Neurobiology of Sexual Assault: Experience, Thinking, Behavior, & Memory

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Value of knowing the relevant neurobiological, memory and other science?
It can help us answer four common important questions...

4 Common Questions
1. Why didn’t they fight, yell, or otherwise resist, leave, etc.?
2. Why do they have memory gaps?
3. Why do they have memories that are inconsistent and/or contradictory?
4. Why do they struggle to recall the sequence of what they can remember?
4 Basic Scenarios

1. Encounter was consensual and person reporting sexual assault knows that but is misrepresenting/lying.
2. Was consensual, but person reporting it later reinterpreted as non-consensual.
3. Wasn’t consensual, but accused sincerely believes it was.
4. Wasn’t consensual and accused knows it.

3 and 4: Victim’s responses and memories may be consistent with the neurobiological impacts of stress/trauma.

Yes, awkward and confusing sexual encounters can be re-interpreted afterward and reported as assaults

That’s NOT what I’m teaching about.

Not assuming “evidence.”
Pointing to what could be consistent with assault.
Providing knowledge to solve problems you face.
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**Defense Circuitry**

- Impaired prefrontal cortex
- Bottom-up attention
- Survival reflexes
- Self-protection habits
- Altered memory encoding and storage

**Defense Circuitry in Control**
High Stress and Fear = Impaired Prefrontal Cortex

Reflexes & Habits

Survival Reflexes
Detection Freezing
Stop everything, hold down brake, scan

Key moment, when
attack is detected

Going out for a nice dinner...
Shocked Freezing

Blank mind, no behavior options arising

When behavior options and thoughts do (finally) arise...

No-Good-Choices Freezing

Bad!  Worse?

Extremely Reactive vs. Extremely Passive
Self-Protection Habits

• Polite responses to dominant or aggressive people
• Polite responses to unwanted sexual advances
• Hoping and pretending it’s no big deal – trying to save face

Fear-Habit Paradox

From normal, expected scenario to unexpected attack...

Initial responses can be habit behaviors based on the just-prior normal interaction

e.g., Schwabe 2013, Hippocampus, 1035-1043; Fehred 2009, Brain Research, 121-128
I have to leave soon.
You’ve got a girlfriend.
My roommate is home.
My boyfriend will be angry.

Real Case

Perpetrator describing methods on social media:
“Feign intimacy,” “then stab them in the back” and “THROW EM IN THE DUMPSTER.”

His victim at trial:
• “I didn’t kick or scream or push,”
• “I felt like I was frozen.”
• “I tried to be as polite as possible.”
• “I wanted to not cause a conflict”
• “I didn’t want to offend him.”
Extreme Survival Reflexes

Escape When There’s No (Perceived) Escape
**Tonic Immobility**

- **Freezing** = Alert and immobile, but able to move
- **Tonic immobility** = *Paralysis, can’t move or speak*
- **Caused by** extreme fear, physical contact with perpetrator, restraint, *perception* of inescapability
- **Not uncommon in sexual and non-sexual assaults**

Collapsed Immobility

Key differences from tonic immobility

- Physiological cause = Heart gets massive parasympathetic input, resulting in...
- Extreme ↓ in heart rate and blood pressure
- Faintness, “sleepiness” or loss of consciousness
- Loss of muscle tone – Collapsed, limp, etc.

Kozlowski et al., 2015, Harvard Rev Psychiatry, 1-21; Baldwin 2013, Neurosci Biobehav Rev, 1549
I felt like a rag doll.

He was just moving me around.

Dissociation
Blanked/Spaced Out
Disconnected from Body
Autopilot
Did not resist
No attempt to escape
Did not scream
‘Active participant’

Reflexes & Habits

Freezing
• Detection
• Shocked
• No-Good-Choices

Extreme Survival Reflexes
• Tonic Immobility
• Collapsed Immobility
• Dissociation

Passive, Polite
• From dating
• From child abuse
• From domination

Dissociative
• Autopilot
• Submission
• Sex acts

Why “fight or flight” is confusing & harmful
A sexual assault victim can engage in habit behaviors with or without being disconnected from sensations and emotions. If dissociation does kick in and the person continues with habit behaviors, that's dissociative autopilot—which involves no sense of choosing the habit behaviors in which one is engaging, which can include sex acts.

Dissociation may or may not accompany tonic immobility. Someone may be unable to move, yell, or even speak—yet fully aware of the horrible sensations of being assaulted and intense emotions like disgust, etc. Moreover, dissociation is common in tonic immobility states, when physical escape is impossible and mental escape is the only option.

Collapsed immobility involves oxygen deprivation, and the resulting faintness or dizziness can be hard to distinguish from dissociative "spacing out." Also, dissociation can happen before and/or overlap with collapsed immobility. However, the passing out of collapsed immobility is very different from dissociation.

Potential Overlaps of Dissociation with Habit Behaviors and the Other Extreme Survival Reflexes

How Brain-Based Behaviors Tend to Unfold Over Time

- **Freezing**
  - Stiff and immobile
  - Can't follow direction
  - Eventually loses all ability to move

- **Rational, Deliberate Behaviors**
  - Less likely to occur during assault
  - Often occurs after assault

- **Habit Behaviors**
  - Usually purposeful and ineffective (e.g., self-defense training)
  - Can occur even in non-assault situations

- **Extreme Survival Reflexes**
  - Escape (passing impossible, intense fear and/or horror)
  - **Dissociation**
    - Can kick in early, spaced out and/or exhibit habit behaviors
  - Tonic Immobility: Paralyzed, muscles rigid
  - Collapsed Immobility: Muscles limp, dicta/paze out

Perpetrator
- Not stressed
- Prefrontal cortex in control
- Thinking and behavior:
  - Planned
  - Practiced
  - Habitual

Victim
- Afraid, overwhelmed
- Defense circuitry in control
- Attention and thoughts driven by perpetrator actions
- Behavior controlled by habits and reflexes
DV / Repeated Physical Assaults

Still mostly reflexes and habits

- PTSD / Hypervigilance: Scanning for signals
- Detection freezing triggered by tone of voice, particular words, body language, etc.
- Habits of avoidance triggered by signals
- Habits of appeasing, (depressed) submission, protecting children, etc.

DV / Repeated Physical Assaults

Dissociation increasingly likely

- Mentally escape the physically inescapable
- Block out physical and emotional pain
- Block out hopes of escape
- Lots of autopilot mode

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Sexual Assault and Memory

Bottom-Up Attention and Memory
Defense circuitry focus: what seems most important to survival and coping
Attended = Central Details = Encoded

Episodic Memory Circuitry
Hippocampus
Are you getting the central details?

Key moment, when attack is detected
**Time-Dependent Hippocampus Effects**

Predict = Survive

Are you getting and using central/early details?

**Stress Impairs Retrieval**

...At least of poorly encoded and consolidated info
Implications

1. Very stressed or traumatized victims cannot recall everything recorded in their brains, no matter how good and gentle the interview.
2. Two or more interviews (over days) may yield much more information than one.
3. Yes, recall can get better over time!

Vulnerability to Distortion?

- Central Details = Very Low Vulnerability
- Peripheral details = High Vulnerability

Gist

Abstract
Stripped of many details
Implications

4. Lots of details missing, even some central details? **Gist still there.**
5. More time since assault = More of recall is gist + reconstructed details.
6. However long ago, central details can be vivid and accurate. Don’t miss them!

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Does alcohol change any of this?

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Alcohol and Memory

- **Low-moderate dose/intoxication**
  - Impairs context encoding
  - Does not impair encoding of sensations
  - Resembles effect of fear/trauma
- **High dose/intoxication:**
  - Impairs hippocampus-mediated encoding and consolidation of both context and sensations

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Mela, LeDoux, 1996, Neuroscience, 74, 313
Bisby et al. 2009, Psychopharmacology, 204, 655; Bisby et al. 2010, Biol Psychiatry, 68, 280

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Fear/Horror/Pain Can “Break Through” Severe Alcohol/Drug Effects

Sexual Assault Unfolding Over Time

Where there is a FRAGMENT there was usually...

FEAR

HORROR

PAIN

So listen and explore for them

HOP
DV / Repeated Assaults

Like arguments of married couples
• Fight over same things, say same things

What do we remember?
• Not every detail, date, order of things said
• First/early really bad argument, and last one
• One or two really bad ones in the middle
• Common phrases, very disturbing details

Are you getting information about brain-based responses?
Are your expectations realistic?
Are you getting central details?
Islands of memory?

Value of knowing and applying the relevant neurobiological, memory and other science?

It can help us understand victims, help them feel safe and supported, and get their ongoing cooperation.