

Development,  
upbringing and  
learning

**EDUCATIONAL PSYCHOLOGY**

(LECTURE)

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# 1. Learning happens when...

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„Learning involves consciously or nonconsciously attending to relevant aspects of incoming information, mentally organizing the information into a coherent cognitive representation, and integrating it with relevant existing knowledge activated from long-term memory.“ (APA)

- ❑ Optimal level of awareness (consciousness) and Attention (sustained, focused) - frontal lobe, basal ganglia, thalamus
- ❑ Thinking (evaluation of information, sorting, analyzing) – access to cortical regions
- ❑ Memory (working memory, storage) - hippocampus

**Cognitive processes are dependent upon mental/bodily state of arousal/activation = affect and its regulation** (limbic system and developed, functional prefrontal cortex)

**impaired self-regulation of affect = impaired learning**

# Biology of emotions

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**Brain** (limbic system) - amygdala -> processes the information quickly and sends signals to the hypothalamus, which in turn activates the autonomic nervous system.

The cortex -> processes the information more slowly, allowing people to **appraise or evaluate the event** and **choose/modulate reaction**. The cortex under an influence of a strong emotion is more likely to process information incorrectly.

## **Autonomic nervous system:**

Sympathetic nervous system involves expending energy (fight or flight)

Parasympathetic nervous system works to keep energy in the body (rest/repair and digest)

# Early brain development

90% of brain development happens before the age of five.

Neurons that fire together wire together

Neural pruning - 'use it or lose it'

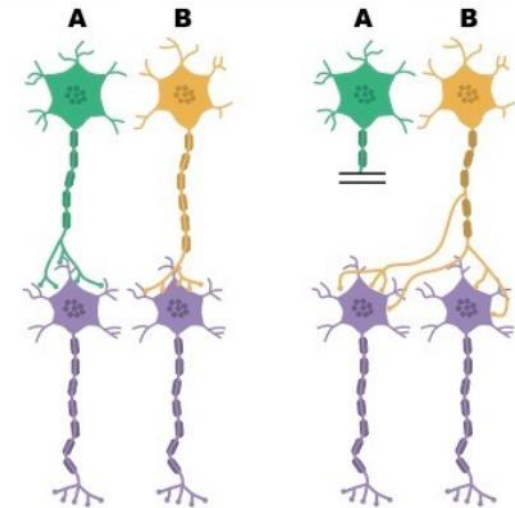
Myelination

Sensitive periods - brain cell connections are more plastic and receptive to the influence of a certain kind of life experience

Critical periods - limited time frame during which certain development can occur

Plasticity - structural and functional changes in the brain that happen as a result of new experiences

**Sprouting:** New axon and dendrite extensions allow existing neurons to form new connections



Neural connections by neuron A and neuron B prior to degeneration

Collateral sprouting of neuron B after damage to axon of neuron A

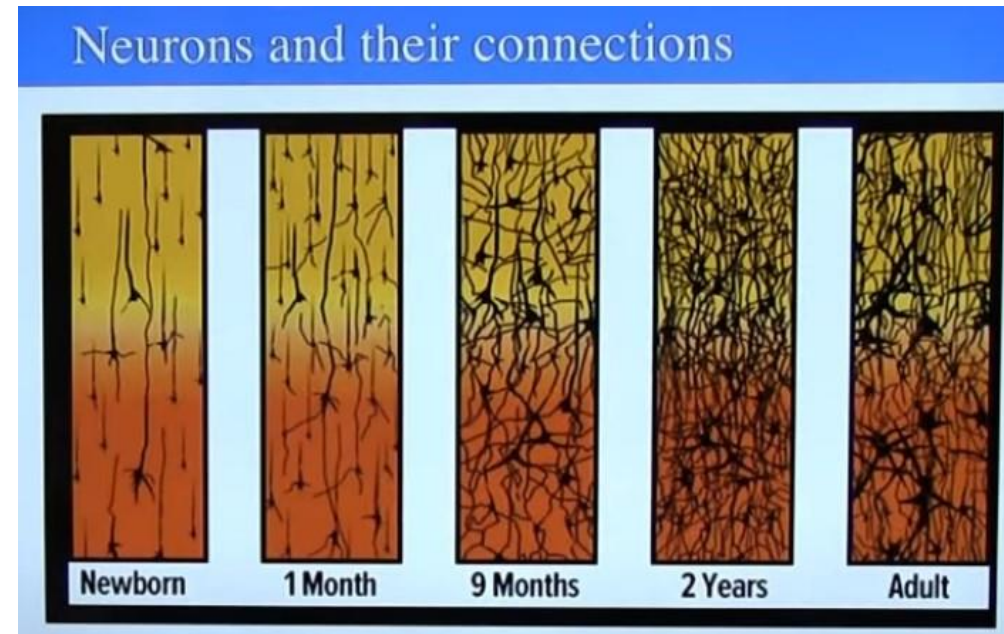
# Environmental interplay

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"The human cerebral cortex adds about 70% of its final DNA content after birth, and this expanding brain is directly influenced by early environmental enrichment and social experiences." (Alan Schore)

**Epigenetic changes** are modifications to DNA that regulate whether genes are turned on or off – how the body reads DNA sequence, which remains the same.

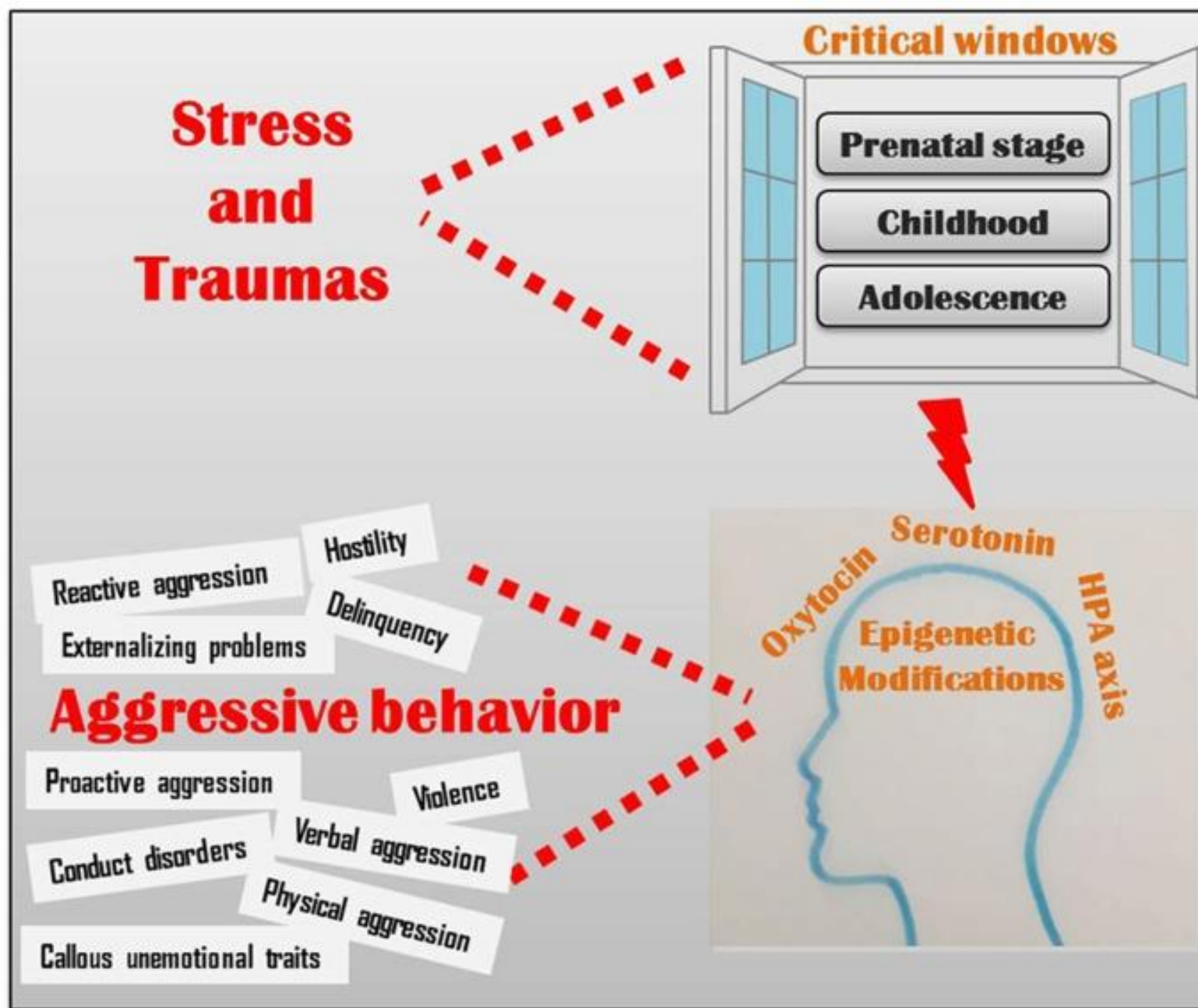
<https://developingchild.harvard.edu/resources/what-is-epigenetics-and-how-does-it-relate-to-child-development/>



# Aggression and epigenetics

Palumbo, S., Mariotti, V., Iofrida, C., & Pellegrini, S. (2018). Genes and Aggressive Behavior: Epigenetic Mechanisms Underlying Individual Susceptibility to Aversive Environments. *Frontiers in behavioral neuroscience*, 12, 117.

<https://doi.org/10.3389/fnbeh.2018.00117>



# Attachment and brain development

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**Bowlby, Ainsworth** > Behavioural model of attachment in 60s-70s

**Alan Schore** > Cognitive model in 80s-90s Emotional (Affect) model of attachment

Right brain development (3rd trimester to second year of life), experience dependent growth

Process of **emotional regulation** = co-regulating process > right brain – to – right brain communication (mostly non-verbal: facial expression, tone of voice, gestures, posture, tactile)

- Includes both up playing of positive emotions and down playing of negative emotions
- Formation of the integrated self
- Connection to the body
- Formation of empathy

The ability to regulate one's emotions and behavior is a key aspect of **executive function**, the suite of skills that allow an individual to plan, monitor, and attain goals.

**Absence of secure early emotional relationship results in dysregulation**

**Can be shaped by later experience – requires relational experiences with an emotionally sensitive and empathetic other**

# Co-regulation of affect in infants



- Repeated experiences of co-regulation help strengthen neural connections in the prefrontal cortex, amygdala, and hypothalamus, which are involved in emotion regulation and stress response.
- Foundation for developing healthy attachment relationships and social skills

Edward Tronick, still face experiment (2.5 min) : <https://www.youtube.com/watch?v=leHcsFqK7So>



# Early exposure to stress

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Cumulative exposure to **cortisol** compromises the ability of neurons to withstand neuropathological insults. Has a neurotoxic effect on the **prefrontal cortex**.

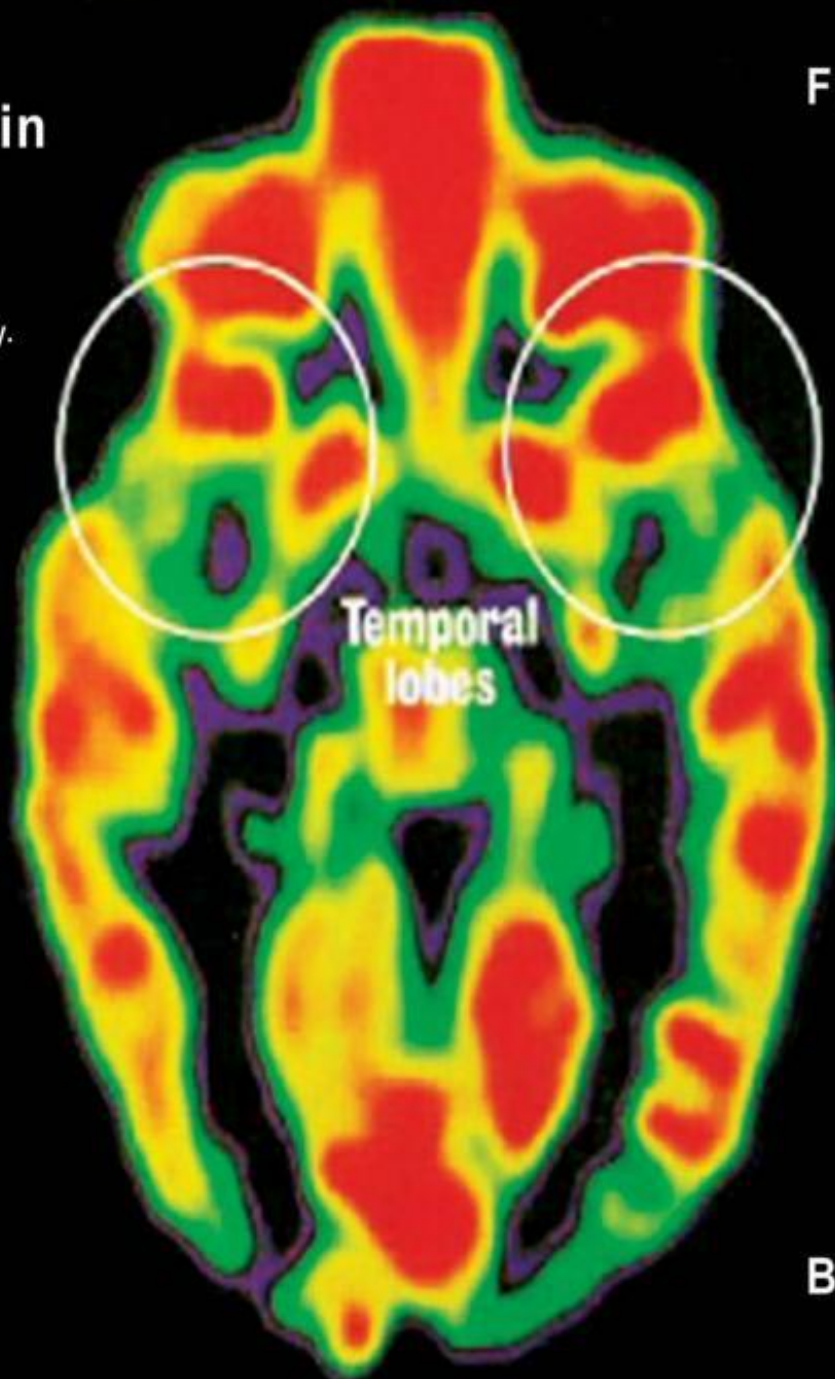
AMYGDALA - sets in motion the stress response. Overrides the prefrontal cortex. Shows volume increase. Increase in reactive behaviors.

HIPPOCAMPUS - Short-term memory loss. Neuronal loss. Impaired memory, sleep, immunity.

Trauma effect: chronic state of low- fear (alarm reaction) – they will respond by using either a dissociative or hyperarousal adaptation. Their functioning on every level (emotional, behavioral, cognitive) will reflect this state. With a prolonged alarm reaction, the child will experience an altered neural state.

## Healthy Brain

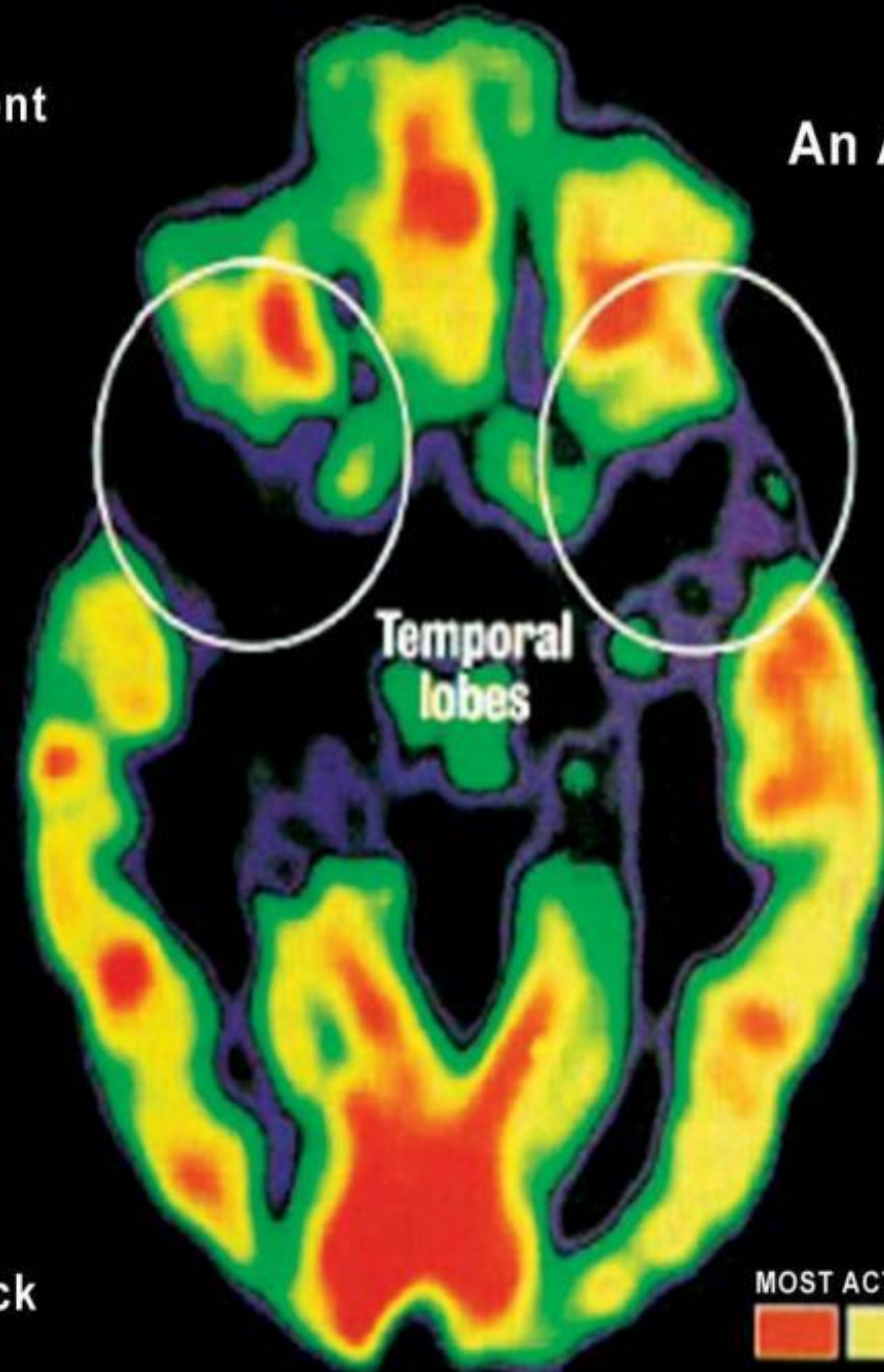
This PET scan of the brain of a normal child shows regions of high (red) and low (blue and black) activity. At birth, only primitive structures such as the brain stem (center) are fully functional; in regions like the temporal lobes (top), early childhood experiences wire the circuits.



Front

## An Abused Brain

This PET scan of the brain of a Romanian Orphan, who was institutionalized shortly after birth, shows the effect of extreme deprivation in infancy. The temporal lobes (top), which regulate emotions and receive input from the senses, are nearly quiescent. Such children suffer emotional and cognitive problems.

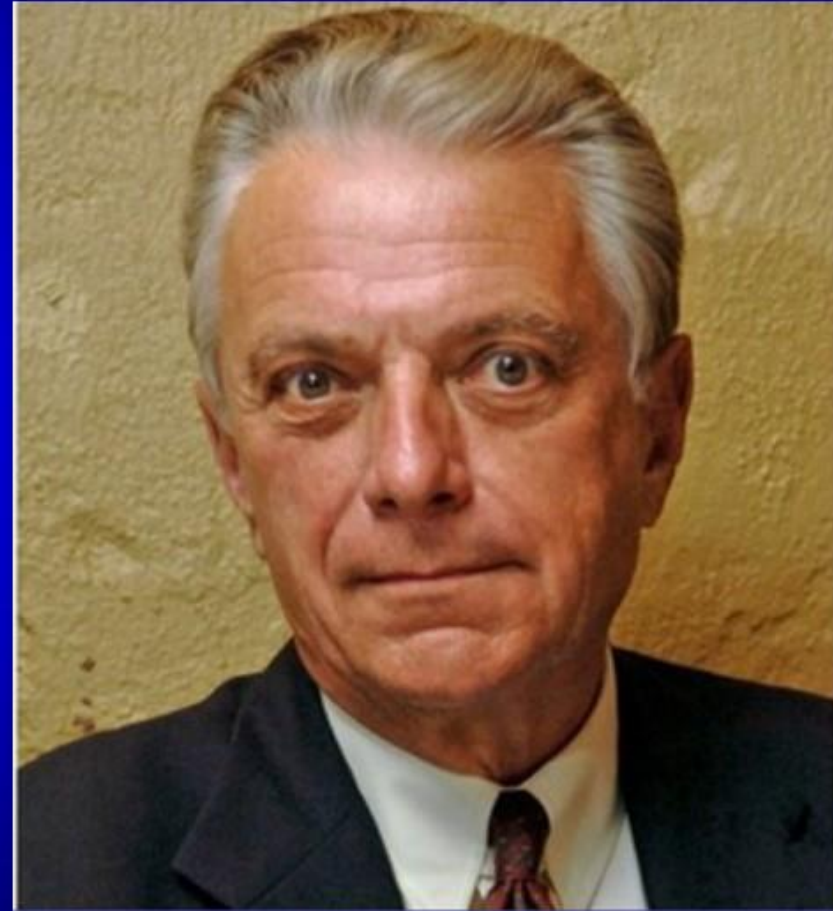


Back

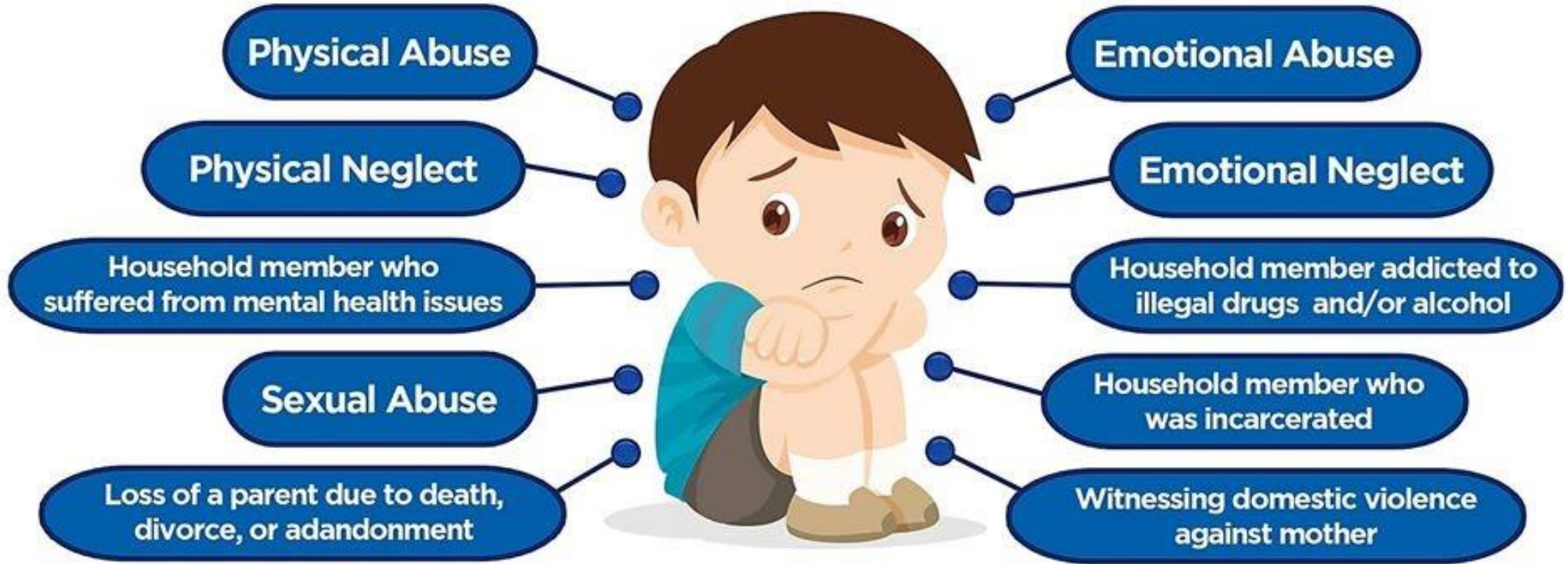


# Adverse Childhood Experiences (ACE) Study

- Dr Vincent Felitti
- Chief of Preventive Medicine at Kaiser Permanente
- Obesity Clinic 1985
- CDC
- [Short Video Introduction to ACE Study](#)



# ADVERSE CHILDHOOD EXPERIENCES INCLUDE:



## ADVERSE CHILDHOOD EXPERIENCES HAVE BEEN LINKED TO:



# Adverse Childhood Experiences (ACEs): Impact on brain, body and behaviour

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**Adverse Childhood Experiences (ACEs): Impact on brain, body and behaviour**

<https://www.youtube.com/watch?v=W-8jTTIsJ7Q&app=desktop> (6 min)

**Childhood Trauma and the Brain | UK Trauma Council**

<https://www.youtube.com/watch?v=xYBUY1kZpf8> (5 min)

# Examples of ACEs prevalence

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## CZECH REPUBLIC

- Physical abuse: 24% - 19.9%
  - Emotional abuse: 34% - 37.8%
  - Sexual abuse: 6% - 4.4%
  - Physical neglect: 8.4%
  - Emotional neglect: 27.4%
- Domestic violence witness: 22%-26%
- Substance abuse: 20%

Skalická, V., & Jurčová, D. (2016). Prevalence of child abuse and neglect in the Czech Republic. *Central European Journal of Public Health*, 24

European Survey of Children's Exposure to Violence (SEV) (Barudyova et al., 2019)

## SWEDEN

- Physical abuse: 2.2%
- Emotional abuse: 7.8%
- Sexual abuse: 1.3%
- Physical neglect: 3.6%
- Emotional neglect: 11.6%

Swedish Living Conditions Survey (ULF) (Statistics Sweden, 2019)

## USA

- Physical abuse: 14.8%
  - Emotional abuse: 22.6%
  - Sexual abuse: 10.8%
  - Physical neglect: 9.4%
  - Emotional neglect: 15.4%
  - Household substance abuse: 10.9%
  - Household mental illness: 18.0%
  - Parental separation or divorce: 15.8%
  - Witnessing domestic violence: 7.5%
- Centres for Disease Control and Prevention. (2020). Behavioral Risk Factor Surveillance System ACE Data.

# Strategies for Promoting Emotional Regulation in Children

## Signs of Emotional Dysregulation



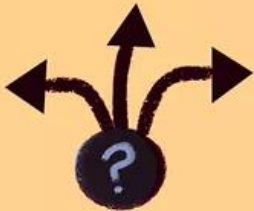
Overly intense emotions



Impulsive behavior



Lack of emotional awareness



Trouble making decisions



Inability to manage behavior



Avoids difficult emotions

Parents, caregivers, and educators can use various strategies to promote emotional regulation in children, such as:

- Teaching children to recognize and label their emotions
- Providing a safe and supportive environment for emotional expression
- Encouraging healthy coping strategies, such as deep breathing or physical activity
- Modeling healthy emotional regulation behaviors

## ER and ACEs relevance to teachers

**Supporting** students' emotional regulation: Teachers can help students develop emotional regulation skills by creating a safe and supportive classroom environment, modeling positive coping strategies, and providing opportunities for emotional expression and regulation.

Teachers who understand the impact of ACEs on emotional regulation can better **recognize the signs** of trauma or chronic stress in their students and refer them to appropriate support services.

Promoting social-emotional learning (SEL): Teachers can integrate (SEL) into their curriculum to support students' emotional development, build positive relationships, and enhance their ability to regulate their emotions.

Creating trauma-informed classrooms: Teachers can adopt a trauma-informed approach to teaching that recognizes the impact of ACEs on students and seeks to create a safe and supportive learning environment that meets their emotional and developmental needs.

Collaborating with families and other professionals: Teachers who understand the impact of ACEs on emotional regulation can work collaboratively with families, school counselors, and other professionals to support students' emotional development and address any challenges they may be facing.



# Further recommendations

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Gabor Maté

Bessel van der Kolk

**Darcia Narvaez „human nest“**

<https://www.youtube.com/watch?v=wmQ3CkUkhuw&list=PLy5Xf1bSSus-yyvhNbHg9a8jVKBT6Ng3Z>

Heather Geddes (Attachment in the Classroom)