

The Neurobiology of Trauma and Trauma-Informed Response

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What is Trauma?

- **Trauma is a normal emotional response to an extremely distressing event**



Community
Violence

Natural
Disaster

War

What are some events
that can lead to trauma?

Sudden Death of
Loved One

Car

Accident

Abuse

Experiencing Trauma

- DSM-V: Post-Traumatic Stress Disorder
 - ***Direct or indirect exposure to traumatic event OR repeated exposure to elements of traumatic events***

“A person was exposed to: death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence”

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington, DC: Author.

**How do you think
someone experiencing
trauma would behave?**

Trauma Symptoms and PTSD

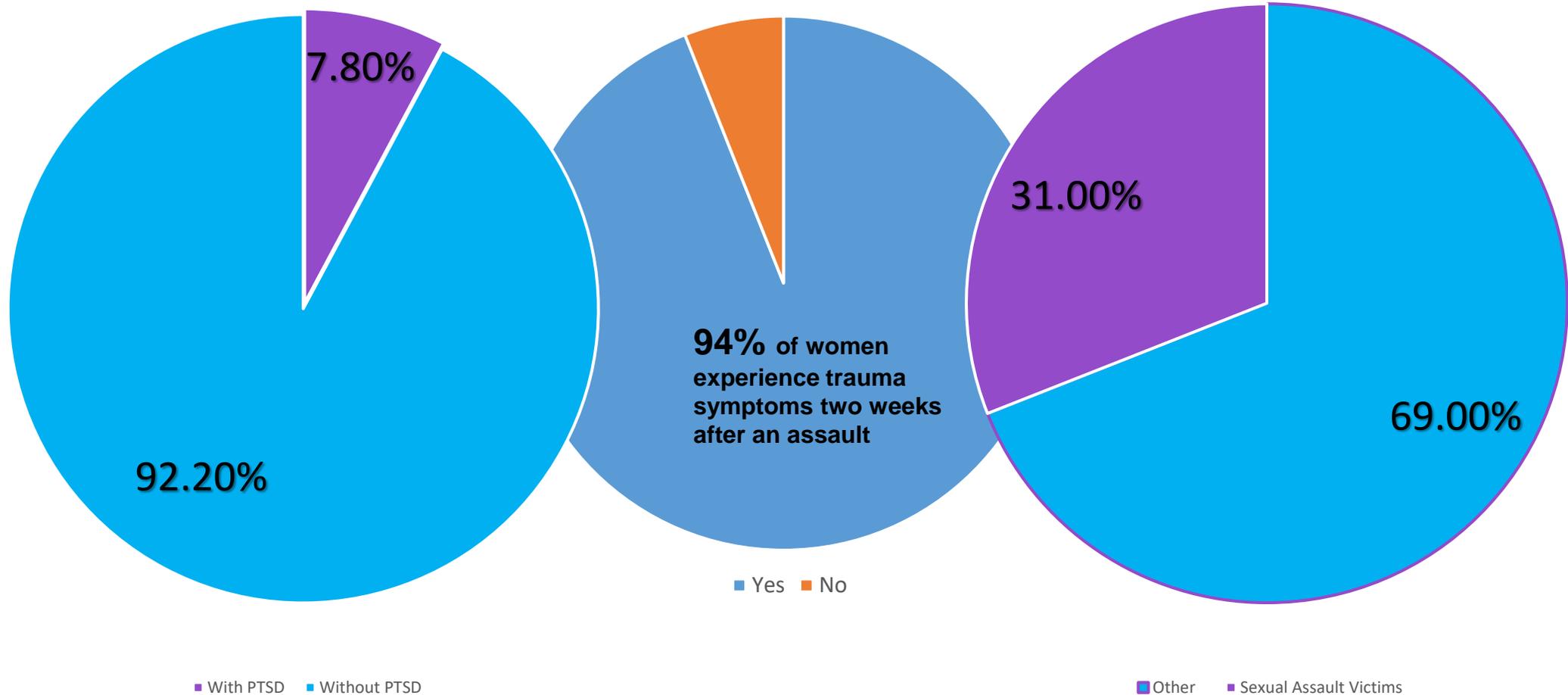
DSM-V: Post-Traumatic Stress Disorder

- Re-experiencing
- Avoidance
- Isolation
- Negative thoughts or feelings



U.S. Sexual Assault Survivors Prevalence of PTSD

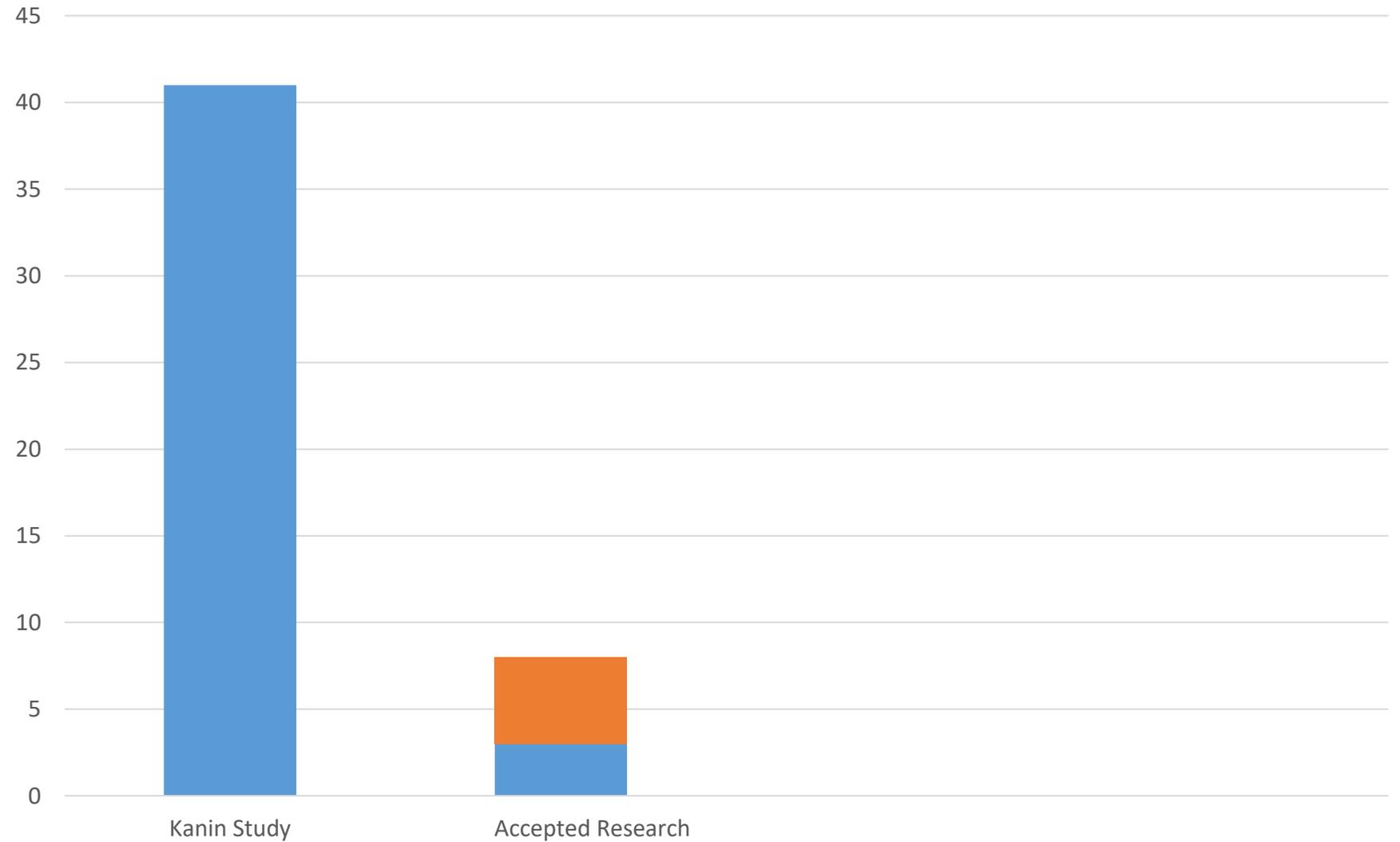
U.S. Population with PTSD Percent of Women Experiencing Trauma Symptoms



■ With PTSD ■ Without PTSD

■ Other ■ Sexual Assault Victims

Prevalence of False Reports



What do we know about false reports?

The Neurobiology of Trauma



Photo source: <https://www.psychologytoday.com/blog/the-athletes-way/201402/chronic-stress-can-damage-brain-structure-and-connectivity>

Forensic Experiential Trauma Interviewing (FETI)

Forensic Experiential Trauma Interviewing (FETI) Techniques

- Purpose is to collect as much forensic physiological evidence as possible
 - Step 1: Genuine empathy
 - Step 2: “Help me understand what you are able to remember about the experience.”
 - Step 3: Listen
- Acknowledge the difficulty of the situation
- Focus on what can be remembered
 - Pleasure and pain > narrative
 - Color, sound, smell, sensation



International Association of Chiefs of Police (2013) Guidelines.
<https://www.theiacp.org/portals/0/documents/pdfs/Psych-OfficerInvolvedShOfficer-Involved Shooting ooting.pdf>

Officer Involved Shooting Guidelines

International Association of Chiefs of Police

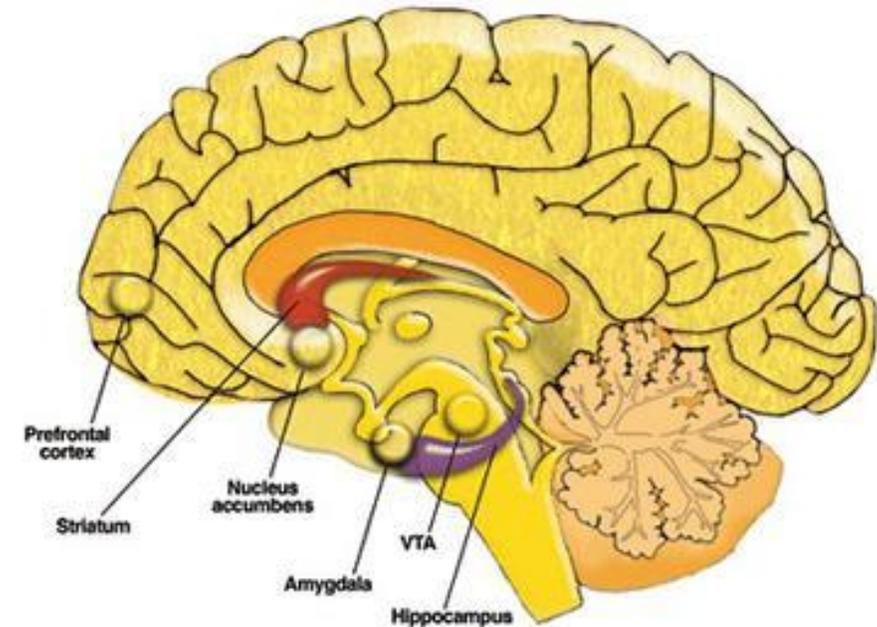
- Key Points:
 - Transported to a safe and supportive environment immediately
 - At least one sleep-cycle before providing pertinent information
 - Privileged communication



International Association of Chiefs of Police (2013) Guidelines.
[https://www.theiacp.org/portals/0/documents/pdfs/Psych-OfficerInvolvedShOfficer-Involved Shooting ooting.pdf](https://www.theiacp.org/portals/0/documents/pdfs/Psych-OfficerInvolvedShOfficer-Involved%20Shooting%20ooting.pdf)

The Neurobiology of Trauma

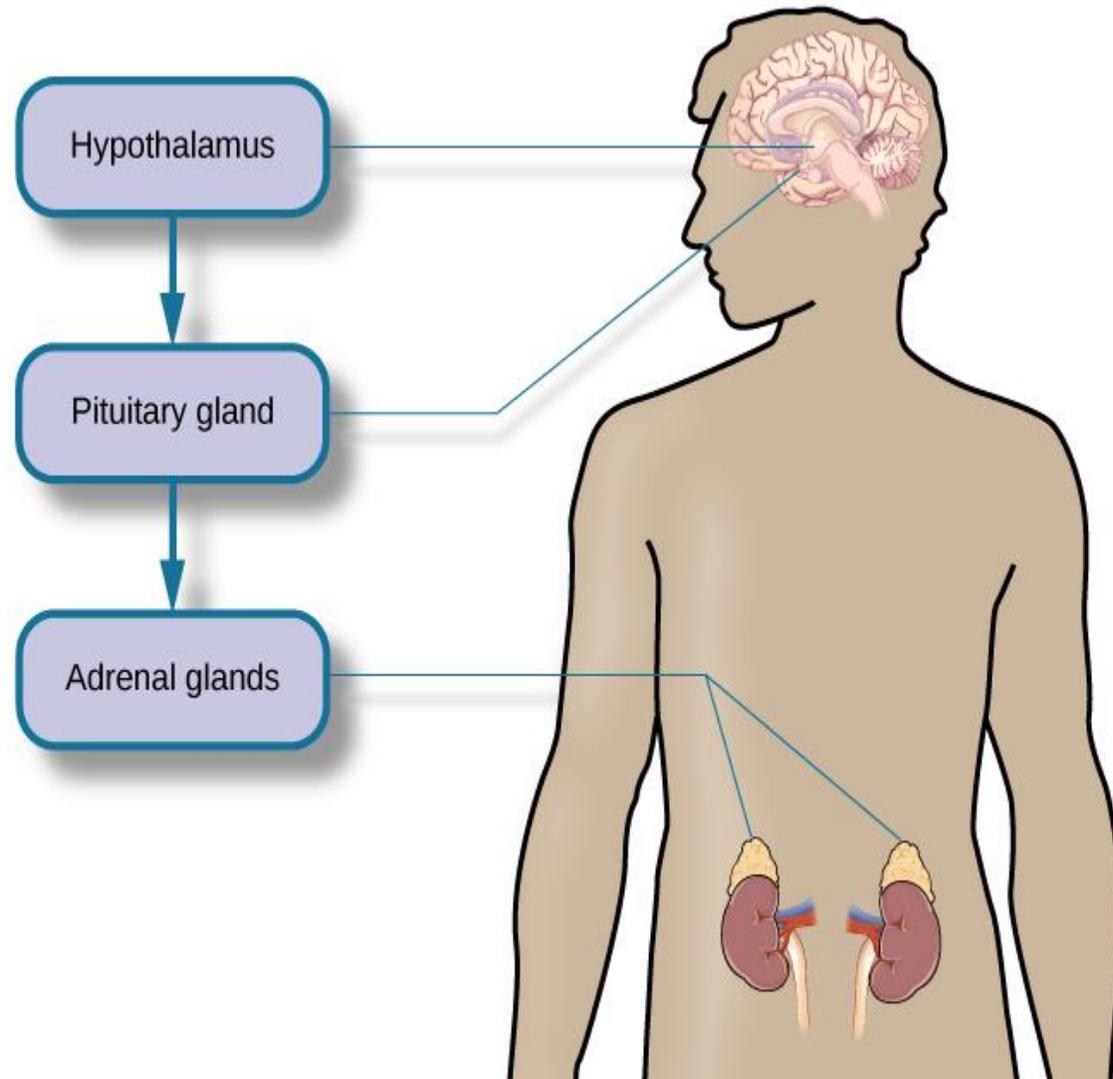
- Prefrontal cortex
 - controls normal thoughts and actions
- Amygdala
 - scans environment for threats



Roozendaal, B., McEwen, B. S., & Chattarji, S., "Stress, memory and the amygdala." *Nature Reviews Neuroscience*, 10, 423-433. 2007.

Photo Source: <https://corticalchauvinism.com/2013/10/21/fear-emotion-and-socialization-the-role-of-the-amygdala-in-the-symptoms-of-autism>

HPA Axis



- Stress hormones:
 - Catecholamines-adrenaline
 - helpful for fight or flight
 - Cortisol-affects energy levels
 - Opiates-blunts pain
 - Oxytocin-creates positive feelings
 - Stress hormones shut down functioning of the prefrontal cortex.
 - Need to rely on any learned behavior



Campbell, Rebecca. "Immediate Aftermath of Sexual Assault—Understanding and Responding to Trauma". The National Sexual Assault Policy Symposium. The National Institute of Justice. 2016. Presentation.

Campbell, Rebecca. "Neurobiology Of Sexual Assault". 2012. Presentation. <https://nij.gov/multimedia/presenter/presentercampbell/Pages/welcome.aspx>

Hippocampus

- Responsible for encoding and storing memories
 - Disrupted when fear kicks in
- Super encoding vs. minimal encoding
- Memories are accurate but difficult to retrieve.
- Alcohol can worsen encoding.



Hopper, J. & Lisak, D. "Why Rape and Trauma Survivors Have Fragmented and Incomplete Memories." Time Magazine.

Roosendaal, B., McEwen, B. S., & Chattarji, S., "Stress, memory and the amygdala." Nature Reviews Neuroscience, 10, 423-433. 2007.

Bisby, J. A. et al., "Acute effects of alcohol on intrusive memory development and viewpoint dependence in spatial memory support a dual representation model." Biological Psychiatry, 68(3), 280-286

Drug Facilitated Sexual Assault

Indicators

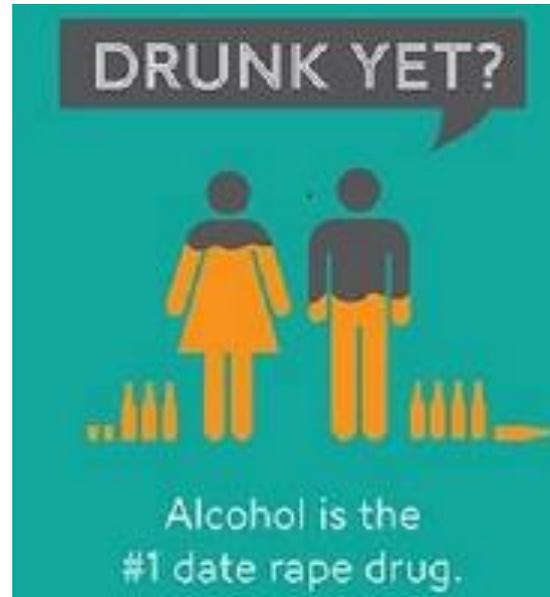
- Low level of alcohol consumption
- Behavior related to being drunk or high
- Reported “black out” period(s)
- Delayed reporting

Impact on Memory

- Alcohol does not stop encoding
- Snapshot memories
- Date rape drugs

What’s Next?

- SAFE
- Role of the FNE
- Role of the crime lab

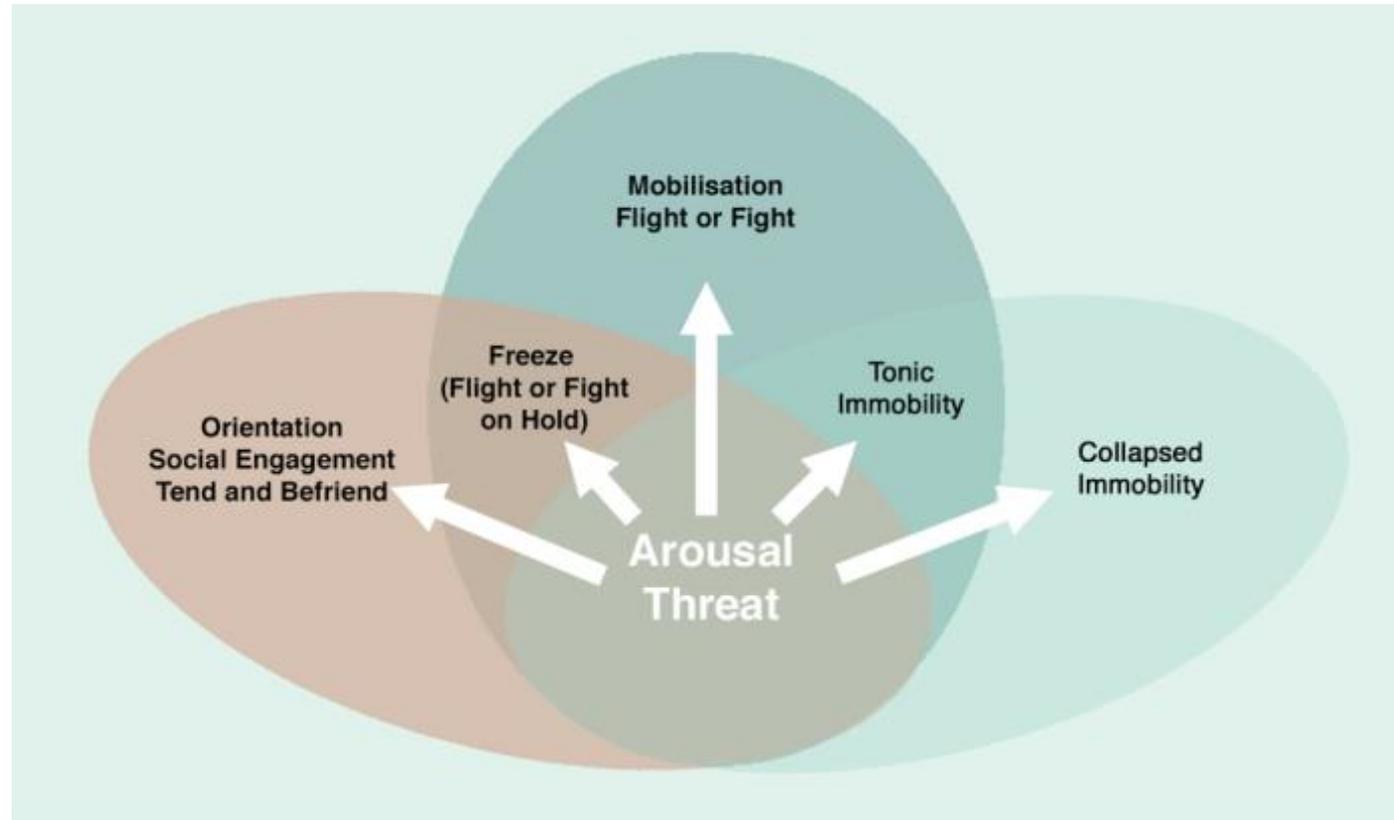


• <https://healinghandsaz.org/2015/03/>



<https://joelgordon.photoshelter.com/gallery/Criminology-Forensics-CSI-DNA-Drug-Testing/G0000d.XbGmS5Id4/3>

Defense Cascade



The Defense Cascade

The venn diagram attempts to summarise, in a non hierarchical way, the 'defense cascade' from Kozlowska et al 2015.

Self-protection habits

My boyfriend
will be mad.

I have an early
day tomorrow.

Polite responses to
unwanted sexual behavior

I don't have
any condoms.

My friends are
looking for me.

Fight, Flight, Freeze

- When encountering a threat, the body enters **fight, flight, or freeze**.
- Freeze can then transition into **tonic** or **collapsed immobility**.



Heidt, J. M., Marx, B. P., Forsyth, J. P., "Tonic immobility and childhood sexual abuse: A preliminary report evaluating the sequela of rape-induced paralysis." Behavior Research and Therapy, 34(9), 1157-1171. 2005.

Photo source: <http://www.healthyplace.com/blogs/traumaptsdblog/2016/02/26/ptsd-recovery-dealing-with-the-freeze-response/>

Tonic Immobility

- Uncontrollable paralysis in response to intense fear.
- Survivors may describe it as 'freezing up.'
- Up to 70% of survivors experience tonic immobility during sexual assault.
- Onset and return to homeostasis is quick



Collapsed Immobility

- Survivor will lose muscle tone and sometimes consciousness.
- They may describe this as 'going limp.'
- Onset and return to homeostasis is slow



Neurobiological Responses in the Animal Kingdom

Examples

- Tonic Immobility
 - Sharks
 - Chickens
 - Fainting Goats
 - Humans

- Collapsed Immobility
 - Hognose Snakes
 - Possums
 - Impalas
 - Humans



Dissociation



- Feeling blank
- Disconnected from body
- May enter autopilot as self-protection

Consequences

- Survivors may experience increased self-blame, doubt, and may be less likely to report.
- Some studies have found links between tonic immobility, depression, and PTSD



Hopper, Jim. "MCASA's Neurobiology Of Trauma Training". 2016. Presentation.

Brain Activity: Attention and Focus

- Top-Down Attention
 - Internal guidance of attention
 - Focus on what will help us meet our goals
- Bottom-Up Attention
 - Attention driven purely by external factors and stimuli
 - Raw sensory input
 - Involuntary
 - Survival based
 - Determined by fear



Central vs. Peripheral Details

Central details:

- Well encoded
- Retained in memory
- Accurate and consistent
- May not initially seem important

Peripheral Details

- Not assessed as relevant to survival at the time
- Remembered poorly
- Often the focus of LE (i.e. perpetrator's clothes, ejaculation, etc.)

Brain Activity: Perpetrator vs. Victim

- Perpetrator
 - Not Stressed
 - Prefrontal Cortex in control
 - Thinking planned and reasonable
- Survivor
 - Fearful and overwhelmed
 - Prefrontal Cortex interrupted
 - Actions and attention driven by perpetrator actions



Hopper, Jim. "MCASA's Neurobiology Of Trauma Training". 2016. Presentation.

Secondary Victimization



Value of Trauma-Informed Services

- Safety
- Trustworthiness and transparency
- Peer Support
- Empowerment, voice, and choice
- Collaboration and mutuality
- Cultural, historical, and gender issues



General Principals for all Service Providers: Do's

- Understand that there is no such things as a “perfect” or “typical” victim.
- Realize that not remembering details of an assault is perfectly normal.

General Principals for all Service Providers: Do not's

- Do not question why survivors didn't act more "rationally".
- Do not question why survivors didn't fight back or run.
- Do not expect survivors to be able to relay what happened in a chronological manner.

Important Takeaways

- Trauma-informed care is mutually beneficial:
 - Survivors avoid secondary victimization
 - Service providers are able to do their job more effectively.



Questions?

Maryland Coalition Against Sexual Assault & Sexual Assault Legal Institute

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