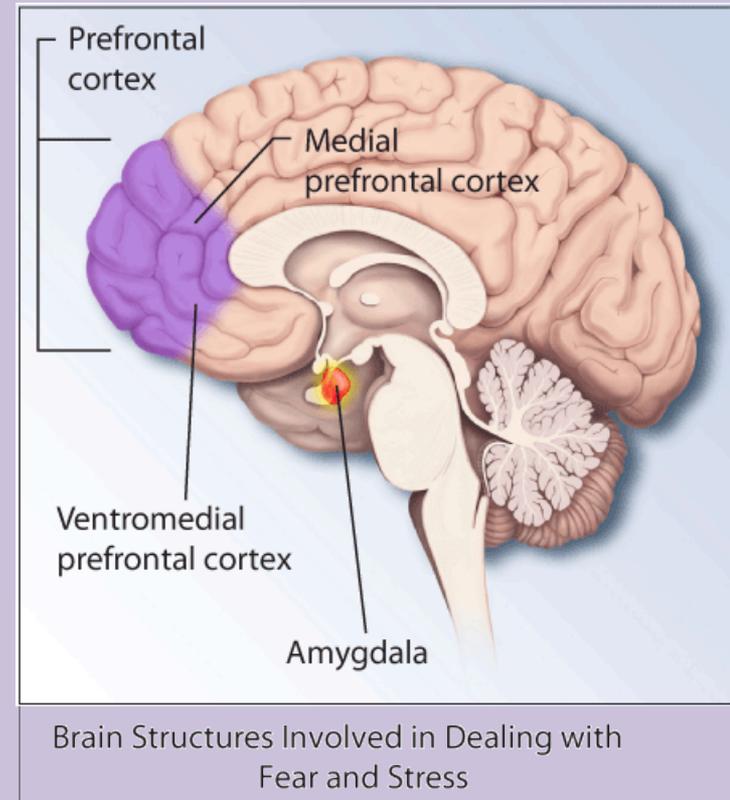


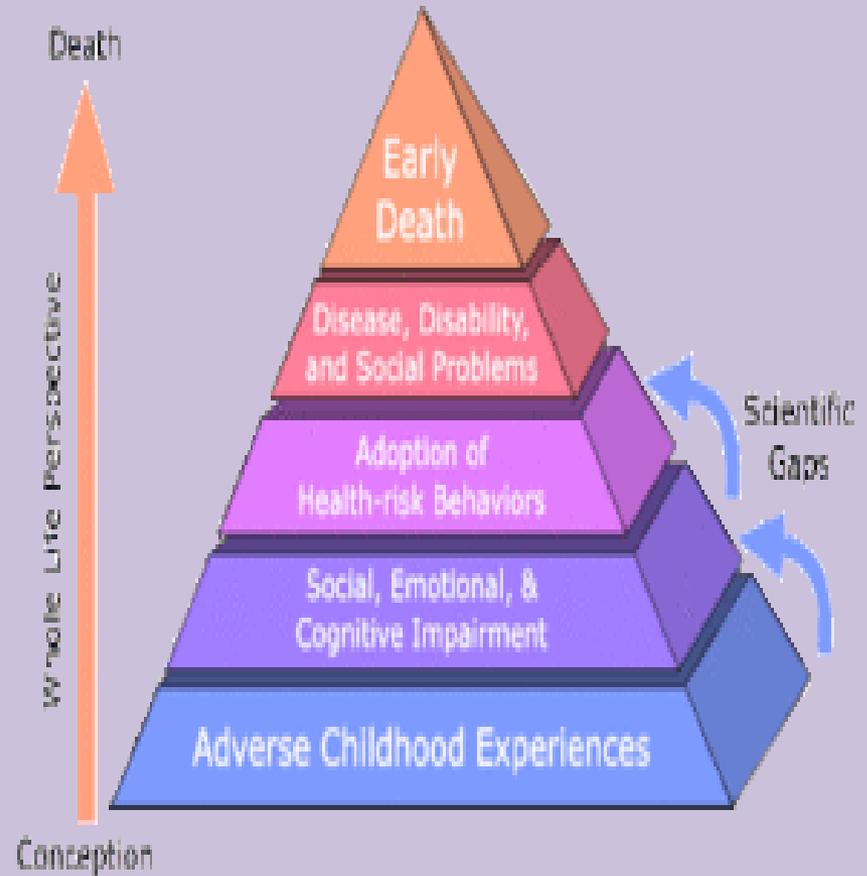
Brain and Trauma/ Adversity

- *Notes on Adversity/
Trauma*
- *Childhood Disrupted*
- *How Your Biography
Becomes Your Biology
and How You Can Heal*
- *Donna Jackson
Nakazawa*



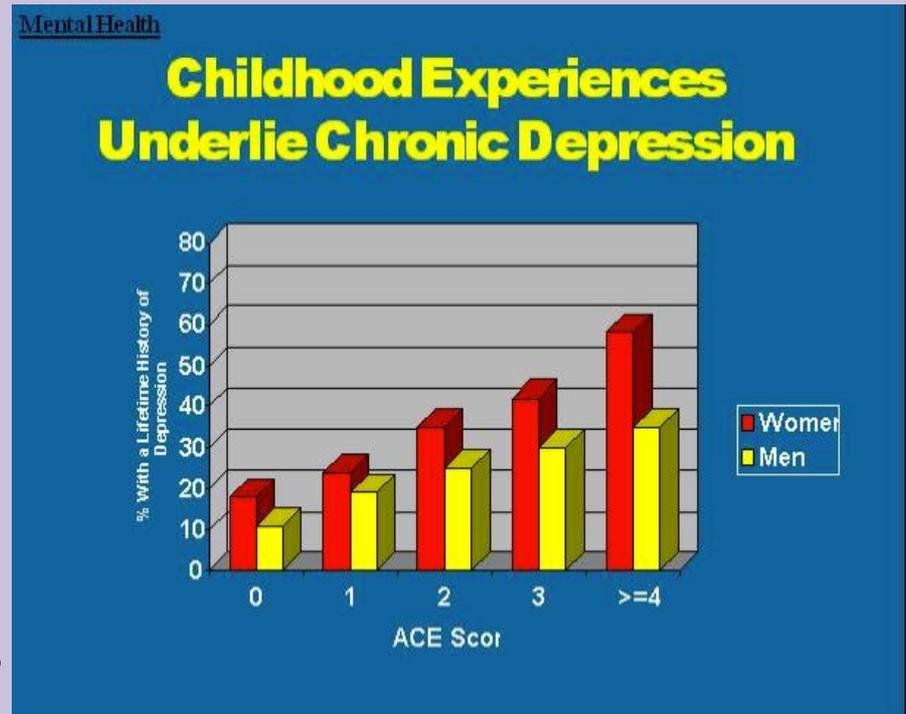
Connection and Regulation

- Early chronic unpredictable stressors, losses, and adversities, we face as children shape our biology in ways that predetermine our adult health. This early biological blueprint depicts our proclivity to develop life altering adult illnesses such as heart disease, cancer, autoimmune disease, and depression.
- Stress erodes the protective caps (telomeres) on the ends of strands of DNA- keeping DNA healthy and intact.



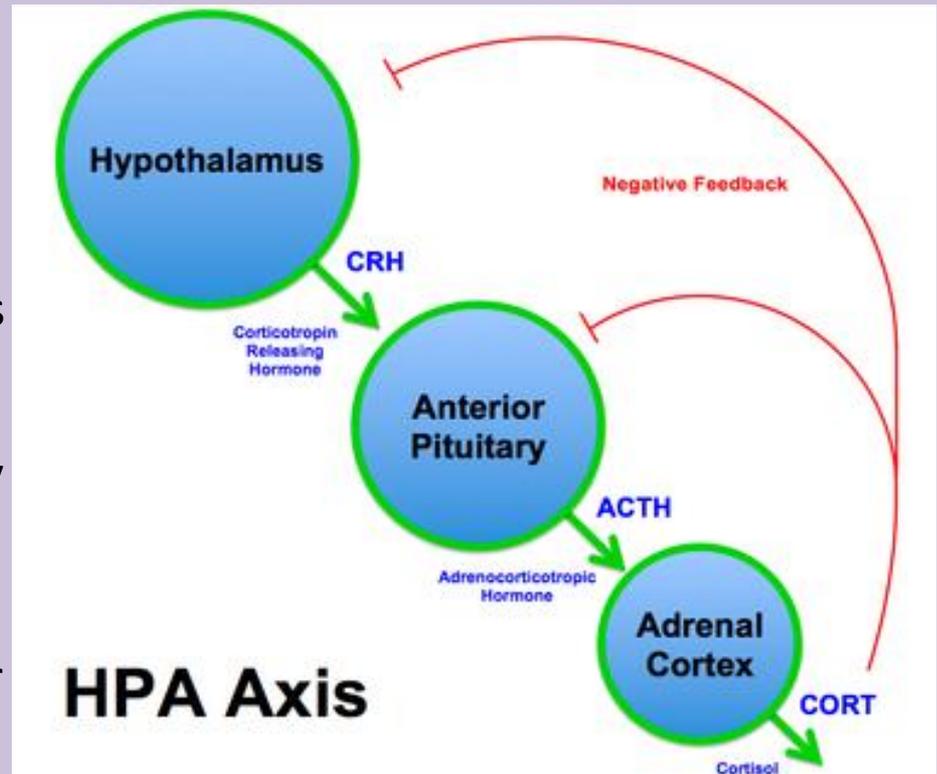
Theory of Everything!

- Correlation between childhood adversity/ brain architecture/ adult well-being!
- The immune system is the body's operating system! Our emotional biography becomes our physical biology. Early stress we face when we were young, catches up with us as adults altering our bodies, cells and even our DNA



Stress Response System

- In young children, the HPA axis is still developing so with early chronic stress the body becomes flooded with inflammatory stress neurochemicals. Early childhood stress reprograms how we will react to stress our entire lives! Early chronic unpredictable stress is most damaging.
- Stress causes the brain and body to marinate in toxic inflammatory chemicals. ACE research show that both the physical and emotional suffering are rooted in the complex immune system- our body's operating control center.



Stress Response can Reprogram our Brains and Bodies

- Emotions can be powerful and we feel them physically. Powerful relationship between mental stress and physical inflammation- as white blood cells secrete cytokines to help destroy pathogens and repair damaged tissue but when there is ongoing stress there is no state of recovery eliciting a low dose an ongoing dose of inflammatory chemicals leading to chronic cytokine activity and inflammation.
- Cytokines are cell signaling proteins (molecules) that aid or help cell to cell communication in immune responses stimulating movements of cells toward sites of inflammation, infection and trauma

Epi-Genetics

- The resetting of the stress response system is epigenetics. The environment can alter which genes become active in the body.
- Methylation- Our DNA is wrapped up tightly in protected proteins which make up our chromosomes. Our genomes don't matter... it is how they are expressed!
- For genes to be exposed properly, the chromosome has to be unwound and opened up like a flower!
- Blemishes on the flower keep it from flourishing.. When our DNA opens up and it is covered in blemishes (methylation marks) that gene cannot express itself properly which is epigenetic silencing!

Epi-Genetics

- Chemical markers are methyl groups in the hippocampi- adhere to specific genes that are supposed to govern the activity of the stress hormone! Chemical markers disable the genes that regulate the stress response

Scenario

Brain Development

- When a young child faces emotional adversity or stressors, cells in the brain release a hormone that actually shrinks the size of the brain's developing hippocampi altering the child's ability to process emotion, memory and manage stress!
- The higher the ACE, the smaller the cerebral gray matter or brain volume in the PFC, amygdala and sensory association cortices and cerebellum. Frontal regions are also underactive making individuals hyperactive to very small stressors.

Microglia Cells

- Early unpredictable chronic adversity triggers a process of low grade inflammation within the brain itself!! We thought the brain to be immune privileged. But under chronic stress the brain creates a state of neuro inflammation- due to non-neuronal cells- microglia which make up 1/10 of our brain cells. These play an integral role in pruning brain neurons in development! They do not like chronic unpredictable stress and they go off kilter and crank out neuro chemicals that lead to neuro inflammation leading to changes in the brain circuitry that can reset the brain for life! In some cases they kill healthy cells

Adolescent Brain Development

- When children come into adolescence they go through a natural period of developmental pruning of neurons. When we are very young, we have an over production of neurons and synaptic connections. Some of these die off naturally to allow us to turn down the noise in the brain to increase our mastery skills that interest us. The brain prepares for becoming more specialized at the things we are good at and interest us- but if due to childhood stress lots of neurons and synapses have been pruned away, then when the natural pruning that occurs during adolescence begins to take place, and the brain begins to prune away naturally neurons it doesn't need, - then suddenly there may be too much pruning! Excess pruning in the integrated areas and circuitry between the hippocampi, corpus collosum, PFC, and amygdala- these brain changes have a profound effect on self-regulation, attention, thoughts and behaviors. The chaotic exposure of microglia cells runs havoc and leads to a reset tone in the brain.

Brain Aligned Strategies

- Brain Aligned Strategies for Emotional Regulation/ Connection and Behavior
- 1. Manage our brain states
- 2. Left eye to left eye/ Soothing tone
- 3. If you lose it – apologize right away! Explain in that 90 second window
- 4. Amplify the good feelings/ notice what is going right and well! Help students to keep a positive image in their minds for 30 seconds to increase its encoding in the brain.
- 5. Power of the 20 second hug.
- 6. Give a name to difficult emotions (What you can name you can tame!)
- 7. Establish a safe place in your mind- pendulation
- 8. My wise self- a conversation with yourself! Mental imagery fools the brain into thinking we are doing actually what we are thinking about!
- 9. Hug yourself tight and then let yourself shrink down to an inch and land in your heart.
- 10. 2 by 10
- 11. Give affirmations for mistakes
- 12. Know your triggers

Brain Aligned Strategies

- Know your coping strategies
- 14. Noticing sheet
- 15. Take your order
- 16. Gratitude/ Write three things that went well and why they went well(sticky exercises)
- 17. Active Constructive Exercise- Get the student to relive the experience- “I’ve seen your work, now tell me where you were when this happened, who was with you, how did it feel?”
- 18. A question for educators in the midst of conflict, chaos or negative emotion- Not What should I do? BUT How can I be?
- 19. Tapping
- 20. Bi-Lateral Scribbling
- 21. Animal Totems
- 22. Focused Attention Practices
- 23. TRE
- 24. Pictures/ Art
- 25. Take Notes or Journal in Pictures!
- “When you hold me like this, it makes me want to fly!”
- A student
- The Key to the success of any educational experience is to get to the cortex!
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Resources

- Journal of Public Health/ Oxford/ August 30, 2014. Measuring Mortality and the Burden of Adult Disease associated with Adverse Childhood Experiences in England.
- University of Cambridge researchers: N. D. Walsh, T. Dalgleish, M. V. Lombardo “General and Specific Effects of Early Life Psychosocial Adversities on Adolescent Gray Matter Volume, “NeuroImage: Clinical 4 2014.
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- “Chronic Stress and Age Related Increases in the Proinflammatory Cytokine IL-6 Proceedings of the National Academy of Sciences of the United States of America, 100, no. 15 (July 22 , 2003).
- “Child Abuse, Depression, and Methylation of Genes Involved with Stress, Neural Plasticity and Brain Circuitry,” Journal of the American Academy of Child and Adolescent psychiatry, 53, no. 4 (April, 2014).
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