

Adversity!

The Brain, Behavior, and Learning

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- Revelations in
Education
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- Connection + Purpose =
Well-Being

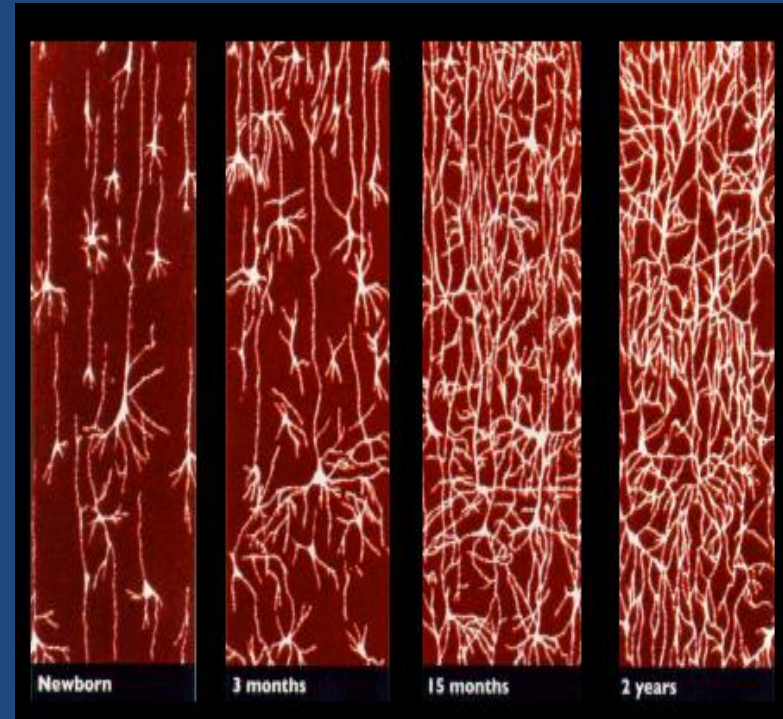


The New Learning Disability

- 25% of our students are walking into our classrooms carrying in anxiety
- When we are anxious WM shuts down
- Salient Peer Group
- 8-25- forming an identity
- ADD and PTSD
- Most negative behavior arises from a stress response
- All students will always choose to act misbehaved before they act stupid?
- All Behavior is communication

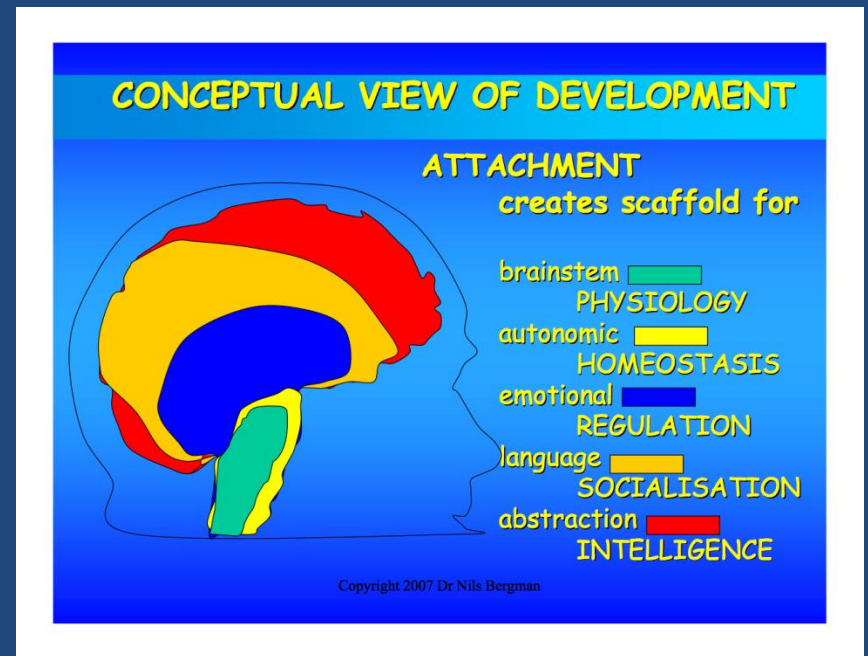
Brain Development

- Neuroplasticity
- Last trimester to two years-greatest time of brain development
- BDNF- Provides protection to the hippocampus/ activating NB
- 1 billion synapses in a cubic centimeter of brain tissue in early development



Layers of Early Development

- Attachment
- Regulation
- Affiliation
- Cognition



Oxygen Masks/ We're Flying in High Altitudes!

- Instead of asking, “What is wrong with this student?” We want to ask, “What happened to this student? What is the story of this student? ”
- Educational Neuroscience
- Brain is built for connection, survival, emotions and learning!
- Social Organ
- Survival Brain can look selfish, disrespectful, aloof, hostile, and violent.



Stress/ Adversity

- Neuro-anatomy
- Everything is perception!
- Survival Brain
- Chronic Stress changes the brain!
- Early experiences have a far greater impact than later ones!
- Impact of Stress/ Our personal relationship with stress
- Modern society mass produces disconnected children – our nuclear family is much smaller and peers, social media and being isolated account for 93% of our interactions...

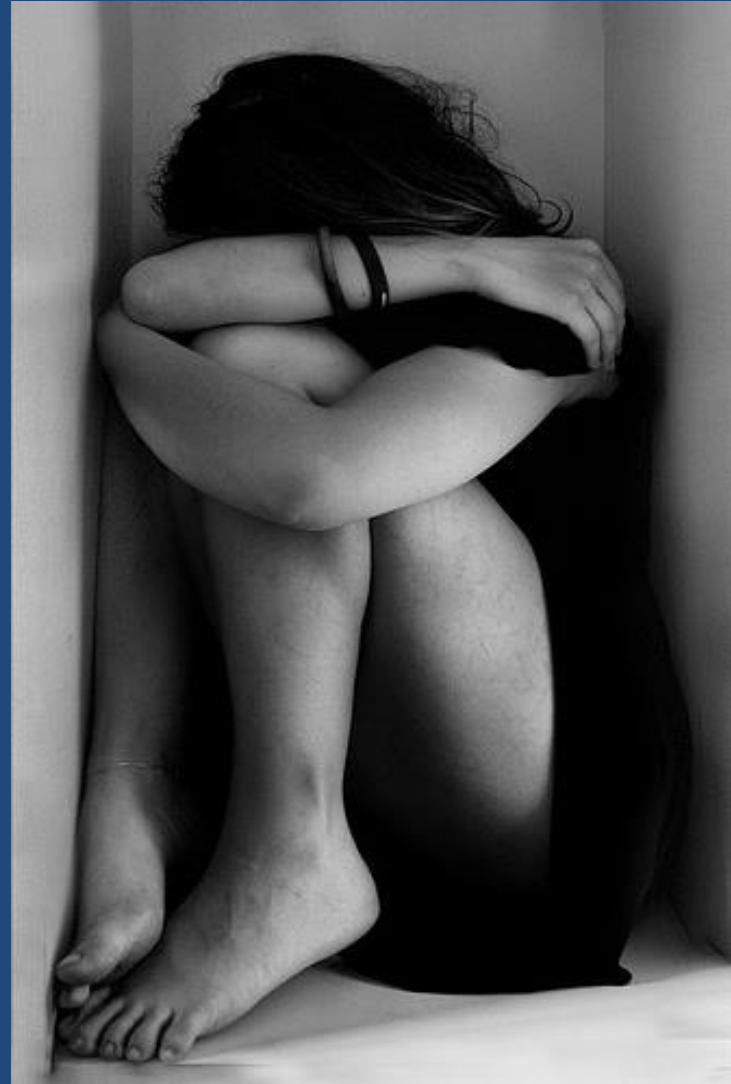
Brain Architecture

- If you lack a deep memory of feeling safe and loved, the receptors in the brain that respond to human kindness fail to develop!
- If we feel safe and loved, our brain specializes in collaboration, play and cooperation.
- If we are constantly feeling unloved and unsafe, then our brain specializes in managing feelings of fear and abandonment



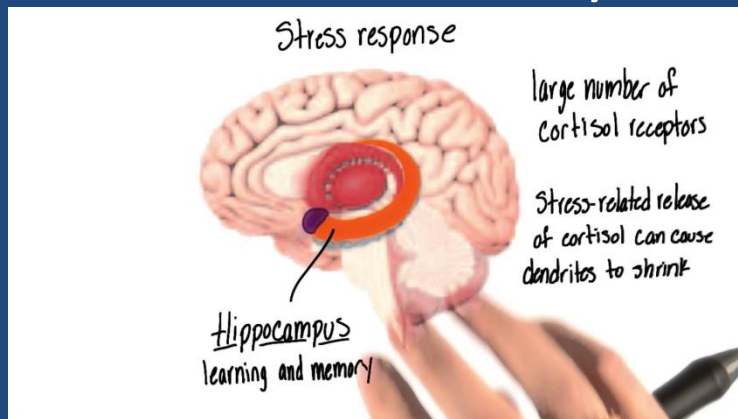
Survival Brain

- When we are living in survival mode, with our stress response turned on all the time, we can really focus on only three things!
- Body: Am I ok?
- Environment: Where is it safe?
- Time: How long will this threat be hanging over me?



Stress Response

- Heightened baseline of arousal
- Stress decreases volume in the hippocampus and corpus collosum
- Overproduction of neural connections associated with fear and anxiety.
- Lowers serotonin
- Few and shorter dendrites
- Irregular levels of neurotransmitters
- Affects how we think and our capacity to think
- Affects imagination and cognitive flexibility
- Without imagination there is no revisioning of the future



Stress Response

- Fundamental reorganization of how the brain manages perception.
- We have built in attachment programs that motivate us to seek out positive bonds with caring adults.
- Cognitive flexibility
- Imagination/ empathy
- We stay stuck in the fear we know
- Our rational cognitive brain only occupies about 30% of the area inside the skull.
- People carrying adversity become stuck in their growth because it is difficult to integrate new experiences.

Stress Response

- The very event that has caused so much pain becomes our source of meaning
- Children and adolescents have a tendency to superimpose the trauma on everything!
- Thalamus- the gatekeeper is gone! No activation discerning sensory integration !
- We become preoccupied with suppressing inner chaos.

Early Years

- Learn more in the first four years than any other time!
- RH- Locus of unconscious functions
- When a child is neglected, this has significant adverse effects,- organization of the developing brain.
- Without attachment , the sensory and motor systems are compromised- these are the fundamental building blocks of emotional and behavioral regulation

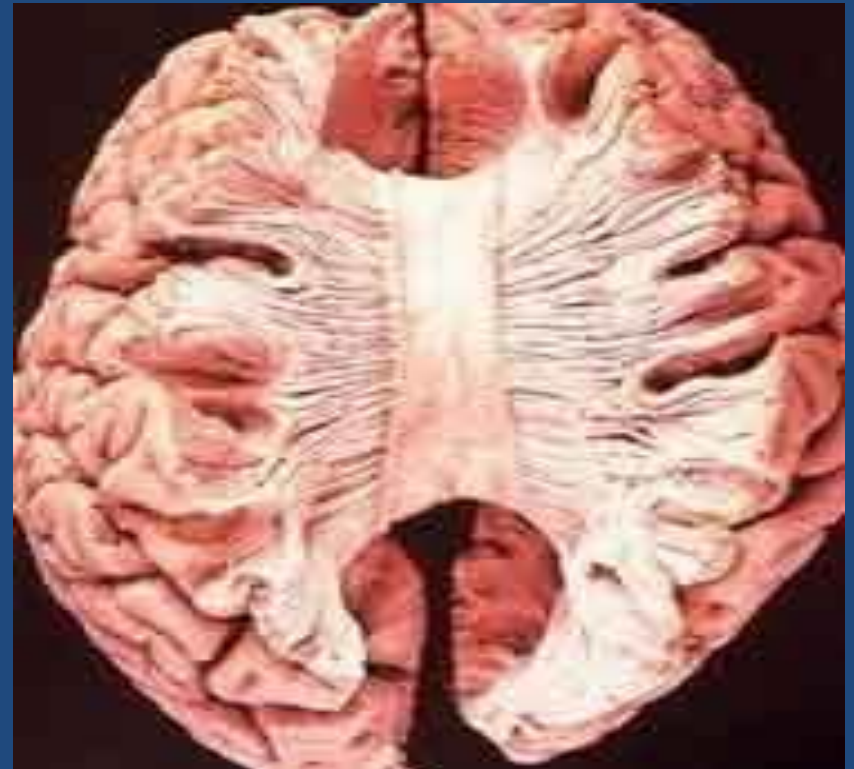
Stress Response

- HPA- two parts
- Sympathetic- comes on board first year
- Parasympathetic- Second year
- Sensory systems to thalamus (relay station) and then thalamus can shut down
- "Suppose a major traumatic stressor occurs, of a sufficient magnitude to disrupt hippocampal function while enhancing amygdaloid function. At some later point, in a similar setting, you have an anxious, autonomic state, agitated and fearful, and you haven't a clue why—this is because you never consolidated memories of the event via your hippocampus while your amygdala-mediated autonomic pathways sure as hell remember."

Steinberg calls attention to the work of Dr. J. Douglas Bremner who does research on Post-traumatic Stress Disorder (PTSD). In an [on-line article](#) Bremner writes: "Recent studies have shown that victims of childhood abuse and combat veterans actually experience physical changes to the hippocampus, a part of the brain involved in learning and memory, as well as in the handling of stress. The hippocampus also works closely with the medial prefrontal cortex, an area of the brain that regulates our emotional response to fear and stress. PTSD sufferers often have impairments in one or both of these brain regions. Studies of children have found that these impairments can lead to problems with learning and academic achievement."

Right Hemisphere!

- The right hemisphere is dominant for nonverbal, largely spatial tasks like copying designs, interpreting facial expression, mentally transforming or transferring visual images in ones' mind, intuitively appreciating geometrical designs. In addition, the right hemisphere is superior to its counterpart in expressing and appreciating emotions.

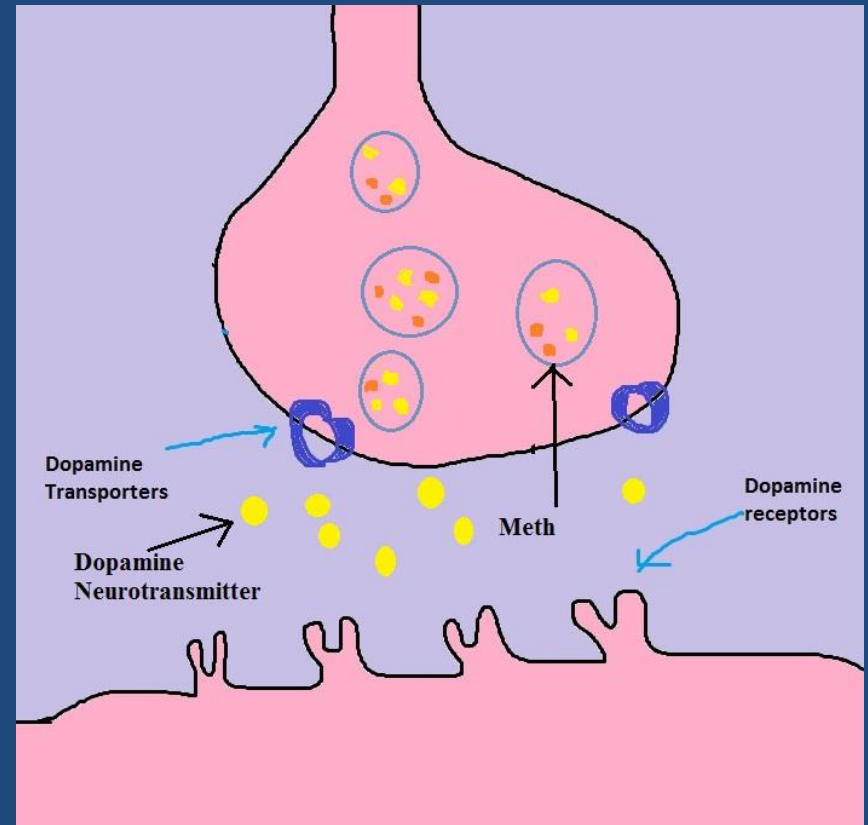


Left Hemisphere

- The left hemisphere is the speech and language maven: it handles reading, writing, and understanding spoken language. The left hemisphere is also specialized for calculation. But more important than the parceling of function is the fact that each hemisphere has its own unique consciousness."
- The right hemisphere responds to negative emotions while the left hemisphere responds to positive emotions. Regarding a stroke in the right hemisphere, Jaak Panksepp, in [*Affective Neuroscience: The Foundations of Human and Animal Emotions*](#) (1998), explains in *Affective Neuroscience* that "often patients remain cheerful despite the severity of their problems." He points out that comparable damage to the left hemisphere "can cause catastrophic emotional distress, and such patients are more prone to become despondent and depressed."

Addicted to Emotions!

- Cells will eventually require an intensity of emotion to open their receptor sites/ the body will require a greater chemical thrill to turn on the cell. For the body to become stimulated, and get its fix, we will need to get angrier, more worried, guiltier.
- When the body isn't getting its chemical emotional needs met, it will signal the brain to make more of those chemicals!



Learning!



- Neurons communicate chemically/ emotions
- Axons send messages electrically
- We learn through repetition and emotion... long term

Brain Development

- The most valuable assets for improving education will not be found in a neuro-imaging lab, but will be with educators who begin to understand the science of learning and behavior.
- Dr. Judy Willis
- Developmental plasticity- just like humans, neurons become efficient in groups.
- The most used roadways, develop the most synapses.

85% of Development in the first five years of life!

- Brains do not store ideas, facts or experiences, they store networks of perceptions.
- These perceptions are the chemical molecules that change gene expression!

"Our whole existence is based on the *vitality* and the *dynamic experiences* of our very beginning.

This period... is the foundation of our life and our experiences of our relationship to the world."

Ludwig Janus, MD

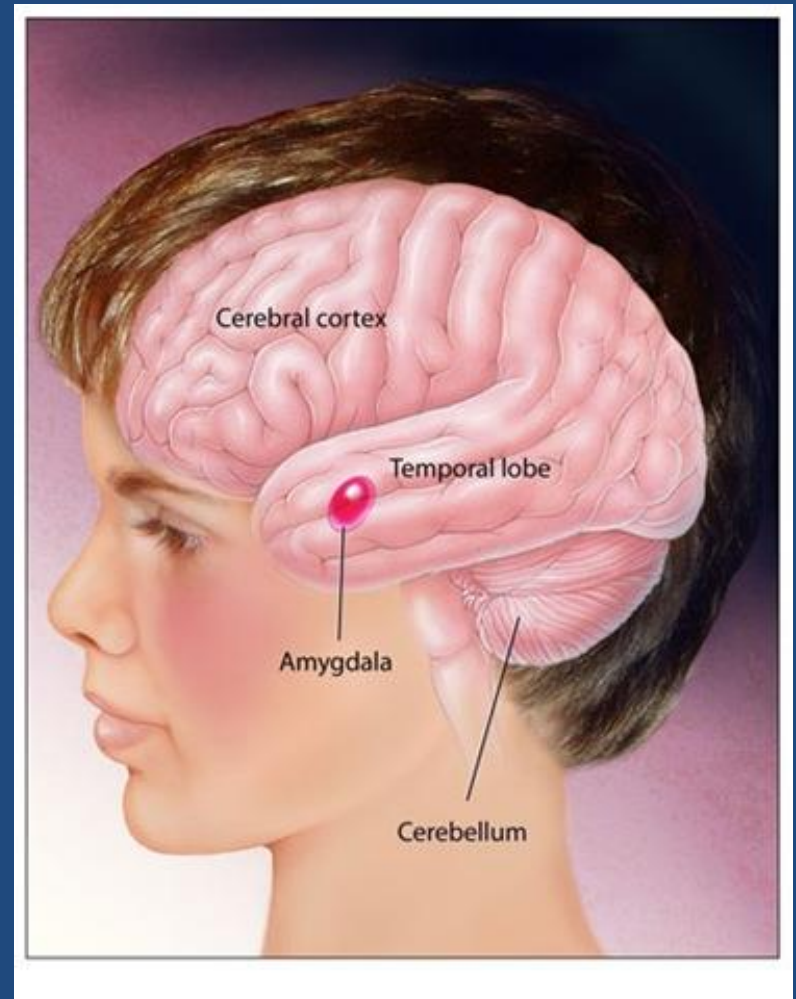
Questions that Drive Connections

- Am I important to someone here?
- Can I share my gifts with someone here?
- Can I influence my world here?
- Are my efforts recognized here?



For All Students!

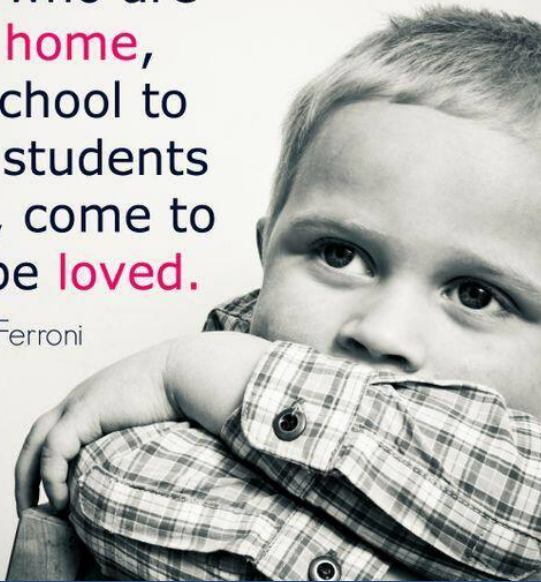
- Identify triggers
- Build on areas of Strength
- Capitalize on interests
- Capitalize on learning!
- How are you smart?



Attachment

"Students who are
loved at **home**,
come to school to
learn, and students
who aren't, come to
school to be **loved**.

~Nicholas A. Ferroni



- Attachment and the Brain
- Safety
- Emotions are contagious
- Children and youth who have experienced adversity have a higher concentration of brain cell growth in the midbrain. They are oversensitive to perceived threats and have lower levels of serotonin, which is linked to anxiety, depression, and aggression!

Neural Tissue and Teaching?

- Memory, neural tissue and development all change with patterned repetitive activity! The systems in your brain that get repeatedly activated will change. This experience-dependent development is one of the most important properties of neural tissue!
- Early experiences with others mold our world views-negative or positive! These are our memory templates.



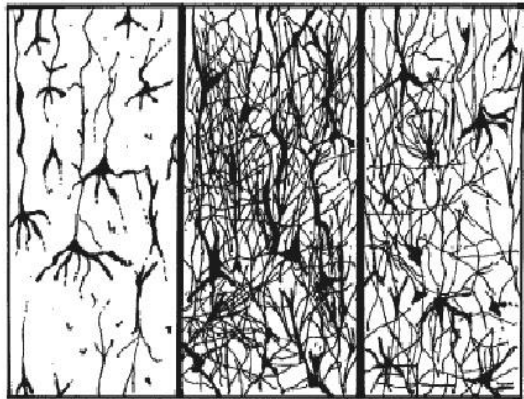
Fear and the Brain

- Fear affects all parts of the brain
- We are feeling creatures who think!
- Brain doesn't know the difference between a thought of the trauma or the actual adverse experience!
- Shame: What is this? Beneath all violence!
- We tend to prefer the certainty of misery to the misery of uncertainty! As teachers we see this and do not understand!



Synaptic Pruning/ Adolescent Brain

Synaptic Pruning



at a child's birth at 7 years of age at 15 years of age

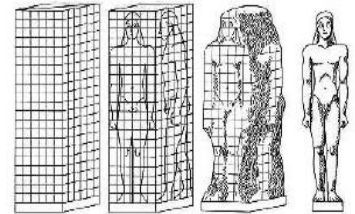
The first change after this synaptic growth spurt is a selective pruning which takes place.

In adolescence, most of this pruning is taking place in the frontal lobes.

The adolescent loses approximately 3 percent of the gray matter in the frontal lobes.

Synaptic Pruning

- Researcher Jay Giedd compares this pruning to Michelangelo with a block of marble. He begins to sculpt away until David emerges.



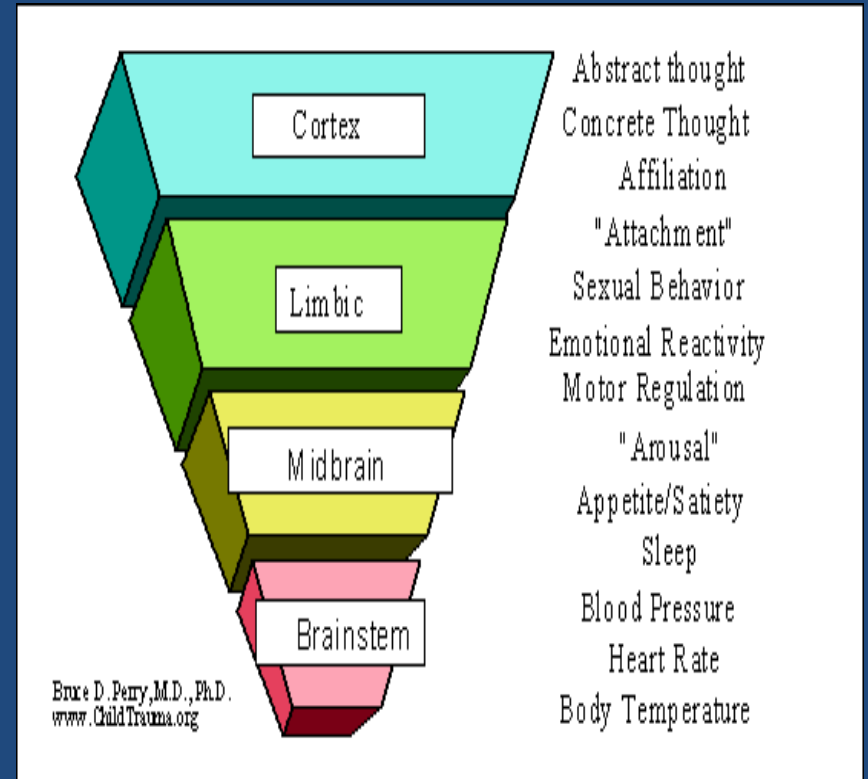
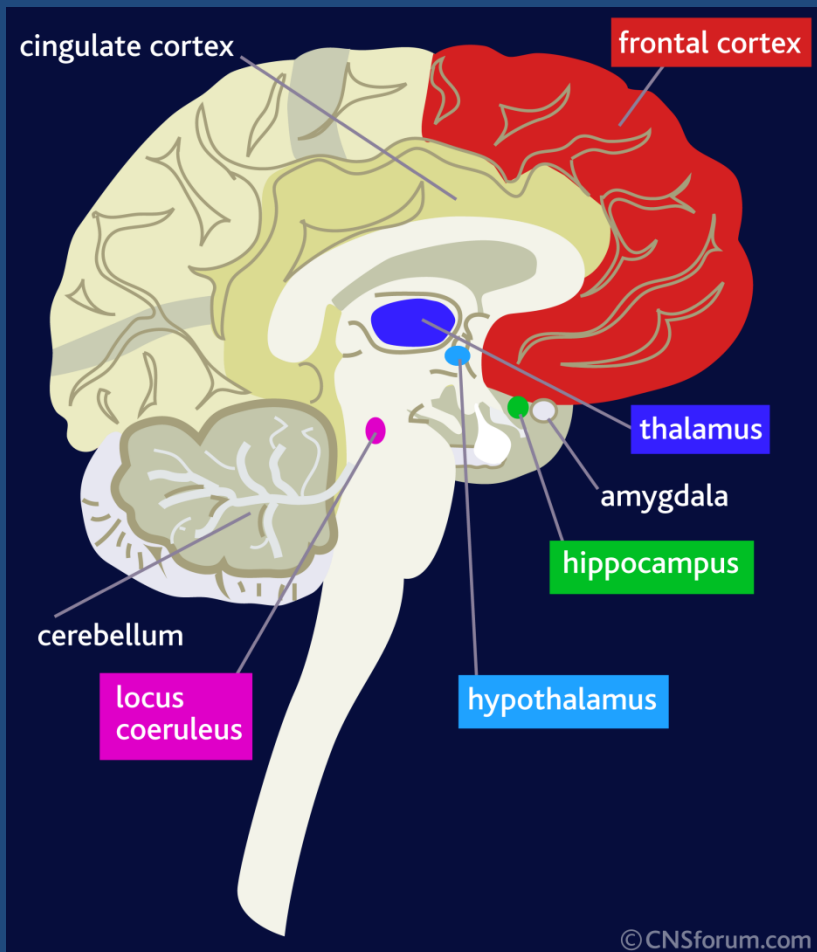
- This is precisely what is going on in the adolescent brain, starting around 11. The brain is pruning away, sculpting away excess material, excess connections, to make a more refined, more efficient, more adult brain.



Brain and Adversity

- The majority of your most difficult students have a history filled with negative experiences! School history may be filled with referrals, punitive interventions, and sustained failure.
- Environments and neurological state of mind are intimately connected
- Attachment is the carrier of all development!
- .

Development



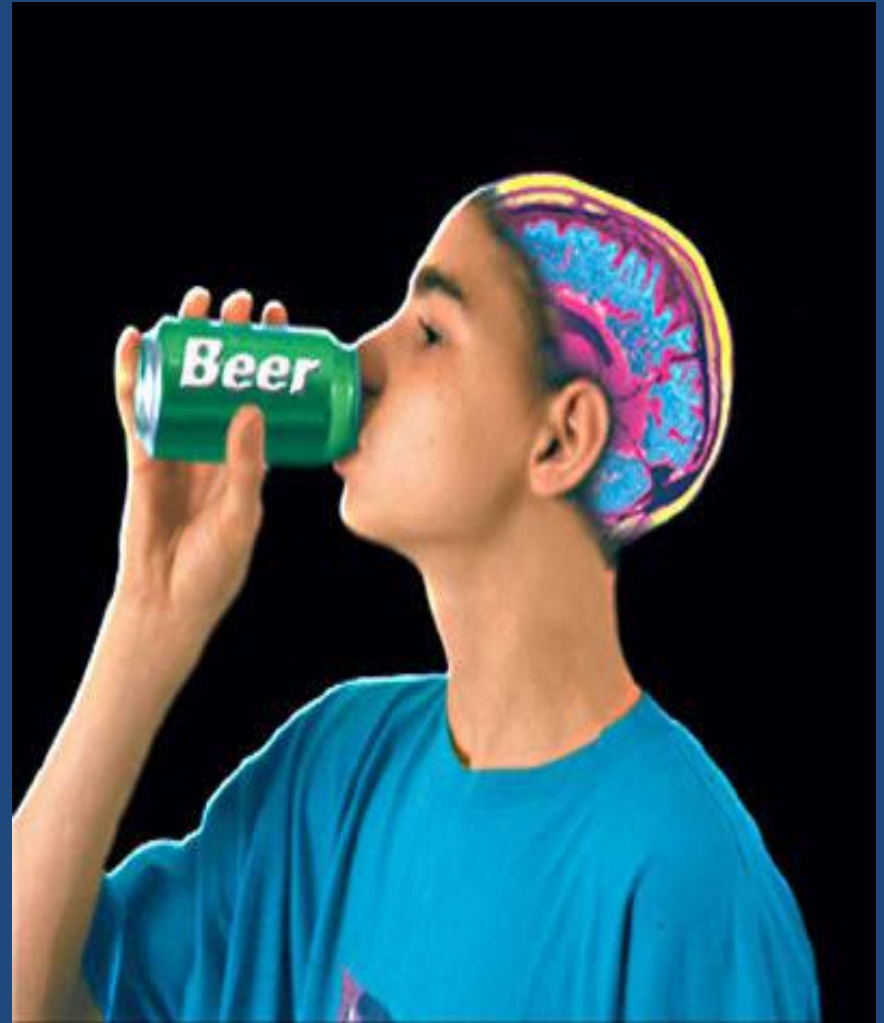
Perception

- Same thoughts
- Same choices
- Same Actions/ Behaviors
- Same Feelings
- Same brain activity which activates the same brain circuits, and reproduces the same brain chemistry in the same way.
- The same brain chemistry signals the same genes
- Same gene expression creates the same proteins, the building blocks of cells which keep the body the same as the proteins are the expression of life and health... literally!



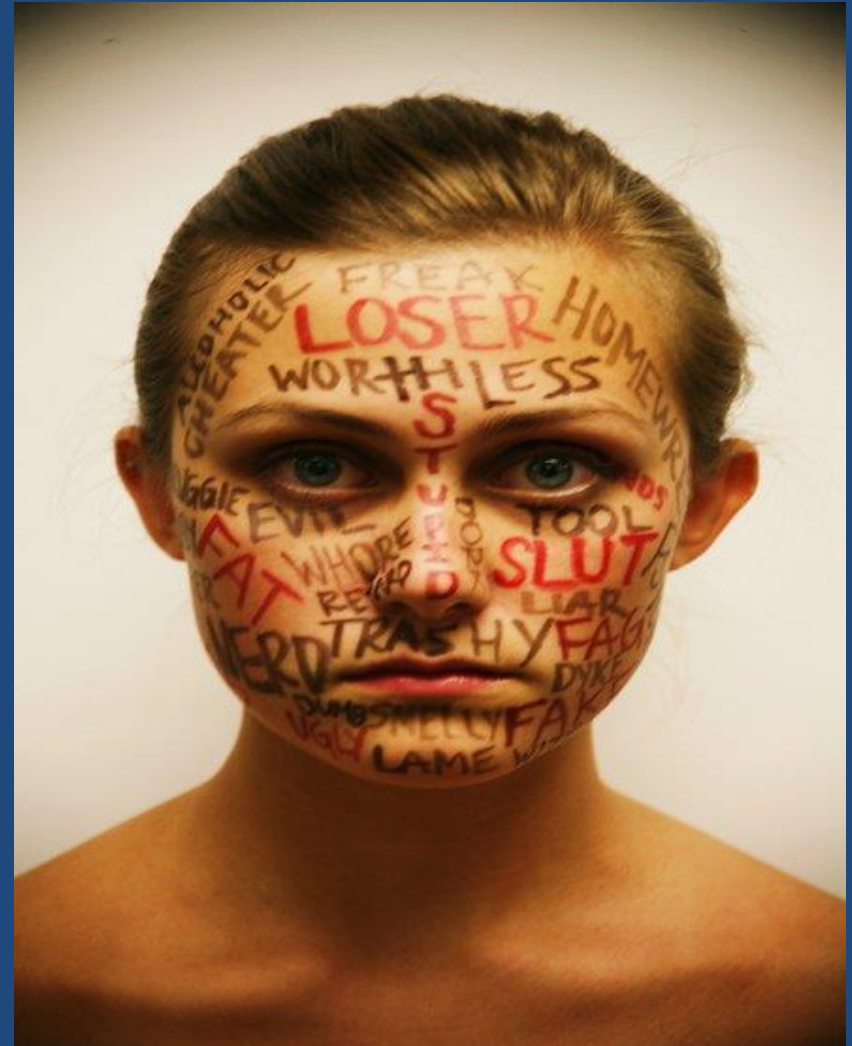
Adolescent Brain

- Increased levels of dopamine
- Lower baseline for dopamine
- Gray and white matter
- Identity
- Peers
- The third type of behavior shaped by the increased reward drives of the adolescent brain is something called *hyperrationality*. This is how we think in literal, concrete terms. We examine just the facts of a situation and don't see the big picture.
- Less serotonin and more testosterone



Identity in Adolescence

- Emotional Spark
- Social Engagement
- Novelty seeking
- Creative Explorations
- Grows from the inside out and from back to front!
- Formation of Identity!
- Connection + Purpose = Well-Being!



Connection/ Relationship

- Built in attachment programs which strongly motivate us to seek out positive bonds with caring adults!
- All behavior is communication / function
- Children and adolescents will always look misbehaved before they look stupid!



What can we do?

- Stress response changes neural circuitry
- Amygdala doesn't respond to words-feelings!
- To co-regulate is fundamental to discipline and deep understanding and behavioral changes



Discipline! A New Neural Path!

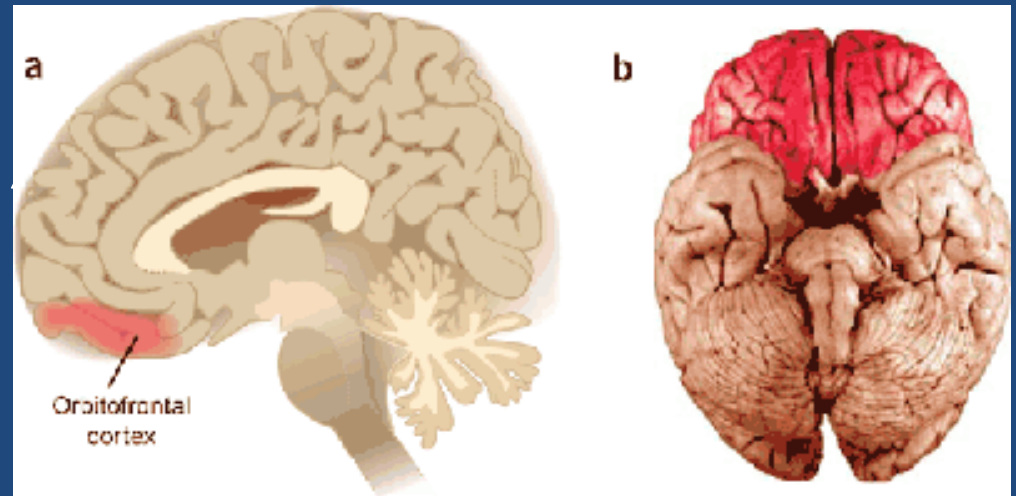
Turn Discipline into a Science!

- Movement , Space and Breath! Focused Attention Practices
- Drawing and Coloring
- Validation
- Power of Questions
- Emotional First Aid Kit!
- Choices
- Service to Another
- Connection Journals



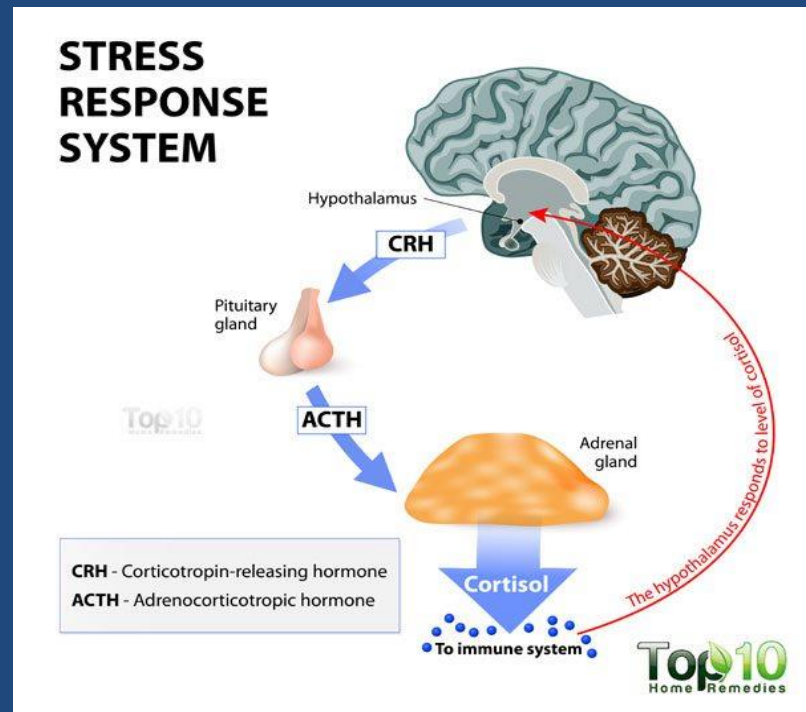
Mediators of Stress/ Adversity

- Relationships
- Two of our greatest human gifts Malleability of the brain and the power of relationships
- Adversity affects how you think and behave immune system, and the DNA function!
- Emotional Regulation
- Occurs in the Orbitofrontal (Phineas Gage)



Cortisol

- 80% of cells in our body have cortisol receptors
- Cortisol affects glucose regulation
- Inflammation
- Cognition
- Cardiovascular health
- Sleep
- When we inject cortisol, our memory and learning performance improve!
- Trauma memories are not filed in long term... they are always available on the desk top and this is what is so difficult!



Movement/ Arts and Adversity

- Children struggle with identity (shame, guilt and self blame)
- Development of right brain suffers because this is the body, mind self awareness
- Right Amygdala- constantly scanning for danger- information not associated with danger is dismissed!
- Pain and fear reduce serotonin levels!
- RH- focuses on movement , play art and the sensory nonverbal.
- The left hemisphere comes on board when there is attachment, a serve and return and the lower systems begin to self organize and develop affecting the higher cortical pathways.
- “You are not a bad kid Thomas, you are behaving in ways that you learned to survive!”

Attachment

- This is the core and context for growth of the nervous system!
- RH to RH- left eye to left eye!
- In the first year of life, emotional communication is foundational and the essential task of living and thriving and surviving!
- In the classroom, when we are :
 - Predictable
 - Emotionally available
 - Consistent we are assisting in the development of brain growth!
 - The more emotions a child is exposed to the broader the ability to empathize!

Head Quarters!

- Core Memories?
- Train of Thought?
- Islands of Personality!
- Emotional Contagion
- Forced Success
- Dual Thought Sheets
- Stories/ Nellie
- Hero's Journey



Strategies

- ❖ Teach students about their brain's neuroplasticity
- ❖ Routines and rituals- change them up/ Bell Work
- ❖ Notice Everything
- ❖ Create class guidelines (agreements) together and change them often!
- ❖ Stories, Images
- Everyone will get what they need!
- Co-Teach and Co-Design Lessons
- Validation and the power of Questions
- What homework did you do for your students this week?
- Focused Attention Practices

Depression and Anxiety

- These are more about future events than past or present because trauma and adversity is on the desktop not buried away! Everything is about surviving in the future...
- Our emotional communications shape our ability to regulate!
- In adversity the VMPPRC is often under responsive and this structure is what turns off the Dorsal Raphe Nucleus which is what triggers anxiety and panic!
- Serotonin
- Depression
- Smaller in size

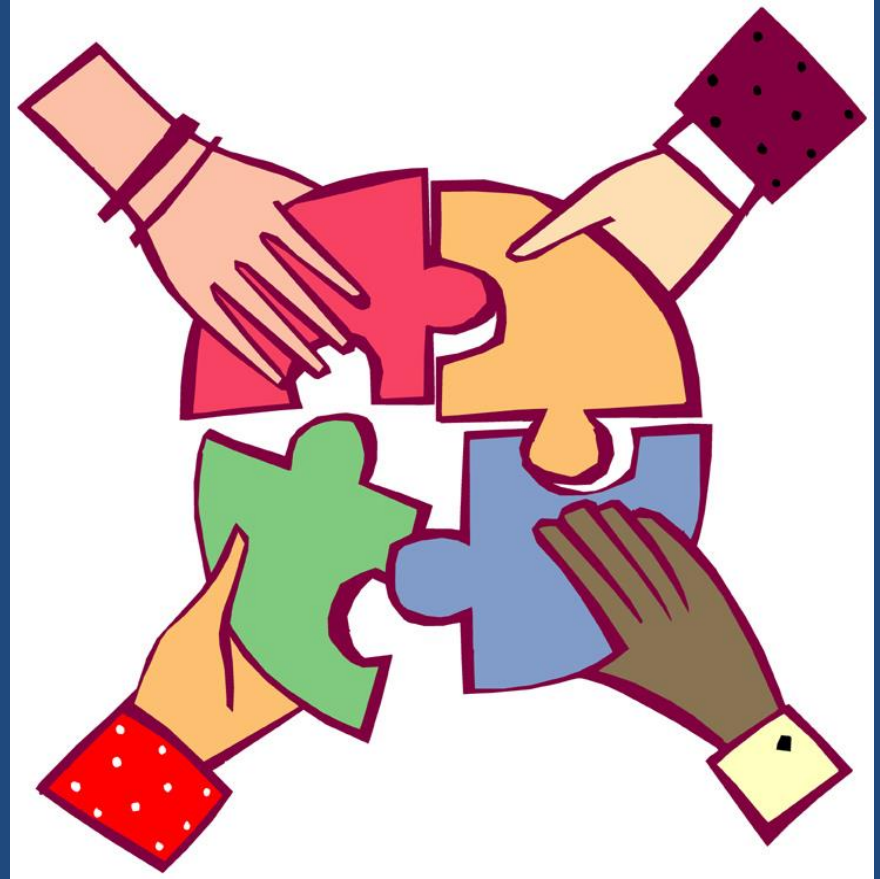
Questions and Validation

- How can I help?
 - What do you need?
 - What can we do to make this better?
 - QUESTIONS FOR LATER
 - What are your resources?
 - What feels difficult?
 - What could be the best possible outcome?
 - What is the worst thing that could happen?
 - What is a first step in improving this situation?
- That must have made you feel really angry.
 - What a frustrating situation to be in!
 - It must make you feel angry to have someone do that.
 - Wow, how hard that must be.- That's stinks!-
 - That's messed up!
 - How frustrating!
 - Yeah, I can see how that might make you feel really sad.
 - Boy, you must be angry.
 - What a horrible feeling.
 - What a tough spot.
 - I hear you.
 - I hear that.
 - Other...

Level the playing field!!

Dual Thought Sheets

- What is our challenge?
- What led up to this challenge?
- How did we handle this together and /or apart?
- Could we have prevented this problem?
- What are two adjustments we will make the next time?



Strategies

- Take your order
- Brain Lab
- Regulation Room
- Amygdala First Aid Station
- Teachers and students
- I will work for you!

A photograph of a restaurant guest check with handwritten text. The check is titled "Guest Check" and has fields for "TABLE NO.", "PERSONS", "SERVER NO.", and "CHECK NO.". The "CHECK NO." field contains the handwritten number "4114-1". Below these fields is a line for "BEV • APPET • SOUP/SALAD • ENTREE • VEG • DESSERT". The main body of the check is a grid where the following text is written in cursive: "to know & tell me when you see me trying!", "to notice when I am feeling frustrated give me a break!", and "let me go to the bathroom one more time!". At the bottom of the grid are fields for "TAX", "TOTAL", and "Thank You -- Call Again". Below the grid is a line for "A.M.O.U.N.T." and a table with columns for "PERSONS", "DATE", "CHECK NO.", and "AMOUNT". The "CHECK NO." column contains the handwritten number "4114-1".

Guest Check			
TABLE NO.	PERSONS	SERVER NO.	CHECK NO.
			4114-1
BEV • APPET • SOUP/SALAD • ENTREE • VEG • DESSERT			
to know & tell me when you see me trying!			
to notice when I am feeling frustrated give me a break!			
let me go to the bathroom one more time!			
TAX			
TOTAL			
Thank You -- Call Again			
A.M.O.U.N.T.			
PERSONS	DATE	CHECK NO.	AMOUNT
		4114-1	

Strategies

- Backward Brain Bike
- Location Location
- Images
- Stories
- Questions Inside Out
- Dual Thought sheets
- Noticing
- Tribal Family
- Bus Drivers
- Serving another at the beginning of the day!
- Noticing!
- 2x10 Strategy
- Above or below the Line
- Maslow Hierarchy/ brand new!!!

Connect with me!!!

- To understand our neurobiology is to know the secret of life!
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- www.revelationsineducation.com
- Desautels_phd - twitter handle

"Who are YOU?" said the Caterpillar.

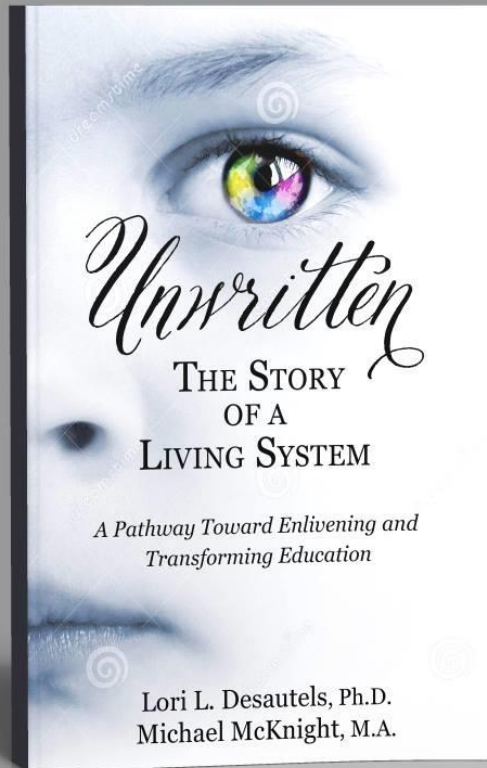
This was not an encouraging opening for a conversation.

Alice replied, rather shyly,

"I-I hardly know, sir, just at present - at least I know who I WAS when I got up this morning, but I think I must have been changed several times since then."

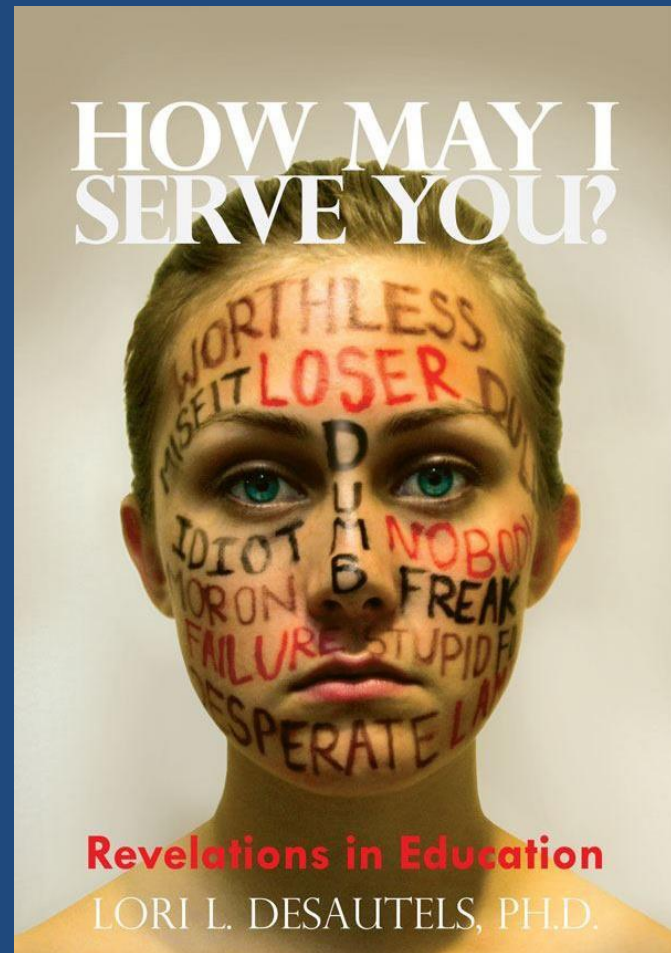
- Alice's Adventures in Wonderland, Lewis Carroll

Thank you!!!!



Lori L. Desautels, Ph.D.
Michael McKnight, M.A.

Michael McKnight, M.A.
Lori L. Desautels, Ph.D.



HOW MAY I SERVE YOU?

Revelations in Education

LORI L. DESAUTELS, PH.D.