

## Special Offenses: Domestic Violence and Sexual Assault Trauma and Investigative Issues

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### Topics

- Stress and Trauma
- Neurobiology – structures
- Neurobiology – processes/physiology & trauma
- Implications for Investigations
- Implications for Testimony

Disclaimer: I am not a neuroscientist.

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### The Brain

- Advances in neuroimaging technology (PET scans, fMRI) have opened up new ways of understanding brain functioning before and after traumatic events
- See Webinars of Dr. Rebecca Campbell  
*“The Neurobiology of Sexual Assault”*

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### Some History:

- Neuroimaging – reveals encoding and remembering/retrieval and reporting events are associated with distinct patterns of activity across the brain
- 1996 Rauch et al. studied PTSD patients using PET scans and found increased activation in the amygdala, anterior cingulate cortex (ACC) and other paralimbic regions when listening to a trauma script compared to a neutral scripts

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### History:

- 2004 studies of Vietnam Vets and Army Nurses (Sin et al., 2004)
- Studies those with PTSD symptoms - related to a PFC-amygdala circuit dysfunction

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### Examples of Types of PTSD Studies

- War veterans – how brain responds to olfactory cues (e.g. fuel, vanilla, )
- Trauma-related pictures and words (comparison groups)
- Mostly questions regarding the PFC-amygdala circuit

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When referring to Neurobiology and Trauma:

- Important to recall that there will be differences among individuals who have experienced a single traumatic incident from those survivors of ongoing interpersonal violence
- Other factors potentially affecting brain imaging: childhood traumas; emotional valence of event; pre-existing conditions;

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Other:

- Individuals with exposure to ongoing interpersonal violence may also have had early exposure to trauma which may have impacted neural structures related to memory and may affect their responses to current trauma (e.g. hippocampal volume changes)

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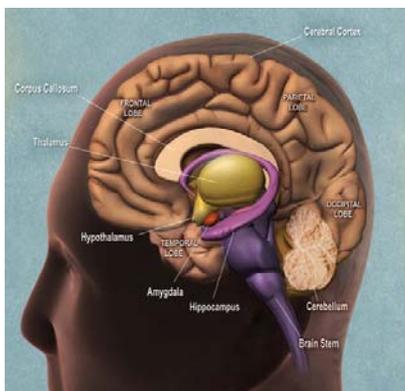
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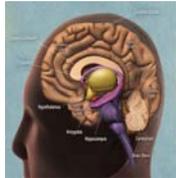
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### Areas of Brain

- **Prefrontal Cortex** (PFC) – complex cognition referred to as “executive functions”– focusing attention where we choose, rational thoughts
- Prefrontal cortex and **Amygdala** are structurally and functionally interconnected



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### Amygdala continued

- **Amygdala** – almond shaped mass about 1 inch long with dozens of nuclei that are connected
- Alerts you to threats to your survival
- Essential component of the circuit involved in (implicit)emotional memory, emotional modulation of memory, emotional influences on attention and perception

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### The HPA Axis

- Amygdala alerts the **Hypothalamus** of threats which alerts the pituitary gland
- The **Pituitary** gland signals the **Adrenals** letting the body know one is experiencing a traumatic event
- Adrenals release a cascade of stress hormones/chemicals

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- These chemicals alert the individual that something important is happening
- If the stimuli are known sources of danger, (and the individual is not in a life-threatening situation) "fear" schemas are retrieved from memory (LeDoux, 2015)
- The stress hormones culminate in the release of glucocorticoids (GC's) from the adrenal cortex (affecting regions of the brain such as the hippocampus - important for memory).

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### Hormones and Chemicals

- Catecholamines (ADRENALINE)
- Cortisol
- Opioids
- Ocytocin
- Floods prefrontal cortex and impairs rational thought
- Affects energy levels
- Blocks pain; blunts emotions
- Body's counter-effect to flood of opioids blocking

**HOW DO THESE AFFECT VICTIM PRESENTATION?**

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### Prefrontal Cortex

- In trauma/extreme fear, prefrontal cortex becomes impaired and commonly is **shut down by the surge of chemicals**
- The region that allows us to think rationally is effectively "shut down"
- Less able to **willfully control** what we pay attention to and therefore less able to recall our experience in an orderly way

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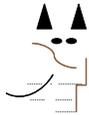
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### Memory - Encoding and Consolidation

- First must **encode** the information – hippocampus encodes visual, auditory, sensory cues and other stimuli
- Second – the information must be **consolidated** into a memory



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### When Threat to Survival:

- **Amygdala** takes over (**not prefrontal cortex**)
- Fear circuitry controls where attention goes (e.g. barrel of gun, facial expression of rapist or can direct attention away from horrible sensations – sexual assault victim focusing on ceiling)
- What the victim is attending to can be fragmentary (e.g. sensations) not the logical unfolding of the assault

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### Amygdala (continued)

- Amygdala and Hippocampus work together
- Although several factors can influence how well a stimulus is encoded, the ability to perceive and attend to the stimulus is a primary factor
- fMRI indicate the amygdala responds to emotional stimuli rapidly, before awareness
- Hippocampus gets the information (from what you hear, see, feel...encoding the cues)

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- Fear can impair the ability of the hippocampus to encode and store contextual information – such as the layout of a room (particularly if attention is focused on survival)
- May also impair the ability to encode time sequencing information (e.g. if something happened before or after)
- Events are not stored in an “all or none” fashion

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- Encoding Memories:
- The amygdala influences encoding of the memory and storage of hippocampal-dependent memories
  - There is evidence that memories for acute emotional events have a persistence and vividness that other memories seem to lack, (however, stress (GC) can either impair or enhance memory depending on the memory stage – meaning acquisition/encoding, consolidation or retrieval) (Diamond et al., 2007)

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**The Brain, Hormones and Chemicals**

- “During an a severe threat to one’s person, pupils dilate, hearing becomes more acute, (*think encoding*)....body is primed for fight or flight...”  
**but neither necessarily follows**

(Dr. James Hopper, Harvard Medical School)

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The Continuum of Victim Responses: Impact on Victim Disclosure

Hormonal flooding can cause an autonomic (uncontrollable) response

- Common for victims to “freeze”
- Differs from tonic immobility (body is paralyzed by fear)
- Some victims fight back and/or flee
- Some resist in passive ways – giving in (e.g. habit)
- Some dissociate – others become faint and pass out

(Dr. James Hopper, Why many rape victims don't fight or yell. *The Washington Post*, 6/23/16)

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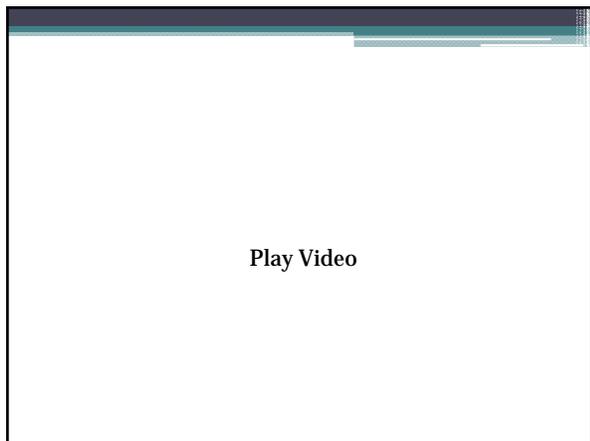
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Threats to One's Survival

- **Tonic Immobility** – “the body is literally paralyzed by fear – unable to move, speak or cry out; body is rigid and hands go numb” versus in “freezing” where the “brain and body are primed for action”
- **Collapsed Immobility** – “think possum, play dead; can be described as feeling sleepy”

(Dr. James Hopper, Why many rape victims don't fight or yell. *The Washington Post*, 6/23/16)

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## Dissociation

- “Reflexive response of spacing out; feeling unreal, disconnected from horrible emotions and sensations of intimate violence”

“Unless someone is drugged or intoxicated into unconsciousness, eventually the brain’s fear circuitry will detect the attack”

*(Dr. James Hopper, Harvard Medical School)*

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## Think careers with high fear

- Build in repetitive behaviors (e.g. combat training; police – revisions to shooting range training methods, etc.)
- “What if you are sexually assaulted and there is no effective habit learning to fall back on?”

*(Dr. James Hopper, 6/23/15. The Washington Post)*

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## Neurobiology and Domestic Violence

- Reasonable to concur that trauma of DV will affect survivors’ memories and behaviors (e.g. see work related to veterans in combat; possible changes in volume of either hippocampus or amygdala)
- DV is different from traumas that are time-delineated as a single episode

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Latest Research:

What is the impact on “implicit” (unconsciously but not consciously recalled) and explicit (consciously or declarative memories) for cues?

Minshew & D’Andrea (2015). Implicit and Explicit Memory in Survivors of Chronic Interpersonal Violence *Psychological Trauma: Theory, Research, Practice and Policy*, 7, 1, 67-75

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However....

Who will have accounts that make more sense?

**Batterer** – thinking, prefrontal cortex, behavior is habitual

**Victim** – perceptual narrowing – attention on surviving; flood of hormones and chemicals via HPA axis

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How Do The Body and Brain’s Reactions To Trauma Affect Investigations?

- Fragmented and Incomplete Memories
- Continuum of victim behaviors/responses during and in aftermath of assault
- What appear to be inconsistencies or discrepancies

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**Trauma-Informed Investigations - General Considerations**

- Safe and nonjudgmental environment
- To the extent possible - allow the victim time to rest and recover (even one sleep)
- Recognize that traumatized victims may talk for shorter periods of time – need more breaks
- Consider follow-up interviews as initial information may be disorganized; Victims should be advised that they may have missed telling about an aspect of the assault and that they should contact LE if they recall anything later at a time when they are not under the influence

( Archambault & Lonsway, 2008)

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**Continued:**

- Limit the number of professionals interviewing the victim
- Little doubt that electronic preservation of the interview (audio or video) is critical for a number of reasons (e.g. inaccurate documentation can appear as victim inconsistencies; statement may not be presented in a logical format and the tape preserves the questions and responses of “snapshot” narratives; etc.)
- Schedule interviews of victims under the influence of drugs or alcohol

( Archambault & Lonsway, 2008)

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**What Interview Methods are Still Prevalent With Adult Victims?**

*From: “The Charles Smith Blog, Portland, OR; dated 2/2/15)*

“the article says that most officers investigating sex crimes have been using the controversial Reid Technique on complainants. That is news to me! I have seen many critiques of the Reid Technique and this is the first time I have heard an allegation that it can traumatize a complainant in a sex crime investigation...”

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### Caution

Methods that suggest interviewers can detect deception are highly problematic and inappropriate for use with victims.

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### What interview method do you use with Adult Victims? (Emphasis of Each)

- General Concepts Model
- Forensic Experiential Trauma Model
- Cognitive Interview Model
- Other

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### Investigative Interviews - Adults

- Methods based on knowledge from research and clinicians from diverse fields
- Application of knowledge regarding neurobiology and trauma
- What studies, if any, have been used to evaluate the interview method(s) and what exactly, is being evaluated? (outcomes)

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### Do you open the door to testimony regarding neurobiology?

- If so, to what extent?
- While it would not be helpful to comment about the particular neurobiological response of a specific victim, it can be helpful to share with jurors what is known about the body's responses to severe threats

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### Select Experts Carefully

“several regions demonstrated an interaction between memory performance and memory stage, including the ventral precuneus/PCC, the dorsal and ventral PPC and the parahippampal cortex....in general task-induced activity is not restricted within the boundaries of intrinsic cortical networks as defined by resting state functional connectivity...”

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### Complexity of Investigative Issues

- Neural correlates are extremely complex with many unanswered questions
- Multiple factors affect what a victim attends to, encodes and consolidates in memory
- Multiple factors affect pre and post investigative issues (including memory retrieval and reporting of the violence)

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Thank You!

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