The Neurobiology of Trauma

What You Need to Know About the Brain & Trauma

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Today’s Presentation

PART I  Peer reviewed research on how trauma affects behavior, memory, and health

PART II  Applying this research to your work as investigators or support persons for MSU students, faculty, and staff
Application: A Cautionary Note

Trauma symptoms do not prove that trauma occurred

Absence of trauma symptoms does not mean that trauma did not occur

Uh . . . so what is this information useful for?

CONTEXT
PART I: Research on Trauma
“In the midst of assault, the brain’s fear circuitry takes over while other key parts are impaired or even effectively shut-down. This is the brain reacting to a life-threatening situation just the way it is supposed to.”

Hopper & Lisak, 2014
Cerebrum
Prefrontal Cortex
Limbic System

- Hypothalamus
- Pituitary gland
- Amygdala
- Hippocampus
Fear Circuitry

- Hypothalamus
- Pituitary gland
- Amygdala
- Hippocampus
This is an autonomic process.

It is hard-wired into the brain.

The victim does not “choose” what happens next.

This will affect behavior, memory, and health.
Behavior: The HPA Axis

Balances body following stress by releasing of hormones

SOURCE: Baldwin, 2013; Southwick et al., 2005; Woods et al., 2005
**Behavior: The HPA Axis**

**Opioids:** Prevent pain

**Oxytocin:** Promote good feelings

SOURCE: Bracha, 2004; Southwick et al., 2005; Zoladz, 2014
**Behavior: The HPA Axis**

**Opioids**: Prevent pain

**Oxytocin**: Promote good feelings

↓

Flat Affect

“Inappropriate” Affect

SOURCE: Bracha, 2004; Southwick et al., 2005; Zoladz, 2014
Behavior: The HPA Axis

**Catecholamine:** Adrenaline

**Cortisol:** Energy available to act

SOURCE: Bracha, 2004; Southwick et al., 2005; Zoladz, 2014
Behavior: The HPA Axis

Catecholamine: Adrenaline

Cortisol: Energy available to act

“Fight or Flight”
It’s more complicated than that.
It’s more complicated than that.

“Fight” is possible, but the brain may initiate a more protective response instead.
It’s more complicated than that.

“Fight” is possible, but the brain may initiate a more protective response instead.

“Freeze” may be a more protective option.
Behavior: **Tonic Immobility**

- Often triggered by physical restraint
- Body is unable to move or talk
- Mind is aware of what’s happening
- Highly variable how long it lasts
- Up to 50% of sexual assault victims experience TI

SOURCE: Kozlowska et al., 2015
I was terrified. I couldn’t do anything and I didn’t know why.
I didn’t want to tell no one because what would I be able to say . . .

No, I didn’t fight back. No, I didn’t yell for help. I just laid there. Wondering if I was going to die.
Behavior: SUMMARY

Victims are in survival mode → brain shutting down conscious control & fear circuitry takes over

Fight, Flight, Freeze → many possible responses

Victims may not act the way you expect them to act
“[Trauma victims] may be unable to recall many important details. . . . may be uncertain about many. . . . may be confused about many. . . . may recall some details inaccurately. This is the human brain working the way it was designed to work.”

Hopper & Lisak, 2014
Memory: How Memory Works
Memory: How Memory Works

Attention ➔ What are we paying attention to?
What we attune to affects what we can remember

SOURCE: Diamond et al., 2007; Wilson et al. 2016
Memory: How Memory Works

Attention ➔ What are we paying attention to? What we attune to affects what we can remember

Memory Encoding ➔ How the hippocampus captures what we’re attending to to start forming a memory

SOURCE: Diamond et al., 2007; Wilson et al. 2016
Memory: Encoding

Central Details ➔ Core aspects of an experience that captured our attention (more likely to be encoded)

Peripheral Details ➔ What’s happening around the core experience that didn’t capture our attention (less likely to be encoded, not as strongly encoded)

SOURCE: Diamond et al., 2007; Wilson et al. 2016
Memory: How Trauma Affects Memory
Memory: How Trauma Affects Memory

Central Details in Trauma

Central to survival
Often are SENSORY-based
“Small” details that may not seem important to others

Memory: How Trauma Affects Memory

Central Details in Trauma

Central to survival
Often are SENSORY-based
“Small” details that may not seem important to others

Peripheral Details

Not central to survival
Often are CONTEXT-based
Details that others may see as important

CENTRAL → Survival, Sensory
CENTRAL ➔ Survival, Sensory

- Sounds
- Sights
- Smells
- Weapons
PERIPHERAL → Context
Memory: Recalling Traumatic Memories

Fragmented ➔ Not organized in a linear sequence
Memory: Recalling Traumatic Memories

Fragmented ➞ Not organized in a linear sequence

Incomplete ➞ Some details are missing
Memory: Recalling Traumatic Memories

Fragmented ➔ Not organized in a linear sequence

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WHY?

Peripheral

Alcohol/Drug Use

Can’t Find RIGHT NOW

Withheld
Memory: Recalling Traumatic Memories

Fragmented ➔ Not organized in a linear sequence

Incomplete ➔ Some details are missing

Incorrect ➔ Peripheral details could be wrong
Memory: Recalling Traumatic Memories

**Fragmented** ➔ Not organized in a linear sequence

**Incomplete** ➔ Some details are missing

**Incorrect** ➔ Peripheral details could be wrong

**WHY?**

“Filled In” by Victim (unconsciously)

Feel Pressured to Answer

Lying
Memory: Recalling Traumatic Memories

Fragmented ➔ Not organized in a linear sequence

Incomplete ➔ Some details are missing

Incorrect ➔ Peripheral details could be wrong

BUT... Central memories stable, accurate

Peripheral memories often accurate

Very few victims fabricate assault
Memory: SUMMARY

Victims are in survival mode → brain shutting down conscious control & fear circuitry takes over

What is central vs. peripheral varies victim-to-victim, assault-to-assault

Reasons for why story is fragmented & scattered → re-evaluate through a neurobiological lens
Health: Immediate Impact
Health: Immediate Impact

- Shock or numbness
- Fear & high startle response
- Depression
- Anger
- Self-blame, shame, guilt
- Isolation, lack of interest

SOURCE: National Center for PTSD (2016); Campbell et al., (2009)
Health: Immediate Impact

- Shock or numbness
- Fear & high startle response
- Depression
- Anger
- Self-blame, shame, guilt
- Isolation, lack of interest
- Difficulty concentrating
- Sleeplessness
- Nightmares
- Headaches & body pain
- Overeating/appetite loss
- Stress-related illnesses

SOURCE: National Center for PTSD (2016); Campbell et al., (2009)
Health: Long-Term Impact
Health: Long-Term Impact

- Post-traumatic stress disorder
- Clinical depression & anxiety
- Suicidal thoughts & behaviors
- Chronic pain
- Chronic health problems

SOURCE: National Center for PTSD (2016); Campbell et al., (2009)
Health: Long-Term Impact

- Post-traumatic stress disorder
- Clinical depression & anxiety
- Suicidal thoughts & behaviors
- Chronic pain
- Chronic health problems
- Work struggles/job loss
- School struggles/drop-out
- Strained relationships
- Increased social isolation
- Financial stress

SOURCE: National Center for PTSD (2016); Campbell et al., (2009)
Health: SUMMARY

Neurobiological effects of trauma ➔ cause psychological and physical health distress

Connect survivors to services ➔ to try to prevent negative long-term impact

Health consequences are severe ➔ need to connect to trained professionals/para-professionals
Application: A Cautionary Note

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Uh... so what is this information useful for?

CONTEXT
Application: What Is Your Role?

Be clear with yourself and others on your role

Fact-finders interview
People who are not fact-finders do not interview

Fact-finders can be kind
People who are not fact-finders can be kind
Application: Trauma Informed Interviewing

BUILD RAPPORT

ESTABLISH TRUST

FACILITATE DISCLOSURE
Application: Trauma Informed Interviewing

Open-ended questions

Do not interrupt. Do not interrupt.

Better recall of peripheral details once have had a chance to talk through what was central to them

Cycle back later on detail/clarification questions
“Can You Help Me Understand What You’re Able to Remember About Your Experience?”

Tell Me More About [That] . . .”

Resources At:
End Violence Against Women International
Application: Trauma Informed Support

Expect fluctuations in behavior, mood, engagement

Difficulty tracking complex information/processes

Clear, simple, direct communication

Warm connect to other support services

Be kind. They may not be kind. That’s ok.
I’m sorry this happened to you.

I believe you.

You are not to blame.

This was not your fault.

Thank you for telling me & trusting me.

How can I help you?

I will support you no matter what.

EXAMPLES OF SUPPORTIVE LANGUAGE

I do not believe you.

Don’t tell anyone else.

Are you sure?

Do you have proof?

You need to move on.

You need to stop talking about it.

Put it in the past.

EXAMPLES OF HURTFUL LANGUAGE

CLOSING THOUGHTS
Everything you say, everything you do is a chance to help me or hurt me.

Make the choice to help. Please help me.
THANK YOU!

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