SENSORY PROCESSING AND TRAUMA

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- Sensory processing is vital to the human experience
- Gives us information about what is going on around us and within us
- Unique perspective to each individual depending on their neurobiology, biological rhythms, and life experiences
- How does the sensory system inform us about who we are and our safety after trauma occurs?

OBJECTIVES

- Understand how trauma impacts the brain
- Articulate the role of sensory processing and students with trauma histories
- Gain observational skills to identify sensory dysregulation
- Identify tools to teach student with trauma histories to be present in the classroom by supporting underlying sensory needs

THE NERVOUS SYSTEM AND TRAUMA

DEFINING TRAUMA

- When an individual experiences a life threatening event in which they feel helpless or fear for their life (physical, emotional, safety, well-being)
- How the individual experiences the traumatic event
- The senses that give us connection and meaning are overwhelmed beyond what an individual can adapt around
- During trauma, the nervous system is overloaded. If the nervous system's ability to return to homeostasis is impaired, how do I then know that I am safe?

HOW DOES TRAUMA CHANGE THE BRAIN

- Hippocampus: located in the limbic system. Responsible for the formation, organization, storage and retrieval of memories. Consolidates information from short-term memory to long-term, and spatial memory that enable navigation; storing and retrieving memories and determining between past and present.
- Amygdala: located in the limbic system. Role in memory, decision-making, and emotional reactions. Brain's fear center; sounds the alarm (smoke detector); tags memories to emotion.
  - After trauma the amygdala can get caught in a high alert loop; it looks for and perceives threat everywhere.
- Prefrontal Cortex: Regulates emotions. Plans complex cognitive behavior, personality expression, decision making, and moderating social behavior. Important for executive function.
- Traumatic stress is associated with increased cortisol and norepinephrine
  - Impacts ability to regulate emotions and attention
  - Changes the ability to modulate the stress response

http://beaconhouse.org.uk/wp-content/uploads/Developmental-Trauma-Close-Up.pdf

THE NERVOUS SYSTEM

- Central Nervous System
  - Nerves in the brain and spinal cord
- Peripheral Nervous System
  - Somatic Nervous System (voluntary)
  - Autonomic Nervous System (involuntary)
- Your nervous system system's most important role is that of survival first. It is designed to detect danger and put into action defense mechanisms to ensure your survival (Porges).
- These systems are defense mechanisms to protect you from overwhelming experiences. (fight, flight, freeze)

AUTONOMIC NERVOUS SYSTEM

- Sympathetic
  - Floods the system with stress hormones to prepare the body to run, fight, or freeze; shuts down parts of the brain for thinking in order to return to more primitive functions of survival
- Parasympathetic
  - Calms and restores the body
- Trauma survivors' brains struggle to shift from reactive back to responsive mode. Instead, their brains stay on alert, primed for threat with dysregulated activity.

THE ROLE OF THE SENSES

- Sensory processing is the process in which meaning is given to an input and action or response occurs.
- If you smell fire, your nervous system detects this input and sends messages to mobilize your body to safety.
- If your senses do not accurately detect, receive, or process the information then does your body know what to do. This level of disorganization results in compensations that interfere with our process to communicate and interact with our world effectively.

THE SENSORY SYSTEM

SENSORY PROCESSING

1. Tactile
2. Proprioception
3. Vestibular
4. Auditory
5. Visual
6. Olfactory
7. Gustatory
8. Interoception

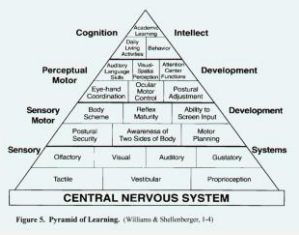


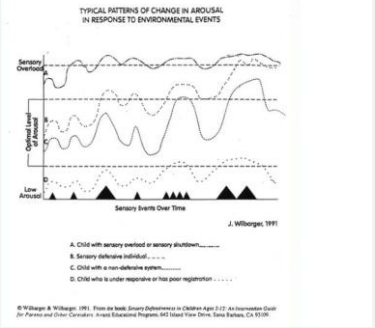
Figure 5. Pyramid of Learning. (Williams & Shellenberger, 1-4)

SENSORY SYSTEM

1. Tactile Processing (Touch)- receptors in your skin; discriminative and protective functions; gives you your container-where I end and you begin
2. Proprioception (Body Awareness)- receptors in your muscles and joints; how hard to push/pull, muscle control; sense of where I am in relation to myself, gives us our anchor
3. Vestibular (Movement and Balance)- receptors in our inner ear; tells us where we are in space; time and space; internal GPS
4. Visual Processing (Sights) input through our eyes
5. Auditory Processing (Sounds)- input through our ears, helps us interpret meaning of sound
6. Gustatory (Taste)
7. Olfactory (Smell)
8. Interoception- sensing when you are full or hungry, when you need to go the bathroom

AROUSAL MODULATION

- Regulation: is being able to adjust in response to change
- Under-Responsive: some individuals need more input or have a high threshold for stimuli
- Over-Responsive: some need less input because they are overwhelmed by input or have a low threshold
- Defensive: this is when an individual's nervous system interprets the input as painful or noxious; this will sometimes present as fear (physiologically, the process is very similar)
- Consider:
  - What sensations are alerting?
  - What sensations are calming?
  - At what intensity is just right for that moment?



PRIMITIVE REFLEXES

- Primitive reflexes are most noticeable in infancy. As we develop, reflexes integrate into the body. When a person experiences trauma, previous integrated reflexes may become active again in order to protect and survive. This can result in persistent reflexive movement or actions that interfere with higher levels of learning and engagement as the brain is operating from a more primal level. Reflex integration contributes to how we process sensory input.
  - Common challenges
    - Moro
    - Hands Supporting
    - Grasp
    - Grounding
  - Common observations that link to reflex integration issues
    - Startles easily
    - Falls outs of chair
    - Fails to catch themselves
    - Fisted hands, thumbs inside the fingers, or beside the index finger
    - Leans on others or furniture, props self up
    - Poor boundaries (crashing into others, hitting)

OBSERVATIONS OF REGULATION

Negative signs/symptoms indicative of overload:

- Taut facial expression or wide eyes
- Clenched jaw
- Flushed cheeks
- Dilated pupils
- Sweaty palms
- Rapid speech or high frequency
- Laughter that is rapid and uncontrollable or doesn't match the context
- Breath holding or shallow breath
- Erratic movement
- Unable to stop moving
- Unable to initiate or executive a functional plan

Positive signs of change and regulation:

- Notice the quality of movement, body language, voice, breath, and thoughts
- Softness in eyes
- Diaphragmatic Breath or big exhale (often our clients are ok at inhale, but don't fully exhale
- Body language softens, may appear more relaxed
- Body stillness
- Planful ideas and organized movement
- Reciprocal communication and engagement
- Improved focus and self-control (ability to pause to think)
- Connection with people (support their system to get a connection)
- Increased language

SENSORY PROCESSING AND THE CLASSROOM

ENVIRONMENTAL INPUT

- Body and Space
  - Can I sit still?
  - When do I get to move?
  - Are others moving around me?
- Sights
  - Lights
  - Info on walls
- Sounds
- Smells
- Unexpected changes

CONSIDERATIONS:

- Where am I in relation to others?
- Am I anchored in this room?
- Am I safe?
- Am I understood?
- Do I know what to expect? Is my space predictable?
- Can I regulate with others? Do I need someone to regulate me?
- Have I had a moment to pause/process?
- Have I had an opportunity to connect?

SENSORY STRATEGIES

SELF-CHECK: ARE YOU REGULATED?

- You cannot regulate another individual, if you are not regulated first.
- If the child's trauma occurred within a relationship, the current relationship is key in facilitating change.
- Co-regulation: is the ability to adjust in response to change within the dynamic interaction with others. It requires a continuous monitoring and adapting to the changing actions of another person.

YOU ARE A TOOL TO REGULATE OTHERS

- ***You are a sensory being. You have your own individual rhythm, smell, sights, movement, and presence that provides input and feedback to others.***
- **Your Presence**
  - Body Language
  - Check your own breath, heart rate
  - Feel your feet on the ground
- **Engagement**
  - Breaking down the steps: first, then
  - Model regulation tools
  - Examples: getting something for your mouth (a cold drink, a crunchy snack, sucking a drink or puree through a straw); fidgets or playdoh or clay; coloring, music, take a break
  - Pacing- notice the rhythm, speed, and ability to pause within your interaction.
  - Avoid "you need to"; instead, try "let's try this" or "I wonder if…"
- **When in doubt:**
  - Pause
  - Take a deep breath
  - Regulate yourself first

SPACE/ENVIRONMENT

- Check your environment? What can be reduced or changed?
  - Lights
  - Sounds
  - Smells
  - Language
  - Distance/space
- Safe Places
  - Define space
    - Tents, bean bag chairs, lofts
    - Eye level
  - Seating options (rocking chairs, bean bags chairs, ball chairs)
  - Weighted objects for grounding
  - Options to keep hands busy (fidgets, tactile bins, playdoh, clay)

GROUNDING

- Anchoring
- Feeling their feet on the ground
- Proprioception
- Connecting with midline (breath, mouth, vision)
- Activities on the ground (rocking like an egg, laying on their belly)

RHYTHM

- Set the pace
- Rhythm of your voice
- Reciprocal ball play (balls, bean bags, zoom ball)
- Tapping (EFT, Rain sounds)
- Breathing activities

TACTILE

- Tactile system is the container of the body. Tactile activity can facilitate defining a child's space.
- Never touch without permission; touch must be seen coming
- Deep pressure vs light touch pressure
- Tactile bins
- Play dough, clay
- Kinetic sand
- Compression (not until child is calm and can accept; do not use if history of restraint)
- Weighted blankets

MOUTH

- First way we learn to self-soothe
- Midline of body, connecting
- Resistance for mouth
  - Blowing games
  - Sucking (water bottle, drinking through straw, resistance is best)
  - Gum
  - Blow pens

MINDFULNESS

- Noticing
- Label on others first
- Breath activities
  - Consider position of body
  - Feedback with bean bags/stuffies or with hands
- Brain Gym (belly buttons, brain buttons, figure 8's)
- Yoga
- Orienting to hear and now
  - 5 things you see, 4 things you hear, 3 things you feel, 2 things you smell, 1 thing you taste

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