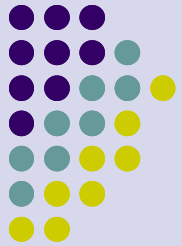
Feeling “Just Right”: Ways to Understand Your Child’s Sensory System



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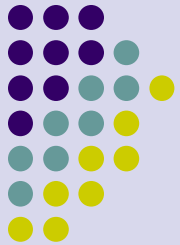
Sensory Integration Theory



"Sensory integration is a theory of brain-behavior relationships. … a neurological process that enables the individual to take in, interpret, integrate, and use the spatial-temporal aspects of sensory information from the body and environment to plan and produce organized behavior."

Fisher, A.G. & Bundy, A.C. (1992). *Sensory integration theory.*

What are our senses?

- Hear (Auditory)
- Taste (Gustatory)
- Smell (Olfactory)
- Touch (Tactile)
- See (Visual)

Auditory

- The primary auditory cortex is located in the superior temporal gyrus of the brain

- Responsible for hearing
  - Level of loud
  - Language comprehension
  - Interpretation of your environment

How do you feel?

-
- https://www.youtube.com/watch?v=ZbZSe6N_BXs
- https://www.youtube.com/watch?v=1SiyIvmFI_8

Gustatory

- The primary gustatory cortex is located near the somatotopic region for the tongue, in the insular cortex deep in the lateral fissure with the secondary taste areas in the opercula
- Responsible for our sense of taste
- Discriminates between safe and dangerous ingestible

Olfactory

- The olfactory bulb is located in the most forward part of the brain on the bottom side of the brain

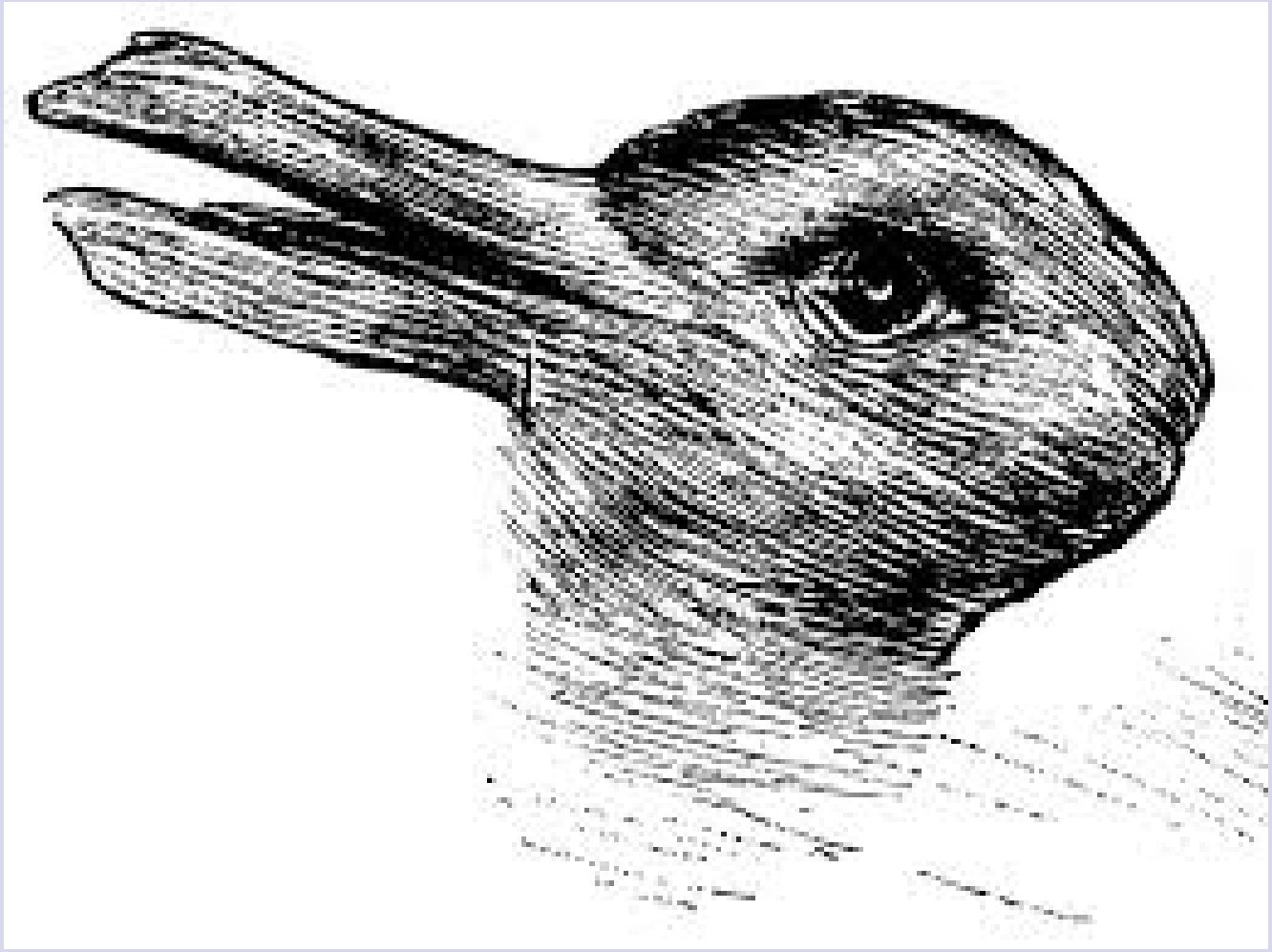
- Serves 4 functions:
  - discriminating among odors
  - enhancing detection of odors
  - filtering out many background odors
  - allowing higher brain areas related to arousal and attention to modify the detection and/or the discrimination of odors

Tactile

- The body sends tactile information to the somatosensory cortex through neural pathways to the spinal cord, the brain stem, and the thalamus
- Often, when an individual has deficits in their sensory processing abilities, we will see it in their interpretation of tactile experiences
- Tactile interventions are some of the most common in sensory integration interventions

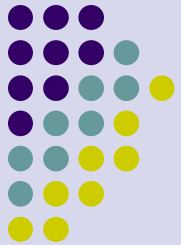
Visual

- The primary visual area of the brain is the occipital lobe
- The visual cortex interprets the image to extract form, meaning, memory, and context



But there are more!

PROPRIOCEPTIVE



- Provides intake that helps us with perception of sensations from touch and movement.
- Helps produce muscle tone and assist with postural adjustments.
- Tells us position of body parts and awareness of body image.
- Responds to maintain touch pressure and muscle grading-effort each muscle should put out to accomplish an action.
- Assists in calming and organizing.
- Assists in developing body scheme for motor planning.

VESTIBULAR

- Where our heads and bodies are in relation to the surface of the earth (gravity).
- Whether we are moving or standing still.
- Whether objects are moving or motionless in relation to our body.
- What direction we are going in, and how fast we are going.

INTEROCEPTIVE

- Receptors gather information from the inside of our body and send it to brain
- The brain helps to make sense of these messages and enables us to feel things such as hunger, fullness, itch, pain, body temperature, nausea, need for the bathroom, tickle, physical exertion and sexual arousal.
- Additionally, interoception allows us to feel our emotions.

NEUROLOGY OF SENSORY PROCESSING

DOPAMINE

When secreted it is the chemical of:

- 1. Activation (volitional motor activity).
- 2. Excites the Limbic System=more emotion more feelings (kinship, bonding, friendship).
- 3. Sharpest thinking/focused behavior, and drives us to action.

Lack of Dopamine:

- 1. Fuzzy thinking/hard to concentrate
- 2. Depressed
- 3. When levels are significantly low= difficulty initiating movement.

Is released by:

- 1. Pressure/Proprioception.
- 2. Touch/Tactile

SEROTONIN

When secreted it is the chemical of:

- 1. Modulation-prevents too much processing.
- 2. Satisfaction/safe.
- 3. Modulation of pain.
- 4. Sleep, appetite, memory, mood, and learning.

Lack of Serotonin:

- 1. Impulsive behavior.
- 2. Overwhelmed.
- 3. O.C.D

Is released by

- 1. Pressure/Proprioception
- 2. Movement/Vestibular.

NOREPINEPHRINE

When secreted it is the chemical of:

- 1. Selective attention. It works in balance with serotonin.

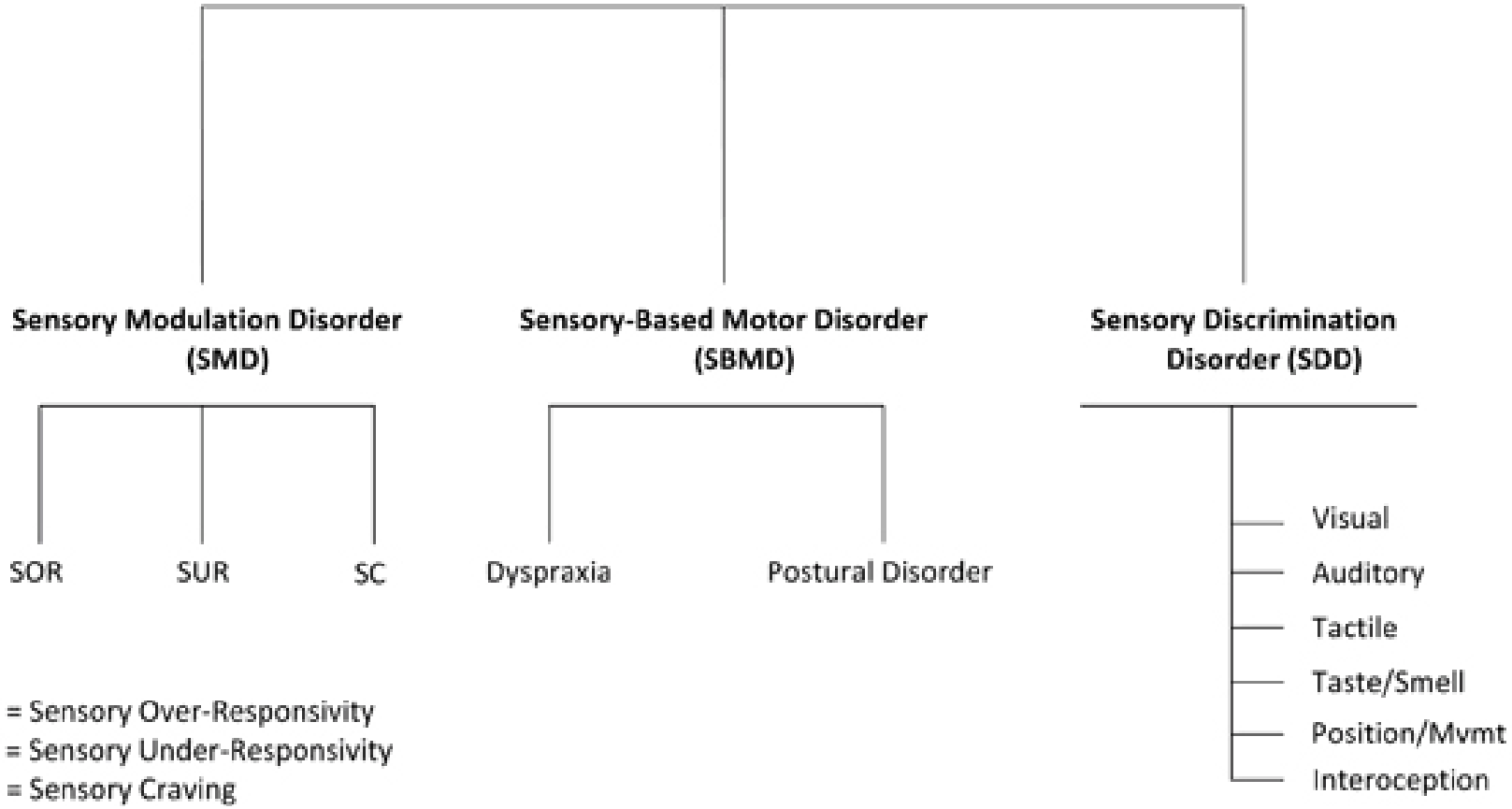
Lack of Norepinephrine:

- 1. Distractibility.
- 2. Perseveration (too much).

Is released by:

- 1. Balancing it with serotonin. And serotonin is released by:
  - Proprioception (When an individual is secreting stress chemicals over a period of time, Serotonin are used up (kids that are chronically anxious). There is an increase in Norepinephrine in an attempt to increase selective attention.

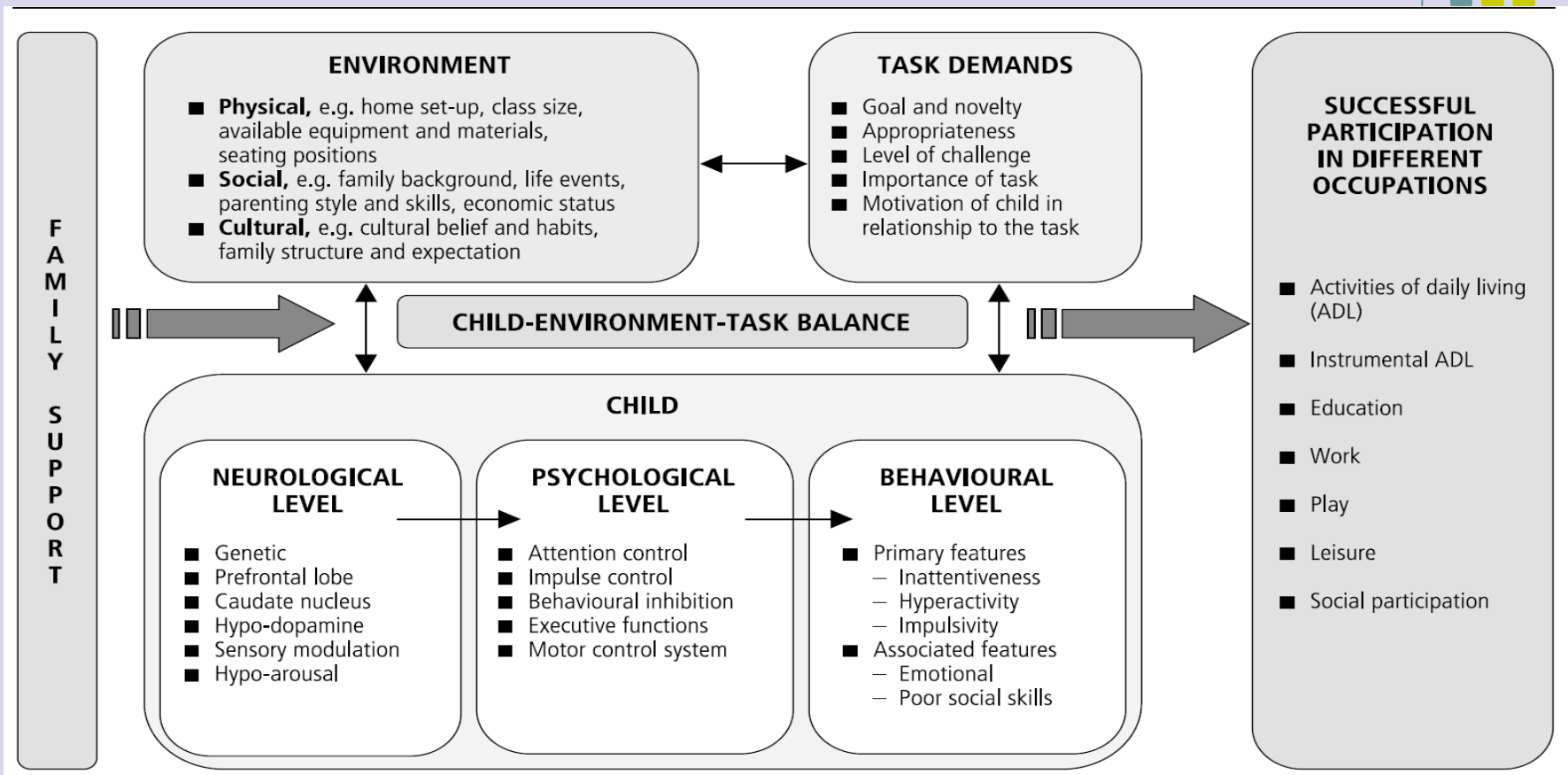
Sensory Processing Disorder (SPD)



SOR = Sensory Over-Responsivity
SUR = Sensory Under-Responsivity
SC = Sensory Craving

Miller LI et al., 2012

WHAT DOES IT LOOK LIKE IN ACTION?



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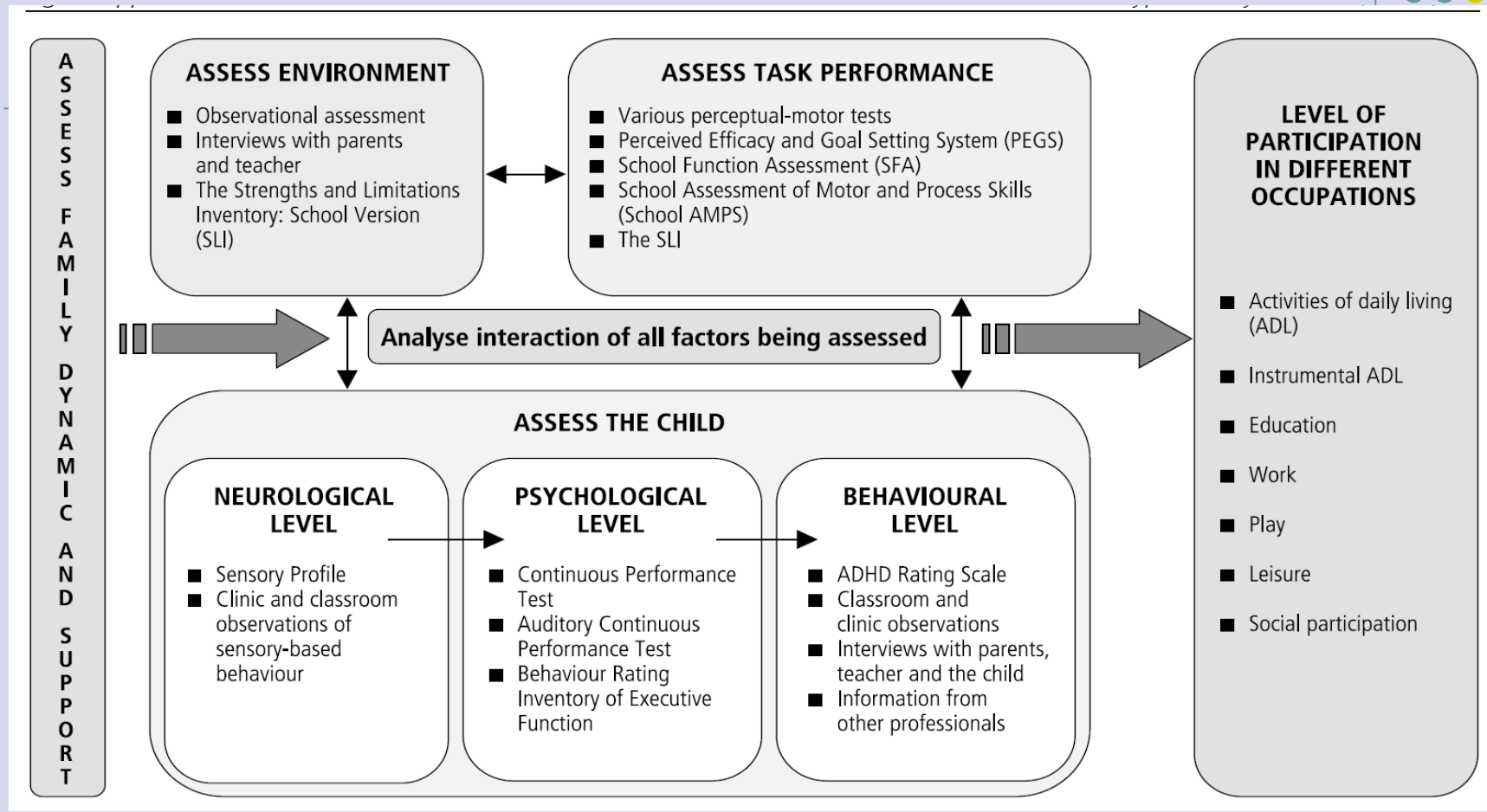
Task Demands

When working with children with Sensory Processing Difficulties, we must consider:

- The goal of the task
- The novelty of the task
- The appropriateness of the task
- The level of challenge of the task
- The importance of the task
- The motivation of the child

The ENVIRONMENT

Family Support



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Approaches to occupational therapy interventions

- Child-environment-task balance
  - The “match between the skills and abilities of the child; the demands of the task; and the characteristics of the physical, social, and cultural environments”
  - Determines the success of occupational performance and participation
- Family-centered care approach
  - Parents become equal team members and the individuality of each family unit is incorporated into treatment planning and implementation

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