

# Understanding Sensory Processing and Autism

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# Activity

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<https://www.youtube.com/watch?v=IcS2VUoe12M>

Video Clip from “Inside Autism” documentary

# Discussion

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- What were some of your challenges?
- How did this make you feel?
- How did this affect your ability to focus?



# Introduction

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Video Clip

# What is Sensory Processing?

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- Sensory Processing (or Integration) is a complex interplay and organization of the senses necessary in order for a person to interpret a situation accurately and make an appropriate response
- Sensory input is necessary for brain functioning
- We cannot see sensory integration... we can only see **learning** and **behavior** that results from sensory integration
- Gives meaning to what is experience by sorting out what is important and allows us to act or respond to a situation



# What is Sensory Integration?

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- Foundation for academic learning and social behavior
- Sensory input and integration is influential for:
  - Arousal regulation
  - Attachment and social relationships
  - Organization of actions
- Over 80% of our nervous system is involved in processing and organizing sensory input

# What is Sensory Integration?

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- The process of sensory integration is like *directing traffic*
- Sensory dysfunction is like a *traffic jam*
- Terminology
  - “Sensory Processing” vs. “Sensory Integration”
  - “Sensory Integration Theory”





# How does sensory integration occur?

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- Sensory Registration
- Orientation
- Interpretation
- Organization of a Response
- Execution of a Response





# Sensory Registration

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- Example: “I hear something” OR “something is touching me”
- Sensory Threshold
  - Variable among individuals/ depends on time of day, previous experience, emotional state, alertness/ stress level, what you expected (i.e. unexpected will likely register more intensely)
  - Hyper/ hypo-reactivity (more on this later)

*What sensory inputs are you noticing right now?*

# Orientation

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- Paying attention to new sensory input
- Brain must decide what is important and what can be ignored
  - Our brains do this automatically
    - Tune in/ Turn up
    - Tune out/ Turn down

*What are you paying attention to and ignoring right now as you sit here?*



# Interpretation

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- Brain interprets sensory information and describes qualities
- Example: I am being touched lightly on my arm by a piece of soft fabric”
- Brain is programmed to respond in order to protect you from harm
  - Fright, flight, or fight response
  - Increased heart rate and respiration, increased blood flow to muscles
  - Brain’s interpretation may initiate an appropriate or inappropriate response
  - Child reacts according to what their brain interprets!!

# Organization of a Response

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- Brain needs to determine whether a response is necessary
- Response can be physical, emotional, or cognitive



# Execution of a Response

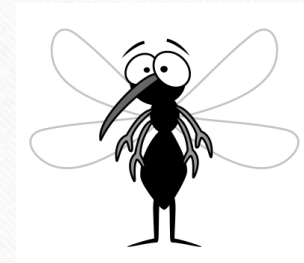
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- Our ability to execute an appropriate response depends on previous components (registration, orientation, interpretation, organization) and adequate motor planning abilities

# Example

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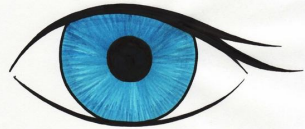
- A mosquito lands on your arm...
  - **Sensory Registration:** I feel something
  - **Orientation:** It is a light touch on my left arm near my elbow
  - **Interpretation:** It is a mosquito. I don't want a mosquito on my arm because it might bite me.
  - **Organization of a Response:** I need to swat it away using my right hand
  - **Execution of a Response:** I activate my right arm to move in such a way that I am able to swat away the mosquito.





# What are the sensory systems?

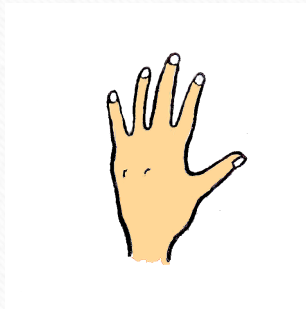
- Visual



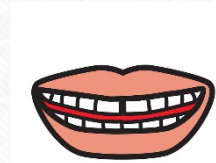
- Auditory



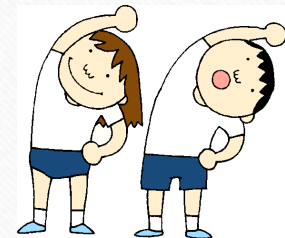
- Tactile



- Smell/ Taste



- Proprioception



- Vestibular



# The ones we already know...

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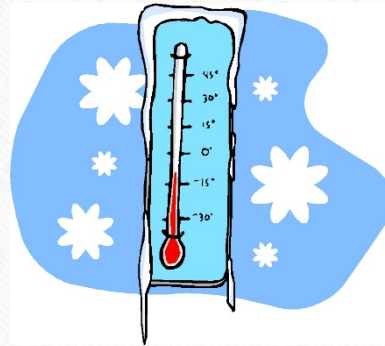
- Vision
- Auditory
- Smell
- Taste

We already know what these do and why they are important...



# Tactile System

- Sense of Touch
- Protects us from DANGER
- Also used for:
  - Pain
  - Temperature
  - Pressure
  - Reassurance
  - Relaxation
  - Communication



# Proprioceptive System

- The unconscious awareness of body position
- Communicates position of body parts, relation to each other, and relation to other people and objects, in other words: Knowing where you are in SPACE
- Movements that require muscles to stretch and work hard





# Vestibular System

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- The sense of movement
- Provides information about movement, gravity, and changing head position
- Quick movements are ALERTING
- Slow movements are CALMING
- Fundamental to all our ACTIONS!



# Sensory Processing Dysfunction

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- Modulation
- Discrimination
- Praxis



# Sensory Processing Dysfunction

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- Modulation
  - The ability to regulate organize reactions to sensory input in a graded and adaptive way
  - Means you can attend to what is important and ignore what is not
  - Alert enough, yet relaxed enough to experience enjoyment and satisfaction in the doing of everyday activities
  - This is where we start working on sensory problems— you have to be able to organized before you can do anything else!

# Hyper- or Hypo- Reactivity

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## Hyper-Reactivity

- Distress with certain sounds
- Sensitivity to light
- Discomfort with certain textures
- Aversion to certain smells/ tastes
- Irrational fear of heights or movement
- Frequent startle reactions

## Hypo-Reactivity

- Disregard of sudden or loud sounds
- Unaware of painful bumps, bruises, cuts, etc.
- Absence of startle reactions
- Lack of attention to environment, persons, things
- Lack of dizziness with excessive spinning
- Delayed responses



# Sensory Dysfunction

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- Sensory Discrimination
  - The ability to distinguish between different stimuli and organize temporal (time) and spatial qualities
- Praxis
  - The ability to plan new movements
  - Includes the processes of:
    - Ideation: knowing what to do
    - Motor Planning

# What is Sensory Dysfunction?

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- Inappropriate and inconsistent responses to sensory stimulation
- Difficulty organizing and analyzing information from the senses
- Reduced ability to connect or “integrate” information from there senses
- Limited ability to respond to sensory information in a meaningful and appropriate manner
- Difficulty using sensory information to plan and execute actions



# Sensory Processing Dysfunction

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- Every individual with poor sensory integration shows a different set of symptoms
- Children with SI issues develop in uneven ways
- Sensory processing dysfunction is NOT:
  - Brain damage
  - Decrease in brain cells
  - Indication of intelligence

# Signs of SI Dysfunction

- Hyper-sensitivity, hypo-sensitivity, or mixed sensitivities to sensory stimulation
- Avoids sensory input
- Seeks sensory input
- Unsure of body position
- Poor motor planning
- Poor coordination, inconsistent motor performance, difficulty learning new motor tasks
- Easily distracted, limited attending skills
- Over-aroused, high activity level, hyper-vigilant
- Under-aroused, low activity level, self-absorbed, passive
- Speech/ language delays
- Learning difficulties
- Behavior Problems





# Sensory Processing and Behavior

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Since we cannot see what is happening inside an individual's brain... we rely on his/her behaviors to tell us what is going on.

Behaviors you may observe:

- Hyperactivity/ inability to sit still
- Withdrawal from activities/ others
- Self-injurious behavior, aggression
- Mouthing objects
- Spinning
- Intentional bumping/ crashing into things/ people
- Excessive noise-making
- Rigidity about routine
- Difficulty with transitions



# What else can impact sensory issues?

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- Physiological symptoms
  - Illness, tired, constipation
- Emotional state
- Anxiety
  - Change in routine
  - Challenging tasks
- Other diagnoses
  - Autism, ADHD, ADD

Think of it like a bucket.....





# Key Points to Remember About Sensory Dysfunction

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- An individual with sensory dysfunction reacts to sensory stimuli in accordance with how they perceive it
  - i.e. “fight or flight” response is very real and how they feel they should react to given stimuli
- Inconsistencies in behavior and response to sensory stimuli may occur depending on a variety of factors
- Individuals may have trouble using more than one system at a time
  - Example: may have trouble maintaining eye contact while participating in a conversation

# Sensory Organization

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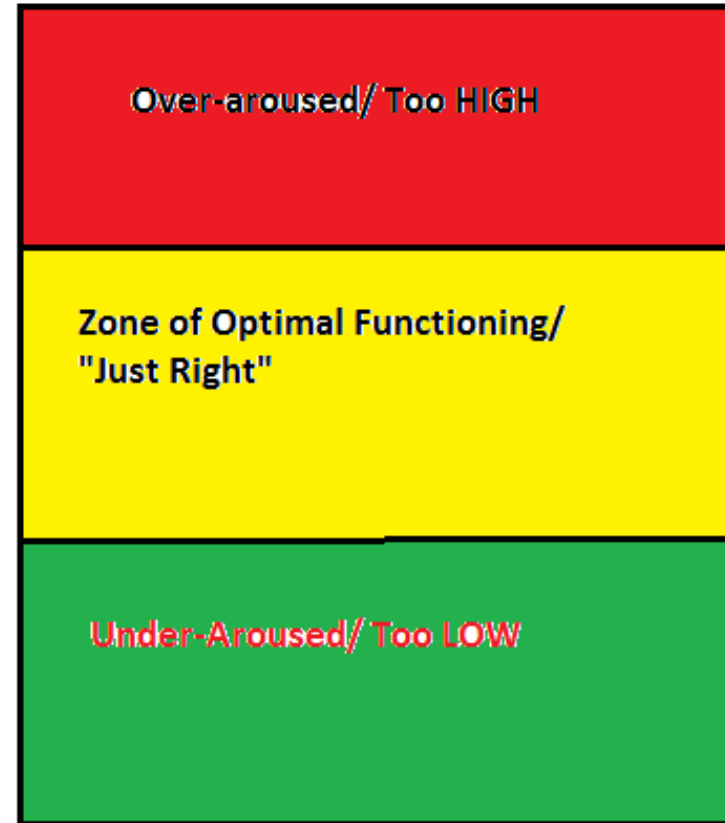
- This is when we feel best: you are alert enough but not over-aroused. You can attend and focus well when you are “organized”.
- Generally speaking, the best ways to achieve sensory organization is through DEEP PRESSURE and HEAVY WORK
  - You cannot overload a child with these 2 types of input (other than maybe making them tired 😊).
  - Start here and if that doesn't seem to help then pull in the other senses.



# Arousal Level

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- Varies throughout the day
- The Zone of Optimal Functioning is where we can focus, attend, get work done– it's when you are "JUST RIGHT"
- Many of our kiddos have difficulty getting into and staying in this zone



# How to Adjust Arousal State?

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Think of your body like a CAR....

- If your engine is going too fast, you push the BRAKES.

*Think of CALMING activities like the BRAKES.*

- If your engine is going too SLOW, you push the GAS.

*Think of ALERTING activities like the GAS pedal.*





# Calming/ Organizing Activities

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- Rhythmic activities (this could be anything from swinging to music)
- Decreasing the intensity of the environment (less light, less activity, less sound, etc.)
- Resistive activities
- Deep pressure
- Slow movement



# Alerting Activities

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- Fast, irregular movements
- Bright lights, colors
- Varying intensity, pitch, beat of music
- Resistive activities
- Light touch





# OT Intervention

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- Assess/ evaluate sensory processing
  - Sensory Profile, Sensory Processing Measure, Sensory Integration and Praxis Test
  - Interview
  - Observation (structured and unstructured)
- Develop individualized plan
  - Sensory diet
  - Strategies for specific problems
  - Structured use of sensory inputs/ activities

# OT Intervention

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- May include:
  - Willbarger Protocol (brushing program)
  - Programs like Interactive Metronome, Therapeutic Listening
  - Parent/ Caregiver Education
  - Social/ Sensory Stories
  - Visual Schedules
  - Self-regulation programs such as ALERT (How Does Your Engine Run)
  - Variety of sensory activities including: tactile play, feeding/ oral play, use of movement/ planning activities, heavy work, and deep pressure



# OT Intervention

- May look simply like PLAY!
- Using variety of sensorimotor activities to help child:
  - Regulate arousal levels
  - Increase attention/ decrease distractibility
  - Decrease anxiety
  - Increase comfort in environment
  - decrease self-stimulating behaviors
  - Develop internal motivation
  - Facilitate positive interactions with peers and adults
  - Promote communication
  - Improve skill performance and increase independence



# What can I do as a caregiver?

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- Recognize the signs that a child needs more or less input
- Redirect them to an activity that may be a “better fit” for them in that moment
- Encourage them to participate but never force
- Follow their lead. Children often seek the input that they need, but they may need you to help control it. Many times kids will seek input and will end up getting too much and becoming over-aroused.
- Advocate for them



# What can I do as a caregiver?

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- Adults
  - We can still try to recognize when an individual is overwhelmed or uncomfortable in an environment
  - Encourage the to advocate for themselves or adjust themselves or the environment
  - Encourage them to participate but understand if they are not yet ready
  - Offer them an “out”. Help them identify appropriate solutions.

# Special Considerations with Autism

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- Not all people with sensory processing issues have ASD, nor do all people with ASD have sensory processing issues
- Many of the characteristics of ASD also fit the mold of sensory processing difficulties- this may or may not be the case
  - Rigidity about routines, difficulty with transitions, reluctance to try new things, unusual or specific interests, social awkwardness could all be indicative of sensory processing issues



# Questions?

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Please feel free to contact me if you have questions or concerns!

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# References

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