

Sensory Integration and Infant Mental Health: Maximizing Potential in Special Needs Populations

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Overview of SI

Sandra Adams, PhD, OTR/L

- FSU Center for Prevention and Early Intervention Policy
 - FAIMH Annual Conference
 - March 16, 2008

Definition of Infant Mental Health

Developmental capacity of a child, birth-3 to:

- experience, regulate, and express emotions;
- form close and secure relationships;
- explore the environment and learn

- Florida's Strategic Plan for Infant Mental Health

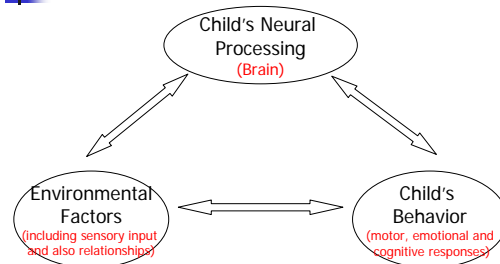
Sensory Integration Theory

- A. Jean Ayres
 - Pioneer theorist in 1960's and 70's.
- More recently
 - Stanley Greenspan
 - Georgia DeGangi
 - Winnie Dunn
 - Gordon Williamson
 - Lucy Miller

Sensory Integration

- Sensory integration is the organization of sensations from the body and from the environment for use in adaptive functioning.
- The brain transforms sensory data into neural impulses in order to create responses in the form of movement, emotional responding, and cognitive problem-solving (Kandel, Schwartz, & Jessell, 2000).

Three Interrelated Components of Sensory Integration



Terms and definitions

- Several terms have been used to describe CNS processes: sensory processing, sensory arousal, sensory modulation, sensory regulation, and sensory integration (Williamson & Anzalone, 2001; Fisher, Murray & Bundy, 1991).
- These terms refer to constructs that attempt to sort out why some children, **for reasons that cannot otherwise be explained**, have difficulty interacting effectively with objects and persons in their environment. (Walker, 2001).

Sensory Processing and Self Regulation

- Sensory processing and self regulation are capacities that are thought to develop in the first years of life and to influence relationships, behavior and learning in subsequent life stages.

Sensory Processing

- Sensory processing refers to the neural processing of sensory stimuli in the brain.
- It is the ability to receive sensory information from the environment (visual, auditory, gustatory, etc) and process it into a coherent understanding of what is occurring and what the appropriate or adaptive response should be.

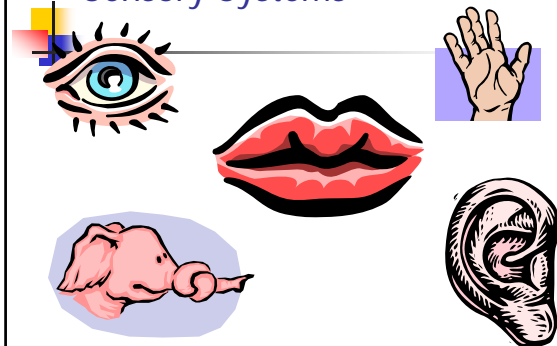
Self Regulation

- Self regulation refers to the capacity to control the nature and intensity of one's responses to stimuli by regulating levels of arousal, attention, affect, and action.
- Self regulation is the brain's ability to organize sensation in order to
 - calm oneself
 - delay gratification
 - tolerate change
 - attend or focus

Why is sensory integration important to infant mental health?

- Disorders in sensory processing and self regulation affect the way in which the child processes information and interacts with the world and also the way others, particularly parents, interact with the child.
- Disorders in sensory integration impact relationships and learning.

Sensory Systems



Sensory Systems

- There are 7 (not just 5)
 - Visual (vision)
 - Auditory (hearing)
 - Gustatory (taste)
 - Olfactory (smell)
 - Tactile (touch)
- What are the other 2?

The other 2 less recognized senses

- **Vestibular** –inner ear
 - gravity and motion of head in space
 - Balance and equilibrium
- **Proprioception** -muscle and joint receptors
 - Position of body in space
 - Position of body parts in relation to other body parts
 - Includes kinesthetic sensory input

Somatosensory system refers to 3 sensory systems that are important to motor development

- Tactile- skin
- Vestibular- inner ear
- Proprioceptive –muscle and joints

Tactile System

Receptors in skin--touch



Tactile System (touch)

- Skin is the body's largest sensory receptor; tactile system is the largest sensory system
- Earliest sense to develop prenatally
- Most mature sensory system during the first few months of life

Tactile System (cont.)

- Normal development of this system facilitates emotional growth & stability
- Critical to our interactions with people and our daily environments
- Two Components
 - Protective System
 - Discriminative System

Tactile System (cont.)

- Protective (Defensive) System
 - Survival
 - Temperature, Light Touch
 - More easily activated during times of stress
 - Plays less conscious role as we mature
 - Important role in mental health
- Discriminative System
 - Develops as CNS suppresses protective system
 - The way we learn about our world
 - What, where, how details
 - Important for motor coordination/dexterity/oral motor development

Vestibular System

Movement and gravity- Inner ear



Proprioceptive System

Receptors in Muscles, Tendons, and Joints



Proprioceptive System

- Receptors in muscles, tendons and joints
- Perception of body movements (kinesthesia) and relative position of the body parts
- Contributes to body scheme
 - Internal awareness of parts
- Contributes to planning and organizing movements as well as learning and remembering movements

Somatosensory systems and Motor development

- Motor development (gross and fine motor) requires proximal stability
 - Balance-Upright when posture disturbed
 - Visual-spatial orientation
 - Proprioceptive-body position in space
 - Vestibular- motion of head in space
 - Postural control
 - Integration of sensations with neural commands to the muscles to keep your center of gravity over a stable but dynamic base of support

SI Disorders

- Disorders in processing of sensory stimuli can result in self regulation and behavior problems that include
 - Difficulty in self control and self calming
 - Arousal and mood regulation problems
 - Attention dysfunctions
 - Maladaptive motor patterns

SI and IMH Disorders

Sensory processing, self regulation and motor control disorders can interfere with the developmental capacity of a child birth-3 to:

- experience, regulate, and express emotions;
- form close and secure relationships;
- explore the environment and learn

Clinical Observations of Sensory Processing, Motor Control and Self-Regulation

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May 16, 2008

Vestibular System

- 3 Inner ear structures detect movement of head and force of gravity
 - Semicircular canals- head movement in space
 - Utricle and saccule- force of gravity
- Contributes to
 - Regulation of muscle tone and coordination
 - Balance and equilibrium
 - Ocular motor control
 - Arousal and attention
 - Emotional state

Objectives

- Identify 8 areas of development that are important to the evaluation process in IMH
- Explain the Impact of Deficits in these Areas on IMH

Some Critical Components of Development

- Arousal Patterns
- Attention
- Hand Use
- Oral Motor
- Physical Stability
- Movement / Coordination
- Play
- Sensory

Arousal

- The ability to maintain alertness and transition between the different states of sleep and wakefulness (Gordon Williamson)
- "May be viewed as behavioral or physiological activity that is dependent on changes in the central nervous system" (DeGangi)
- Six States of the Infant: Deep sleep, light sleep, drowsy, active alert, crying (Berg & Brazelton)



Attention

- Attention & interaction with caregivers
- Attention to people, tasks, objects
- Ability to shift attention
- Focused attention



Hand Use

- Hands to midline (midline fingering-4 m.)
- Emerging digit isolation (8-9 m.)
- Isolation of index finger (10-14 m.)
- Waving/Imitation (1 year)
- Tool Use
- Self-Care



Oral Motor

- Oral exploration of fingers, objects, toes
- Progression to solids, textures
- Impact on speech and articulation



Stability and Postural Control

- Preferred positions (sitting, on tummy, on back)
- Variety of sitting positions
- Progression of balance and shifting weight
- Gradual reduction in propping on hand

(Know Typical Development)

Movement and Coordination



Hands and knees crawling

- Stability & Mobility
- Trunk Rotation and Weight Shifting
- Positional changes of head (stimulates vestibular system: all 3 semi-circular canals – detection of motion & gravity)*
- Weightbearing into hands/shoulders and knees/hips (stimulates proprioceptive system-body awareness)
- Tactile Input



Movement and Coordination

- Organized vs. Disorganized
- Efficient vs. Inefficient
- Preferences and Avoidances
- Transitional Movement Abilities
- Inner drive to move, explore, and conquer gravity



Movement and Coordination

- Balance abilities in all positions and planes of movement
- Reaction to feet leaving ground / moving in space
- Reaction to head inversion



Play

- Reaction to Novelty
- Space Management (exploration and experimentation with movement in space)
- Material Management (process vs. finished product)
- Imitation
- Participation

(Revised Knox Preschool Play Scale)



Sensory Systems

- Vision
- Hearing
- Smell
- Taste
- Touch

There are 3 more.....



The Hidden Senses

- Tactile
- Proprioceptive
- Vestibular



Sensory Observations

- Note preferences and avoidances
- Sensory Seeker
- Hyper-reactive
- Hypo-reactive
- Avoidant
- Overly vigilant/overly passive/sensory seeking
- Importance of context
- All other areas (arousal, attention, hand use, oral motor, physical stability, movement/coordination, play) can be impacted by sensory processing difficulties



Sensory Screening Tools

- Test of Sensory Functions in Infants (4-18 m.) DeGangi & Greenspan
- DeGangi-Berk Test of Sensory Integration (3-5 yrs.)
- Infant/Toddler Symptom Checklist (7-30 m.) DeGangi
- Infant/Toddler Sensory Profile (B-36 m.) Dunn

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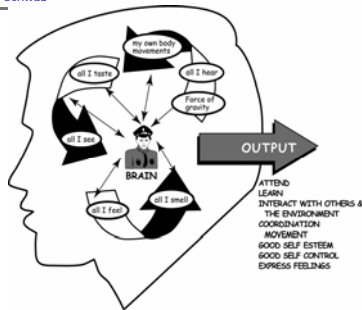
SI and IMH: Maximizing Potential in Children with Special Needs

■ Kathryn Shea, LCSW

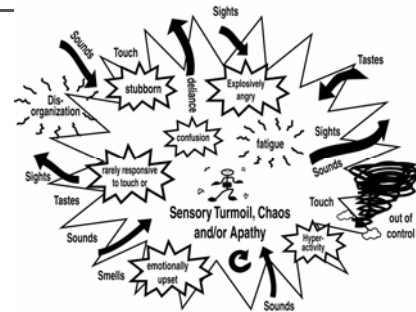
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Normal Sensory Integration

source: Dorothy Schwab

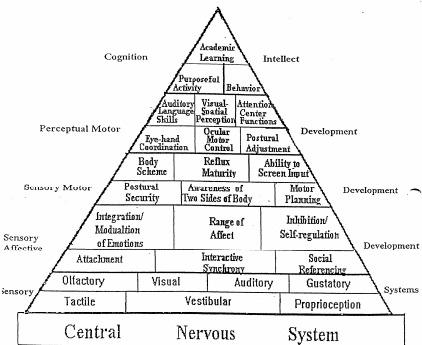


Disordered Sensory Integration source: Dorothy Schwab



SI, IMH, and FAS

- Video – Seth at age 6





Effectiveness of Early Intervention

"The overarching question of whether we can intervene successfully in young children's lives has been answered in the affirmative and should be put to rest. However, interventions that work are rarely simple, inexpensive, or easy to implement."

(From *Neurons to Neighborhoods*, 2000)

Early Childhood Mental Health ~ What is it?

Early childhood mental health is the social, emotional, and behavioral well-being of children birth through five and their families, including the developing capacity to:

- Experience, regulate, and express emotion;
- Form close, secure relationships; and
- Explore the environment and learn.

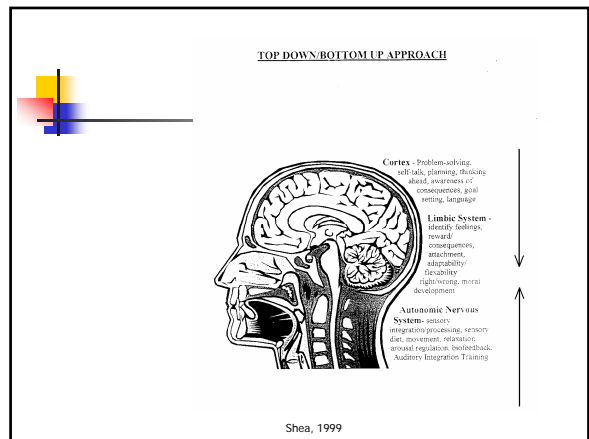
Infant Mental Health Definition

- All within the context of family, community, and cultural expectations for young children
- Synonymous with healthy social and emotional development
- Must imply multi-discipline approach

(Zero To Three, Infant Mental Health Task Force, 2002)

What Can We Do Together?

- Goal is to move the child up the Social/Emotional Stages of Development (Greenspan & Wieder)
 - Shared attention and regulation (0-3 months)
 - Engagement and relating (2-7 months)
 - Two-way intentional affective signaling and communication (3-10 months)
 - Long chains of co-regulated emotional signaling and shared social problem solving (9-18 months)
 - Creating representations (or ideas) (18-30 months)
 - Building bridges between ideas: logical thinking (30-48 months)



SI, IMH, FAS

- Video of Seth at age 7 with AIT
- Video of Seth at age 10 – Where is he on the social/emotional developmental ladder?

SI, IMH, FAS

- Incorporating IMH techniques of
 - Wait, Watch, Wonder
 - “Speaking for Baby”
 - Developmental Guidance
 - Incorporating the DIR approach- focus on following child’s lead and encouraging “intent” through who, what, where, how, when,
 - Useful throughout lifetime

Seth's Self Portrait Age 9



Seth's Self Portrait Age 17-won art award



Si, IMH, FAS

- Video of Uncle Seth at age 19 with his very favorite niece

The End!

