Impact of Crime on Victim Survivors

What you need to know and why

May 14, 2015

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Who am I?

Psychologist

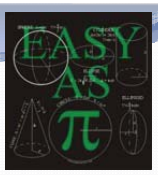
Trainer/Clinician/Evaluator
Expert in the field of DV

Translator

Musician & Photographer

Why neuroscience?
(at 0800 no less!)

Our learning objectives:



- Understand the basics of the neurobiology of trauma
- Understand some of the specifics related to sexual assault victims and domestic violence victims
- Use that understanding to:
  - make sense of seemingly counterintuitive victim behavior
  - understand the importance of soft eyes and more effectively communicate with victim survivors

Snapshot of Part 1

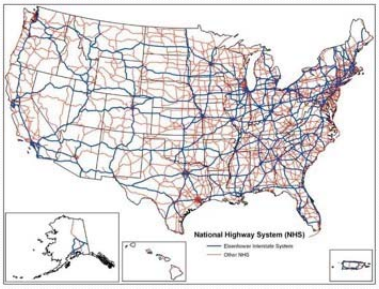
- Brain basics
- Brain circuitry - the fear circuit sans trauma
- The impact of sexual assault - the fear circuit & trauma
- The after effects of trauma on the brain
- Small group discussion/exercise

A few thoughts before we jump in

I'm not a neuropsychologist

A few thoughts before we jump in

Regarding the brain: we're discussing a small stretch of highway…no more than a few miles!

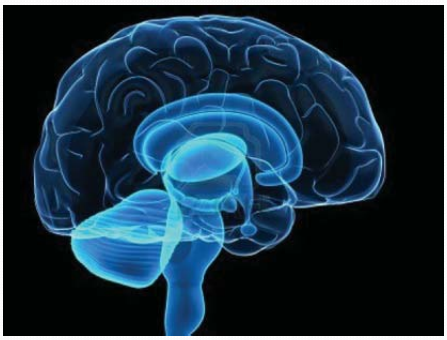


A few thoughts before we jump in

We will both be discussing the brain during a sexual assault/domestic violence assault/other assault and the potential long term impact on the brain

Defining Trauma

Defining Trauma



Defining Trauma

Defining Trauma

"It's just the brain doing what the brain does."

~ Me

Snapshot of Part 1

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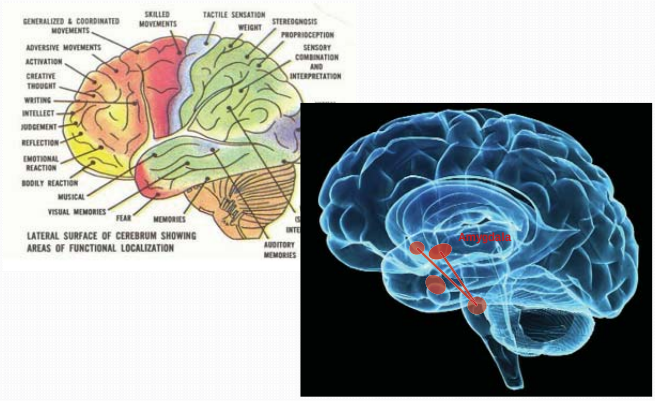
Localized Function versus Circuitry



It's the difference between:

"the amygdala is responsible for…"

and

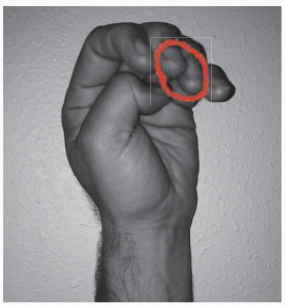
"the amygdala is involved in…"

A few brain basics

You have a brain-map in your fist!

A few brain basics

Pre-frontal cortex = your middle nails



A few brain basics

Pre-frontal cortex plays a role in*:*

Top-down attention: *you consciously chose!*

A few brain basics

Pre-frontal cortex plays a role in*:*

Top-down attention

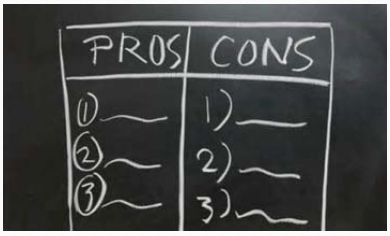
Integration of data: *consolidation of memory/narrative*

equals

A few brain basics

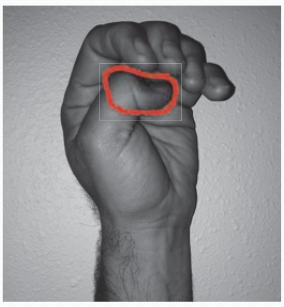
Pre-frontal cortex plays a role in*:*

Top-down attention
Integration of data
Logical decision making



A few brain basics

Limbic System = area around your thumb



A few brain basics

Limbic System plays a role in:

Fear network

A few brain basics

Limbic System plays a role in:

Fear network

Memory encoding

Snapshot of Part 1

- Brain basics
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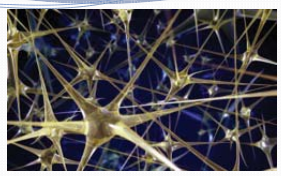
Circuits = Neural Networks



- The neurons that fire together wire together
- Repetition breeds neural networks
- The more often/more intense = deeper network

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Repetition over time!

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OR...

TRAUMA!

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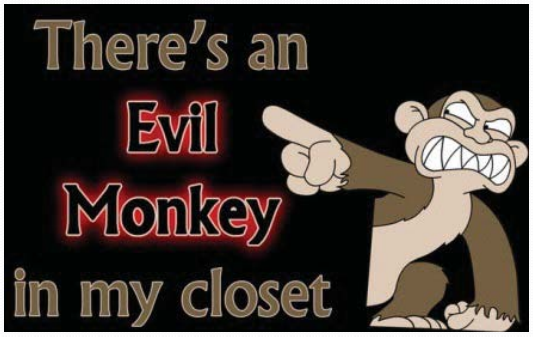
Trauma vs Threat



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Predict and Protect!

Consistently assess for safety

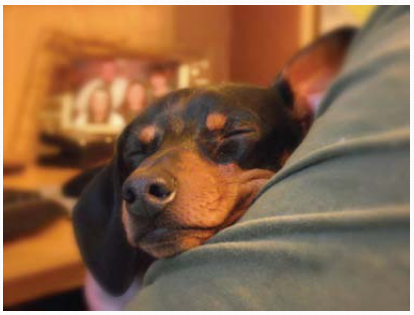
Involves:

Various sensory inputs

Maps of safety/threat

The extremes are easy to understand…

Map of safety or threat?



The extremes are easy to understand…

Map of safety or threat?

Sometimes it's not so obvious…

"Sense" Danger

DANGER
WILL ROBINSON!

Involves:

Various sensory inputs

Fear network
(including amygdala)

NOT the pre-frontal cortex!

Assess the threat!

Involves:

Various what?

Maps of what?

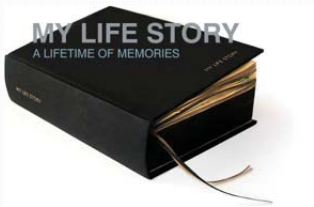
If the threat is valid,
you don't think, you act!

Respond to the threat...

We evolved to **freeze first**,
then **flee** if possible.

Once the threat has passed...

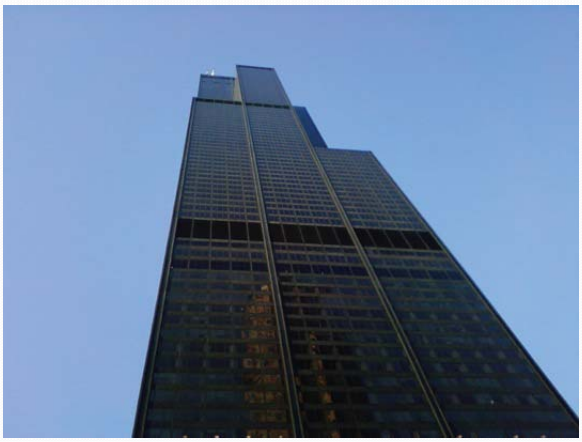
Learn from experience
Make logical decisions to minimize future risk



Involves:

The integrative function of the
pre-frontal cortex

Imagine for a moment…



As an aside…

- We have very advanced memory networks!
- No trauma? No problem. We'll store that in a nice time line for you.
- File that away for later…

Snapshot of Part 1

- Brain basics
- Brain circuitry - the fear circuit sans trauma
- **The impact of assault - the fear circuit & trauma**
- The after effects of trauma on the brain

During an assault
Fear Circuitry takes over!

Fear Circuitry taking over =

- **Impaired** pre-frontal cortex
- Survival **reflexes/reactions**
- Bottom-up **attention**
- Self-protection **habits**
- Altered **memory** encoding and consolidation

Fear Circuitry taking over =

- ***Impaired* pre-frontal cortex**
- Survival **reflexes/reactions**
- Self-protection **habits**
- Bottom-up **attention**
- Altered **memory** encoding and consolidation

High Stress + Fear = Impaired Prefrontal Cortex

Arnsten 1998, *Science, 280,* 1711-1712; Arnsten 2009, *Nature Reviews Neuroscience, 10,*

Fear Circuitry taking over =

- **Impaired** pre-frontal cortex
- Survival ***reflexes/reactions***
- Self-protection **habits**
- Bottom-up **attention**
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Freeze

Maybe the monster won't <u>see</u> me!

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Freeze

Ready to suddenly burst into action

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When

FEAR

kicks in

Fight or flight?

We evolved to **freeze first**, then **flee** if possible.

Fight or flight?

FREEZE —> FLEE —> FIGHT!

How to FLEE when there's no (perceived) escape route

Drastic survival reflexes...

Dissociation

Blanked/Spaced Out

Disconnected from Body

Autopilot

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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
- Can occur in sexual and non-sexual assaults

Marx et al. 2008, *Clin Psychol Sci Practice,* 74; Bovin et al. 2008, J Trauma Stress, 402; Brickman & Briere 1984, Int J Women's Studies, 195; Fuse et al. 2007, J Anx Disord, 265

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Tonic Immobility

- **Response over 300 million years old**
- Sudden onset, usually after failed struggle
- Sudden termination
- **Can last from seconds to hours**
- **Does not impair alertness or memory encoding**

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Humphreys et al. 2010, J Interpersonal Viol, 358

Tonic Immobility

Other common elements

- Fixed or unfocused staring
- Intermittent periods of eye closure
- Rigid or trembling muscles
- Sensations of coldness
- Numbness or insensitivity to pain

53 Marx et al. 2008, *Clin Psychol Sci Practice,* 74; Bovin et al. 2008, J Trauma Stress, 402

Collapsed Immobility

Similar to tonic immobility

- **Can't move or speak**
- **Causes =** extreme fear, physical contact with perpetrator, restraint, **perceived** inescapability
- **Evolutionarily old response**
- **Sudden onset** (but more gradual offset)

55 Kozlowski et al., in press, *Harvard Rev Psychiatry* ; Baldwin 2013, *Neurosci Biobehav Rev*, 1549; Bracha 2004, *CNS Spectrums*. 679

Collapsed Immobility

Key <u>differences</u> from Tonic Immobility

- **Extreme ↓ in heart rate and blood pressure**
- **Faintness, "sleepiness" or loss of consciousness**
- **Loss of muscle tone – Collapsed, limp, etc.**

Kozlowski et al., in press, *Harvard Rev Psychiatry* ; Baldwin 2013, *Neurosci Biobehav Rev*, 1549

I felt like a rag doll.

He was just moving me around.

Fear Circuitry taking over =

- **Impaired** pre-frontal cortex
- Survival **reflexes/reactions**
- Self protection **habits**
- Bottom-up **attention**
- Altered **memory** encoding and consolidation

Fear Circuitry taking over =

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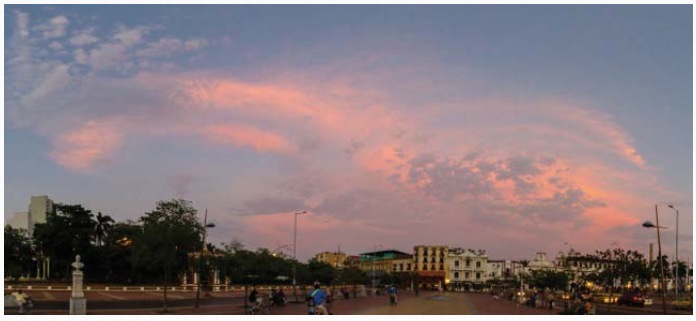
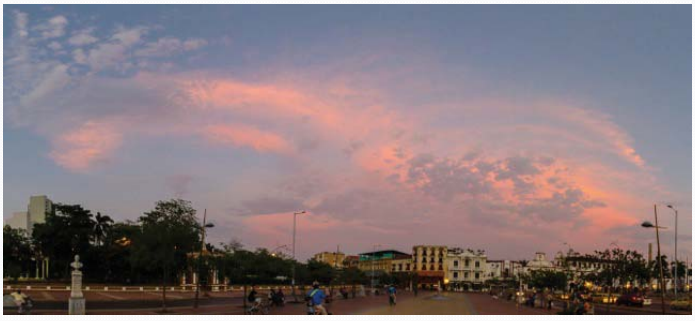
When you're not threatened…



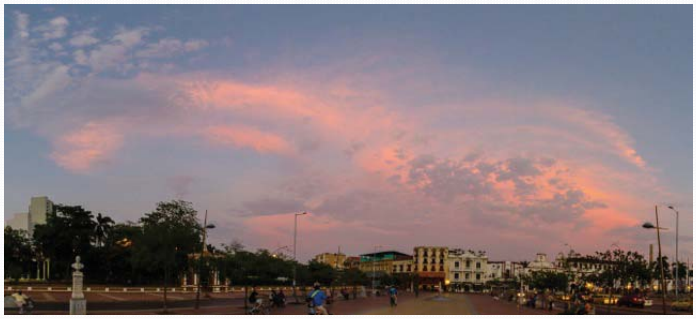
You control your attention

When you're not threatened…



You may get distracted…but when you notice, you regain control over what you attend to in the environment

When you're not threatened…



This is called TOP-DOWN Attention (you call the shots!)

Fear Circuitry taking over =

Q: What do you focus on if there is no weapon?

Fear Circuitry taking over =

A: What ever will help you survive/cope!

Fear Circuitry taking over =

- ***Attention is no longer a conscious choice!***
- **You pay attention in order to survive/cope**
  - **may mean paying attention to the threat**
  - **may mean NOT paying attention to the threat!**
- ***This is called BOTTOM-UP attention***

Fear circuitry focus:

What seems most important to **survival** and **coping**

How do you know what your victim/survivor will remember?

Fear Circuitry taking over =

- **Impaired** pre-frontal cortex
- Survival **reflexes/reactions**
- Bottom-up **attention**
- Self-protection **habits**
- Altered ***memory*** encoding and consolidation

Focus of your attention

↓

Encoding

↓

Consolidation/Storage

Bottom-Up Attention and Memory

Fear circuitry focus:

what seems most important to **survival** and **coping**

Bottom-Up Attention and Memory

Central Details are the details focused on by the victim - central to survival and coping

Central Details get encoded/consolidated!

Listen to this audio clip and pay attention to what the officer remembers and what he can't remember

Bottom-Up Attention and Memory

Peripheral details are the details NOT focused on by the victim

Peripheral details have a lower rate of getting encoded/consolidated!

Vulnerability to change?

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

The hippocampus & memory

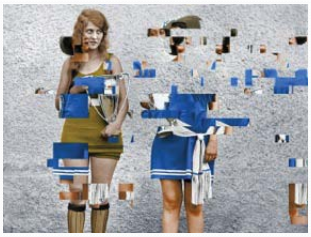
If you saw a hippo on campus you'd remember!

The hippocampus & memory

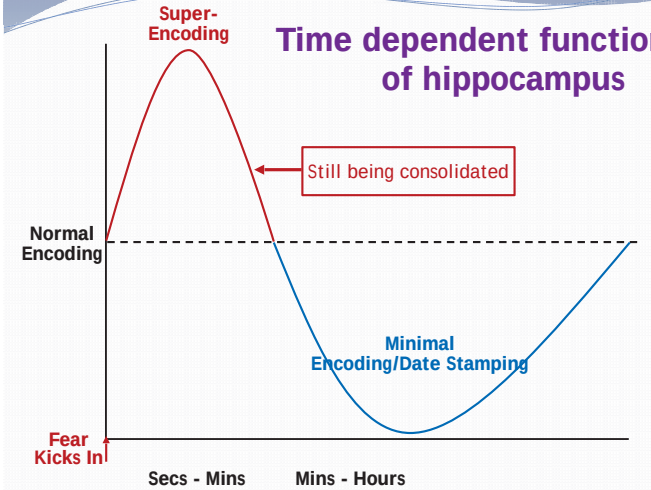
Plays a role in “date stamping” memory

The hippocampus & trauma =

- During a traumatic event the hippocampus goes through two phases



Time dependent functioning of hippocampus



Zoladz et al., 2014, *Costa & Villalba (Eds.), Horizons in Neuroscience Research (Vol. 14), 1-40*

What else Gets Encoded and Consolidated

- **Islands** of memory (fragments & key periods related to survival r reactions)

- **Few** peripheral details
- **Little** time-sequence information
- **Little** words or narrative

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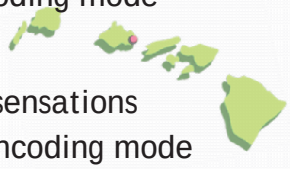
Islands of Memory

- **Larger islands** – Key periods within assault
  - When **fear kicked in**, right before and after
  - Hippocampus in hyper-encoding mode



- **Micro-islands** – Fragmentary sensations
  - Hippocampus in minimal-encoding mode

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Exposure to trauma =

- Decreased activity in Broca's area
- Broca's area is related to speech
- Some believe that this is why individuals struggle to use words to explain their traumatic experiences.

"I just can't find the words"

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Explicit vs. Implicit Memory

Explicit = You know it's a memory. You likely will include it in your account of the incident.

Implicit = You <u>don't realize</u> it's a memory, so all else being equal, aren't likely to include it in your account of the incident.

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Explicit vs. Implicit Memory

Explicit = Can be elicited by asking traditional investigative questions.

Implicit = Likely will not be elicited without asking sensory focused questions.

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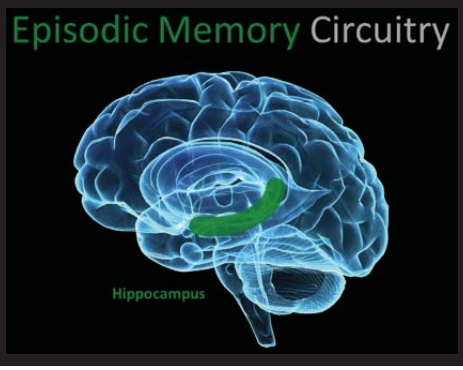
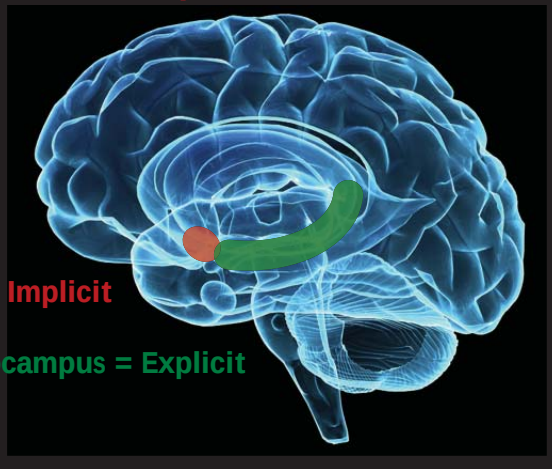
Explicit Memory Formation

Encoding → **Consolidation** → Stored Memory

Episodic Memory Circuitry

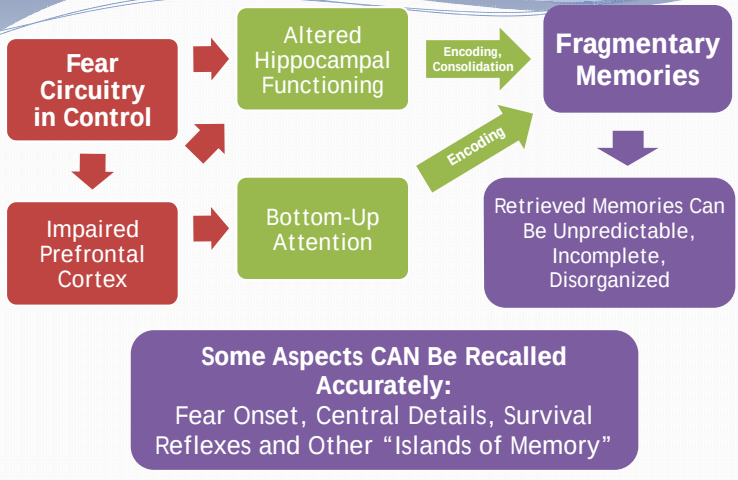


Explicit vs. Implicit Circuitries



Amygdala = Implicit

Hippocampus = Explicit



e.g., Schwabe et al., 2012; Neurosci Biobehav Rev, 1740; Joels et al., 2012, Pharmacol Rev, 901.

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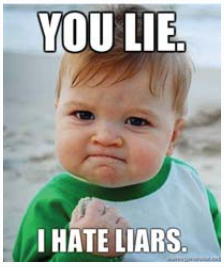
Traumatic Memory

Ever had a witness discredited because her/ his account of the alleged crime was disjointed or didn't make sense?

Hmmmm...



Impact of trauma on narrative*

*the ability to take various memories and piece them together in a meaningful manner

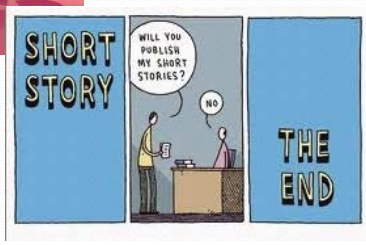
Our expectations of a narrative

Beginning

Middle

End

Temporal Integrity



A few brain basics

Pre-frontal cortex plays a role in*:*

Top-down attention

Integration of data: *consolidation of memory/narrative*

equals

What happened at breakfast?

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Memory is initially a disconnected set of data points

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Your Left Prefrontal Cortex is heavily involved in integrating the data points into a narrative

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This is traumatic memory!

The taste of orange juice

The feeling of jeans on your skin

A feeling or sense of disappointment

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Imagine for a minute:

You can't put the memories into a narrative...
...you can't even find the words to describe them!

Perpetrator

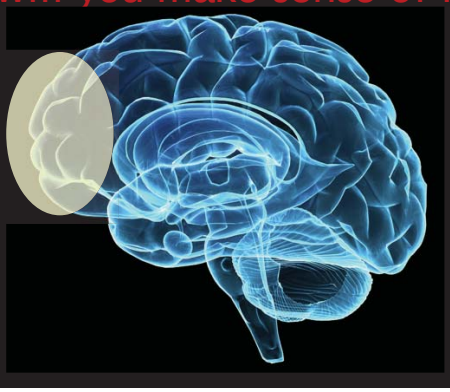
- Not stressed
- **Prefrontal cortex in control**
- Thinking and behavior:
  - Planned
  - Practiced
  - Habitual
  - Narrative function intact so account of incident will likely have temporal integrity.

Victim

- Afraid, overwhelmed
- **Fear circuitry in control**
- Attention and thoughts driven by perpetrator actions
- Behavior controlled by survival reflexes and habits from childhood (incl. abuse)
- Narrative function impaired so account of incident will likely NOT have temporal integrity.

And when your Left Prefrontal Cortex comes back on line...

how will you make sense of it all?



The impact of alcohol

Alcohol and Memory

- **Low dose/intoxication**
  - Impairs context encoding (hippocampus)
  - 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
  - Does not necessarily impair implicit memories

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

Seemingly Counter-intuitive Victim Behavior

it's not counter-intuitive if you understand the science!

Small group exercise

- In groups of 3 or 4 please come up with a list of:
  - victim behaviors during a sexual/domestic assault that would seem counter intuitive if you didn't have any training in the neurobiology of trauma.
- If you can give specific examples, please do.

Snapshot of Part 1

- Brain basics
- Brain circuitry - the fear circuit sans trauma
- The impact of assault - the fear circuit & trauma
- The after effects of trauma on the brain

Exposure to trauma over time =

A hyper-sensitive "Danger Will Robinson"




=


Exposure to trauma over time =

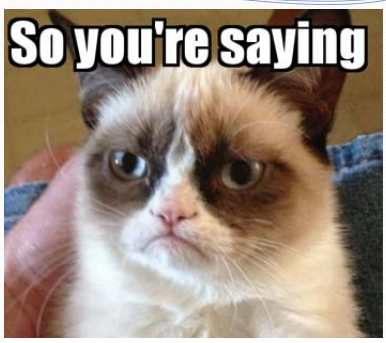
- **Remember, the hippocampus shifts away from contributing to the process of assessing safety**

More science behind the experience

Look at this photo and take it in – really examine it.

More science behind the experience

Now imagine turning to your neighbor and describing what you saw in as much detail as possible.



When you get triggered, you can't just "notice you're safe" without some help or until you crash

Seemingly Counter-intuitive Victim Behavior

****it's not counter-intuitive if you understand the science!***

Small group exercise

- In groups of 3 or 4 please come up with:
  - A list of victim behaviors in the hours, days, weeks, months, and years after a sexual/domestic assault that would seem counter intuitive if you didn't have any training in the neurobiology of trauma.
  - Come up with a scientific explanation for why the victim might engage in this behavior.
- If you can give specific examples, please do.

Does it makes sense that the victim:

- May have appeared not to resist or "fight back" during the sexual assault.
- May not have been able to give "basic" who/what/where/when/why/how details to law enforcement.
- May only be able to give a partial account of the assault to law enforcement or even at trial.
- May not want to be present in the courtroom during her testimony.
- May have changed various details in her account of the assault from the time of the initial law enforcement investigation to the time of her testimony.
- May at some point appear to have a blank stare while testifying and appear unable to speak.
- May seek out sexual partners soon after the assault, or even continue to have sexual relations with the defendant.

Every assault, every victim, every brain is unique!

Being open to the nuance and context of <u>every</u> assault, every victim/brain is easier said than done!

Essentials of Healing and Seeking Justice

"The core experiences of psychological trauma are disempowerment and disconnection. Recovery, therefore, is based upon the empowerment of the survivor and the creation of new connections…."

- Judith Herman

Response flexibility

Understanding the Victim/Survivor Experience (Part 2)

How did crime scenes used to get processed?

How do crime scenes get processed today?

Science dictated the change in technique!

Why does one use a soft brush to dust for fingerprints?

Science tells us that by using a hard brush you can lose or contaminate evidence by damaging the ridges…right?

What is science telling us about interviewing/interacting with trauma victims?

There is a softer, more effective brush out there!

The traditional paradigm of investigation…

The traditional paradigm of investigation…

Sequence of Events

5:05:32	Bus loses power
5:06:15	Mr. Waggoner gets off bus
5:11:22 – 5:13:13	Multiple gunshots heard
5:13:35	Mr. Waggoner gets back on bus
5:17:49	Bus loses power (second time)
5:18:01	Mr. Waggoner clears the weapon
5:18:54	Bus starts driving again
5:23:15	Arrives at Westown
5:25:15	Police on bus
5:28:24	Paramedics on bus
5:29:20	Mr. Waggoner leaves bus

Approximate times

2/26/2014 4

Bottom-Up Attention and Memory

Central Details are the details focused on by the victim - central to survival and coping

Central Details get encoded/consolidated!

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Bottom-Up Attention and Memory

Peripheral details are the details NOT focused on by the victim

Peripheral details have a lower rate of getting encoded/consolidated!

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Fear circuitry focus:

What seems most important to **survival** and **coping**

How do you know what your victim/survivor will remember?

Fear circuitry focus:

What seems most important to **survival** and **coping**

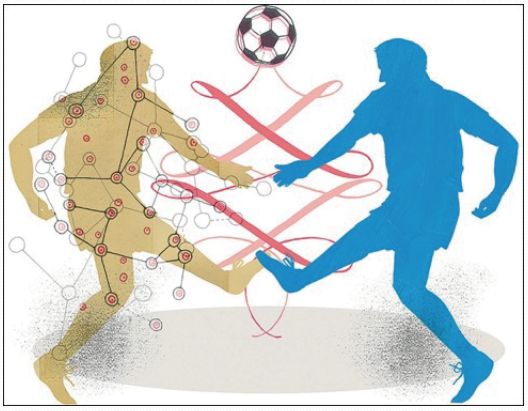
To know, you have to be given access to the victims/survivor's experience…

To be given access to a victim/ survivor's experience…

you need the password…

The science of mirror neurons

- Monkey see…monkey do…
- Monkey see…monkey's brain fires like he's doing… but he's not doing!
- What the WHAT???



More on mirror neurons

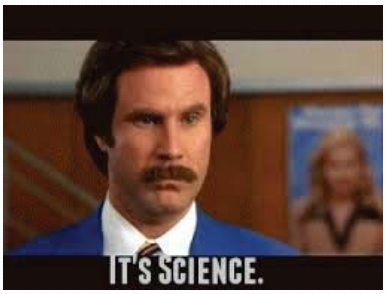
- Mirror neurons are connected to the limbic system (which is about our emotions)
- When we mirror the motor activity of facial expression, it allows for emotional resonance (or empathy)

More importantly

- The victims you work with will mirror YOUR facial expressions…and have a sense of whether you are connected emotionally…
- Remember where is the limbic system is? It's not conscious on their part.

So the password is…

Soft eyes!



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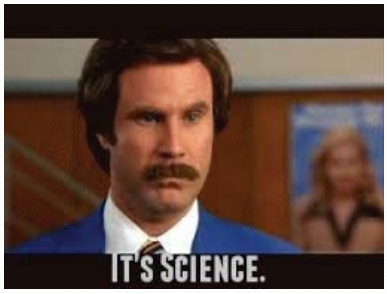

Listen to this clip from the film Captain Phillips

Notice the tone and the approach of the officer…

What's it sound like?

What are you able to tell me?

Then listen and take notes…yep…avoid interrupting!

What kind of thoughts were you having? Do you remember any particular smells/sounds/feelings?

What's one thing you don't think you'll ever forget?

Organizing

- We all do it!

Exposure to trauma also means:

- A neural network that leads to an automatic response to any perceived threat.

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The Left-prefrontal Cortex

- The LPFC is the thumb nail on your middle finger (if your right hand is your brain)
- The main functions of the LPFC are integrative:

1. Use of language
2. Use of logic
3. Tells the story of your life (lying!)

We are who we tell ourselves we are…

What story do victims tell?

What's the cultural narrative

for being a victim?

What story do victims tell?

One complication of being a victim of violent crime is that very often, fight or flight is not an option…

What story do victims tell?

We create our narrative...we fill in the blanks...

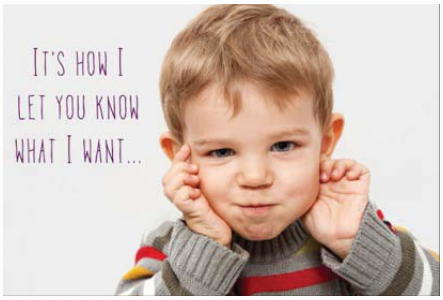
The Impact on Narrative

At all levels of the process WE impact the "pot" of experiences a victim has…

We create our narrative...we fill in the blanks...

What's that got to do with me?

- How do you organize victims (effectively or ineffectively)?



What story do many victims tell themselves?

It makes no sense…but I know what happened!

Cast doubt…

You'll get shut out…and lose valuable data!

Suspend your disbelief…

You'll be let in…and given access to more data!

Other suggestions for interacting with victims/survivors

Questions? Comments?

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Thank you to Jim Hopper, Ph.D. for his multiple contributions to this training and use of several of his slides.