When Fear Is Near

"Imminent danger results in fast, likely 'hard-wired', defensive reactions mediated by the midbrain." – Mobbs et al., 2009, J Neurosci

9/12/20

Amygdala

- Sensory Cortex
- Medial Prefrontal Cortex
- Dorsolateral Prefrontal Cortex
- Thalamus
- Hippocampus

Brain Fiber Tract Network

- Edges -> Fiberstreams
  - Diffusion tensor imaging (DTI)
  - Tractography

Neuroimaging in PTSD Rauch, van der Kolk et al, 1994

De-activation of Left hemisphere
Imprint of trauma on Right
Left anterior prefrontal cortex (Broca's area) goes off-line (speechless terror, dumbfounded)

Brain Fiber Tract Network

- Verbal abuse: higher gray matter volume (GMV) in auditory cortex and lower integrity of left arcuate fasciculus, DMNs, and arcuate fasciculus integrity associated with lower verbal IQ and comprehension.
- Witness domestic abuse: Lower grey matter density in right lingual gyrus and reduced thickness in portions of visual cortex. Witnessing domestic violence between 15-12 years of age had considerable effect on thickness and volume.
- Sexual abuse: Lower GMV in primary visual cortex and visual association cortices directly correlate with duration of exposure before age of 12 and associated with deficit in visual memory.
Altered Networks in the brain following trauma

Determine relevance, attention, information processing and self-experience
**Insula**

- **CONTENT OF FEELINGS**
  - Conveys bodily states to the brain

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**Exteroceptive Sensations**

- The PTSD dissociative subtype showed limited vestibular nuclei connectivity with regions involved in exterceptive processing
- This may reflect a compromised ability to gather exterceptive input from one’s surroundings
- Combined interoceptive and exterceptive processing is critical for the multisensory integration at a cortical level

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**PTSD Dissociative Subtype**

- When I don’t have a sense of self, I don’t know where to move... I cannot move.

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**Interceptive Inference**

- The insula is a key node for the convergence of exterceptive and interoceptive sensory information
- This creates an interoceptive inference – awareness of a sensory experience

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The Default Mode Network in PTSD  Bluhm, Lanius et al, 2014
Controls (n=16): Positive Correlation

Bluhm, Lanius 2005

PTSD (n=18): Positive Correlation

Functions of The Default Mode Network

- Self-reflection/interospection
- Autobiographical Memory
- Perceiving the perspectives of others
- Experience of having an embodied sense of self existing in space
- Continued experience of self across time & into future

The Default Mode Network in PTSD  Bluhm, Lanius et al, 2014

Controls (n=16): Positive Correlation

Bluhm, Lanius 2005

PTSD (n=18): Positive Correlation

The default mode network (DMN) at rest and under stress


Terpou, Lanius et al, 2020


Multisensory Integration and the Embodied Self

- The dorsal prefrontal cortex is thought to be critical for multisensory integration.
- The dorsal attentional network and the default mode network are thought to work in tandem to facilitate activation of the central executive network to carry out higher-order cognitive tasks, including emotion regulation.

Training Empathy, Compassion, and Perspective Taking

SELF-OTHER DISTINCTION

EMPATHY

COMPASSION

COGNITIVE PERSPECTIVE TAKING

PROSOCIAL BEHAVIOR

The Perspective Dyad

Does Learning to get a better Understanding of yourself and your inner parts predict a better Theory of Mind?

Working out different Aspects of the Self: IFS

**Inner Parts:**

4 levels to identify inner parts:

- Bodily Reactions
- Feelings
- Thoughts / Opinions
- Imagination / Inner Pictures

Examples of Inner Parts

- The Inner Judge
- The Booder
- The Best Self
- The Fighter
- The Life-Saver