

**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...

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**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?

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## 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.

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

**That's NOT what I'm teaching about.**

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**Not assuming "evidence."**

**Pointing to what could be consistent with assault.**

**Providing knowledge to solve problems you face.**

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1. Why didn't they fight, yell, or otherwise resist, leave, etc.?
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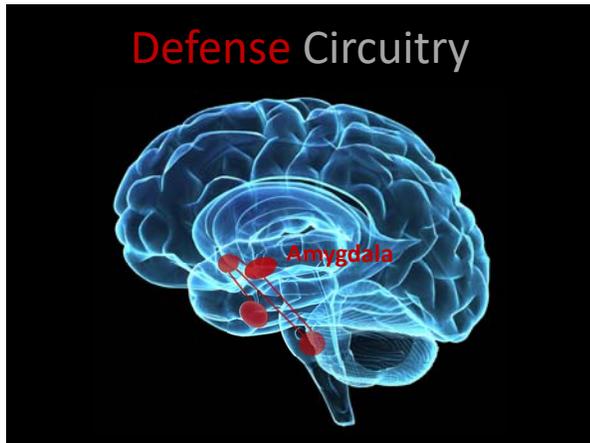
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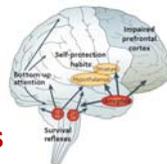
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## Defense Circuitry in Control

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



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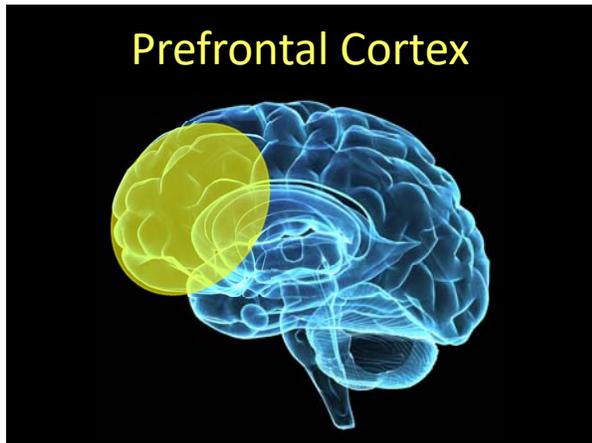
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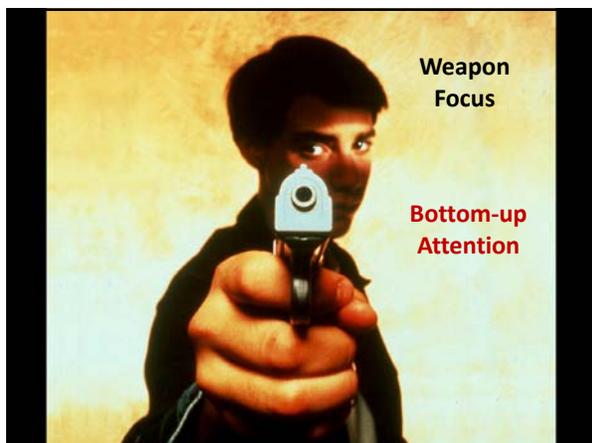
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# Reflexes & Habits

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# Survival Reflexes

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## Detection Freezing



Stop everything, hold down brake, scan

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Key moment, when

**attack**

is detected

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Going out for a nice dinner...



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## Shocked Freezing



**Blank mind, no behavior options arising**

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

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## No-Good-Choices Freezing



**Extremely Reactive vs. Extremely Passive**

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## 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**

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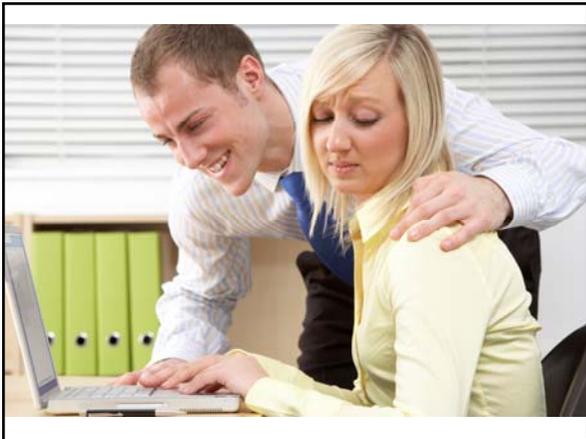
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## Fear-Habit Paradox

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; Packard 2009, *Brain Research*, 121-128.

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I have to leave soon.  
You've got a girlfriend.  
My roommate is home.  
My boyfriend will be angry.

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**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."

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**Extreme**  
Survival Reflexes

Escape When There's  
No (Perceived) Escape

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## 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**

Moller et al., 2017, *Acta Obstet Gynecol Scand*, 932; Marx et al. 2008, *Clin Psychol Sci Practice*, 74; Bovin et al. 2008, *J Trauma Stress*, 402; Fuse et al. 2007, *J Anx Disord*, 265

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## 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*, 1-25; Baldwin 2013, *Neurosci Biobehav Rev*, 1549

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I felt like a rag doll.



He was just moving me around.

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# Dissociation

Blanked/Spaced Out  
Disconnected from Body  
Autopilot

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**Did not resist**  
**No attempt to escape**  
**Did not scream**  
**'Active participant'**

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**Reflexes & Habits**

|   |   |
|---|---|
| <b>Freezing</b> <ul style="list-style-type: none"><li>• Detection</li><li>• Shocked</li><li>• No-Good-Choices</li></ul>                                   | <b>Passive, Polite</b> <ul style="list-style-type: none"><li>• From dating</li><li>• From child abuse</li><li>• From domination</li></ul> |
| <b>Extreme Survival Reflexes</b> <ul style="list-style-type: none"><li>• Tonic Immobility</li><li>• Collapsed Immobility</li><li>• Dissociation</li></ul> | <b>Dissociative</b> <ul style="list-style-type: none"><li>• Autopilot</li><li>• Submission</li><li>• Sex acts</li></ul>                   |

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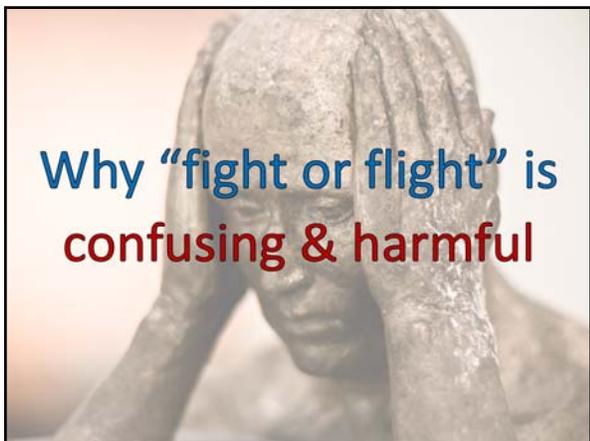
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**Why "fight or flight" is  
confusing & harmful**

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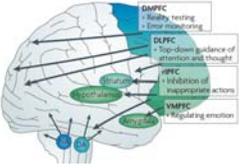
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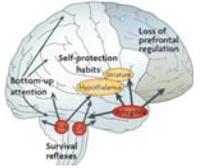
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**Perpetrator**

- 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

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### How Brain-Based Behaviors Tend to Unfold Over Time

**Freezing**  
(scientific def.)

**Detection Freezing**

- Everything stops
- 1-3 seconds

**Shocked Freezing**

- Can follow detection
- Blank mind, no behavior options to choose from
- Can last several seconds

**No-Good-Choices Freezing**

- Can follow detection or shocked
- Only "bad" choices of extremely passive vs. reactive behaviors
- Seconds to minutes

**Rational, Deliberate Behaviors**

- Less likely with more stress and trauma, due to impaired prefrontal cortex
- If it happens, not necessarily effective – and then it's back to reflex and habit behaviors.

**Habit Behaviors**

- Usually passive and ineffective (no self-defense training)
- Face-saving and submission habits we've all learned
- From gender socialization (e.g., "nice girl" habits)
- From childhood abuse experiences

**Extreme Survival Reflexes**

Escape (seems) impossible, intense fear and/or horror

**Dissociation:** Can kick in early, spaced out and/or autopilot habit behaviors

**Tonic Immobility:** Paralyzed, muscles rigid

**Collapsed Immobility:** Muscles limp, dizzy/pass out

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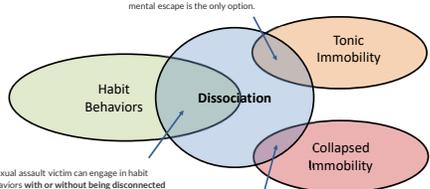
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### Potential Overlaps of Dissociation with Habit Behaviors and the Other Extreme Survival Reflexes



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.

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.

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## 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.

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## 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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## 4 Common Questions

1. Why didn't they fight, yell, or otherwise resist, leave, etc.?
2. Why do they have memory gaps?
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# Sexual Assault and Memory

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## Bottom-Up Attention and Memory

Defense circuitry focus: **what seems most important** to survival and coping

Attended = **Central Details** = Encoded



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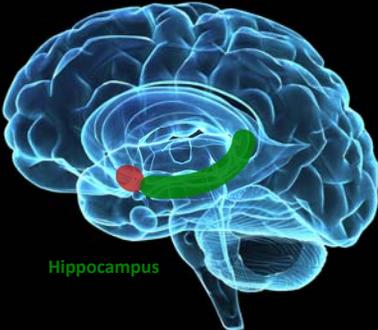
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## Episodic Memory Circuitry



Hippocampus

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Are you getting the  
central details?

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Key moment, when  
**attack**  
is detected

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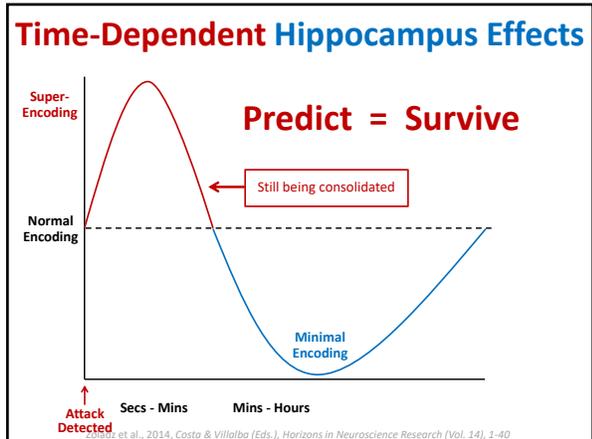
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Are you getting and using central/early details?

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**Stress Impairs Retrieval**

...At least of poorly encoded and consolidated info

e.g., Schwabe et al., 2012; Neurosci Biobehav Rev, 1740; Smith et al., 2016; Science, 354, 1046

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## 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!

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## Vulnerability to Distortion?

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

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## Gist

Abstract  
Stripped of many details



e.g., Gilboa & Marlatte, 2017, Trends in Cognitive Sciences, 618-631.

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## 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

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

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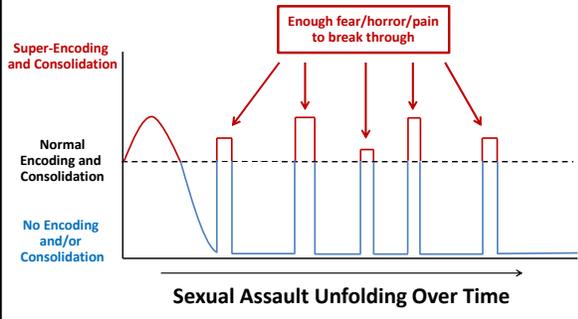
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### Fear/Horror/Pain Can “Break Through” Severe Alcohol/Drug Effects



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Where there is a **FRAGMENT** there was usually...

**FEAR**

**HORROR**

**PAIN**

So **listen** and **explore** for them



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## 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**

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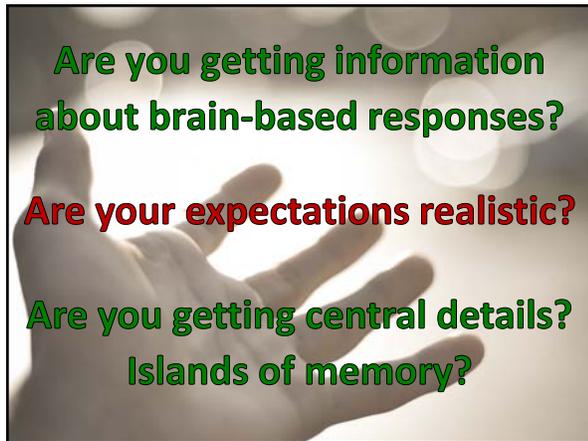
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**Value** of knowing and applying the relevant neurobiological, memory and other science?

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

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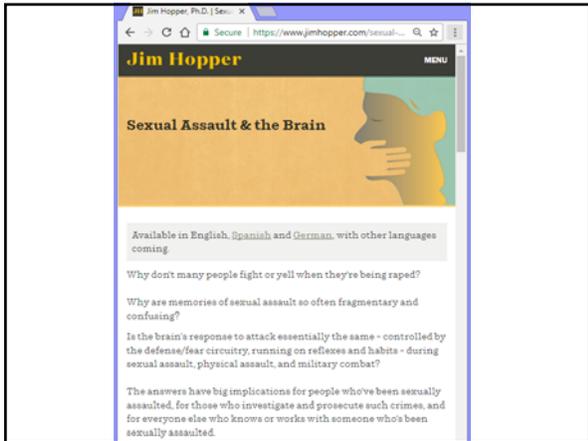
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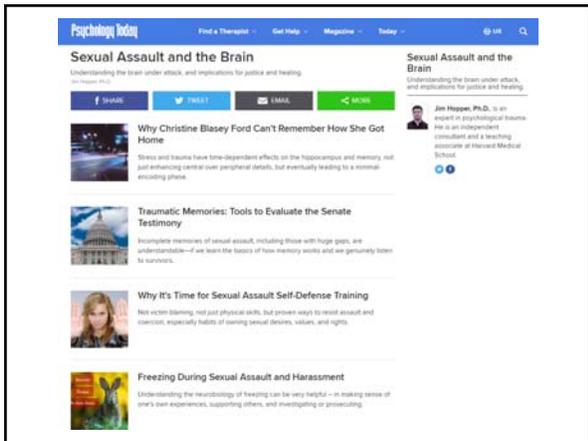
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