try at home to support your child's regulation and motor skills.

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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

TACTILE

Sense of light touch and deep pressure.

AUDITORY

PROPRIOCEPTION

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

VESTIBULAR

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

TASTE

INTEROCEPTION

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

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, like a lawn mower outside
- Hesitation to climb, slide, or swing on the playground
- Strong reactions to scents that others may not notice

SENSORY UNDER-RESPONSIVITY

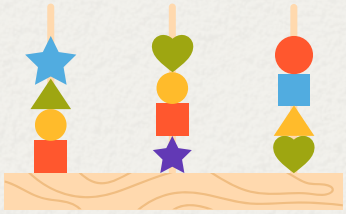
For children who are sensory under-responsive, their response to sensory input is less than expected.

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 DISCRIMINATION 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 without looking
- Maintain posture and balance

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 perception 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:

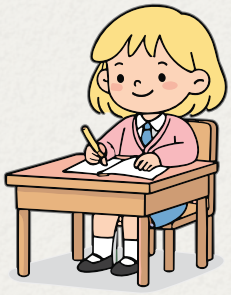
- **Sequencing:** Completing the movements required to complete a task in the correct order.
  - Important for: dressing, brushing teeth, climbing from one piece of playground equipment to another, completing multi-step tasks
- **Imitation:** The ability to copy body positions and movements from another 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
- **Constructional (visual) praxis:** Planning and executing motor skills required to build, draw, or copy a visual design.
  - Examples include copying a block design, replicating a model to complete a craft, and completing puzzles
- **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 skills).

THESE AREAS CONTRIBUTE TO THE ABILITY TO:



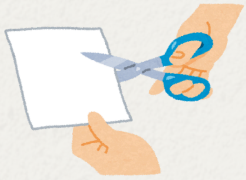
- Comfortably sit unsupported and maintain upright posture while seated at a desk (children with poor postural development may W- sit on the floor and slump at their desk)
- Rotate your body to turn towards someone when they call your name
- Keep head and body still while the eyes move to read
- Navigate surroundings while biking
- 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 important for many bilateral coordination tasks as it helps with timing and makes movements smoother. Rhythmic movement can also be regulating!

BILATERAL AND RHYTHMIC ACTIVITIES TO TRY:

- Building with legos
- Bear crawl, crab walk, log roll
- Lacing or bead stringing
- Climbing on playground equipment (monkey bars, rock wall, ladders)
- Catching a large ball
- Playdough, especially with tools
- Cooking or baking activities
- Imitating clapping rhythms
- Bounce on ball to a favorite song
- Repetitive coordinated movements: opposite knee touches, jumping jacks, hopscotch, bicycle legs, jump rope



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 (like tickles) 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.
- Heavy work (pushing, pulling, lifting, weight-bearing, etc.) activates the proprioceptive system.

CONSIDERATIONS FOR OVER-RESPONSIVITY

For children with sensory over-responsivity, everyday sights, sounds, or touch can feel too intense. Their body 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. As a result, their emotional reactions may seem bigger than expected for the situation.

DEEP PRESSURE AND HEAVY WORK

Deep pressure tactile input and proprioceptive input help the brain release calming chemicals called dopamine and serotonin. These chemicals turn on the calming part of the nervous system and counter the “fight or flight” stress response.

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

Activities to try include:

TRAMPOLINE

BALL PIT

RICE OR BEAN BIN

CARRY GROCERIES

SWIM

LIFT BOXES OR BIG TOYS

BEAN BAG CHAIR

COMPRESSING HAMMOCK OR BODY SOCK

CLIMB

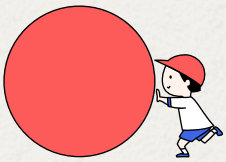
“BURRITO” ROLL INTO A HEAVY BLANKET

TIGHT HUGS

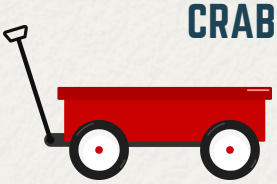
WEIGHTED BLANKET

BEAR CRAWL OR CRAB WALK

CHEW GUM



ROLL A WEIGHTED BALL



PULL A WAGON

ADDITIONAL SUPPORTS FOR REGULATION

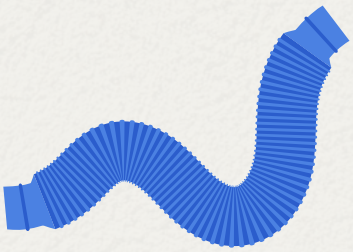
Environmental Supports

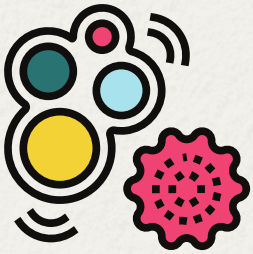
- Adding a dimer switch to lights in your home
- Providing noise-canceling headphones for loud environments
- Look for seamless, tag-free clothing
- Use unscented cleaning products, detergents, and soaps
- Creating a dedicated low-stim space in your home (a pop-up tent, draped blankets, a special comfy chair etc.)
- Providing your child with warnings in advance before going into environments that may be over-stimulating

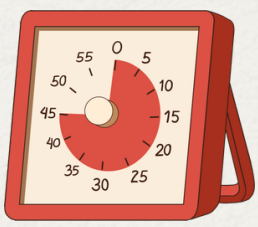
Calming Sensory Items

Sensory-based items can provide calming input and promote self-regulation. Speak with an OT for specific recommendations on what types of sensory toys would be the best fit for your child.

Here is a link to a list of general sensory item recommendations:
https://docs.google.com/document/d/e/2PACX-1vSLAnEZqxwRJVzHjQT4_UNy5tG46aDqRe-UXmWojfaTePDqQh8O6O_viKdxpk9EYAmvNKoPmdmRogNf/pub







Modifications for transitions:

- Transition before or after the rest of the group
- 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: “It’s time for school. You have art class today, I can’t wait to see what you will make!” vs “Turn off the TV, it’s time for school.”
- Look for patterns and identify triggers for particularly challenging transitions

ADDITIONAL SUPPORTS FOR REGULATION

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
- Marking upcoming events on a paper calendar and count down
- Social stories help kids understand expectations for new situations: free downloads https://autismbehaviorservices.com/social-stories/#library
- Regulation strategy cards
- Visual sequencing supports breaking activities (brushing teeth, dressing, mealtime, etc.) into steps

Breathing and meditation

- Breathing exercises: kids' breathing exercises link
- Guided meditations: Meditation YouTube link

5 Senses Mindfulness

WHAT TO DO IF YOU THINK YOUR CHILD MAY HAVE SENSORY PROCESSING CHALLENGES

Talk to your child's pediatrician about your concerns and request a referral for an occupational therapy (OT) evaluation.

- An OT can assess how your child processes sensory information through observations, standardized assessments, and parent/ caregiver surveys and interviews.
- The OT will determine if your child's sensory processing is impacting their development (motor skills, academic skills, play skills, daily living skills, emotional regulation)
- Your child may qualify for weekly occupational therapy services that consist of play-based approaches to promote sensory integration and build regulation skills to help in all aspects of life.
    - Sensory integration therapy should include the use of swings and climbing equipment to expose your child to a variety of sensory input and challenge motor planning skills.

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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