A BIOPSYCHOSOCIAL APPROACH TO TRAUMA-INFORMED SCHOOLS

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AGENDA FOR TODAY & TOMORROW

- Introductions
- Basic functional neuroanatomy
- Brain Development & Toxic Stress: The ACEs Study
- How emotions develop
- New ideas and research
  - Circumplex Model
  - Polyvagal Theory
  - Embodied cognition
  - Affective Neuroscience
  - Interoception
- Breathe!
- From neuroscience to intervention
NOT THE USUAL PSA

“...Place the oxygen mask on yourself first before helping small children or others who may need your assistance.”

OPTIONS . . . .

- Talk to me
- Talk to a peep
- Call best friend
- Call family member
- Breathe
- Trust yourself
- Call your counselor
- Self-soothe
- Self-care
- Hugs, hugs, hugs, hugs, hugs, hugs
THINGS TO KEEP IN MIND...

- We are going to discuss a major paradigm shift in the translation of neuroscience to the concepts of intelligence, cognition & emotion
- This information will probably require professional introspection
- This discussion may invite cognitive dissonance
- This discussion will most likely require creative energy...

NEUROANATOMY REVIEW

- **Frontal Lobe**
  - Problem solving
  - Emotional traits
  - Reasoning (judgment)
  - Speaking
  - Voluntary motor activity

- **Parietal Lobe**
  - Knowing right from left
  - Sensation
  - Reading
  - Body orientation

- **Occipital Lobe**
  - Vision
  - Color perception

- **Temporal Lobe**
  - Understanding language
  - Behavior
  - Memory
  - Hearing

- **Cerebellum**
  - Balance
  - Coordination and control of voluntary movement
  - Fine muscle control

- **Brain Stem**
  - Breathing
  - Body temperature
  - Digestion
  - Alertness/sleep
  - Swallowing
Antonio Damasio conducted research on the insula and proposed that most of this structure consists of somatic markers that map bodily states associated with our emotional experiences, thus giving rise to conscious feelings.

This is the school of thought known as embodied cognition, according to which conscious rational thought cannot be separated from emotions and their incarnation in the rest of the body.
EMOTIONS FROM A NEURODEVELOPMENTAL PERSPECTIVE

- 1) we know that we are dealing with moving targets
- 2) we compare and predict depending on age
- 3) we understand that certain cognitive capabilities only come with age
- 4) we know that we assess and treat a child in context

CONDITIONS NEEDED FOR APPROPRIATE EMOTIONAL DEVELOPMENT

- Good genes
- Good preconception care
- Good prenatal care
- Good postnatal care
- Good nutrition
- Safe and predictable benign environment
- Enriched relationships
- Enriched environment
- Good modeling sources
PROGRESSIVE DEVELOPMENT OF EMOTIONS

- Mediated by attachment
- Mediated by language
- Mediated by higher cortical functions
- Mediated by culture
- Mediated by age

NEURODEVELOPMENTAL TIMING
PROGRESSIVE DEVELOPMENT OF AFFECT AND COGNITION

Paramount for affective integration and healthy homeostasis

Executive Functions

Attachment

Attunement

Attention

HISTORY OF RESEARCH ON EMOTIONS
CIRCUMPLEX MODEL OF AFFECT

POSNER, RUSSELL & PETERSON

- All affective states arise from cognitive interpretations of core neural sensations that are the product of two independent neurophysiological systems
- Arousal and valence
- Dimensional model in which all affective states are understood to arise from common, overlapping neurophysiological systems
- “As emotions are experienced and communicated, cognitive interpretations are employed to identify the neurophysiological changes in the valence and arousal systems and conceptually organize these physiological changes in relation to the eliciting stimuli, memories of prior experiences, behavioral responses, and semantic knowledge (Russell, 2003). Emotions can therefore be seen as the end product of a complex interaction between cognitions, likely occurring primarily in neocortical structures, and neurophysiological changes related to the valence and arousal systems, which presumably are subserved largely by subcortical structures.” (p.5)

TRANSLATING CIRCUMPLEX MODEL

- Investigated but not challenged by any body of research
- Wonderful teaching tool
- Allows client to have a parsimonious visual orientation tool to map out his/her/their emotional/interoceptive experiences
- Brings affective world into cognitive world in terms of concepts, definitions, language, communication with others and self
- Good starting point for rapport, therapeutic process, and skill building
- Easy to adapt for psychoeducation with children

EMBODIED COGNITION

- The mind is inherently embodied, thought is mostly unconscious and abstract concepts are largely metaphorical.....
- Language translates body into cognition...
- Reason is not based on abstract laws (Descartes) because cognition is grounded in bodily experience
- holding warm cups of coffee; warm memories judge temp to be higher; future thinking leans forward; past thinking leans backwards; heavier clipboards hold more important info; thinking about cheating accepts antiseptic cloths; sitting in hard versus soft chairs (judgments about interviewee); cold shoulders; warming up to people.....
EMBODIED COGNITION: VIDEO SHORTS

- https://www.youtube.com/watch?v=VvnT7oYfRjQ

- Sappi Neuroscience Shorts - Embodied Cognition and Communicative Touch

- Dr. David Eagleman

RUBBISH

![Brain Diagram]

- Neocortex: Rational or Thinking Brain
- Limbic Brain: Emotional or Feeling Brain
- Reptilian Brain: Instinctual or Dinosaur Brain
**BUD CRAIG: INTROCEPTIVE MODEL**

- **'Neuromatrix' model**
  - Somatosensory cortex
  - Thalamus
  - Spinothalamic nerve tract
  - Sensory neurons
  - Spinal cord

- **'Homeostatic' model**
  - Anterior cingulate
  - Parietal cortex
  - Multiple spinothalamic fibre types
  - Sensory neurons
  - Spinal cord

**INTEROCEPTION FOR OCCUPATIONAL THERAPISTS**

Interoception is a sense that provides information about the internal condition of our body—how our body is feeling on the inside. Interoception allows us to experience many body sensations such as a growling stomach, dry mouth, tense muscles or racing heart. Awareness of these body sensations allows us to experience essential emotions such as hunger, fullness, stress, pain, body temperature, need for bathroom, sexual arousal, relaxation, anxiety, sadness, frustration, and safety.

At the most basic level, interoception allows us to ask the question, “How do I feel?” in a given moment.

Interoception also helps us manage the way we feel, by prompting us to take action based on the body signals we notice.
INTEROCEPTION

- Dr. Emma Goodall
- Interoception: The Nest Project-Current Research and Implications
- Youtube.com

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We respond to fear by following an autonomic nervous system hierarchical pattern that follows evolutionary development:

The newest system (ventral vagus system) for calm socially engaged ways of resolving the situation. Then move to an other system (sympathetic nervous system) for flight or fight responses and then to the oldest system (dorsal vagus system) for freeze/immobilization.

**AUTONOMIC NERVOUS SYSTEM**

- **Sympathetic activation** (also Sympathetic arousal) increases when you experience excitement, or something important is happening or about to happen. It increases also with stressors - whether physical, emotional, or cognitive. In some medical conditions (e.g., epilepsy), it shows significant increases that are related to specific brain structures activation.

- **Parasympathetic activation** occurs when your body needs to slow down and relax. It can be stimulated by the consumption of a hearty meal or deep breathing.

- How do we measure sympathetic activation? The skin is the only organ that is purely innervated by the sympathetic nervous system (and not affected by parasympathetic activation). We can observe increases in sympathetic activation by monitoring subtle electrical changes across the surface of the skin.

- Changes in heart rate (the time between the peak of each heart beat) occur as a result from both sympathetic and parasympathetic activation. Estimates of parasympathetic nervous system activation or vagal tone can be made by extracting the high frequency component of this heart rate variability.

  - https://www.empatica.com/

**VAGAL TONE**

- Prime component of the parasympathetic nervous system
- 80-90% of nerve fibers in the vagus nerve are reserved for communicating the state of your body viscera to the brain (gut feelings)
- Traverses most of the body from the brainstem/cerebellum down to the stomach, heart and every major organ
- Triggering/stimulating the vagus nerve release acetylcholine which is calming and anti-inflammatory
- Can administer natural stimulation via deep breathing, music
- Vagal tone is the ability to switch easily from sympathetic arousal to parasympathetic calm
Dynamic control of nervous system is within individual’s control

That the body works for homeostasis and protection/advancement

We can identify and isolate strategies for increasing rapport

Increases understanding of what is needed for solid attachment in infancy and emotional development

Brings new light to the understanding of complex trauma, acute trauma, and attachment disorders
Heart beat detection tasks


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**THE BEST WAY TO BREATHE: 4 4 6 2**

https://www.youtube.com/watch?v=1sgb2cUqFlY
Breathing and autonomic function are tightly linked.

Voluntary reduction of breathing rate enhances parasympathetic activity and reduces sympathetic activity.

Slow breathing also attenuates stress-related increases in skin conductance and finger pulse volume, which indicate reduced sympathetic activity.

ANS function and emotional well-being are closely related. In particular, yogic breathing was reported to improve clinical depression, and focused-attention Zen breathing reduced negative feelings. In a prior study in Craig’s lab, slow breathing reduced ratings of heat pain intensity and unpleasantness, and notably, it produced significant reductions in overall levels of negative affect.

EMOTIONAL DISPOSITIONS/AROUSAL STATES: BRAIN LOCALIZATION

AMYGDALA: cingulate, medial thalamus, PAG

ANTERIOR CINGULATE; PERIAMYGDALIC PATHWAYS

DESIRED AROUSAL STATES: CARE

ANTERIOR CINGULATE; VENTRAL SEGMENTAL AREA

• Large-scale neural networks
• Instinctual
• Genetically dictated
• Sex based
• Cannot be turned on or off
• Non-linguistic
• Chemically bound
• Localized and distributed in the body and deep in the brain
• Can be called “primary emotions” or “emotional primes”
• Cortex uses neurotransmitters, subcortical affective primes use neuromodulators
SEVEN EMOTIONAL DISPOSITIONS/AROUSAL STATES: TRANSLATED INTO PSYCHOEDUCATIONAL/COUNSELING TERMS

- Mad
- Sad
- Scared
- Seeking
- Care
- Play
- Sex

But we are not going to talk about sex.

TRANSLATING PANKSEPP

- Supports embodied cognition, somatic marker, interoception research
- Suggests panhuman affective primes that are culturally mediated
- Educates about a large range of emotional primes that have discrete but inter-related homeostatic significance
- Normalizes the significance and variety of affective experience
- Assists the individual in sorting out what is driving his/her/their thoughts/feelings/behavior
GALVANIC SKIN RESPONSE

- Rosalind Picard
- MIT Media Lab---MIT-wide Mind, Hand, Heart initiative.
- Affective Computing
- https://www.youtube.com/watch?v=ujxriwApPP4
- Technology and Emotions

RESEARCH SUPPORT

- Correlation between emotional awareness and fluid reasoning (Yuan, Qin, Wang & Yu, 2012).
- Correlation between emotional awareness and intelligence scores (Craig, 2015)
- Correlation between emotional awareness and academic functioning (Teixeira dos Santos & Mortimer, 2003)
- Correlation between emotional awareness and healthy heart functioning (Critchley & Garfinkel, 2017)
- Correlation between emotional awareness and breathing (Craig, 2010)
- Correlation between emotional awareness and vagal tone (Porges, 2015)
- Correlation between emotional awareness and interventions for ASD (Mahler, 2016)
- Correlation between emotional awareness and good pain management (Critchely, 2017)
- Implications for educational policy (Immordino-Young, 2016)
FROM LOCATION TO INTERVENTION: TRANSLATING NEUROPSYCHOLOGY INTO SCHOOL PSYCHOLOGY PRACTICE

ADAPTED CIRCUMPLEX: AWARENESS OF VALENCE AND AFFECT
INTEROCEPTION AND EMOTIONS

- Notice the valence (approach or avoid)
- Notice the arousal level
- Accept it as information to be considered
- Remember that it is sensed by you only
- Remember that no one can define it for you
- Remember that no one can demand it be different

- Are you comfortable or not?
- If not, start to define exactly what the feelings are and what they are about....

DO:
- 😠 Irritated to Angry
- 😞 Disappointed to Sad/Grieving
- 😦 Worried to Scared
- 😝 Care to Love
- 😪 Curious to Seeking Out
- 😄 Play to Play

- 😍 Sexual desire
**DON'T**

*Are You AWARE of How You Are Feeling Now?*

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<thead>
<tr>
<th>Feeling</th>
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<tr>
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*How do you feel today?*

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**EMOTIONAL INTELLIGENCE**

*Emotional intelligence is being smarter with feelings.*

![Diagram](Diagram.png)
SENEING, KNOWING, IDENTIFICATION

- The Hawn Foundation—The MindUp Program
- https://www.youtube.com/watch?v=tAo-ZSmLJ4

1. Mindfulness

The essential part of all skills taught in skills group are the core mindfulness skills.

*Observe, Describe, and Participate* are the core mindfulness “what” skills. They answer the question, “What do I do to practice core mindfulness skills?” *Non-judgmentally, One-mindfully, and Effectively* are the “how” skills and answer the question, “How do I practice core mindfulness skills?”

2. Interpersonal Effectiveness

The interpersonal response patterns—how you interact with the people around you and in your personal relationships—that are taught in DBT skills training share similarities to those taught in some assertiveness and interpersonal problem-solving classes. These skills include effective strategies for asking for what one needs, how to assertively say “no,” and learning to cope with inevitable interpersonal conflict.

This module focuses on situations where the objective is to change something (e.g., requesting someone to do something) or to resist changes someone else is trying to make (e.g., saying “no”). The skills taught are intended to maximize the chances that a person’s goals in a specific situation will be met, while at the same time not damaging either the relationship or the person’s self-respect.

3. Distress Tolerance

Most approaches to mental health treatment focus on changing distressing events and circumstances. They have paid little attention to accepting, finding meaning for, and tolerating distress. This task has generally been tackled by religious and spiritual communities and leaders. Dialectical behavior therapy emphasizes learning to bear pain skillfully.

4. Emotion Regulation

People with borderline personality disorder or who may be suicidal are typically emotionally intense and labile—frequently angry, intensely frustrated, depressed, and anxious. This suggests that people grappling with these concerns might benefit from help in learning to regulate their emotions.
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