

Neurobiology of Trauma and the Relationship to Law Enforcement Investigations

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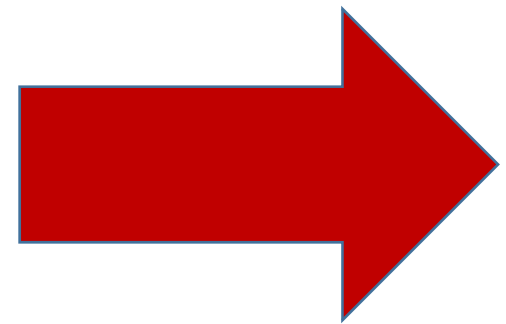
Traumatic Stress Studies (TSS) Group



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Read what's on the next screen



It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way- in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

-Charles Dickens, *A Tale of Two Cities*

What did your eyes do?



People often have strong beliefs about memory based on their own experiences...



What beliefs have you heard about memories for sexual assault?

Much of how victims respond
during and after a sexual assault
is **automatic**

...like those eye saccades.

Overview of Today's Session

- Review: The brain and stress response systems
- Memory: 3 stages
- Pulling it all together

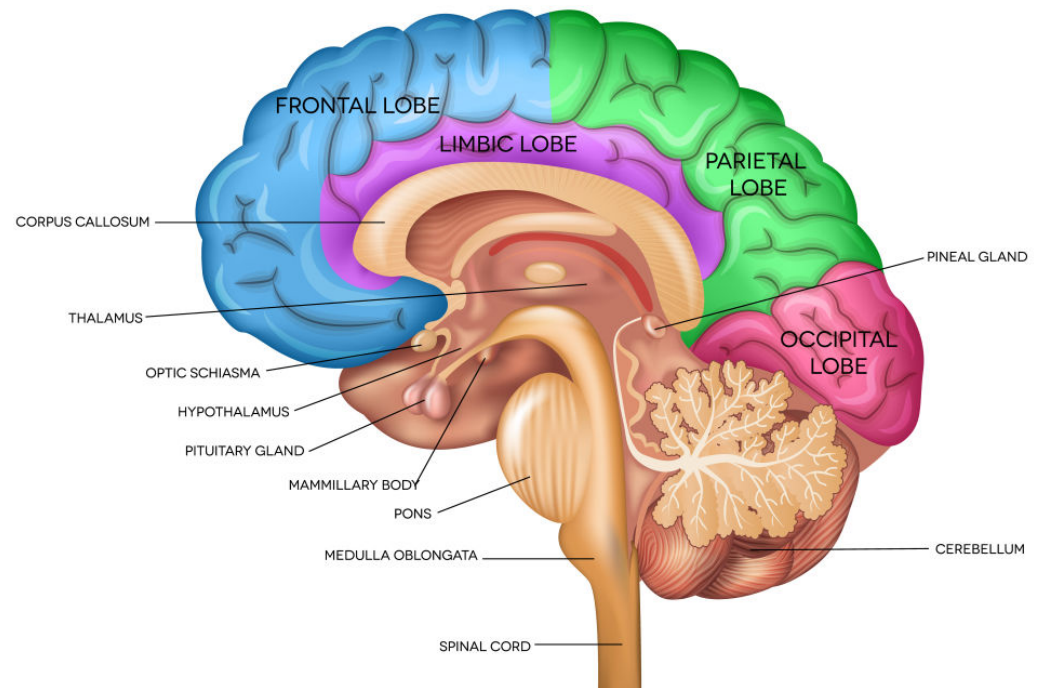
Let's start with the brain
and stress response
systems...

The goal is not for you to memorize a bunch of brain regions.

Rather, the goal is to get a sense of the many brain regions involved in responding to trauma in order to appreciate how disruptions can occur.

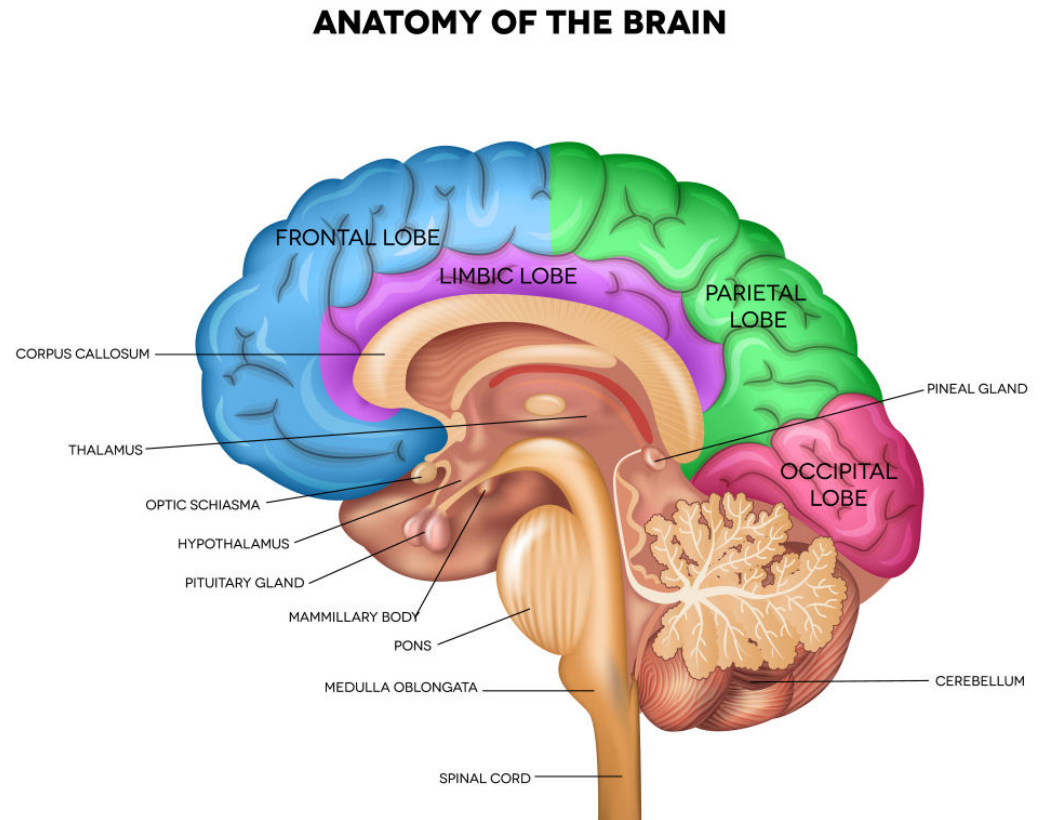
Brain Regions

ANATOMY OF THE BRAIN



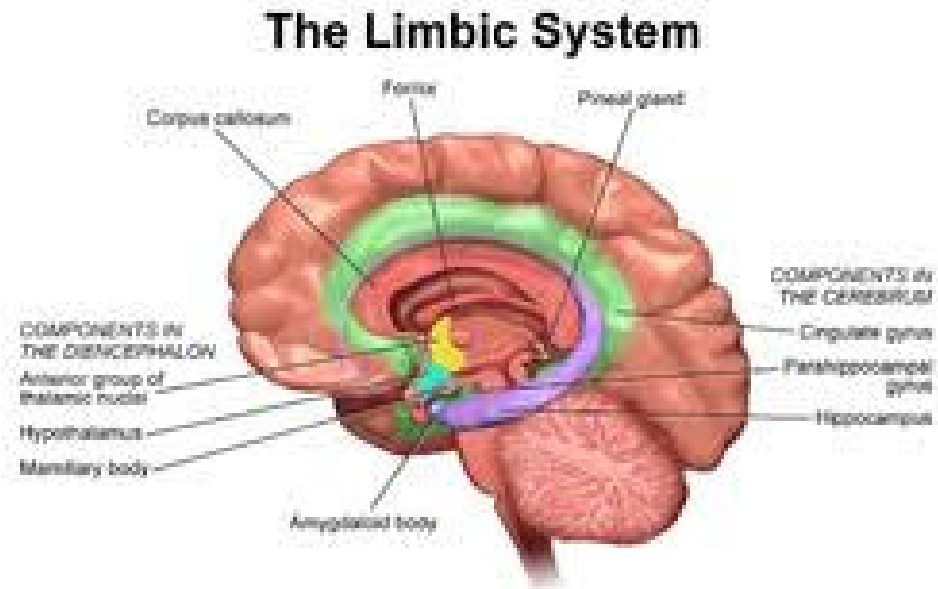
Brain Regions

- Prefrontal Cortex
 - Attention
 - Scanning, focusing, inhibiting, shifting
 - Planning/decision-making
 - Integrating memory information into narratives



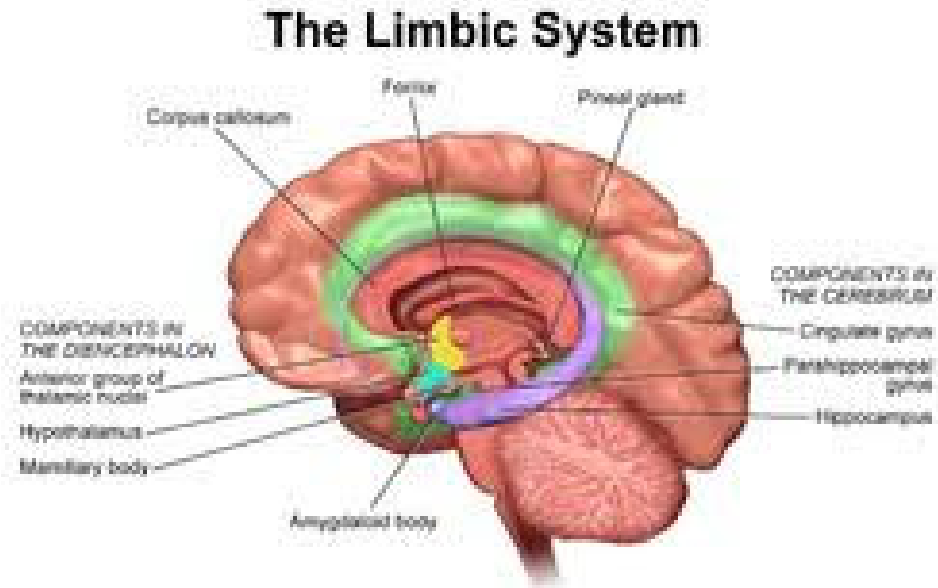
Brain Regions

- Limbic System
 - Defense (detecting and responding to threats)
 - Memory
 - Emotions



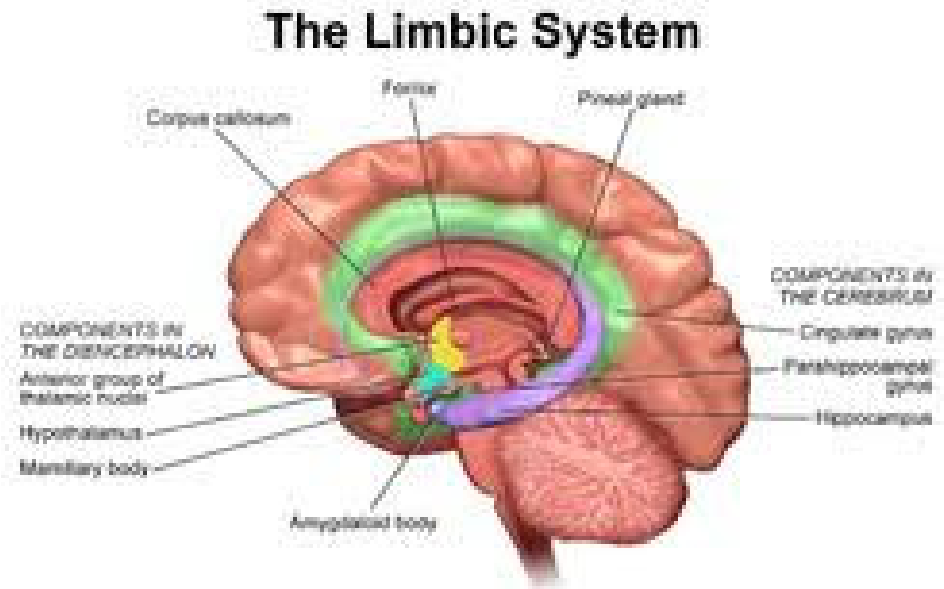
Brain Regions

- Amygdala
 - Detects threats
 - Involved in responding to and memory for fear



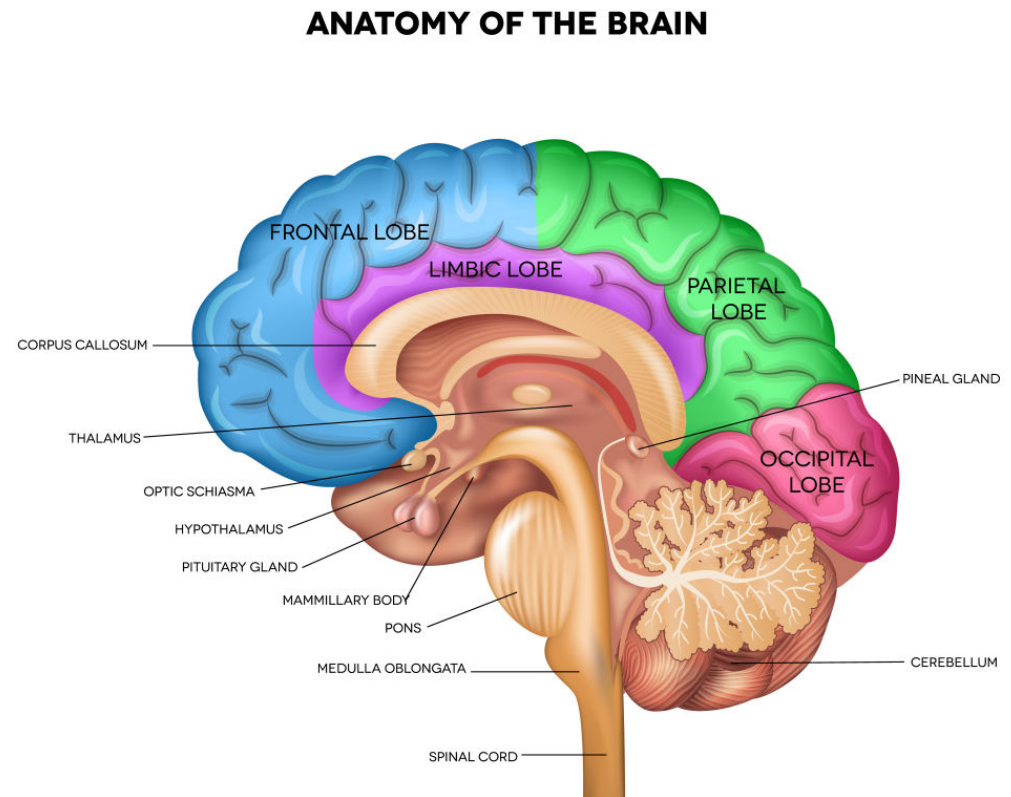
Brain Regions

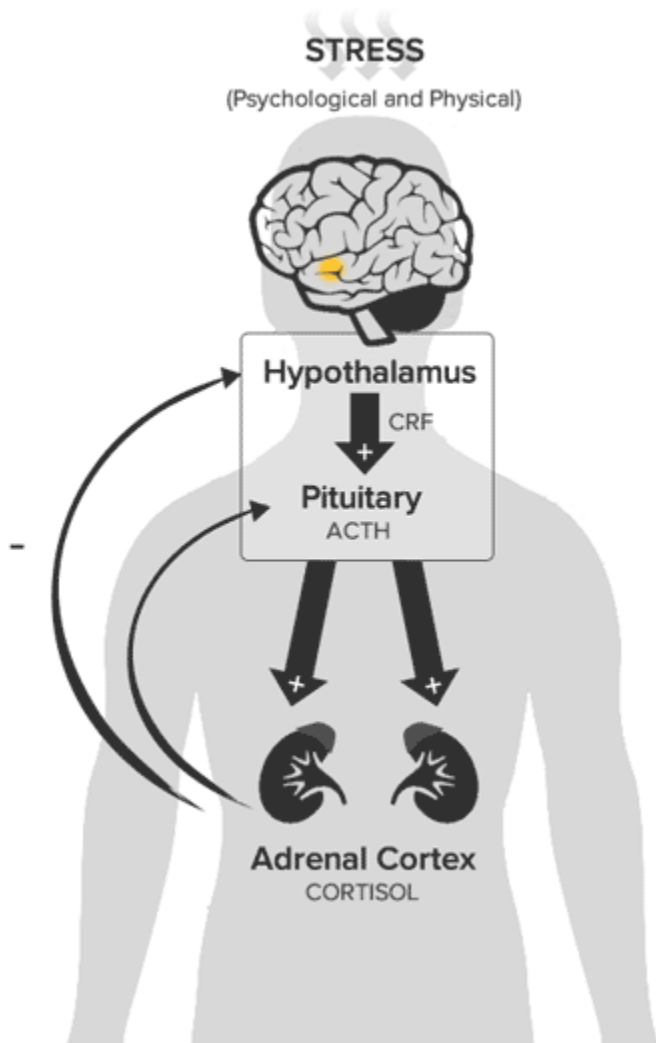
- Hippocampus



Brain Regions

- Hypothalamus
- Pituitary Gland





Hormone	Impacts
Catecholamines (adrenaline)	Fight or flight responses
Cortisol	Energy available
Opioids	Prevent pain
Oxytocin	Promote good feelings

The brain and body
responding to trauma...







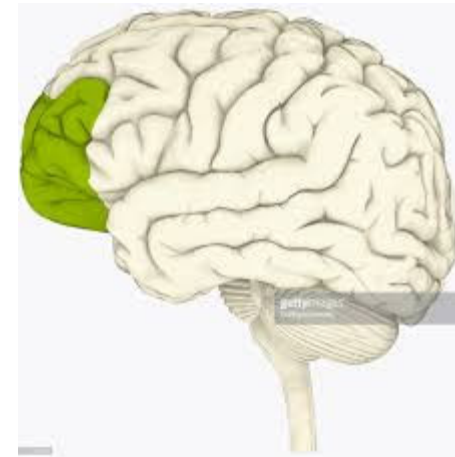
Flight

Fight

Freeze

Tonic Immobility

Importance of considering habit responses.



And impact on the brain regions
we just discussed.

Memory

Memory, 3+1

- 3 Stages
 - Encoding
 - Storage (Consolidation)
 - Retrieval

- Meta-memory

Memory processes can be affected by many things, such as where attention is directed in the moment, hormones, alcohol.

What gets encoded?



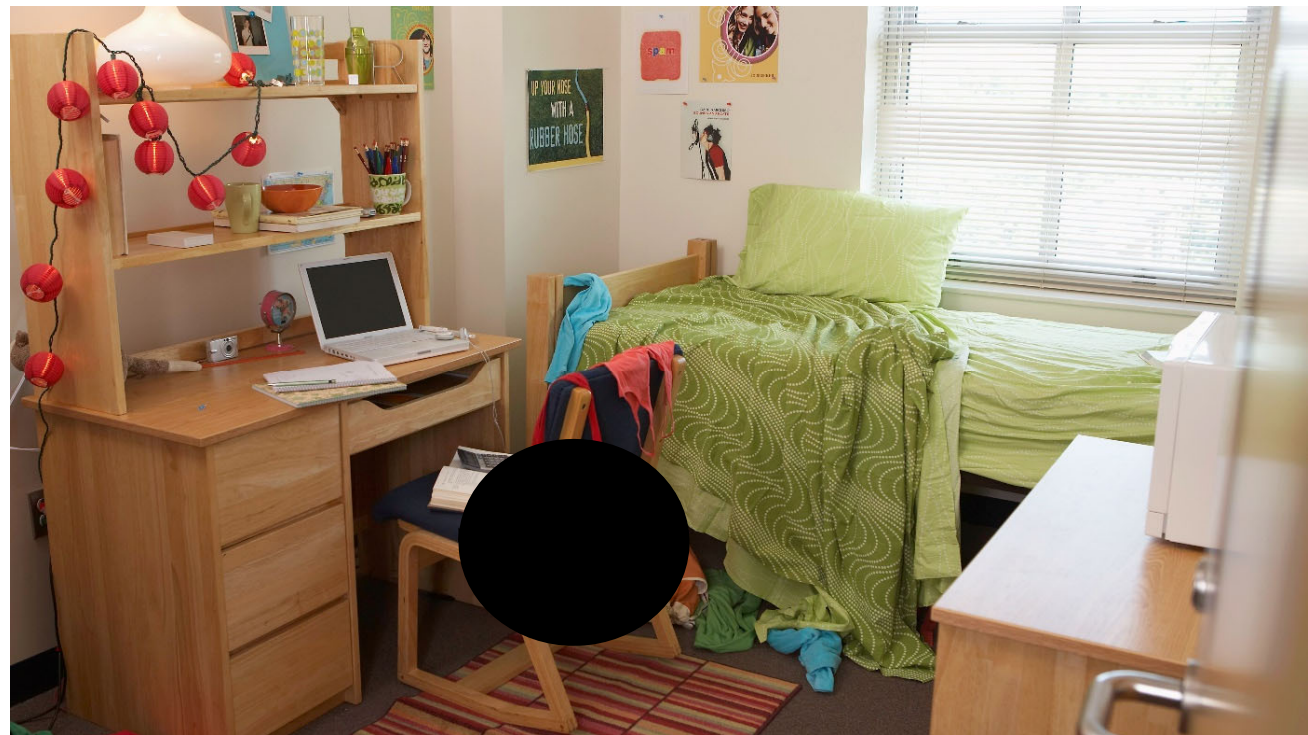
Important to consider what are
peripheral versus central details...to
the victim (not to you)

Encoding: Central details

Smells Sounds Tactile Perceptions



Everything else: Peripheral details



What gets stored?

Storage: Central versus peripheral
details

Storage: Sleep

Storage: Emotion and Stress

Storage: Fading

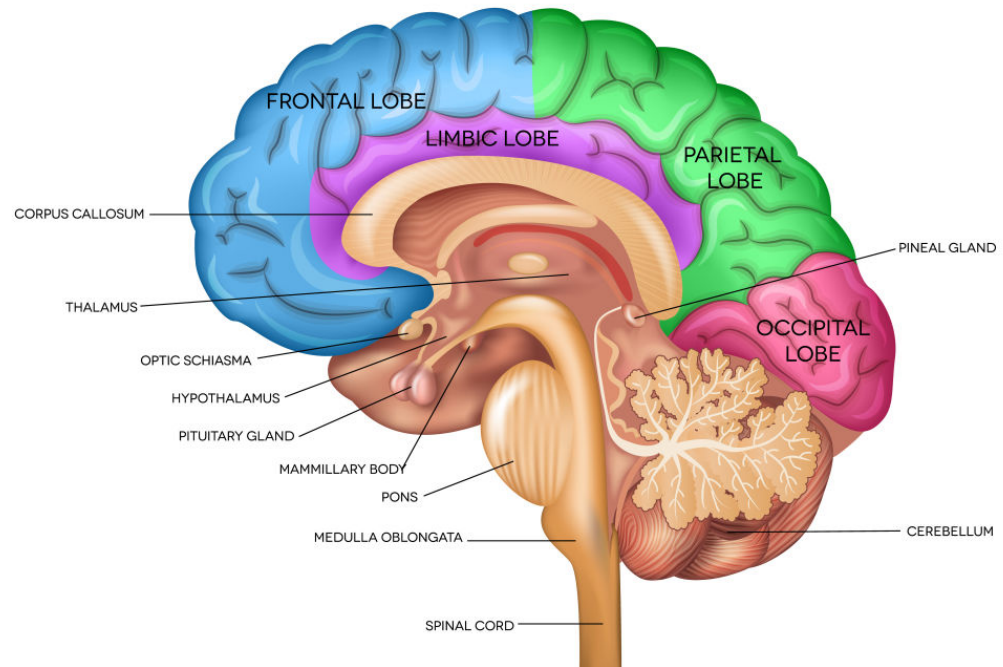
Storage: Vivid, Sensory Details

What gets retrieved?
And how accurately?

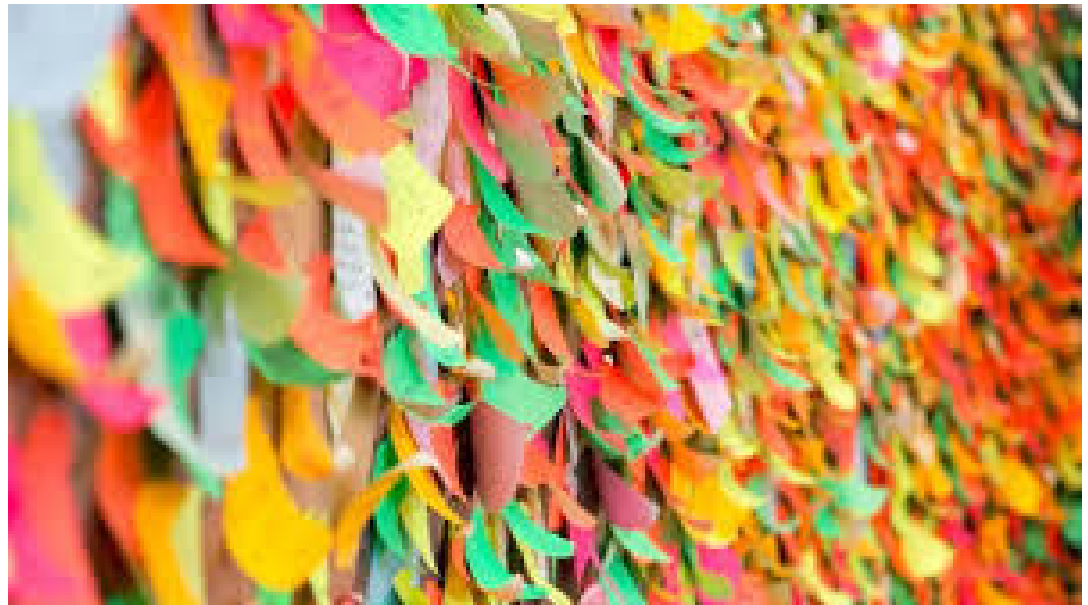


Returning to the brain to think about more about retrieval...

ANATOMY OF THE BRAIN



- Prefrontal cortex
 - Attention
 - Meaning-making



... and memory fragments.



Also, need to take into account people's beliefs about their memories (meta-memory).

Implications for interviews



Other issues...

For example, the victim doesn't
show for the interview...



The Invisible Victims of Traumatic Brain Injury

Most people know it's a problem for athletes and soldiers—but it affects victims of domestic violence even more

By Anna P. DePrince, Kim Corgens on November 13, 2019



Credit: Getty Images

Thousands of athletes returned to high school, college and professional football fields this fall, renewing discussions about the risk for and potentially devastating consequences of traumatic brain injuries (TBI) in contact sports. However, an even larger population of people affected by TBI will continue to go unrecognized and undiagnosed: women who are victims of domestic violence.

One in seven women has been injured by an intimate partner. Among women experiencing domestic violence, a handful of research teams

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There may be other memory and attention issues to consider.

Pulling it all together...



Trauma, the brain, and the body

- Complex, **automatic** systems set in motion in response to threat/stress
- Victims **cannot will their brains and bodies** to act differently
 - Just like we can't stop our eye saccades
- The things that victims do and say may be inconsistent with folk psychology (how we might expect people to respond to sexual assault), but are **consistent with neurobiology**.



Thank you.

Contact information:



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Using Research to Address Trauma and Violence

The Traumatic Stress Studies (TSS) Group, directed by Anne P. Deprince, Ph.D., is part of the Psychology Department at the University of Denver. In these pages, you will meet our team members and collaborators, as well as read about current research and access full-text publications.

We pursue several lines of research with both youth and adults to understand the consequences of trauma, particularly violence exposure. For example, we examine alterations in basic cognition (such as attention and memory) associated with different forms of trauma exposure and clinical symptoms. In addition, we draw on cognitive and socio-cognitive models to examine risk for problems post-trauma, such as re-exitinations, as well as seek to understand how appraisals of a trauma (e.g., fear, betrayal, shame, anger) relate to later symptoms. Further, we apply our basic research findings to intervention and prevention work. Our research draws on multiple methodologies (e.g., laboratory cognitive tasks, clinical interviews, survey methodology) as well as theories from diverse psychological perspectives to address both basic and intervention questions.

We strongly value community engagement in our research approach, allowing us to address questions of public concern as we learn from and with our community partners.

CONTACT US

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