

# Healing from the Inside Out

The Neurobiology of Trauma in Children

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11:30 AM – 12:30 PM



# Today's Agenda

- WHAT is trauma?
- HOW does the brain respond?
- WHAT can we do?



# 1. What is Trauma?

# National Child Traumatic Stress Network (NCTSN) Definition

“Trauma occurs when a child experiences an intense event that threatens or causes harm to his or her emotional and physical well-being”

## Substance Abuse and Mental Health Services Administration (SAMHSA)

“Individual trauma results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has lasting adverse effects on the individual’s functioning and mental, physical, social, emotional, or spiritual well-being”

# Different types of trauma

## Acute Traumatic Events

- Sudden or violent loss of a loved one
- Physical or sexual assault (for example, being beaten, shot, or raped)
- School shootings
- Gang-related violence in the community
- Terrorist attacks
- Natural disasters (for example, earthquakes, floods, or hurricanes)

## Complex (or chronic) Trauma

- Physical, sexual, emotional abuse
- Neglect
- Domestic violence



Children also experience LIFE EVENTS that can be traumatic

- Death of a parent, sibling or caretaker
- Separation from parent, sibling or caretaker (incarceration, deportation)
- Relocation

# Think 3 E's

- EVENT
- EXPERIENCE
- EFFECT



2. How does the brain respond to trauma?





Brains are very squishy  
And **SENSITIVE**

# The Stress Response Simplified!

## 1. Amygdala triggers the ALERT!

Redirects attention and energy



## 2. Stress response

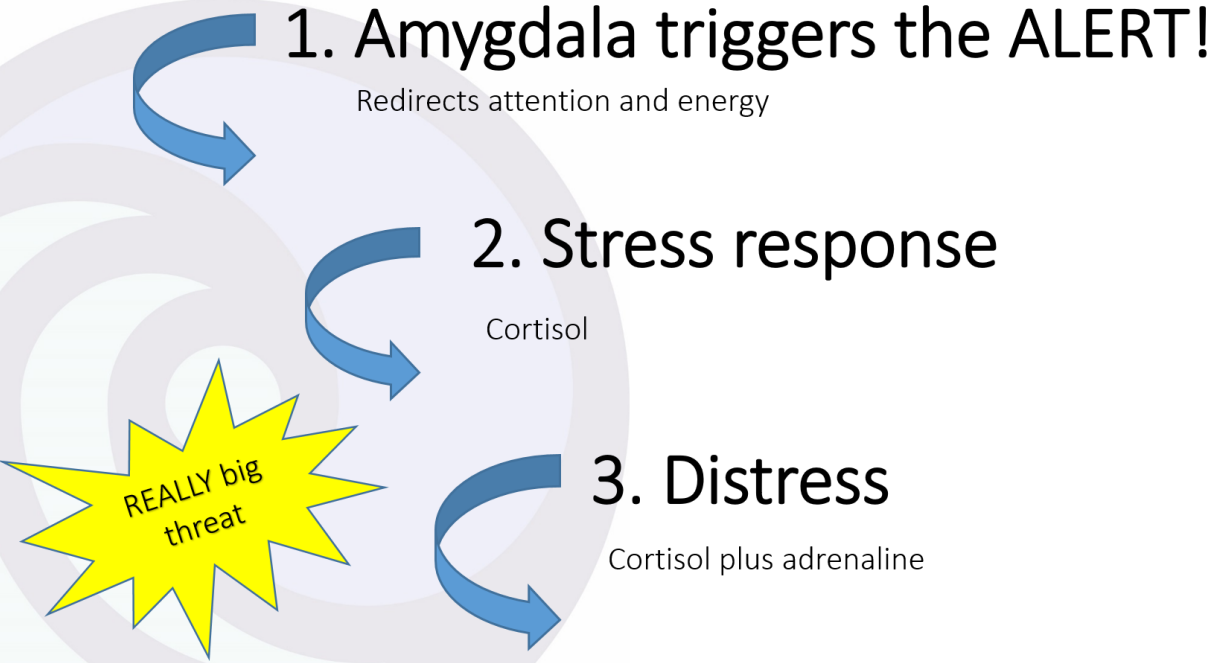
Cortisol

## 3. Distress

Cortisol plus adrenaline

REALLY big  
threat

# The Stress Response Simplified!

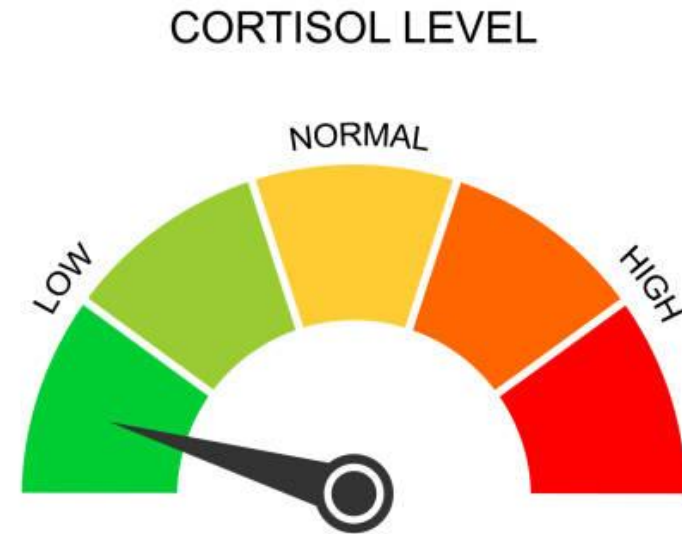


Your brain and body are compelling you to act



# Your brain wants you to....

- Solve the problem causing the stress
- Cope with the problem
- Escape from the problem
- SURVIVE



Solve the problem  
causing the stress

Cope with the problem

Escape from the problem

SURVIVE



What happens  
when  
the meter is too  
high?



## 2 specific changes:

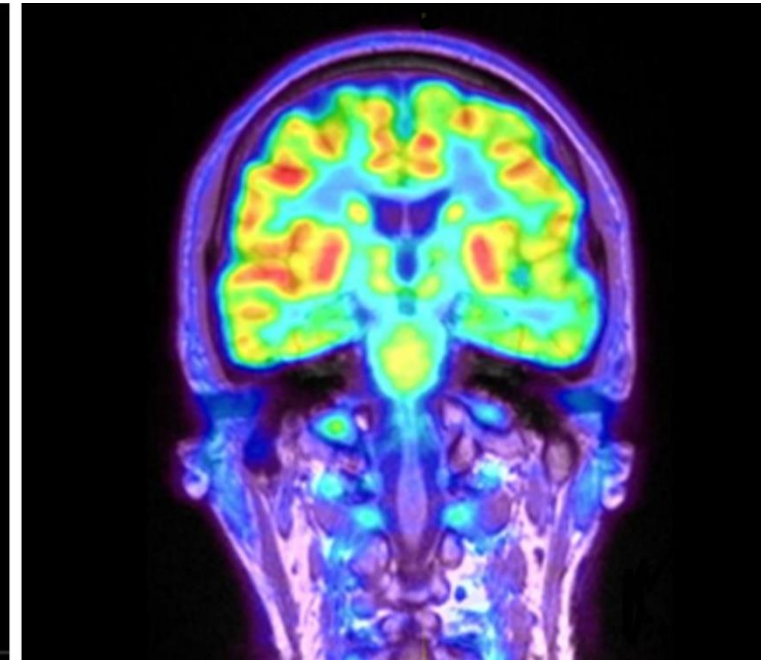
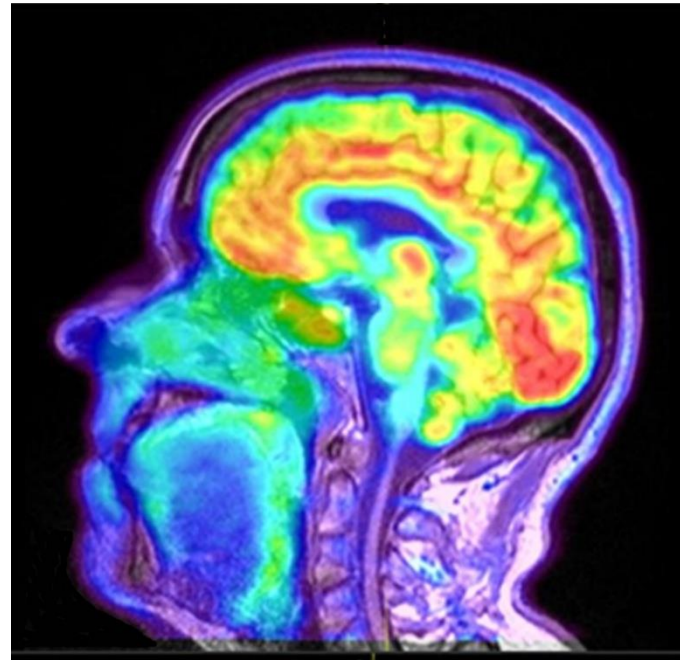
1. Children impacted by chronic stress as a result of trauma may experience a more sensitive and/or prolonged stress response
2. Specific areas of the brain may change in size and may not function optimally

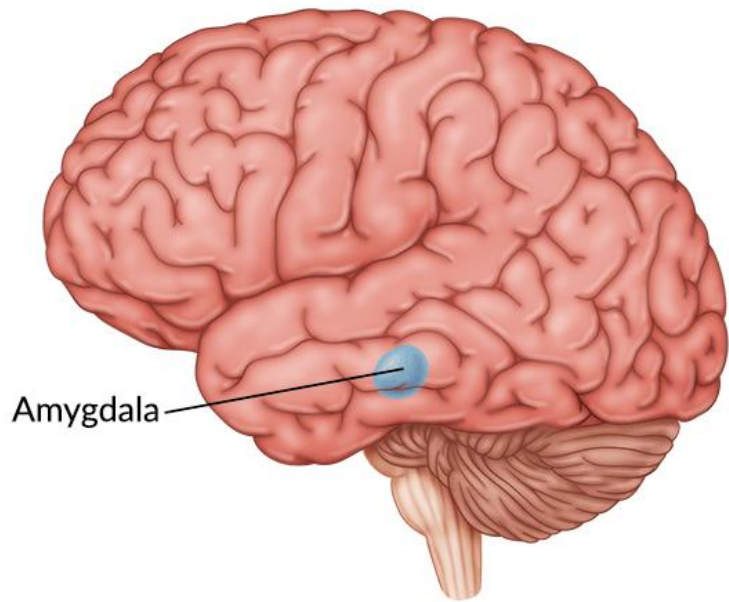




Which areas of the brain are affected?

- Amygdala
- Hippocampus
- Corpus Callosum
- Prefrontal Cortex





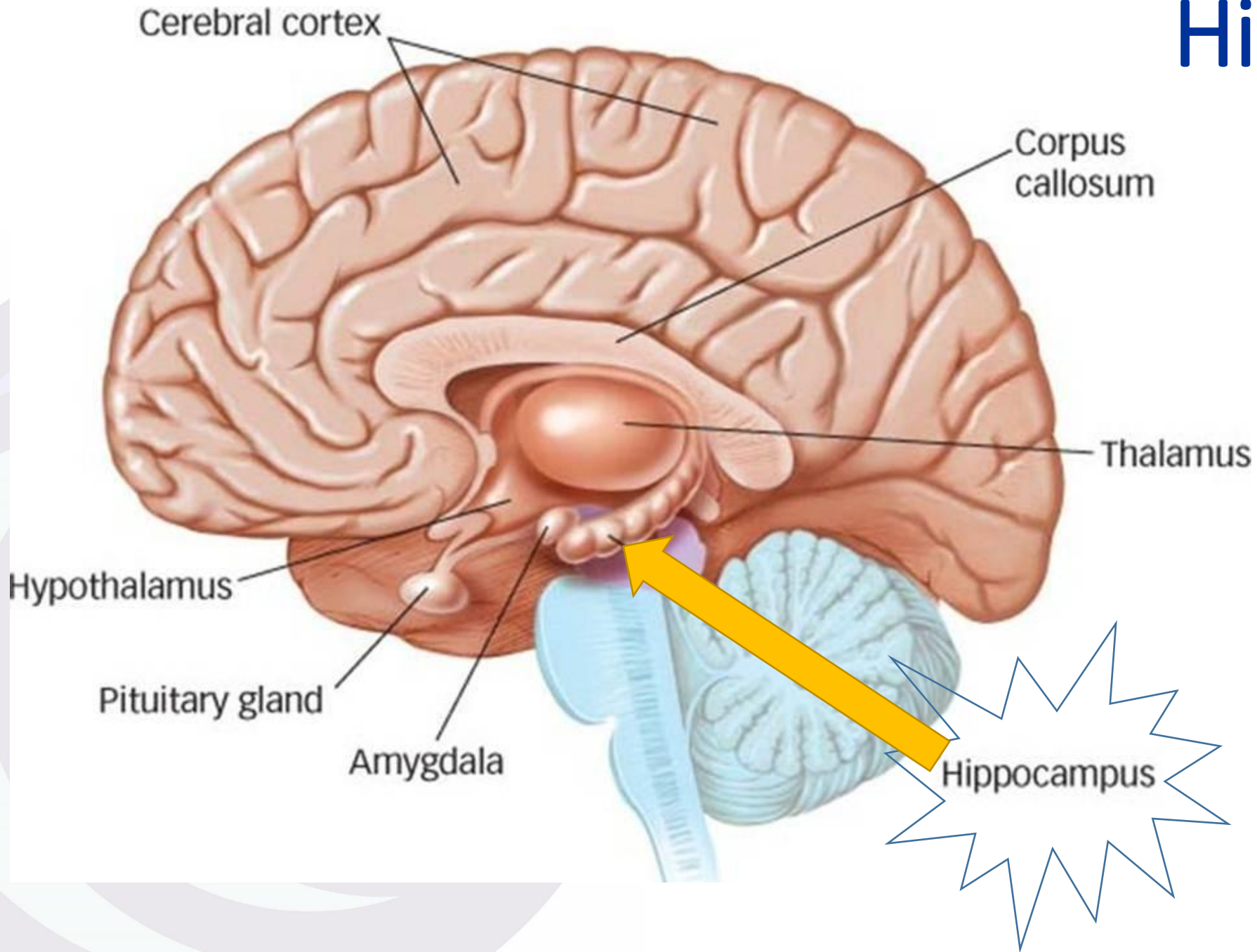
Experiences of trauma can cause the amygdala to become larger and more active

## What might that look like?

- Quick to fear (subjective experiences of fear)
- More intense fear
- Longer lasting experiences of stress and fear
- Anxious, nervous, on edge
- Hypervigilance
- Difficulty paying attention
- Difficulty with emotional regulation (relationship with hippocampus)



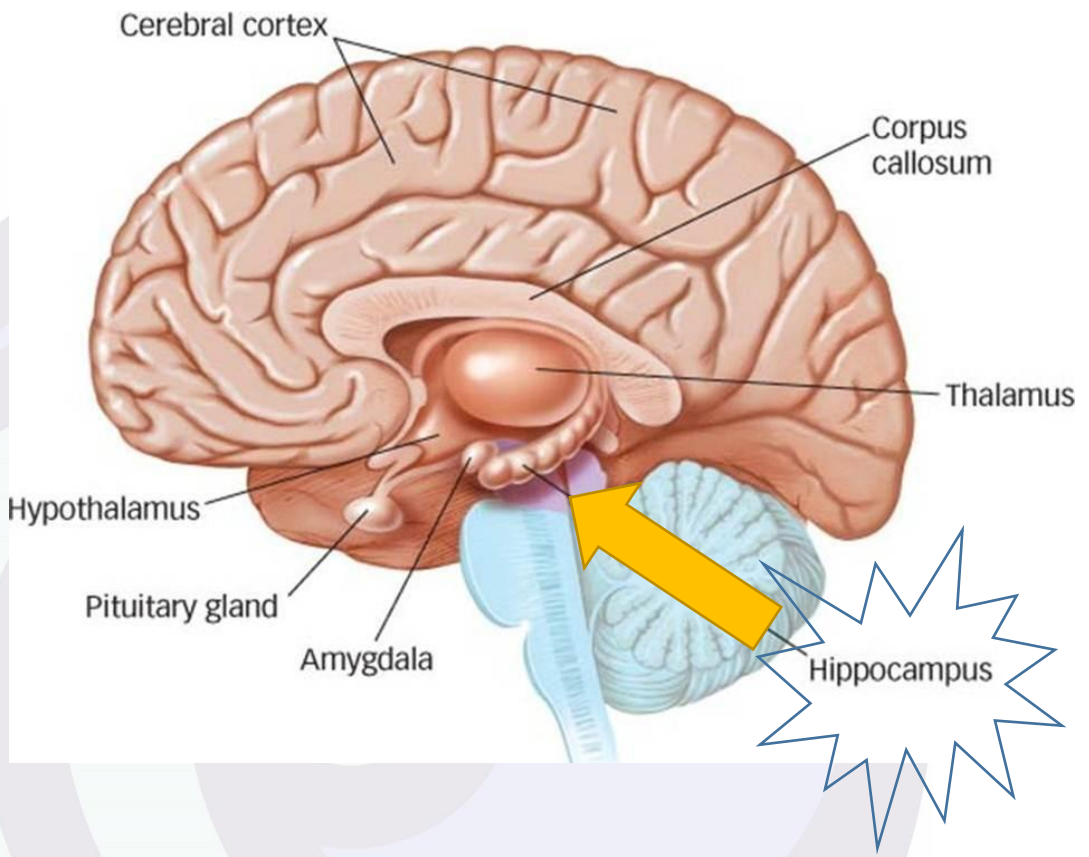
# Hippocampus



## Hippocampus functions

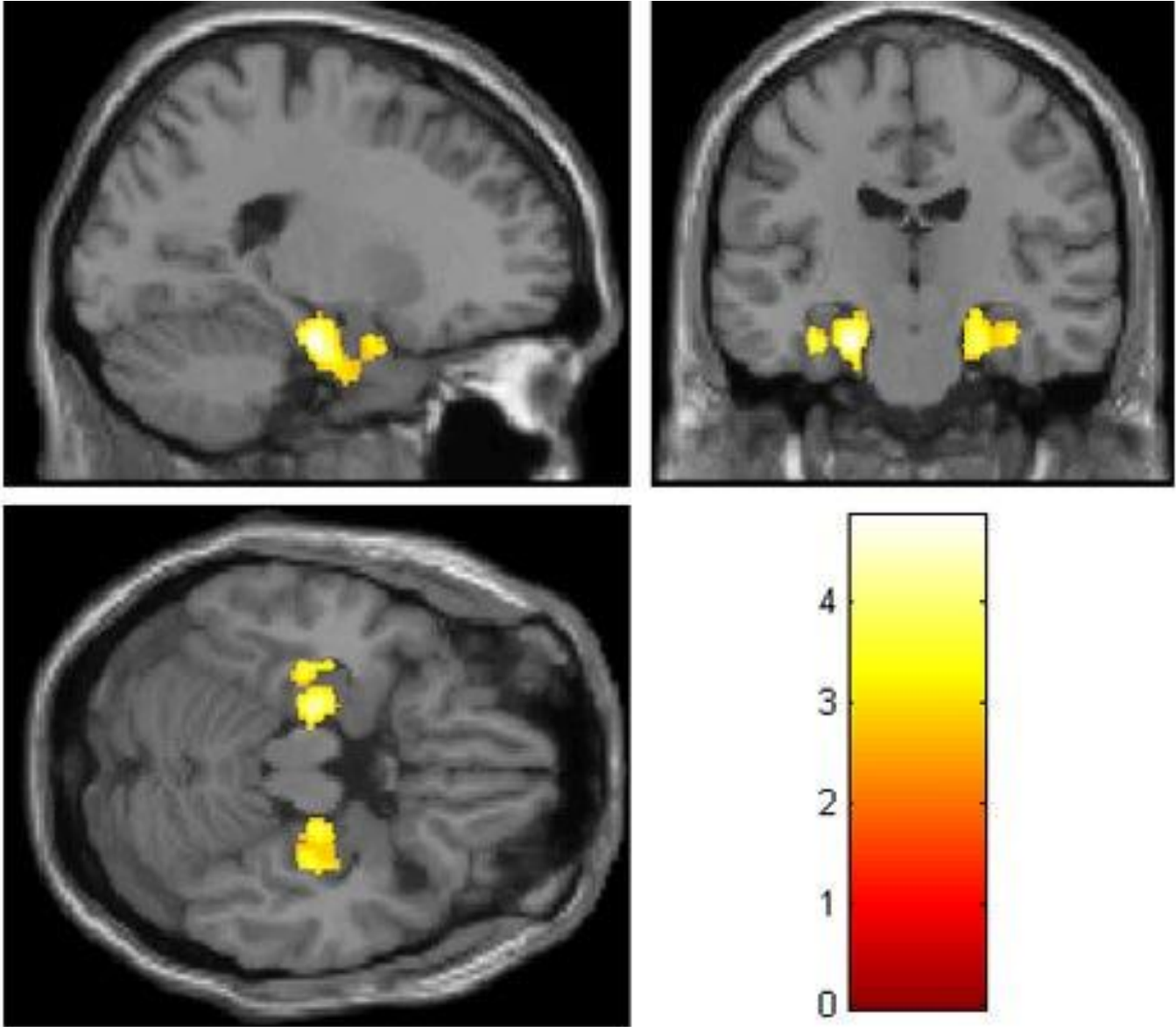
- Memory – storing memory, encoding from short term memory to long-term
- Learning
- Emotional processing (in conjunction with amygdala)
- Spatial navigation – helping us remember how to get from place to place, remember directions





Experiences of trauma can cause the hippocampus to become smaller and less active

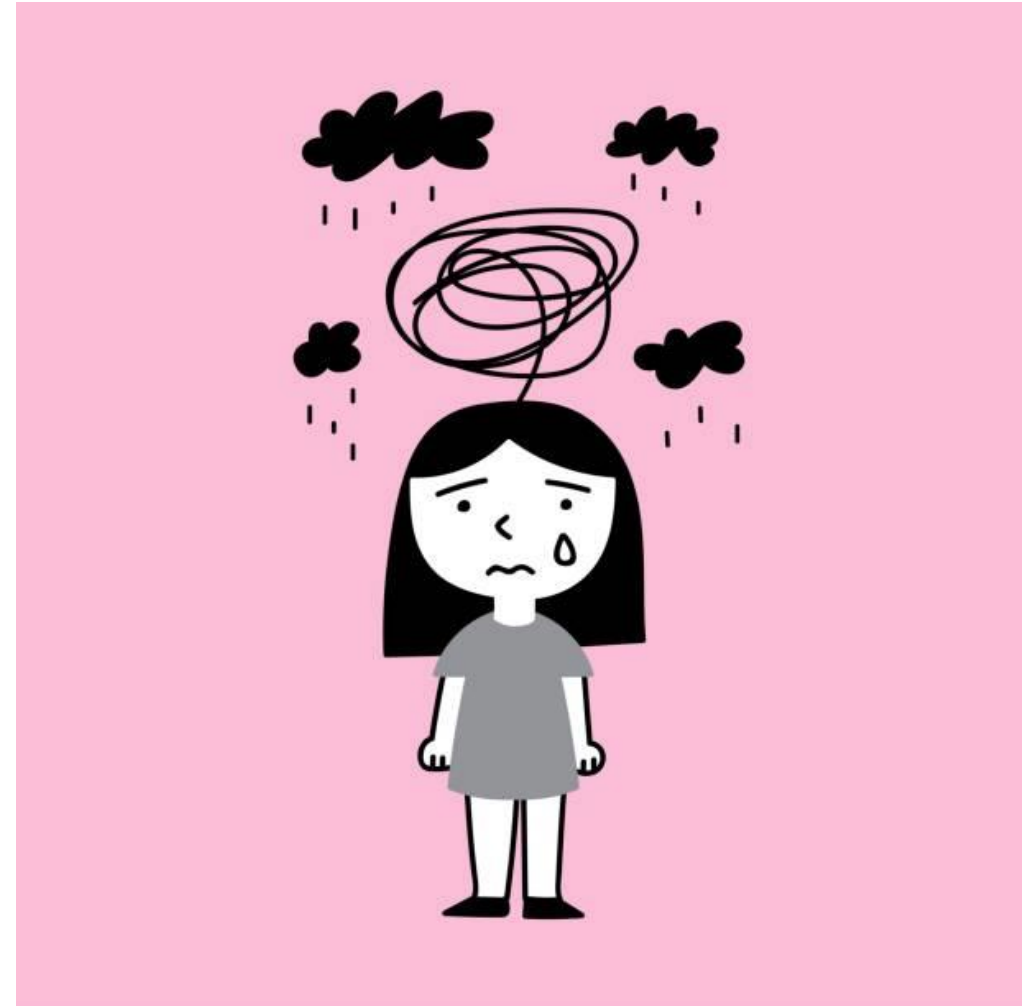
(fewer neurons, fewer synapses, less dendritic branching)



<https://news.yale.edu/2014/06/11/brain-retains-signs-childhood-trauma-and-warning-substance-abusers>

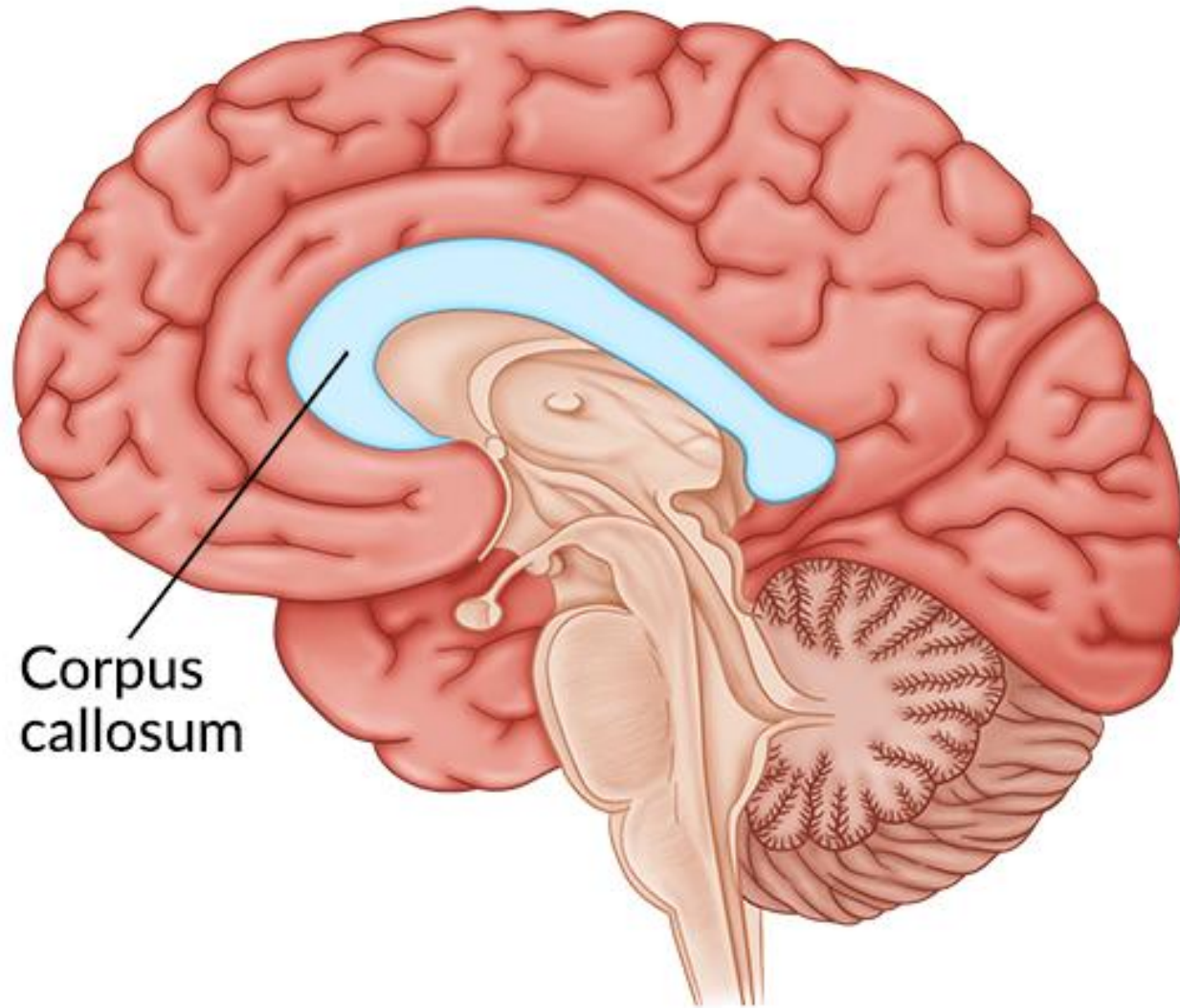
## What might that look like?

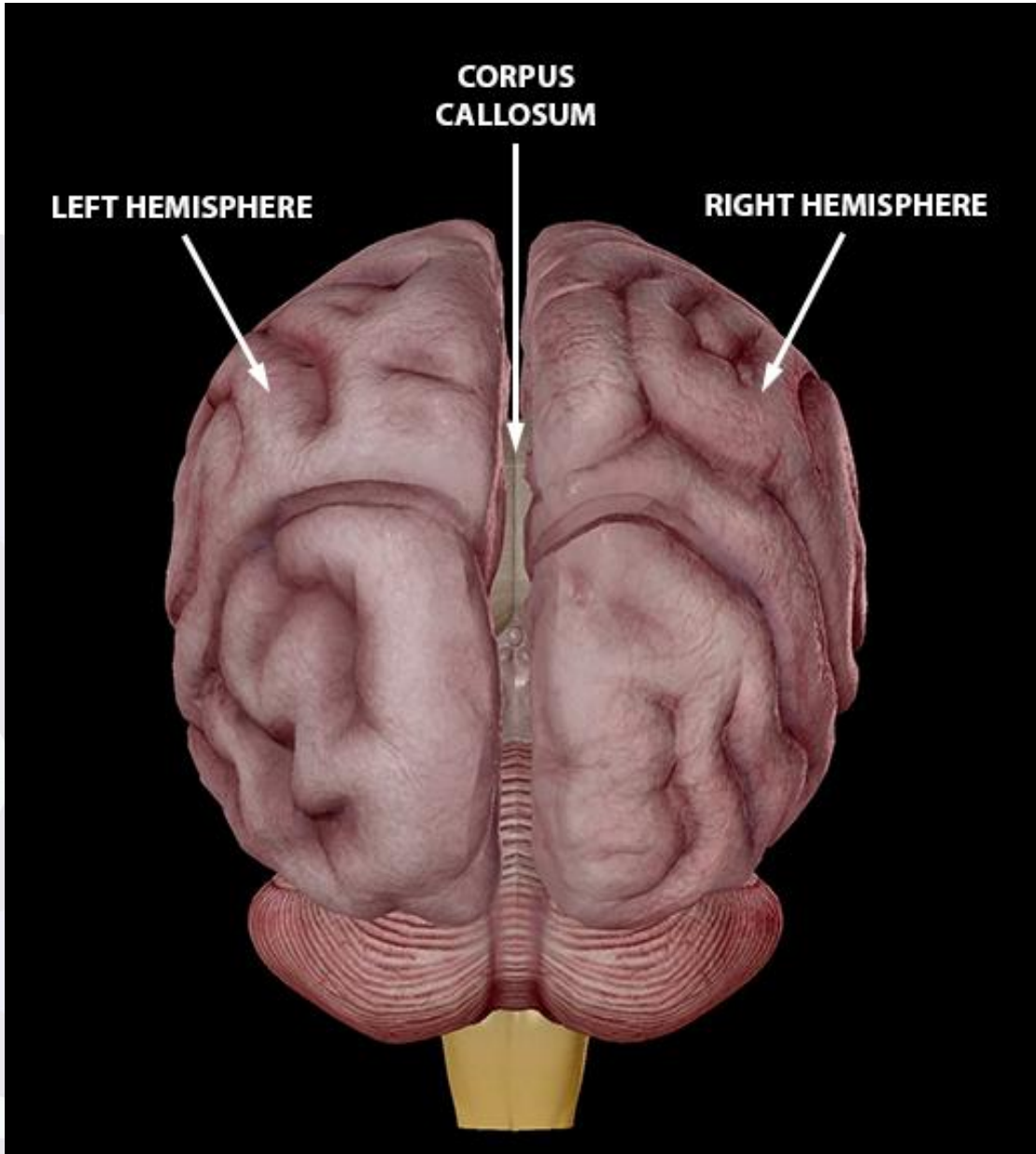
- Difficulty with learning (memory)
- Difficulty encoding short term experiences into long term memory
- Challenges with spatial awareness
- Difficulty paying attention
- Difficulty with emotional regulation (relationship with amygdala)





# Corpus Callosum



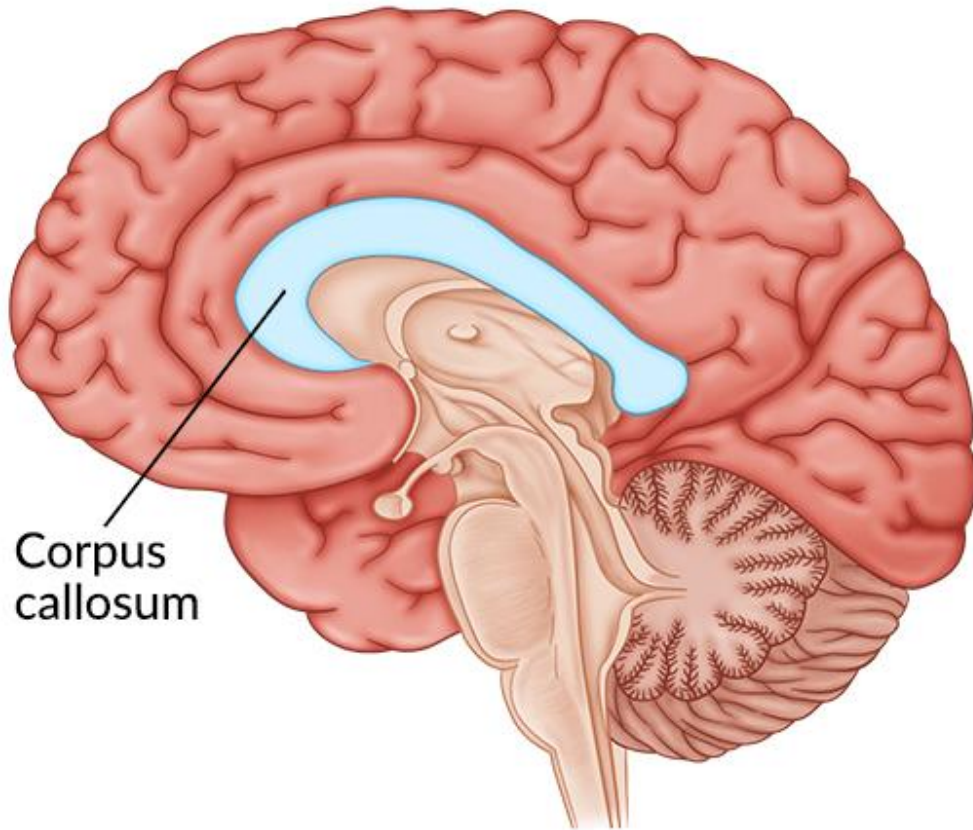


# Corpus Callosum function



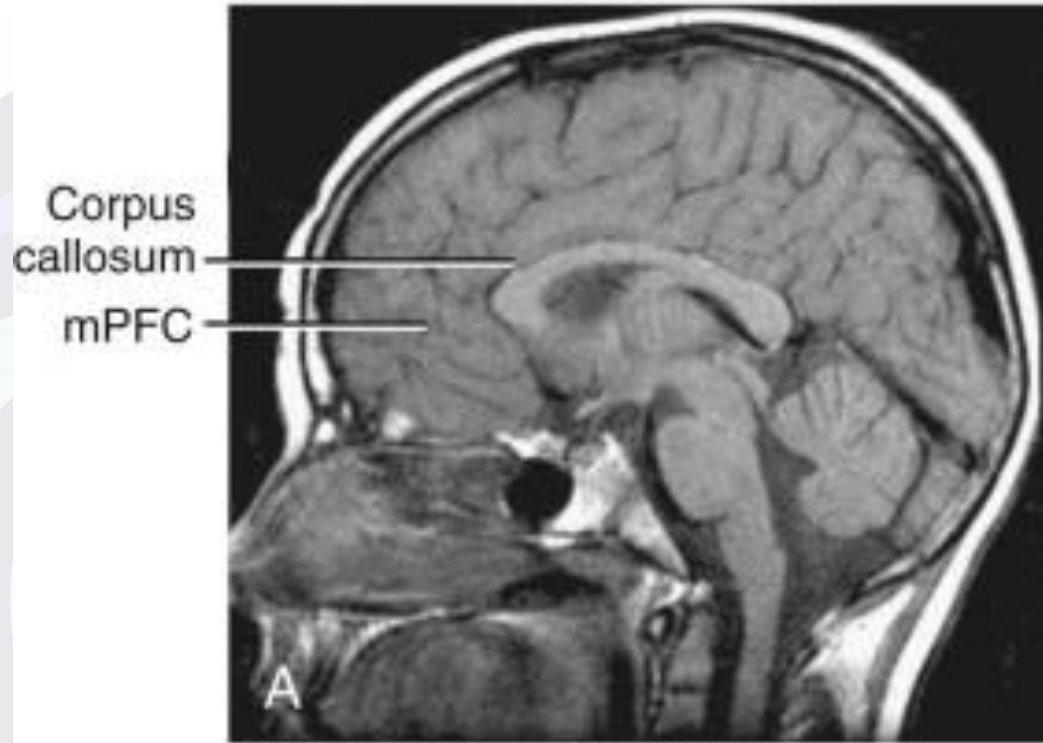
Connects left and right  
hemispheres of the brain

Left side	Right side
<ul style="list-style-type: none"><li>• logic</li><li>• sequencing</li><li>• linear thinking</li><li>• mathematics</li><li>• facts</li><li>• thinking in words</li></ul>	<ul style="list-style-type: none"><li>• imagination</li><li>• holistic thinking</li><li>• intuition</li><li>• arts</li><li>• rhythm</li><li>• nonverbal cues</li><li>• feelings visualization</li><li>• daydreaming</li></ul>

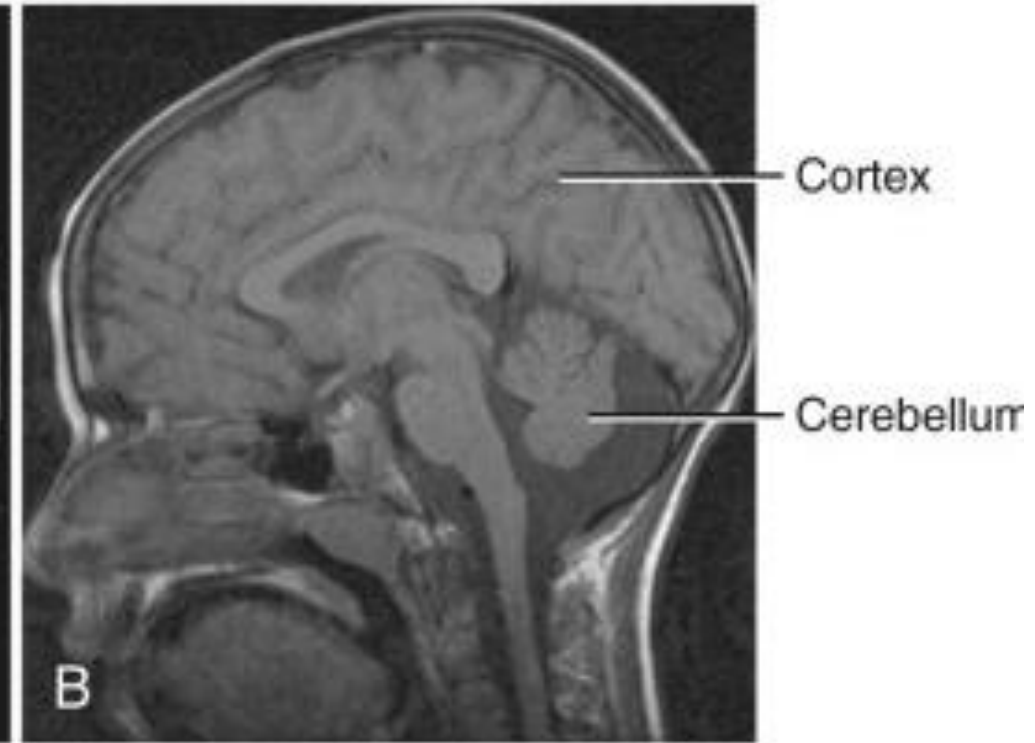


Experiences of trauma can cause problems in development of the corpus callosum (smaller in size)

HEALTHY 10 YEAR OLD

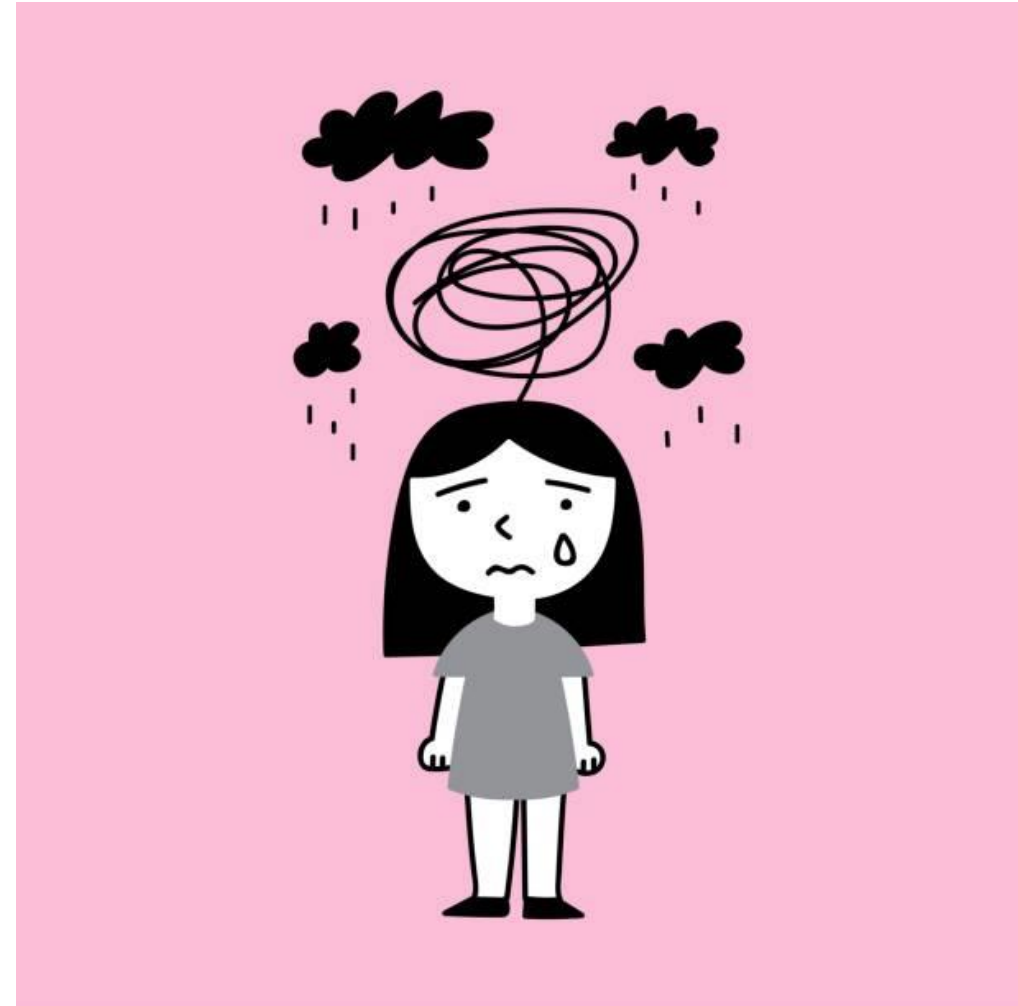


10 YEAR OLD WITH  
ABUSE-RELATED PTSD



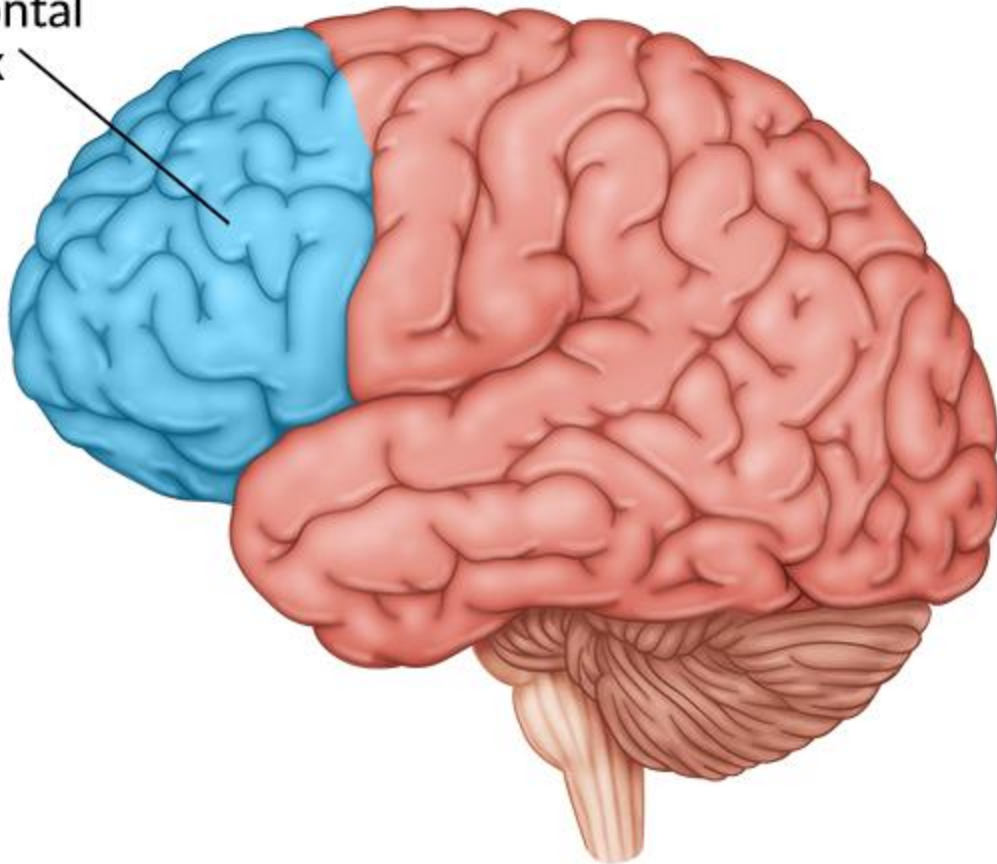
## What might that look like?

- Difficulty using language to describe emotions
- Difficulty with integrating symbols and numbers (ie word problems)
- Challenges with emotional regulation
- Difficulty recognizing cause and effect relationships
- Gender differences



# Prefrontal Cortex

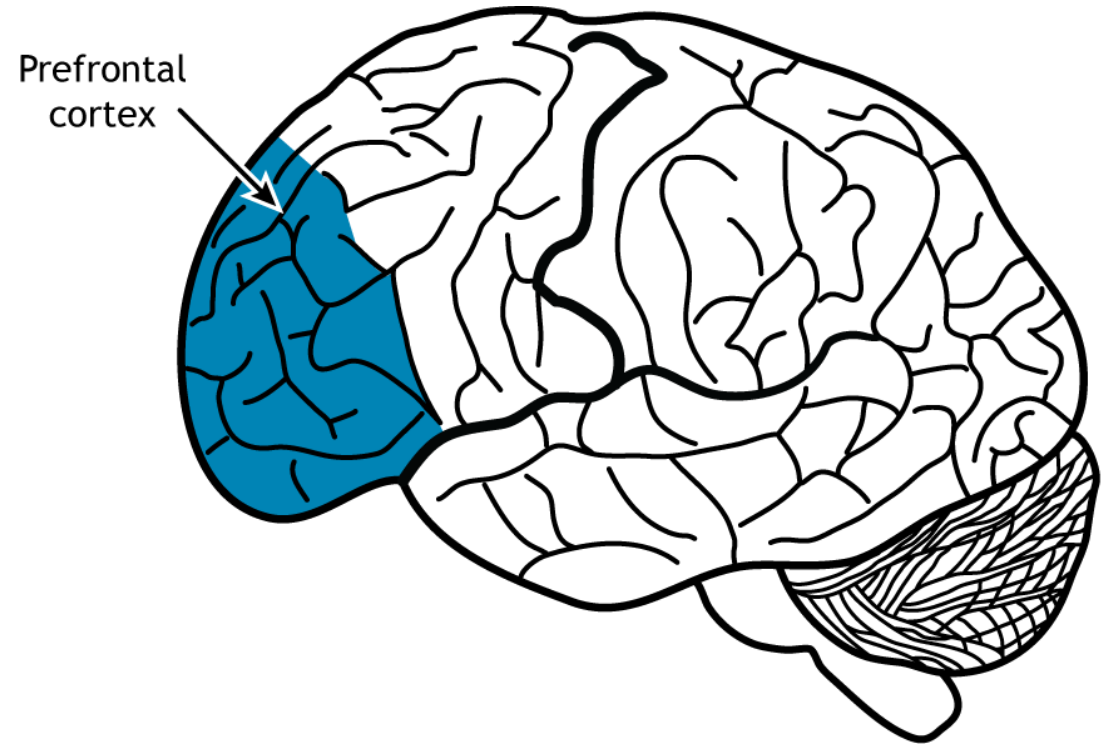
Prefrontal  
cortex



## Frontal lobe functions (partial list)

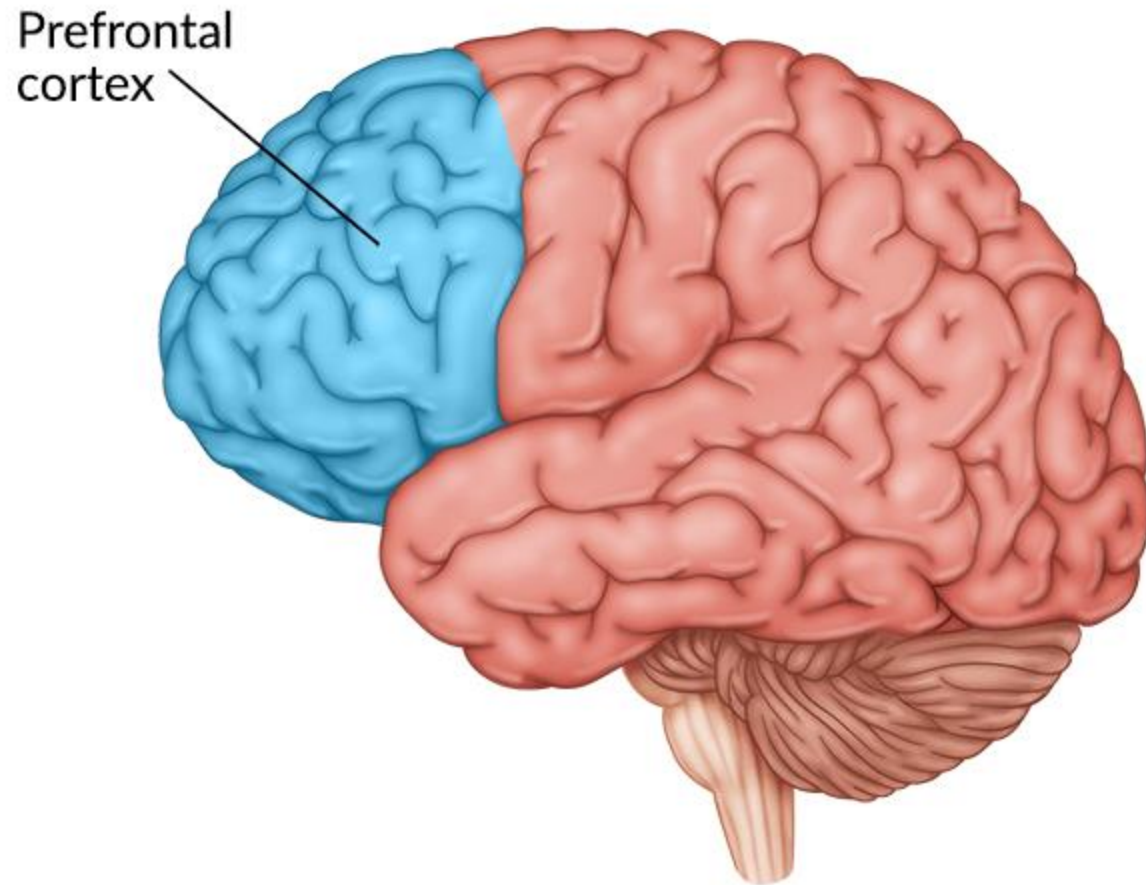
### Executive function skills

- Planning
- Organization
- Time orientation
- Impulse control
- Predicting consequences
- Task initiation
- Task completion

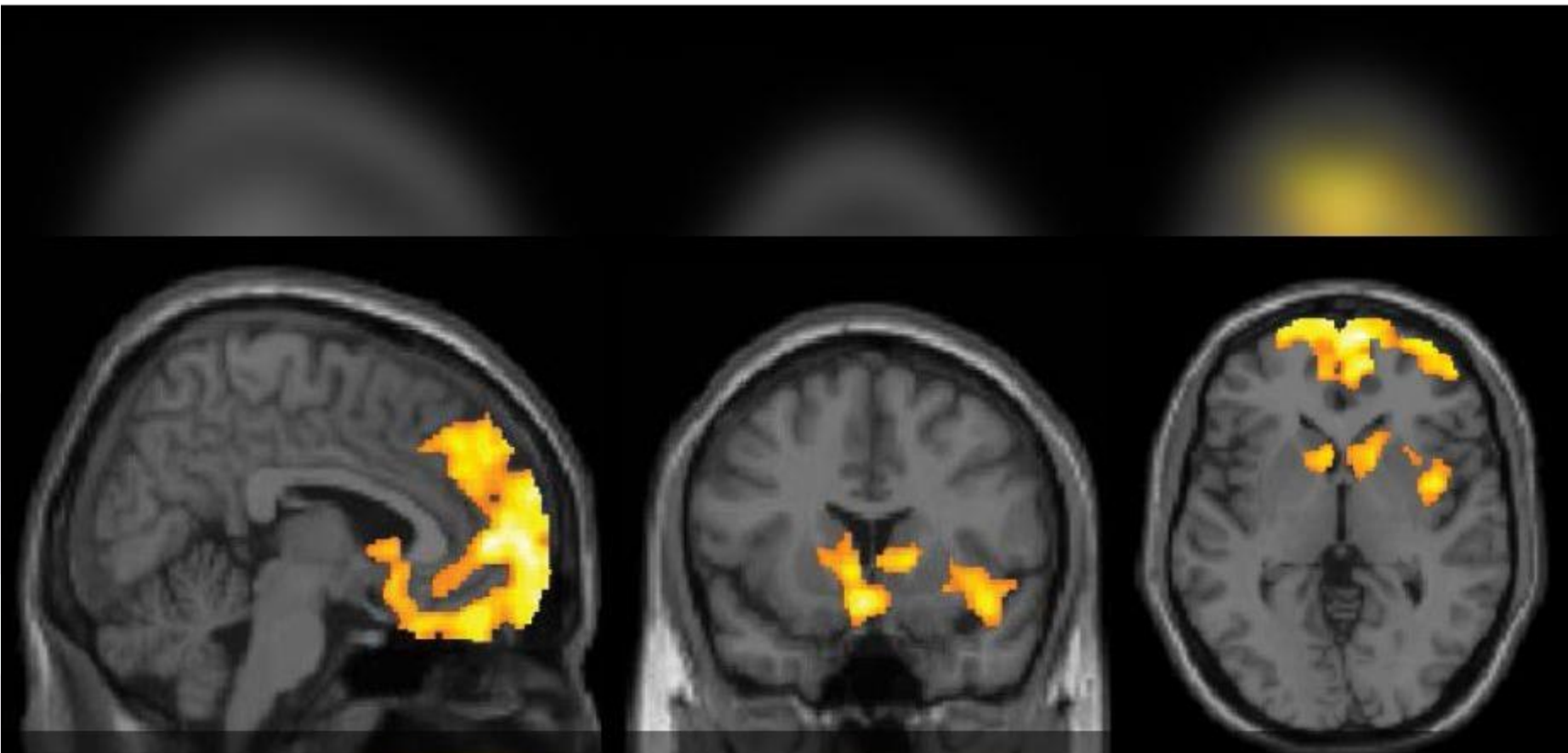




# Prefrontal Cortex



Experiences of trauma can cause problems in development of the prefrontal cortex (smaller, less active, slower to develop)



## MRI

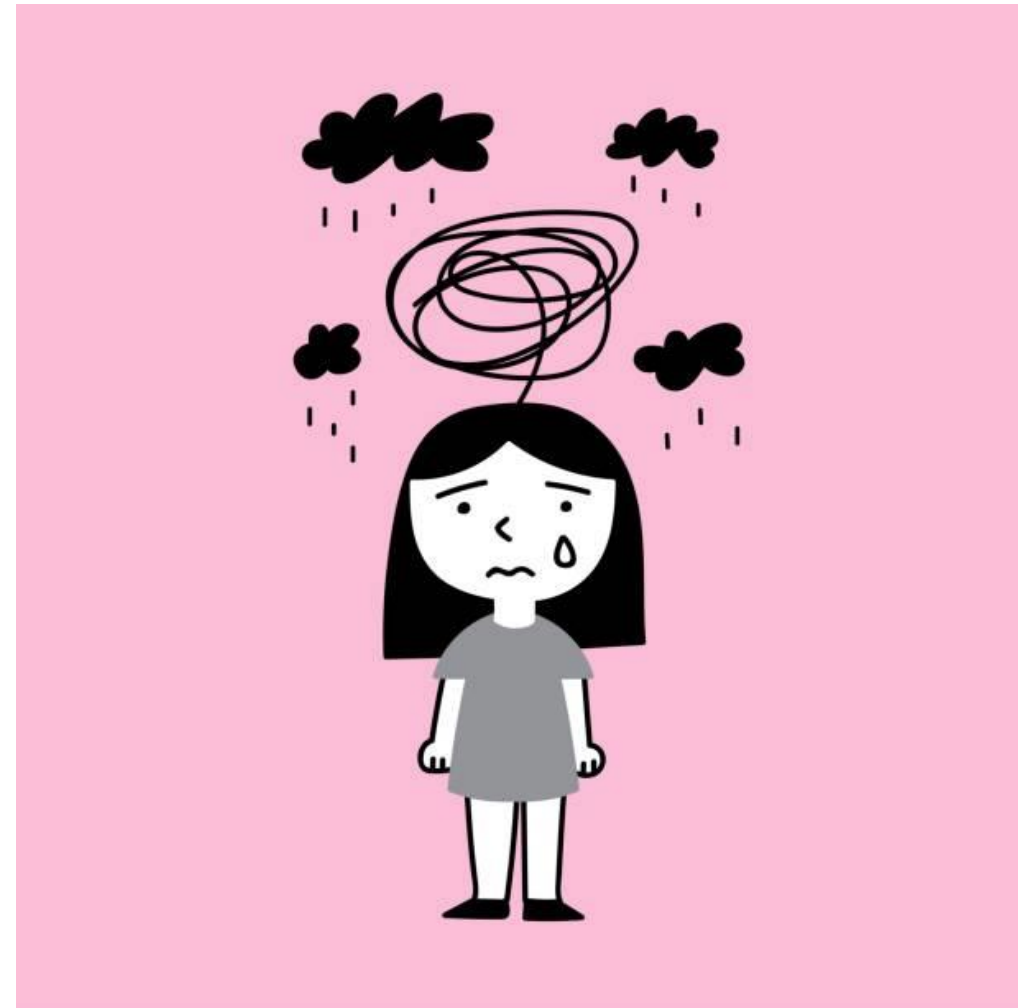
In a recent Yale study, magnetic resonance imaging scans showed a correlation between the number of stressful events an individual has experienced—even those that might be considered only mildly stressful—and reduced volume (yellow and orange) of the medial prefrontal cortex, anterior cingulate, and right insula. These brain areas serve important functions related to self-control and the regulation of emotions.

<https://medicine.yale.edu/news/medicineatyale/article/stress-adversity-take-a-toll-on-the-brain/>

What might that look like?

Traumatized children often struggle with complex, goal-directed behavior and have trouble adapting to environmental changes and demands.

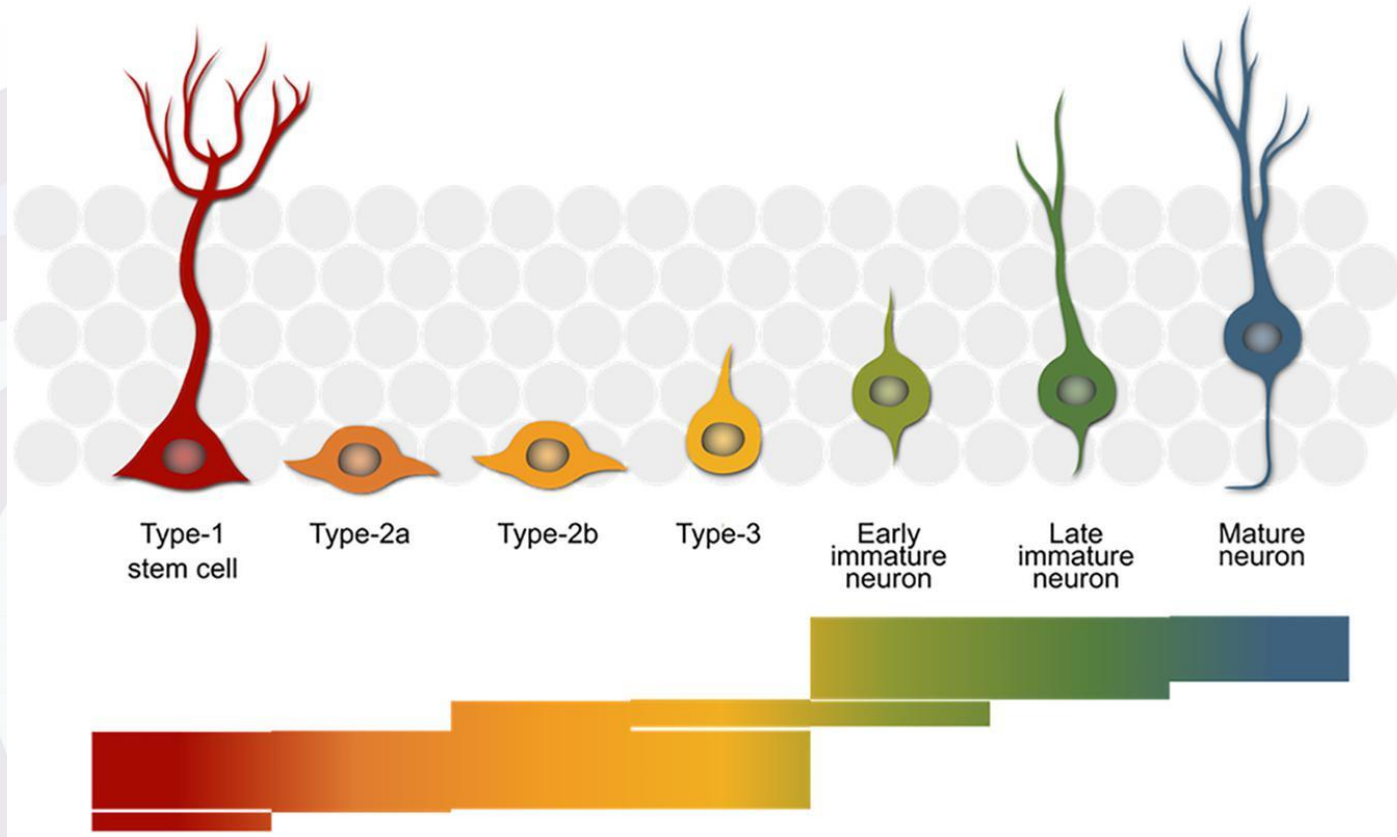
Executive Function Skills lag behind those of non-traumatized peers



# 3. What can we do?

Not all stress becomes toxic  
stress

# Neurogenesis



# TRAUMA INFORMED STRATEGIES

## CULTIVATE

Safety

## CREATE

Routines

## BUILD

Relationships

## ALLOW

Individualized interventions and supports

## TEACH

Self regulation

## PRACTICE

Self care



## CULTIVATE SAFETY



- Take steps to ensure no further trauma occurs
- Reassure. Remind children they are safe and loved
- Create a safe space where a child can go when needed (ie calming corner in a classroom, a safe chair or other special location at home)
- Pay attention to tone of voice and posture (what does the amygdala perceive?)
- In schools and other settings, focus on positive climate and culture and anti-bullying efforts



## CREATE ROUTINES



- Routines help strengthen a sense of safety. Knowing what to expect helps quiet an active amygdala
- At home: consistent times for meals, bedtime, homework and family connection
- At school: consistent schedules, expectations for transitions
- Visual cues can help
- When deviating from the routine, prepare and inform. Consider using familiar parts of the regular routine (ie reading the same story)

## BUILD RELATIONSHIPS

"Relationships are the agents of change and the most powerful therapy is human love."

Dr. Bruce Perry



## BUILD RELATIONSHIPS

- Supportive, safe, stable, consistent caregivers are perhaps the most effective intervention for children who have experienced trauma
- When children become dysregulated, use active listening, calm and patience to help them regain self control
- Learn about trauma-informed strategies for parenting, discipline (teach, not punish)



## Allow for Individualized Interventions and Supports

- Recognize that children may need MORE support, even when behaviors are challenging
- No “one size fits all” approach

**FAIR ISN'T**  
everybody getting the  
same thing.....

**FAIR IS**  
everybody getting  
what they need  
IN order to be  
**SUCCESSFUL.**

# TEACH SELF REGULATION

- Consider relaxation techniques such as [belly breathing](#), stretching and yoga poses, and tensing and releasing muscles.
- In times of calm, [play feeling charades](#)—acting out being hungry, proud, or disappointed, for example.
- Talk about where in the body your child feels the emotion, such as the chest, stomach or head. Name different feelings with different [colors](#).
- Practice skills to use when they get upset or angry, such as deep breathing, seeking an adult, or taking a break for active play or [exercise](#).



# TEACH SELF REGULATION

- Use a calm and neutral voice
- Body language that conveys safety
- Help them feel safe
- Let them tell their story (do not interrupt, “Yea I hear you, tell me more.” )
- Use words that de-escalate or are neutral (such as “how did that feel? I wonder if...”)
- Attune to the child
- Acknowledge their feelings. Do not minimize what they are feeling
- Sit with them
- Offer a break (water, walk)



## HOW DO YOU FEEL?

Find the child that looks like you

 <p>Sleepy / Tired Sick / No energy</p>	 <p>Bored / Sad Cannot focus on work Wants to get out</p>	 <p>Happy / Calm Ready to learn Reay for fun / Focused</p>	 <p>Worried / Fed-up Frustrated / Silly Too excited / Fidgeting</p>	 <p>Angry / Yelling Fighting / Screaming Crying / Very scared</p>
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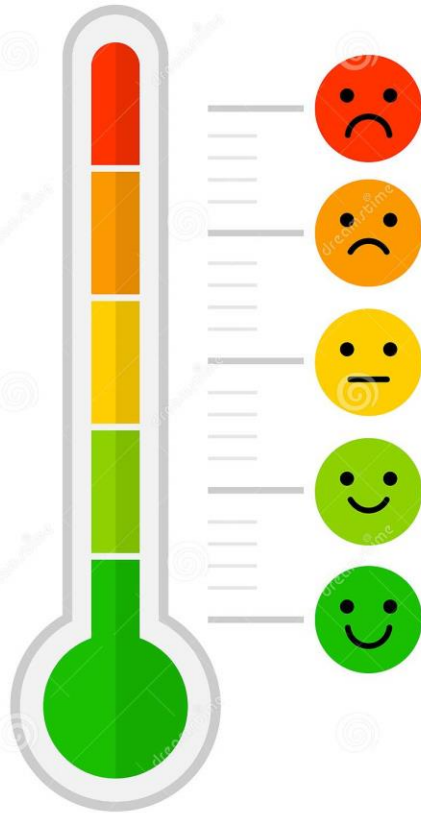
## TRIAL SOME STRATEGIES TO BE LIKE HAPPY CODI

Write down below what works for you

<p>10 x star jumps Go for a walk Log rolling on the carpet CK Classroom Course</p>	<p>Listen to music Stretch arms Use a fidget toy CK Classroom Course</p>	<p>Play with others Learn Work Smile and laugh</p>	<p>Take a break / ask for help Deep breathing Push-ups CK Classroom Course</p>	<p>Walk away from others Go to your safe place Hit/kick a ball or big cushion Go for a run/walk</p>
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# How do you check in with yourself?







KEEP IT  
GREEN

# PRACTICE SELF CARE

- Physical self care (nutrition, gym, schedule dr appts, sleep, take time off when sick)
- Psychological (reading for fun, time away, meditation, therapy, time away from screens/social media)
- Emotional (time with others, positive personal affirmations, watch favorite movies or shows, laugh)
- Spiritual (reflection, prayer, spiritual connections)
- Relational (regular dates with spouse or partner, activities with kids, time with pets)



How do you transition from work to home?

Do you have a daily ritual that you use?





“Whether you and I and a few others will renew the world some day remains to be seen. But within ourselves we must renew it each day.” —Hermann Hesse



# Stay in Touch!

<https://supportforallseasonsinc.org/CFL>



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