

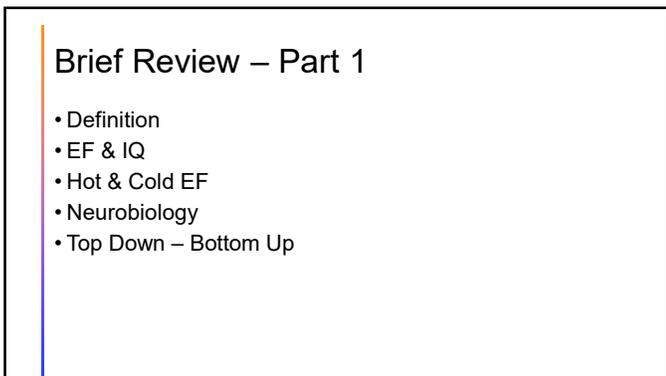


Agenda – Part I	Part II
<ul style="list-style-type: none">• Definition• Neurobiology• Development	<ul style="list-style-type: none">• Clinical Interventions• Interdisciplinary approaches• Early Intervention• Dyadic Interventions• School Based Interventions

- + • Executive Functions
- o - Definition
- s

- Widely used term applied to various aspects of adaptive functioning.
- The meaning varies greatly depending on the knowledge and intent of the user. (McCloskey, 2009)







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Play

- A powerful tool for intervention
- Play therapy refers to a large number of interdisciplinary treatment methods all applying the therapeutic benefits of play.
- Play therapy differs from regular play – helps children to address and resolve their concerns that are barriers to adapting to their environment to the best of their ability.

Interdisciplinary Concepts of play

- Pediatric OT interventions
- Infant and early childhood mental health interventions
- Dyadic models of intervention

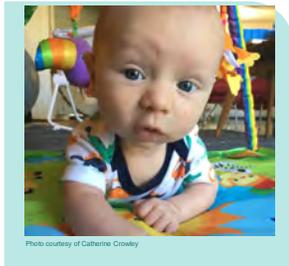
Levels of Play

- Sensory play
- Parallel play
- Symbolic play
- Engaged play

**Sensory Processing,
Co-Regulation, &
Executive Function**

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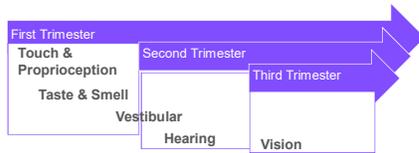
Let's Take a Look at Critical Periods of Development:



**SP: Sensory Processing &
Development**

- Sensory Processing (SP) plays a **vital** role in **motor, intellectual** and **social development**
- Typical SP contributes to:
 - All movement
 - Attention
 - Learning
 - Emotional Regulation
 - Social Functioning
- Atypical SP is a crucial part of development in children affected by a wide spectrum of neurodevelopmental disorders, including **autism**

When the Senses Come Online



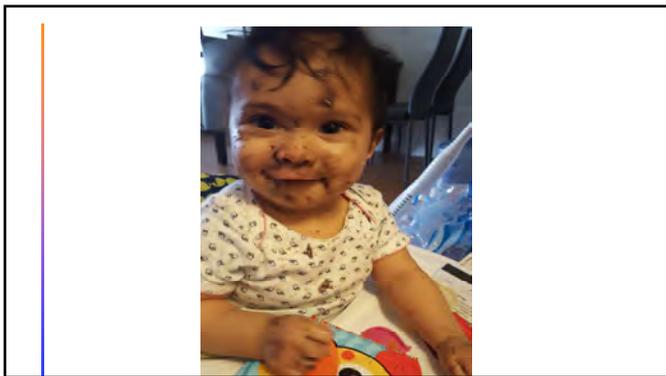
Adapted from Nebraska's "Sensory Development System" published in Zero to Three. <http://zerotothree.com>

Impact of Sensory Processing on Affective and Motor Experiences



Photo courtesy of Catherine Crowley





What are the senses?

- Name the big 5

The Big 5 Plus 3 (and maybe 1 more)

	1. Vision (seeing)
	2. Auditory (hearing)
	3. Olfactory (smell)
	4. Gustatory (taste)
	5. Tactile (touch)

Sensory Systems, cont'd

- 6. **Vestibular:** Receptors in semicircular canals of the inner ear.
- **Response to position of the head in relation to gravity and movement.**
- **Ability to keep head erect and vertical in relation to the ground.**
- **Impacts on development of body posture, muscle tone, visual-motor control, bilateral coordination, reflex integration, equilibrium responses.**
- **Provides for a sense of security of where body is in space.**
- **Contributes to alertness and arousal**

Sensory Systems, Cont'd.

- 7. **Proprioception:** Receptors located in joints and muscles.
- **Response to pressure, movement, and changes of position provide information regarding position of body in space.**
- **Critical in development of body scheme and motor planning, controlled, smooth and coordinated movements.**
- **Provides security and stability in movement, body position.**
- 8. **Interoception:** provides information about the internal condition of our body and its signals. Cues us when hungry, full, having to eliminate, breathing, and autonomic nervous system (ANS) related to emotions (flushing, breathing heavily or holding our breath, etc)
- **Effective communication among body, mind, feelings (Price & Hooven, 2018).**

Neuroception: Polyvagal theory (Stephen Porges, PhD, Neurobiology of feeling safe

- Developed the contribution of the 2 sides of the cranial nerve (dorsal and ventral) called the Vagal Nerve system to understanding behavior
- Porges' Polyvagal theory has an expanded interpretation of the autonomic nervous system, ANS, (out of our consciousness, response to stress, etc) including sensory pathways and emphasizing brainstem regions regulating our autonomic function (like breathing, sweating when stressed)

• Porges, S. (2011). *The Polyvagal Theory: Neurophysiological foundations of emotional attachment, communication, self-regulation.* NY: Norton.
 • Porges, S. (2017). *The pocket guide to the Polyvagal Theory: The transformative power of feeling safe.* NY: Norton.
 • A noted international scholar and Distinguished University Scientist at Indiana University, where he directs the Trauma Research Center within the Kinsey Institute.

#9 Neuroception: Polyvagal Theory: Social Engagement System

- This theory links sensory pathways, brainstem areas influencing and regulating autonomic function.
- The two parts of the Vagus Nerve (10th cranial nerve) system function differently. The "smart vagal" is the ventral (frontal) vagus nerve area that links regulation of the muscles of the face and head to produce a **social engagement system** (*I smile, you smile, etc. "I see you"*).
- Dorsal areas of the Vagus nerve are unmyelinated (the dumb vagal) and terminate below the diaphragm, controlling many areas of our viscera and digestive tract.
- The Ventral areas are myelinated (smart vagal) and terminate above the diaphragm. They are the social engagement areas.
- Locate these areas on your body

Polyvagal Theory & Neuroception

- Emphasizes social reciprocity
- Co-regulation
- Connectedness
- Neuroception uses this process to evaluate risk vs safety. If trauma has occurred repeatedly, neuroception's evaluation is not always accurate and we can perceive threat when there is none
- (See TED talk, Nadine Burke Harris, and ACES (Adverse Child Experience Scale))

Contributions of Sensory Systems to Executive Functioning

- Organized sensory processing allows us to respond and interact with the world in an effective manner to solve problems, learn, and achieve our goals.
- What is your world like when loud music is playing near you as you attempt to concentrate?
- When you are driving somewhere new, what kind of environment do you require in order to follow directions? What sensory systems are involved in this effort? (hint: there are a lot)

Ooh, now this could be dysregulating.....



Intervention strategies

- Let us brainstorm a few solutions to the questions posed in the previous slide
- What are strategies you might use to help yourself concentrate, drive safely to a new place, and stay calm throughout?
- These are the same strategies you can help your clients with.
- IDEAS: Calming, regulatory-building sensory input
- Put a few in the chat while we watch this short video.
- <https://www.youtube.com/watch?v=Pu05WNLpyjY>



Shifting attention, following directions: Move and Freeze

• <https://www.youtube.com/watch?v=388Q44ReOWE>



What is Proprioception? WHY?

- <https://www.youtube.com/watch?v=Oquc160D1dw>
- Proprioceptive activities activate, calming, organizing movements through "heavy work" activities that put weight on the bones, joints, and increase blood flow while calming the system.
- Activities (depending on the child) can be of short duration. If the child needs more, give them more!
- **Little ones:** Crawling through a short tunnel and sports
- **Big kids:** Jumping Jacks calisthenics,
- Pushing a large foam block, book, wagon with a rock in it, etc.

Regulate the environment first

- Is it possible to: turn music down? Change music to be calming?
- Turn TV off or down?
- Everyone speak softly? Create a sensory corner?
- Wrap up in a snug blanket? (swaddle)
- Get outside to a calm spot?
- Create a spot in a closet that is cozy with a blanket, light, pillows, etc?

Strategies to calm and organize don't have to be costly, just creative

- Brainstorm in small groups about a case where you break up your session with play or movement, or some of these activities.

PLAY

- Joy ignites the system!
- Laughter is the best medicine
- A smile goes a long way

These old sayings may make you want to be cynical, but they are actually spot on!



the senses and contribute to self-regulation and executive functioning

- "Playfulness in humans does not end when adulthood begins and it serves many functions beyond the learning of species-specific skills."

Sensory Strategies and Interventions

- **Sensory Experiences:**
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- Short animated intro to proprioception- <https://www.youtube.com/watch?v=Oqac160D1dw>
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- **Explanations & Ideas for general sensory calming strategies**
- (3 min) - <https://www.youtube.com/watch?v=3G5W7N1pyY>
- (12 min) - <https://www.youtube.com/watch?v=8CHN4F8W4>
- **Movement/Proprioception Strategies - Ideas**
- <https://www.youtube.com/watch?v=8jg4FT-cGgM>
- <https://www.youtube.com/watch?v=0X6N400Gc>
- <https://www.youtube.com/watch?v=yv8e3k1Dc> - Really great compilation of animal walks!
- <https://www.youtube.com/watch?v=5d3mrm6k4g> - More animal walks from PTN
- <https://www.youtube.com/watch?v=3d95e4005dQ> - Sensory chalk walk
- <https://www.youtube.com/watch?v=5TjY5Uj>
- <https://www.youtube.com/watch?v=388245402WE>
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School based Interventions

- Studies have shown programs that integrate physical activity with the teaching of academic subjects have better academic outcomes.

Programs combining movement plus instruction.

- **Take 10!** – Children’s movements are designed to solidify and concretize academic concepts, such as marching in place to a story about exploration, learning multiplication tables by doing jump rope actions, or doing two-part muscle contractions to help students understand word contractions. (Kibbe 2011, McCloskey, 2009)
- **Learning Through the Arts** – Artist educators partner with teachers in creating and delivering arts-infused lessons, such as learning math through dance, history thru story-telling.

Theater

- Noice (2004) found that theater training which involves moving in space and using one's whole body (embodiment) produces more EF benefits than training in more sedentary art such as visual arts, digital photography or quilting.
