

MAKING SENSE OF SENSORY PROCESSING DISORDER



Center for Autism and Related Disorders
at Kennedy Krieger Institute

A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing teamwork and support.

OBJECTIVES

- Define sensory processing
- Review sensory systems
- Discuss characteristics of Sensory Processing Disorder (SPD)
- Understand the sensory and motor challenges children experience with SPD
- Attain sensory strategies to enhance a child's ability to successfully engage in activities of daily living throughout their school day
- Gain strategies to integrate behavioral interventions and sensory plans using a collaborative team approach



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing teamwork and support.

ROLE OF OT

- The role of an occupational therapist is to promote independence with daily living skills and functional everyday tasks
- A child's daily living skills include play, self care: eating, dressing, grooming, toileting, sleeping in addition to participating community based activities with family and peers
- Sensory processing is one factor that may be influencing a person's ability to perform their functional daily living tasks



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

SENSORY PROCESSING

Sensory integration is our body's ability to **take in the sensory information from our environment**, **organize the information**, and use it to **create a functional response** (Behavioral/Sensory/Motor Response)

- The sensory system is constantly processing information in order to understand the world around you
- This system is responsible for taking in the sensory information and then deciding if it is important to respond or filtering out the unimportant information

Based on the work of A.Jean Ayers, PhD, OTR



Center for Autism and Related Disorders
at Kennedy Krieger Institute



WHAT'S SENSORY PROCESSING LOOK LIKE?

For Example: Trying a New Food

1. Take In Sensory Information



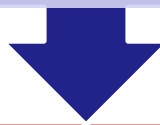
Color, taste, size, shape, smell, wet/dry, smooth/bumpy, temperature



2. Organize The Information



Is it a good smell, is it similar or different to foods you like



3. Create A Functional Response



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

WHAT ARE THE SENSORY SYSTEMS?

1. **Tactile System:** Touch
2. **Vestibular System:** Movement, balance
3. **Proprioceptive System:** Position, body movements
4. **Auditory System:** Hearing
5. **Visual System:** Sight
6. **Olfactory System:** Smell
7. **Oral/Gustatory System:** Taste



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

TACTILE SYSTEM

- The sense of touch

Responsible for:

- detecting harm
- localizing pressure
- determining the quality of a stimulus (hot/cold, rough/smooth, sharp/dull)
- discriminating between different types of touch (light/deep, tickle/scratch)



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing support and unity.

VESTIBULAR SYSTEM

- It is a fluid filled system located in the inner ear
- The sense of movement, balance, and relationship gravity
 - Tells us if we are moving, how fast we are moving, and in what direction we are moving
 - It coordinates the movements of the eyes, head, and body
- This sensory system maintains muscle tone, posture, and coordinates the two sides of the body



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

PROPRIOCEPTIVE SENSE

- The sense of position and movement of the body
- Uses information from the muscles and joints to give awareness of body position
 - This sense makes it possible for a child to adjust their body to prevent from falling out off a chair
 - Ex: Allows us to drink a cup of coffee with our eyes closed
- Stimulated by push pull activities



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

AUDITORY SENSE

- The sense of hearing
- Provides information about sound, pitch, volume, & tone
 - When you are driving and hear an emergency vehicle your auditory system gives you a lot of information
 - The noise is high pitched because it needs to alert you
 - It is loud so you can orient to it
 - You can tell the location or direction it is coming from
 - You can notice if it is not near you anymore and it is safe to continue driving



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

VISUAL SYSTEM

- The sense of sight
- Provides information about color, size, brightness, shape, texture, depth, and space



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

OLFACTORY SYSTEM

- The sense of smell
- Provides information about fragrant, burnt, acid, spicy, foul, pungent, etc.
- Closely related to taste



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

ORAL AND GUSTATORY SENSE

- The sense of taste
- Provides information about bitter, sour, salty, and sweet
- Sense of smell- strongly tied to memories





A Child's View of Sensory Processing Watch Video

<https://www.youtube.com/watch?v=D1G5ssZIVUw>



Center for Autism and Related Disorders
at Kennedy Krieger Institute



DIFFICULTIES WITH SENSORY PROCESSING

- A well integrated sensory system is able to process and respond to sensory input efficiently, appropriately, and maintain a constant state of comfort
- Deficits in sensory processing occur when the brain is not able to organize sensory input effectively or accurately
 - take in the sensory information from our environment
 - organize the information
 - create a functional response
- When the process of sensory integration is disorganized, a number of problems in learning, skill development, play, and/or behavior may be evident





WHAT SENSORY PROCESSING DIFFICULTIES MAY LOOK LIKE?

- Overresponsive or underresponsive to sensory input
- Unusually high (impulsive, on the go) or low (sedentary) activity level
- Limited functional play
- Motor coordination problems/poor motor planning- clumsy, bump into things, trip, fall
- Attention and/or behavior issues
- Low tone, fatigue with motor activities





CONTINUUM OF RESPONSES TO SENSORY INPUT

UNDERRESPONSIVE

OVERRESPONSIVE



Optimal Arousal level

- High Sensory Threshold
- Sensory seeking
- Hyporesponsive
- Low Registration
- Sensory Cravings

- Low Sensory Threshold
- Sensory Avoiding
- Hyperresponsive
- Sensory Sensitive



Center for Autism and Related Disorders
at Kennedy Krieger Institute



EXPERIENCING SENSORY MOTOR DYSFUNCTION



Center for Autism and Related Disorders
at Kennedy Krieger Institute

A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing support and unity.

CHARACTERISTICS OF AN OVERRESPONSIVE SENSORY SYSTEM

- The child's central nervous system is hyper alert to sensory input
- Tend to avoid sensory experiences
- May go into sensory overload, fear, or stress which triggers a 'fight or flight' or 'fight or freeze' response
- Overreact, negatively and emotionally, to ordinary movement sensations
- Cautious, slow moving, sedentary and hesitate to take risks
- Dislike messy play activities
- Distress during grooming and dressing tasks
- Cover ears to protect from noxious sounds
- Refuse certain food textures or temperatures





TOOLS TO ADDRESS OVERRESPONSIVENESS

- Provide deep pressure activities
 - Ball roll, hotdog roll, mat sandwich, weighted vest/pads, firm hugs
- Encourage play with multi-sensory toys
 - Fidgets, textured balls, putty, foam soap, water play
- Slow, gradual, predictable movements
- Activities should be close to the ground
- Warn before loud noises
- Provide a tunnel, tent, fort, or small space



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing support and unity.

CHARACTERISTICS OF AN UNDER-RESPONSIVE SENSORY SYSTEM

- The child's central nervous system is hypo-aroused or under-aroused to sensory input
- Child seeks out sensory experiences due to poor registration of sensory input
- Seek alerting input
- Have poor body awareness, requiring firm pressure to know where they have been touched
- Constantly touch people and objects
- Need to move constantly, fidget, difficulty sitting still
- May not respond when called
- May stuff or pocket food





TOOLS TO ADDRESS UNDER-RESPONSIVENESS

- Hand fidgets
 - Textured balls, putty, therabands vibratory input
- Use multi-sensory toys
 - Putty, sand, noodles, shaving cream, foam soap, finger painting, vibration
- Sit on a rocking chair, T-stool, seat disc, large ball
- Vary tone, pitch, and rate of speech
- Activities that provide heavy work (stretching and shortening muscles)
 - Open/close door, help rearrange furniture, push stroller/wagon, tug-o-war, wall push-ups, chair push-ups, erase chalkboard, carry heavy books or backpack, playground activities (monkey bars, trampoline, jump off platform)



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing support and unity.

BENEFITS OF SENSORY STRATEGIES

- Promote functional and purposeful activities
- Help children adjust to under/over sensitivities to promote an appropriate arousal level so they can participate optimally
- Help the student identify his or her arousal level
- Help the student, parent and teacher identify appropriate sensory based coping strategies to adjust their child's arousal level
- Assist families and classroom staff to create supportive sensory environments for their child



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing support and unity.

IS IT SENSORY OR IS IT BEHAVIOR?

- Children can respond to a sensory need with negative behavior
- The child's sensory needs should be addressed as well as the behavior
- A sensory “diet” and a behavioral plan can be developed jointly
- Sensory input should be a preventive tool
- Be careful not to reward a child behaving poorly with sensory input



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and teamwork.

STRATEGIES FOR THE CLASSROOM

- **Environmental Adaptation**
- **Routines**
- **Inclusion**



STRATEGIES CONTINUED: ADAPTIONS

Environmental Adaptions:

Reduce sounds

Reduce extra visual input

Organize the work space (folders, baskets, containers)

Seat placement

Desktop accommodations

Visual to prompt personal space

Calming options

Movement opportunities





STRATEGIES CONTINUED: ROUTINES

Routines:

Consistent routines with consistent expectations

Providing visual or auditory supports (schedules, timers)

Develop transition activities (song, movement sequence)

It takes time to develop routines



Center for Autism and Related Disorders
at Kennedy Krieger Institute



STRATEGIES CONTINUED: INCLUSION

Inclusion:

Movement games paired with classroom curriculum

Yoga

Simon Says

Dance breaks

Stretching

Morning Warm Ups



Center for Autism and Related Disorders
at Kennedy Krieger Institute

A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing support and teamwork.

SENSORY GYMS: DO'S AND DON'TS

- Use preventively
- Scheduled sensory breaks
- Collaborate with your student's occupational therapist regarding specific movement, pressure, touch, activities that your student will benefit from
- Caution when using swings: balance, safety, gravitational insecurity, vestibular over-responsiveness
- Do not use a sensory gym as an indoor playground
- Do not use the sensory gym with a child who is escalated-need alternative plan/location
- Do not use the sensory gym as a reward





Collaboration is KEY

- Occupational therapists should collaborate with the IEP team including
- Speech therapy
- Behavioral therapy
- Psychology
- Teacher
- Teacher assistant
- Family



A black and white photograph showing several hands of different skin tones stacked on top of each other, symbolizing unity and support.

BARRIERS TO IMPLEMENTING SENSORY STRATEGIES

- Time
- Group dynamics
- Parental involvement
- Caseloads
- Size of classrooms
- Equipment
- Needs of other children in the classroom





GROUP DISCUSSION



Center for Autism and Related Disorders
at Kennedy Krieger Institute



REFERENCES

- Ayers, A. J. (1979). *Sensory Integration and the Child*. Los Angeles, CA: Western Psychological Services.
- Anderson, E. & Emerson, P. (1996). *Unlocking the Mysteries of Sensory Dysfunction: A resource for anyone who works with or lives with, a child with sensory issues*. Arlington, TX: Future Horizons.
- Dunn W (2001). "The sensations of everyday life: empirical, theoretical, and pragmatic considerations". *AJOT*. 55 (6): 608–20.
- Kranowitz, Carol Stock, M.A. (1998). *The Out-of-Sync Child: Recognizing and coping with Sensory Processing Problems*. New York, NY: The Berkley Publishing Group.
- Kranowitz, Carol Stock, M.A. (2003). *The Out-of-Sync Child Has Fun: Activities for kids with Sensory Processing Problems*. New York, NY: The Berkley Publishing Group.
- Marco EJ, Hinkley LB, Hill SS, Nagarajan SS (May 2011). "Sensory processing in autism: a review of neurophysiologic findings". *Pediatrics Research*. 69 (5 Pt 2): 48R–54R
- Miller LJ, Anzalone ME, Lane SJ, Cermak SA, Osten ET (2007). "Concept evolution in sensory Integration: a proposed nosology for diagnosis". *AJOT*. 61 (2): 135–40
- Miller, Lucy Jane (2006) *Sensational Kids: Hope and Help for Children with Sensory Processing Disorder*. Penguin Group USA Inc.
- Paris, Betty A. and Murray-Slutsky (2005). *Is it Behavior or Is it Sensory: Behavior Problem Identification, Assessment, and Intervention*. Psychcorp a Brand of Harcourt
- Owen, J. , Marco, E., Desai, S., Fourie, E., Harris, Julia , Hill, Susanna S., Arnett, Anne B., Mukherjee, Pratik. (2013) Abnormal white matter microstructure in children with sensory processing disorders. *NeuroImage: Clinical*. DOI:10.1016/j.nicl.2013.06.009

