

TRAUMATIC EXPERIENCES, DEVELOPING BRAINS & NEURAL PATHWAYS TO HEALING

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SHAPE A BRAIN

SHAPE A FUTURE™

TODAY'S WORKSHOP

- The social brain
 - relational neuroscience
 - adaptive attachment: safety & exploration
 - emotional regulation strategies
- Basic brain structures, functions, processes
- Relational trauma
- Relational repair: re-regulate, rewire, restore, & re-story

FRAMING QUESTIONS

- How do early experiences shape the development of our relational (social) capacity?
- How do we shift bio-chemical responses & adaptations to trauma?
- How do we reclaim emotional well-being?

RELATIONAL QUESTIONS

- How does my body/brain/mind:
 - experience a sense of safety in my environment?
 - respond to threat in my environment?
 - inhibit or allow for exploration?
- What elements in my environment are present when my body/brain/mind feels safe? Threatened?
- What does my body/brain/mind need to return to a state of calm when activated?

THE SOCIAL BRAIN

- Nature, nurture, niche
 - relational ecosystems, habitat
- Interpersonal neurobiology
- Evolution of the social brain: cognition, communication (language), engagement systems
- “Survival of the nurtured”

EXPERIENCE

- The brain and mind develop and change across the lifespan.
- Neuro-development and function are dependent upon experience; primary experience is caregiver relationship.
- Experience is external and internal.
 - *“It’s not just what happens to you that counts...it’s what you think happens to you.” Jerome Kagen*
- Synaptic connections are maintained, strengthened, created, and eliminated through experience.

THE EMBODIED BRAIN BODY MIND BRAIN

Parts & Processes

NEUROSCIENCE LEXICON

- ***Neuroplasticity***: Brain's ability to rewire, change, re-organization throughout life.
- ***Exuberance***: Proliferate development of synaptic connections (***Synaptogenesis***), followed by ***Pruning***: elimination of synaptic connections (use it or lose it).
- ***Neurogenesis***: Growth of new neurons, after birth--primarily in the hippocampus.
- ***Myelination***: Coating of neurons with myelin sheath, creates faster signals; final stages of initial completion mid-20s to early-30s.

TWO HALVES OF THE WHOLE

Right-hemisphere

- on-line at birth, dominant
- attachment processes
- affect regulation, empathy
- social
- non-linear
- body sense
- images, themes, patterns

Left-hemisphere:

- mylenation 18 months
- logical
- cause/effect reasoning
- verbal processing (language)
- sequential
- plans and structures
- controls feelings

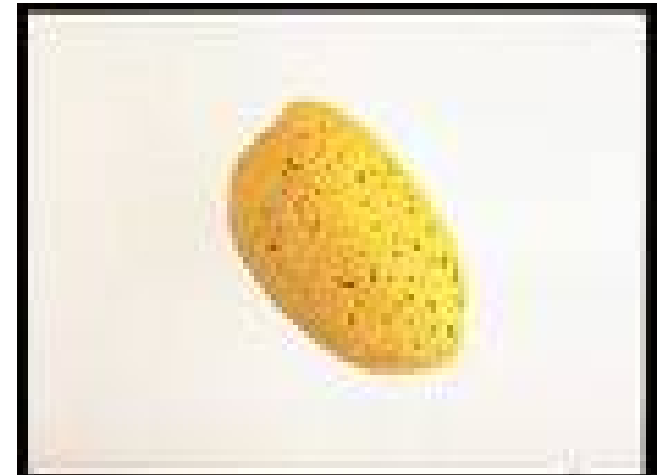
CORPUS CALLOSUM

- Connective body between hemispheres, 200 million nerve fibers.
- Transfers information between left and right (interhemipsheric communication).

AMYGDALA

“almond”

- Temporal lobes
- Major affective activities
- Survival, fear: freeze, flight, fight
- Receives information first, tells you how you feel
- Autism: social behavior interpretation
- Depression
- PTSD



HIPPOCAMPUS

“seahorse”

- Temporal lobes
- Learning and memory
- Converts short term to permanent memory
- Affected by estrogen
- Key structure in Alzheimer's dementia.
- If mood symptoms are severe, trauma-hippocampus shrinks



PREFRONTAL CORTEX (PFC)

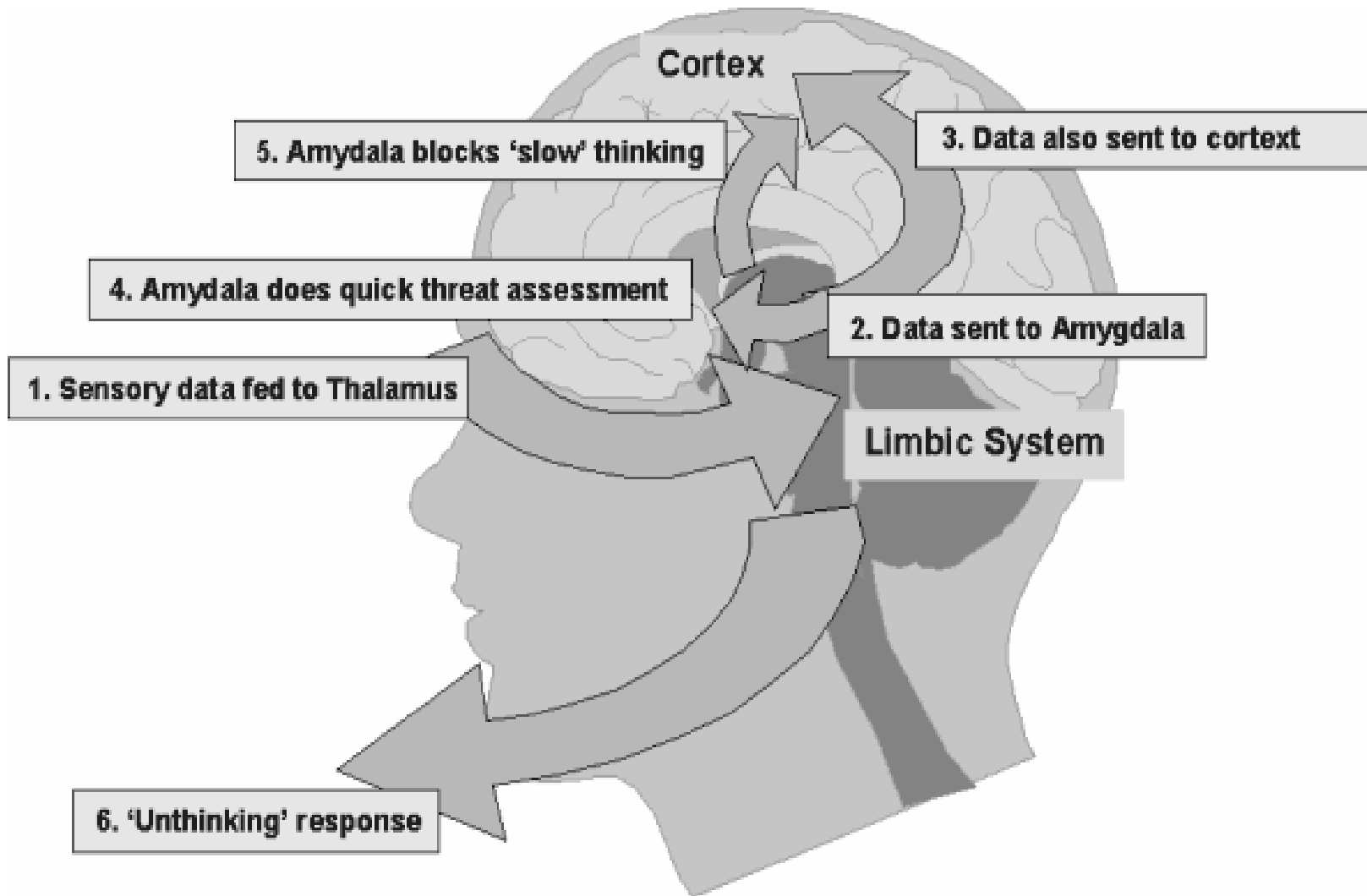
- Executive functions (dorsolateral frontal cortex)
 - Planning
 - Reasoning
 - Problem solving
- Moral & social cognitions
 - Delays/inhibits immediate reaction to stimuli (orbitofrontal cortex)
 - Forecast consequences of current actions on future goals
- Affect regulation, response flexibility
- Fast thinking
- Long-term memories
- Injuries create impairment to social abilities

NEUROTRANSMITTERS

Neural Narratives

- Inhibitory—braking system
 - Serotonin
 - GABA
- Excitatory—accelerator system
 - Dopamine
 - Epinephrine
 - Glutamate
 - Histamine
 - PEA

PROCESSING



MEMORY SYSTEMS

Implicit

- *Amygdala*
- Present at birth
- Pre-verbal
- Encodes emotions, behavioral patterns, learned habits, & perceptions
- No conscious attention for encoding
- Recall void of sensation remembering
- Activates strong feelings & body sensations

Explicit

- *Hippocampus*
- Middle of second year
- Requires conscious attention for encoding
- Autobiographical: sense of self & time
- Factual
- Recall sensation of remembering
- Sense of self in the past

RELATIONAL NEUROSCIENCE

Let's put our heads together

**A child's first reflection of
self is of the parent's
unconscious**

***The roots of resilience are to be found
in the sense of being understood by
and existed in the mind and the heart
of a loving, attuned, and self-
possessed other.' John Bowlby***

ATTACHMENT

- The brain hard-wired for attachment; neural maps of the self as experienced by other.
- Right brain to right brain communication.
- *Non-verbal expressions of primary emotions* from caregiver most important influence.
- Affective attunement, resonance, rupture-repair.
- Primary attachment figure “teaches” the infant how to organize and regulate emotional inner-self.

“One’s degree of confidence that significant others, usually family members, will provide support & protection & will remain in within close emotional proximity.”

ATTACHMENT NARRATIVES

- The first relational story.
- “Rough, wordless blueprints for emotional life.”
- No articulated thoughts or words to define or give meaning to the event.
- Emotional response drives behavior.
- When child develops language, habitual affective responses already established.
- The most robust predictor of a child’s attachment is the coherence of the parent’s life narrative.

SECURE AND INSECURE

- *Securely* attached: emotionally flexible, enhanced cognitive abilities & adaptive social functioning.
 - *Resilience to stress, integrated, coherent narrative*
- *Insecurely* attached (developmental trauma): emotionally rigid, impaired social relationships.
 - Series of ruptures without repair
 - Right hemisphere dysregulation

RIGHT TO RIGHT NON-VERBALS

- Eye contact
- Facial expressions
- Tone of voice
- Posture
- Gesture
- Timing
- Intensity of response

Siegel

SEEKING SAFETY

- Experience of safety is necessary for emotional regulation.
- Emotional regulation is necessary to engage in exploration.
- Exploration is necessary for new learning.
- New learning is necessary to develop resources for adaptation.

ENGAGING EXPLORATION

What is exploration?

What forms does exploration take?

What information does exploration provide?

- Sensory
- Affective
- Cognitive
- Relational

TRAUMATIC EXPERIENCING

WHAT DEFINES TRAUMA?

- Experiencing extremely stressful event or events.
- Potentially traumatic events include both objective experience and subjective experience.
- Potentially traumatic events may be singular or repetitive incidents.
- Three levels of interpersonal trauma:
 - Impersonal
 - Interpersonal
 - Attachment
- Greater degree of interpersonal involvement-greater potential for trauma.
- “Stress pileup”: accumulation of traumatic stress over time.

Allen, Menninger Clinic

STRESS AND THE BRAIN

- Stress can be transmitted in utero.
- Response to source undifferentiated.
- Attachment influences the regulation of stress hormones (cortisol).
- Stress activates the cortisol system, soothing lowers cortisol.
- In the absence of soothing cortisol levels stay high with harmful effects on the brain.
- Overtime the cortisol “thermostat” is reset.

BRAIN RESPONSE TO TRAUMA

- Perpetual state of arousal: activated freeze/flight/fight.
- Over-develops limbic region.
- Decreased activity to other regions of the brain, under-develops frontal lobe.
- Brain resources for cognitive and social skills less activated.
- Reduced connections in corpus callosum
- Decreased volume of the hippocampus.
- Impairs memory functions.

TRAUMA: BRAIN TO BEHAVIOR

- Neuro-physiologically adapted to distressing (unpredictable) environment.
- Rapid heart rates, tense muscles, trouble sleeping.
- Hyper-vigilant.
- Prone to misinterpret others.
- Tune out verbal.
- Hypersensitive to non-verbal.
- Gender differences:
 - *males*: irritability, verbal and physical aggression, violence, alcohol abuse
 - *females*: withdrawn, depression, anxiety

TRAUMATIC EMOTIONAL MEMORY FUNCTIONING

- Vivid memories stamped in emotional brain (neural imprinting).
- Perceptual cues (triggers): sight, sound, smell, touch, etc. can activate memory.
- Unresolved trauma triggers alarm system that does not fit with current situation.
- Sense of uncontrollability is key to feeling emotionally overwhelmed. Helplessness. Fearfulness.
- Lack of differentiation of past from present. Lack of adaptive response (integration of feeling and thinking).

But in order to reverse the effects of trauma, it is not sufficient that care be *given*. It must be *received*.

Diana Fosha

INTEGRATED & COHERENT NARRATIVE

- Autobiographical & reflective.
- Continuity of self across time: past, present, anticipated future.
- Integrates emotional, cognitive, sensory, & behavioral systems.
- Stable, adaptive, & flexible.

OPTIMIZING

- Creating safe spaces
 - Environmentally, relationally, synaptically
- Encouraging exploration
 - Play, autobiographically
- Resourcing
 - Externally and internally

WINDOW OF TOLERANCE

- Intensity of emotion—arousal
- Multiple windows...different emotions
- Lack of safety
- Past-present merge
- Level of disruption
 - Hijacking, flooding
- Beyond window: sub-cortical processing dominant
- Within window: integration of systems

RECOVERY & EXPANSION

- Sensation awareness, body awareness
- Environmental triggers
- Recovery
 - “...decreasing the disorganizing effects of a particular episode of emotional arousal.” Siegel
 - Reinststate cortical processes: self-reflection & impulse control
- Relational work: attune, attend, resonant
- Resonance circuitry: right/right=safety
- Present moment focus
- What’s happening right now=exploration

FINAL COMMENTS

- Slow down
- Stay present
- Know your own inner landscape
- Give up linearity
- Celebrate the small stuff

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