

## SENSORY INTEGRATION (SI) FOR

- **SI THEORY**

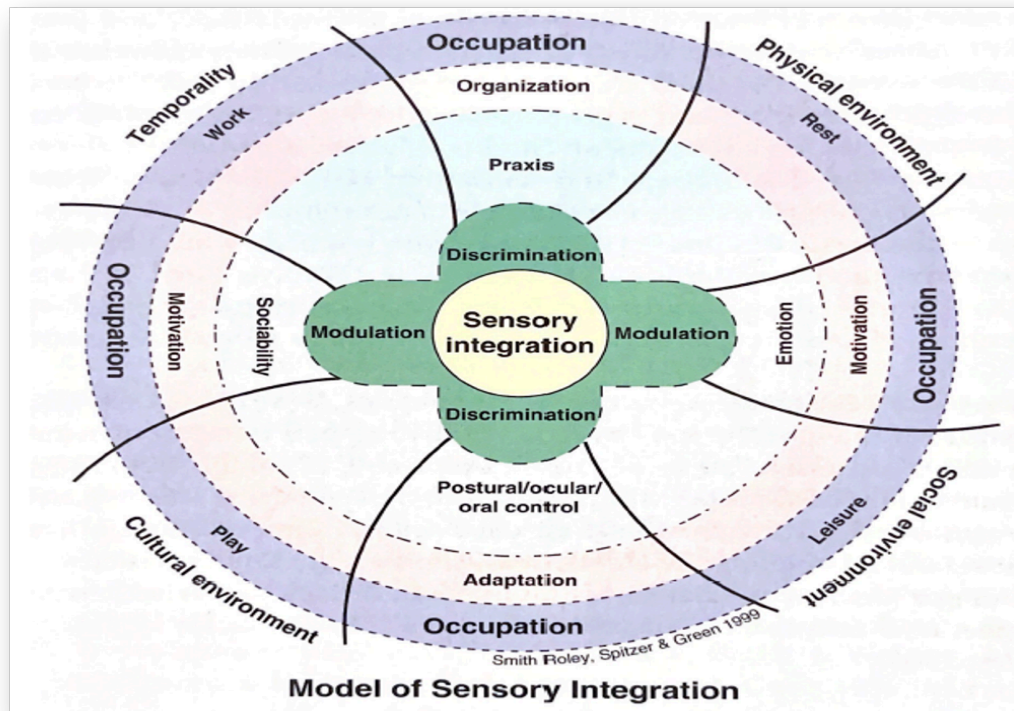
- The **integrative processes resulting in perception and other types of synthesis of sensory data that enable people to interact effectively in the environment**

- **SENSORY INTEGRATION**

- The **neurological process that organizes sensation from one's body and from the environment**

- “Learning is a function of the brain” - A Jean Ayres

## MODEL OF SENSORY INTEGRATION

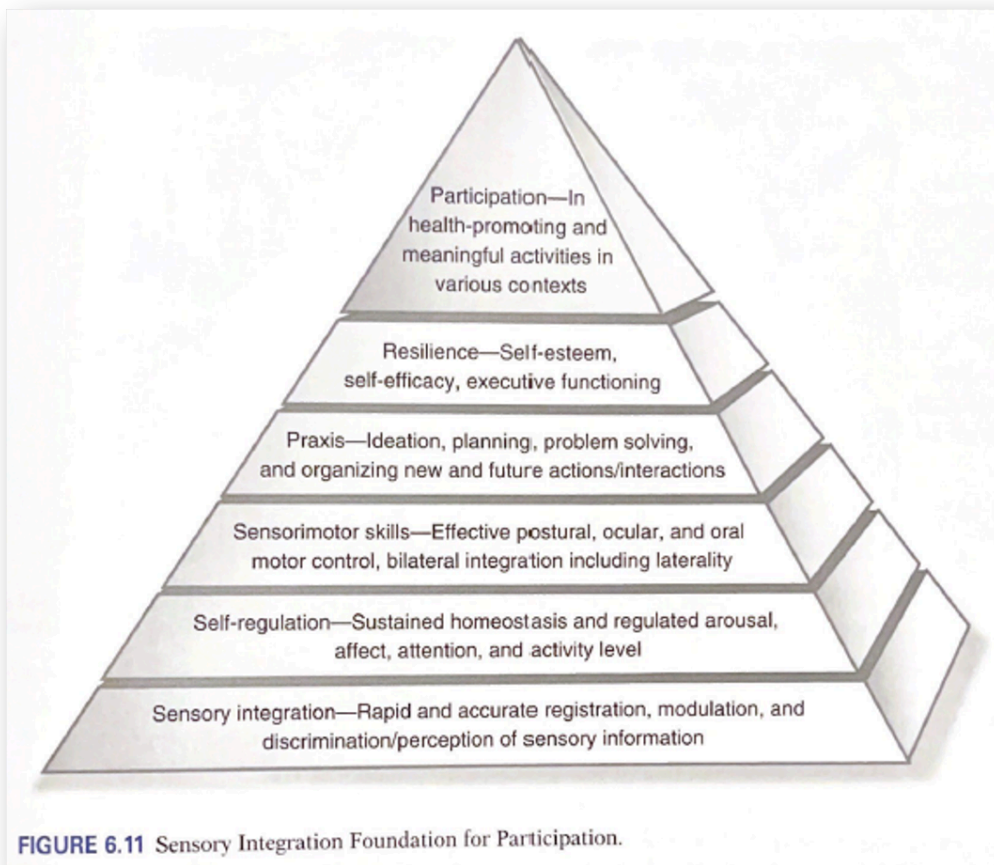


## THEORY BASE

- Human Development
- Neuroscience
- OT
- Behavior and Learning

## ASSUMPTIONS

- Hierarchically organized
- Meaningful registration of input
- Inner Drive
- Input from one sensory system can facilitate or inhibit the state of the entire organism
- Neural plasticity
- Developmental sequence



- **POSTULATES OF SENSORY INTEGRATION**

- Holistic
- CNS influences behavior
- States of sensory systems determine quality of adaptive response
- Adaptive responses contribute to future adaptive responses
- Child driven
- Just right challenge
- modulation, discrimination or sensory based motor problems
- Focus on underlying deficits, not behaviors
- Behavior change through controlled sensory input
- Multi-sensory input needed for registration and integration

- **EVALUATION**

- Sensory Integration and Praxis Test (SIPT)
- Southern California Post-Rotary Nystagmus Test (SCPNT)
- DeGangi Berk Test of Sensory Integration
- Miller Assessment for Preschoolers (MAP)
- Sensory Processing Measure (SPM)
- SPM-Preschool (SPM-P)

- Sensory Profile
- Sensory history
- Clinical Observation of Motor and Postural Skills (COMPS)
- Clinical observations
- COMPS
- Parent/teacher/self report

<i>Sensory motor Level I Alerting body through the five senses</i>	<i>Development Level II Filtering input to provide a frame of reference</i>	<i>Perceptual-motor Level III Creation of an action plan</i>	<i>Cognition Level IV Integration of input and action plan</i>	<i>End products</i>
Tactile (touch)			Academic learning	Academic learning ability Ability to organize
Vestibular (gravity/movement)	Body scheme Coordination-2 sides of body Motor planning	Ocular motor control Eye hand coordination Postural adjustments	Activities of daily living	Specialization of brain/body Self-control
Proprioception (muscles and joints)				
Visual	Activity level Attention span Emotional stability	Purposeful activity Attention center functions Visual-spatial perception	Behavior	Self-confidence Ability to concentrate
Auditory	Postural security Capacity to screen Sensory information	Visual perception Auditory-language skills		
Olfactory Gustatory				Self-esteem Abstract thought/ reasoning Language

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## ● **SENSORY SYSTEMS**

- Visual
- Auditory
- Tactile
- Vestibular
- Proprioception
- Olfactory
- Gustatory
- Interoception

## ● **VISUAL SYSTEM**

- **Visual** - responsible for **seeing**.
  - The primary visual area of the brain is the **occipital lobe**.
  - **Projections are received from the retina** where different types of information are encoded.
  - Types of visual information include: **color, shape, orientation, and motion**.

## ● **AUDITORY**

- **Auditory** - responsible for **hearing**.
  - The primary auditory cortex is located in the **superior temporal gyrus** of the brain.
  - Specific sound frequencies can be mapped precisely onto the **primary auditory cortex**.
  - Particular areas in the auditory cortex process changes in sound **frequency** or **amplitude**, while other areas process **combinations of sound frequencies**.

- **TACTILE**
  - **Tactile** - responsible for **processing touch** information from the body.
    - The body sends tactile information to the **somatosensory cortex** through neural pathways to the spinal cord, the brain stem, and the thalamus.
    - The **primary somatosensory cortex** is the primary receptive area for touch sensations,
    - Located in the **lateral postcentral gyrus**, a prominent structure in the parietal lobe of the human brain.
- **VESTIBULAR SYSTEM**
  - **Vestibular** - contributes to **balance and orientation in space**.
    - It is the leading system informing us about the **movement and position of the head** relative to gravity.
    - Our movements include two positions **rotations and linear directionality**.
    - Two related components: the **semicircular canal system**, (related to detecting rotation) and the **otoliths**, (related to detecting linear acceleration/deceleration).
- **PROPRIOCEPTIVE SYSTEM**
  - **Proprioception** - senses the **position, location, orientation, and movement of the body muscles and joints**.
    - Proprioception provides us with the **sense of the relative position of neighboring parts** of the body and the **effort used to move body parts**.
    - Proprioception is activated by input to a **proprioceptor in the periphery of the body**.
    - Combines sensory information from neurons in the **inner ear** (detecting motion and orientation) and **stretch receptors** in the muscles and the joint-supporting ligaments for stance.
- **OLFACTORY**
  - **Olfactory** - responsible for processing **smell**.
    - The olfactory bulb is located in the most **forward part of the brain on the bottom side of the brain** and **transmits smell information** from the nose to the brain.
    - Unlike the other sensory systems, the olfactory bulb has only **one source of sensory input** (neurons of the olfactory epithelium) and **one output**.
- **GUSTATORY SYSTEM**
  - **Gustatory** - responsible for the sense of **taste**.
    - Allows us to **discriminate** between safe and harmful foods.
    - Usually, individuals prefer **sweet and salty** tastes to **sour or bitter** tastes.
    - Unami signals need for vital nutrition.



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- **INTEROCEPTIVE SYSTEM**

- **interoception** - sensations related to the **physiological/physical condition of the body.**
  - **Receptors in internal organs**
    - Interoception detects **responses that guide regulation**, including hunger, heart rate, respiration and elimination.
    - The Interoceptive stimulation is detected through **nerve endings lining the respiratory and digestive mucous membranes.**
    - Interoception works the vestibular and proprioceptive senses to determine **how an individual perceives their own body.**

- **INDICATORS OF FUNCTION/DYSFUNCTION**

- Sensory System Modulation
  - SOR, SUR, SC
    - Overreponseive
    - Underreponsive
    - Craving
- Sensory Discrimination - ability to decided between levels of input
  - Visuodyspraxia - **poor control over fine movements throughout the body, including those of the eyes.**
  - Somatodyspraxia-
- Sensory Based Movement Disorders
  - Postural Ocular Disorder
  - Bilateral Integration and Sequencing
  - Dyspraxia