Adversity!
The Brain, Behavior, and Learning

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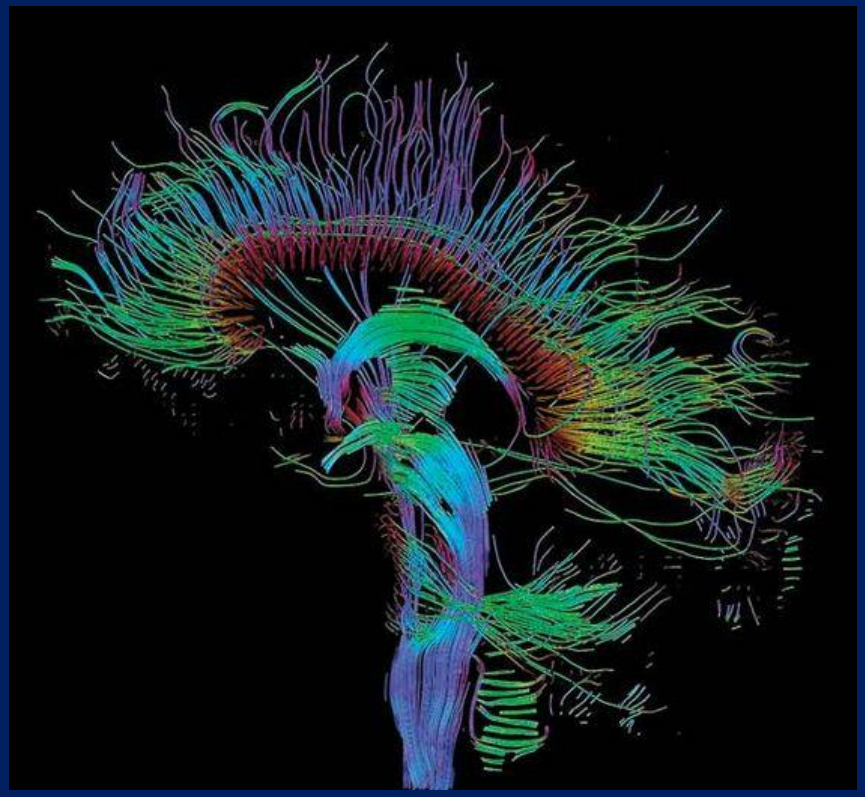
Revelations in Education
Desautels_phd
Connection + Purpose = Well-Being

Applied Educational Neuroscience/ Brain and Adversity

- Framework and not a program
- Teacher Brain State

- This framework encompasses engagement, attachment, regulation, and the natural ways the brain feels, behaves and learns.



Educational Neuroscience Framework

Wellness = Connection+ Purpose

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Restorative Justice

Relationships And Engagement

Academics

Discipline

Positive Behavioral Intervention And Supports (PBIS)

Collabora
for Socia
Academi
And
Emotiona
Learning
(CASEL)

-Aligned Strategies

Educational Neuroscience

Stress Response

Neuro-anatomy

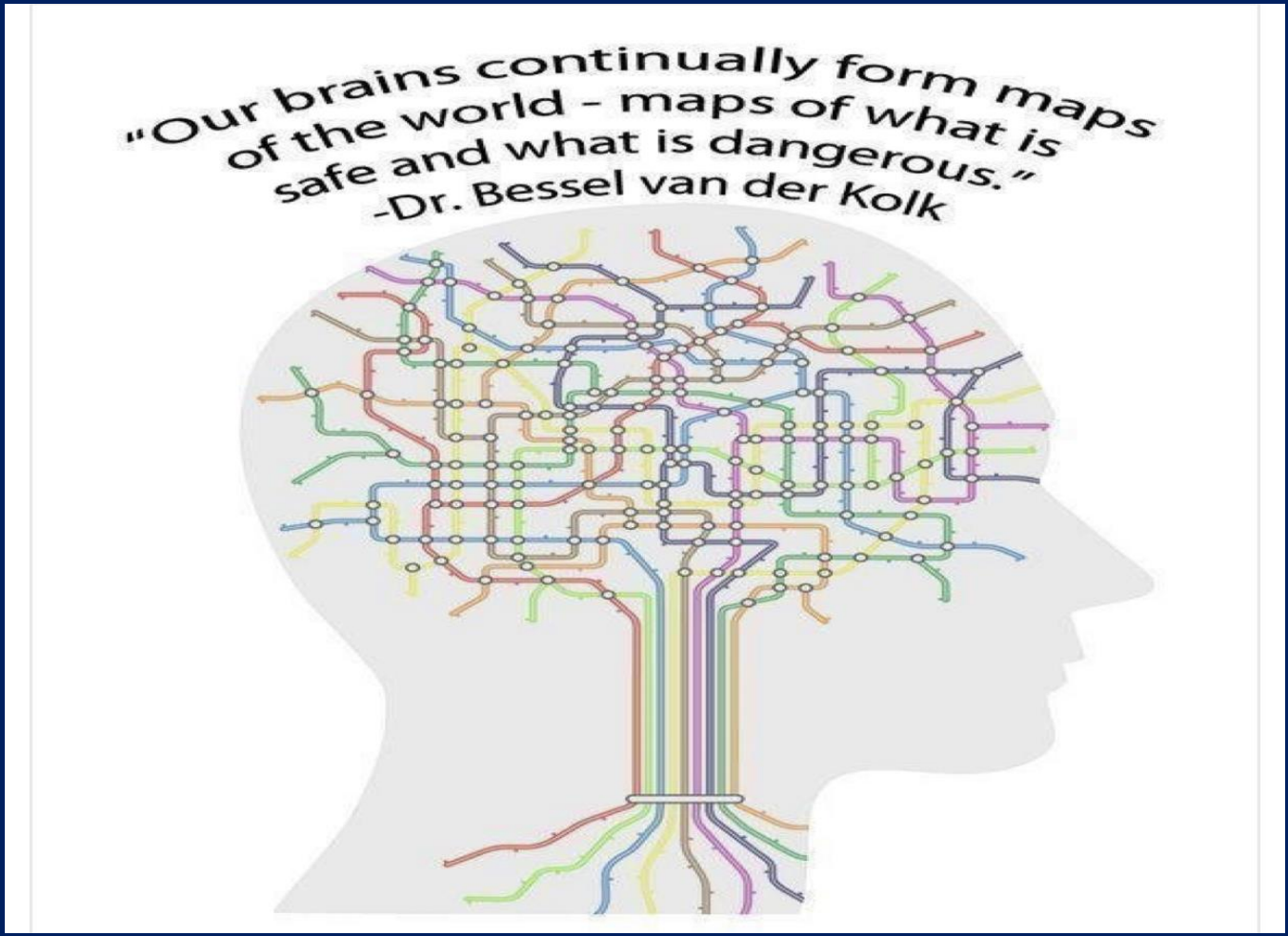
Neuro-plasticity

Self-regulat

Framework and Discipline
Applied Educational Neuroscience

- Brain's regions and connectivity/ we meet students where they are.
- This is not a DISORDER but a REORDERING of neural networks
- Achievement Gaps can be Adversity Gaps

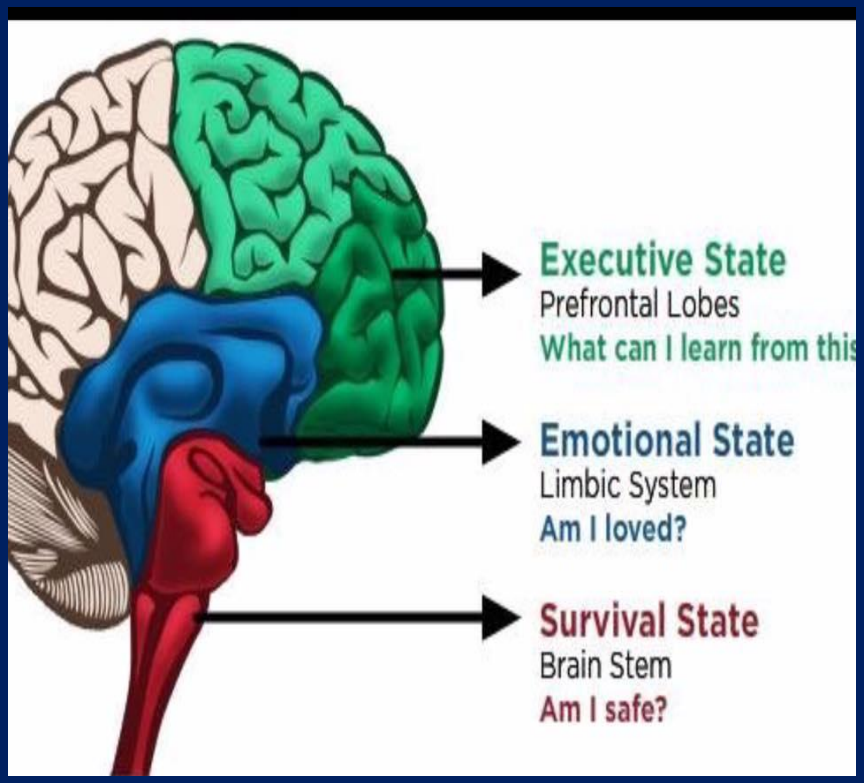
We Are Memory Templates!



Applied Educational Neuroscience

- Educator Brain State
- Teaching staff and students about their neuro-anatomy
- Regulation/ Co-regulation of the nervous system
- Attachment/ is the carrier of all development
- Use the language of science

Survival Brain



- Am I safe? Who Can I Trust?
- When will this be over?
- Am I felt?
- What can I learn?
- Anxiety can be a result of:

1. Genetic factors
2. Psychological process/ Perceptions and cognitive Belief Systems
3. Experiences

- No sense of self- no emotion
- Fear is the awareness that we are in danger!!

Our Children and Youth

- One in 5 youth have or will have a serious mental illness
- At least 50% of those get no treatment
- By 2030 the World Health Organization states that depression will be the number one global health risk
- An NIH study found that 25.1% of kids 13-18 in the US have been diagnosed with anxiety disorders
- Suicide is the 3rd leading cause of death in youth ages 10-24
- School is “defacto” MH provider
- Juvenile Justice system is next level of system default
- Adverse Childhood Experiences (ACES) (NAMI, 2016 & NIMH, 2016)

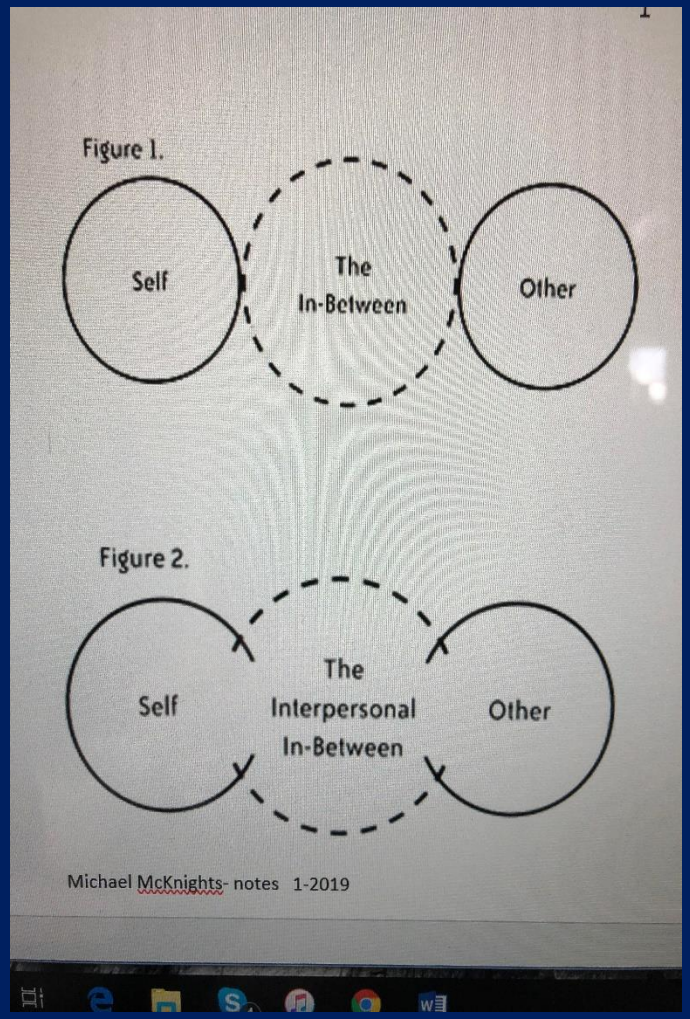
- Students who attend school from kindergarten through secondary school typically spend more than 13,000 hours of their developing brain’s time in the presence of teachers.

- Their brains are highly susceptible to environmental influences – social, physical, cognitive, and emotional. And, more important, their brains will be altered by the experiences they have in school.
- (Eric Jensen, Teaching With the Brain in Mind, 2nd Edition)

Our Current Mental Health and Challenges

- A National Institute of Health study found that 25.1% of kids 13-18 in the US have been diagnosed with anxiety disorders
- • Depression increased by 21% between 2012-2015 for boys and 50% for girls (Twenge, J., 2017)
- • According the Department of health and Human Services, 56% more teens experienced a major depressive disorder in 2015 than 2010 (60% experienced sever impairment)
- By 2030 the World Health Organization states that depression will be the number one global health risk
- • In 2015, 29.3% of Indiana students reported feeling sad or hopeless (cdc, 2015) and 19.8% of Indiana high school students seriously considered suicide (3rd highest rate in the nation) (ISDH, 2015)

The Interpersonal In Between



- Relational Practice is where growth occurs
- Connections are the foundation of life… you would not be here without a connection
- If we work with students to form alternative templates and maps, they will have different experiences.

An Invisible Reordering!

- If you notice the two people sitting next to you, you see them, but you don't know their story!
- Our early emotional stories determine the body and brain's operating system and how well they will be able to guard our physical and emotional health for all our lives!

Describe Your Community

- Touch Points
- Regulation
- Educator Well-Being

ACE Study

American Journal of Preventive Medicine 1998;14:245-258

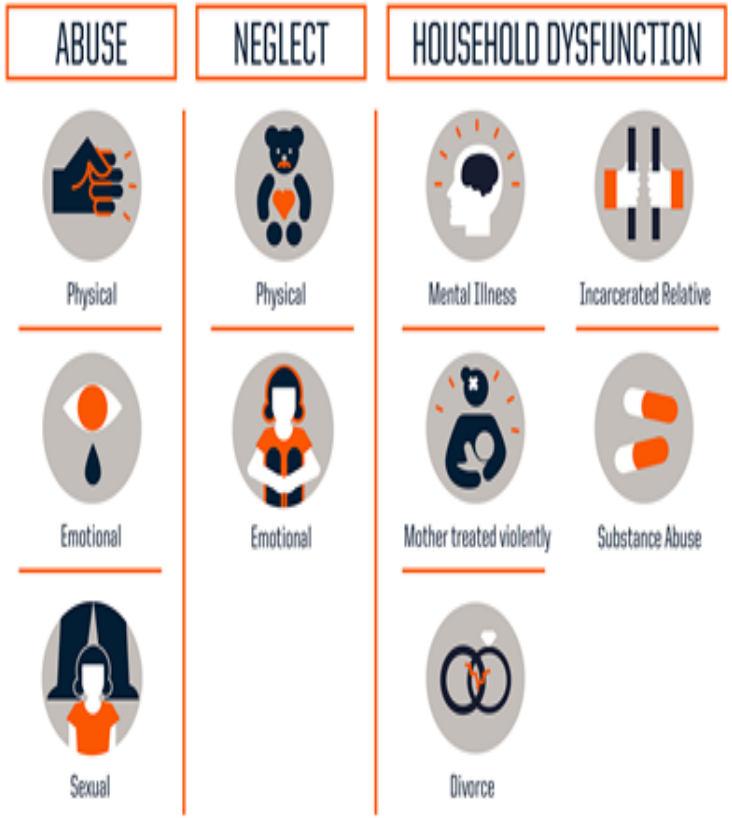
Research Article

Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults

The Adverse Childhood Experiences (ACE) Study

Vincent J. Felitti, MD, FACP, Robert F. Anda, MD, MS, Dale Nordenberg, MD, David F. Williamson, MS, PhD, Alison M. Spitz, MS, MPH, Valerie Edwards, BA, Mary P. Koss, PhD, James S. Marks, MD, MPH

Categories of ACEs from Felitti and Anda

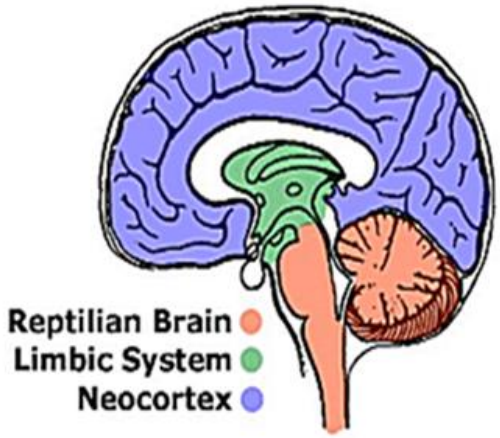


Possible Risk Outcomes from ACEs

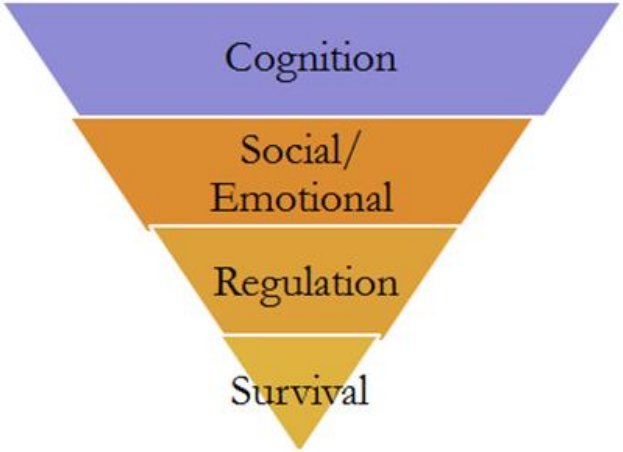
New Ace Study!

- Prevalence of Adverse Childhood Experiences From the 2011-2014 Behavioral Risk Factor Surveillance System in 23 States
- MelissaT.Merrick,PhD;DerekC.Ford,PhD;
- KatieA.Ports,PhD; AngieS.Guinn,MPH
- Early adversity is associated with leading causes of adult morbidity and mortality and effects on life opportunities.
- OBJECTIVE To provide an updated prevalence estimate of adverse childhood experiences (ACEs)in the US in a large, diverse, and representative sample.
- DESIGN,SETTING,AND PARTICIPANTS Data were collected through the Behavioral Risk Factor Surveillance System(BRFSS) ,an annual nationally representative telephone survey on health-related behaviors, health conditions, and use of preventive services, from January1, 2011, through December31, 2014. Twenty-three states included the ACE assessment in their BRFSS. Respondents included248, 934 noninstitutionalized adults older than 18 years. Data were analyzed from March15 to April 25,2017.

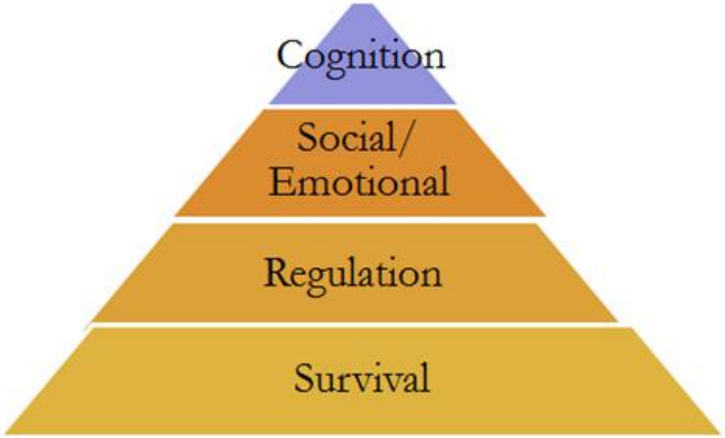
Social and Emotional Health Carry Cognitive Health!



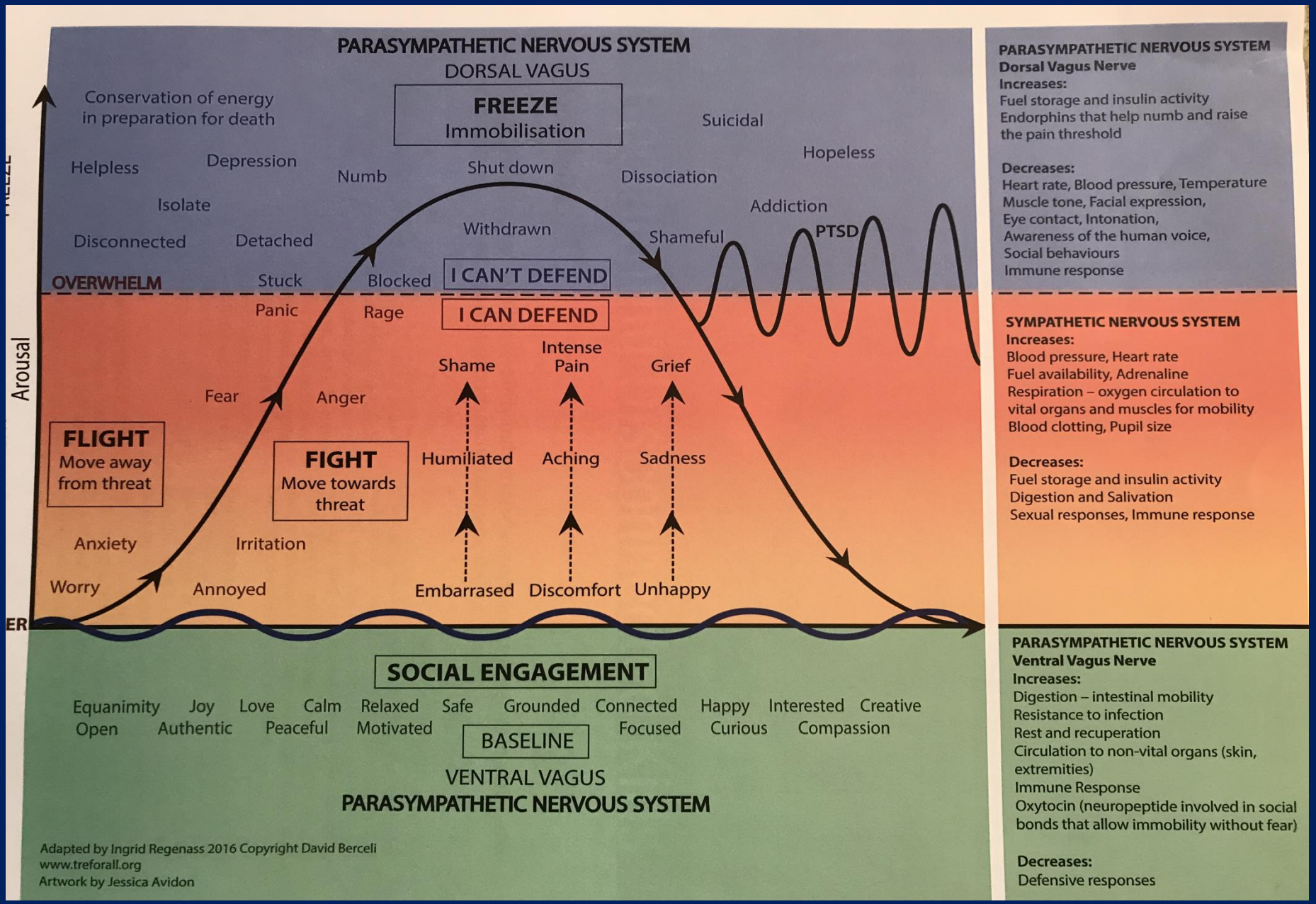
Typical Development



Developmental Trauma



Adapted from Holt & Jordan, Ohio Dept. of Education


PARASYMPATHETIC NERVOUS SYSTEM
DORSAL VAGUS
Conservation of energy in preparation for death
FREEZE
Immobilisation
Suicidal
Hopeless
Helpless
Depression
Numb
Shut down
Dissociation
Isolate
Addiction
Disconnected
Detached
Withdrawn
Shameful
PTSD
OVERWHELM
Stuck
Blocked
I CAN'T DEFEND
Panic
Rage
I CAN DEFEND
Arousal
Intense Pain
Shame
Grief
Fear
Anger
FLIGHT
Move away from threat
FIGHT
Move towards threat
Humiliated
Aching
Sadness
Anxiety
Irritation
Worry
Annoyed
Embarrased
Discomfort
Unhappy
SOCIAL ENGAGEMENT
Equanimity Joy Love Calm Relaxed Safe Grounded Connected Happy Interested Creative
Open Authentic Peaceful Motivated Focused Curious Compassion
BASELINE
VENTRAL VAGUS
PARASYMPATHETIC NERVOUS SYSTEM
Adapted by Ingrid Regenass 2016 Copyright David Berceli
www.treforall.org
Artwork by Jessica Avidon
PARASYMPATHETIC NERVOUS SYSTEM
Dorsal Vagus Nerve
Increases:
Fuel storage and insulin activity
Endorphins that help numb and raise the pain threshold
Decreases:
Heart rate, Blood pressure, Temperature
Muscle tone, Facial expression,
Eye contact, Intonation,
Awareness of the human voice,
Social behaviours
Immune response
SYMPATHETIC NERVOUS SYSTEM
Increases:
Blood pressure, Heart rate
Fuel availability, Adrenaline
Respiration – oxygen circulation to vital organs and muscles for mobility
Blood clotting, Pupil size
Decreases:
Fuel storage and insulin activity
Digestion and Salivation
Sexual responses, Immune response
PARASYMPATHETIC NERVOUS SYSTEM
Ventral Vagus Nerve
Increases:
Digestion – intestinal mobility
Resistance to infection
Rest and recuperation
Circulation to non-vital organs (skin, extremities)
Immune Response
Oxytocin (neuropeptide involved in social bonds that allow immobility without fear)
Decreases:
Defensive responses

Three Types of Stress

Brief increases in heart rate, mild elevations in stress hormone levels

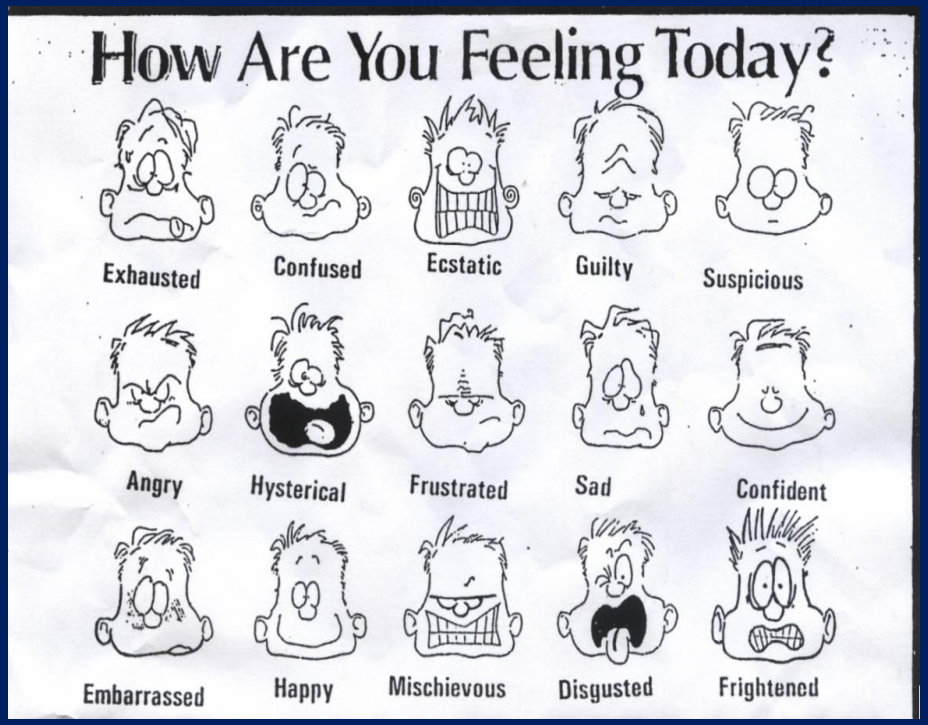
Serious, temporary stress responses, buffered by supportive relationships.

Prolonged activation of stress response systems in the absence of protective relationships.

Amygdala's Language

- Feelings!
- Two Ways to Calm the Amygdala!

- What are they?
- Discuss!



CALMING THE BRAIN

The Science Behind Exercise (all in a single workout!!!)

Exercise changes **Brain Anatomy, Physiology and Function**

Increases levels of neurotransmitters (***seratonin*** and ***noradrenaline***) that are decreased in depression **(MOOD)**

Increases the number of neurotransmitters (***dopamine***) that gives you that feeling of reward

Stimulates the birth of brain cells in the hippocampus **(MEMORY)**

Increases ability to *focus* & *shift* attention **(ATTENTION) lasts 2 hrs!**

20 Minutes of Exercise

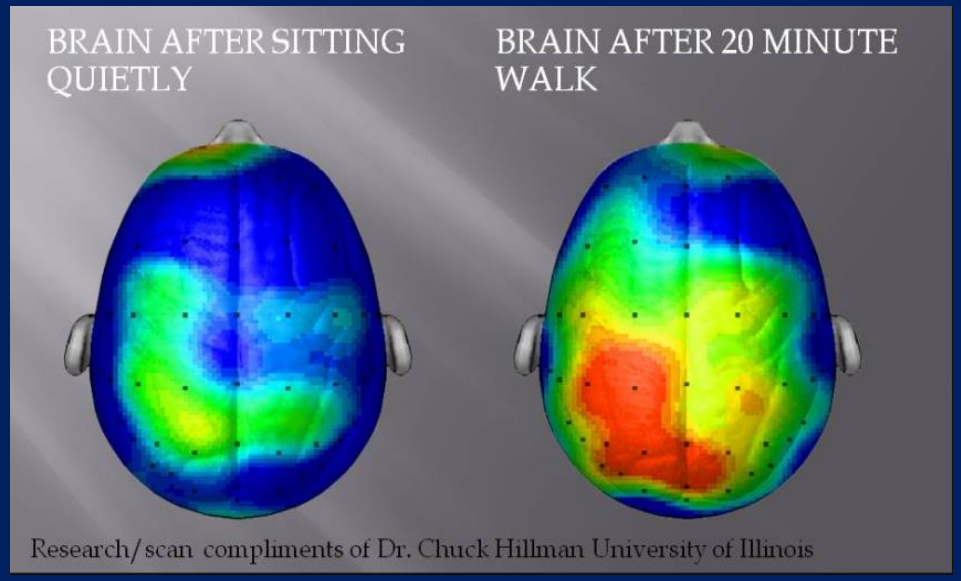
Dr. Chuck Hillman

2009 University of Illinois Study

9 year olds

"..20 minutes of exercise just before taking a test or giving a speech can improve performance"- Dr. John J. Ratey

- Average Composite of 20 Students' Brains Taking the Same Test

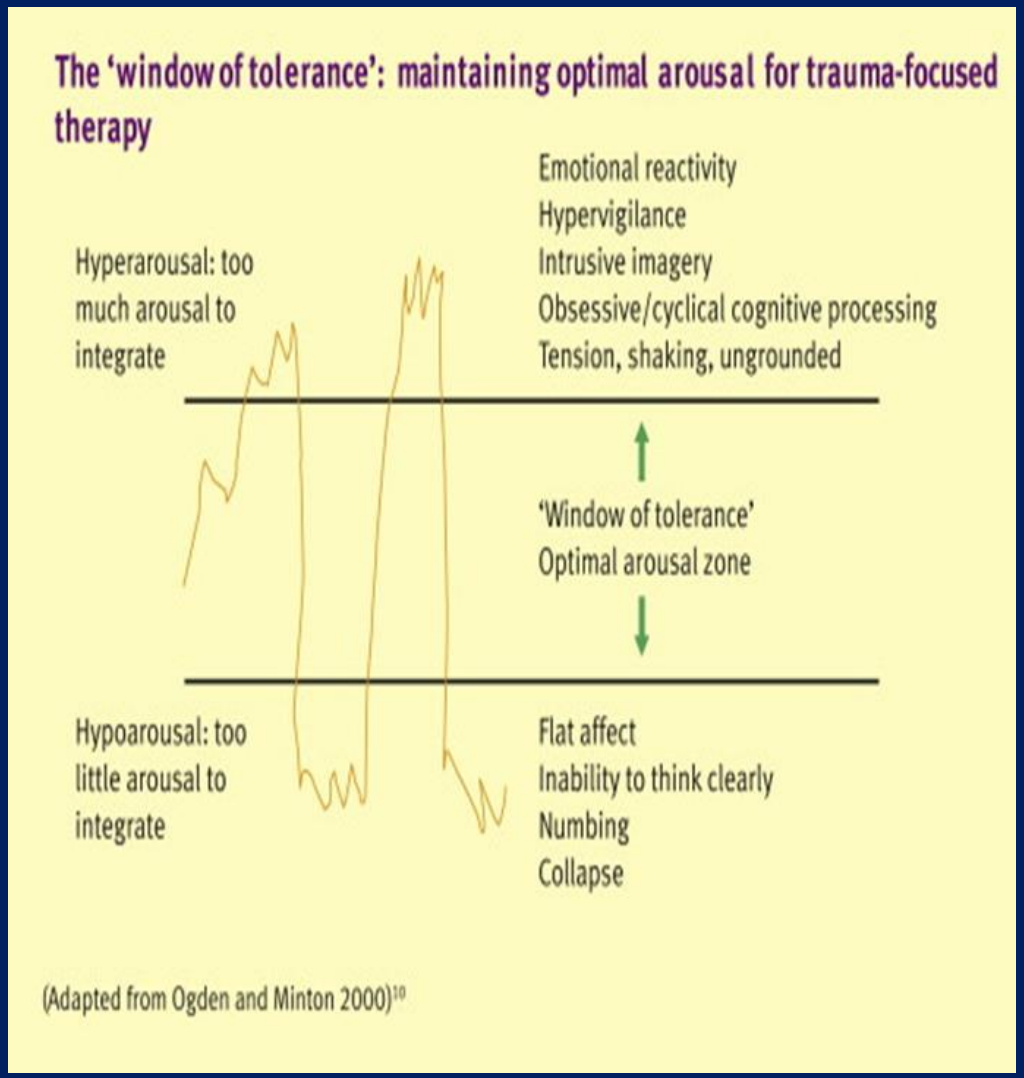


Brain Derived Neurotrophic Factor (BDNF) Released During Aerobic Exercise

- “Miracle Gro” for your brain, John J. Ratey, MD
- Naturally occurring protein responsible for:
- Neurogenesis creation of NEW NEURONS & SYNAPSES
- Repairing Failing brain cells
- Protecting Healthy brains cells
- “Crucial biological link between thoughts, emotions, and movement.” John J. Ratey, MD

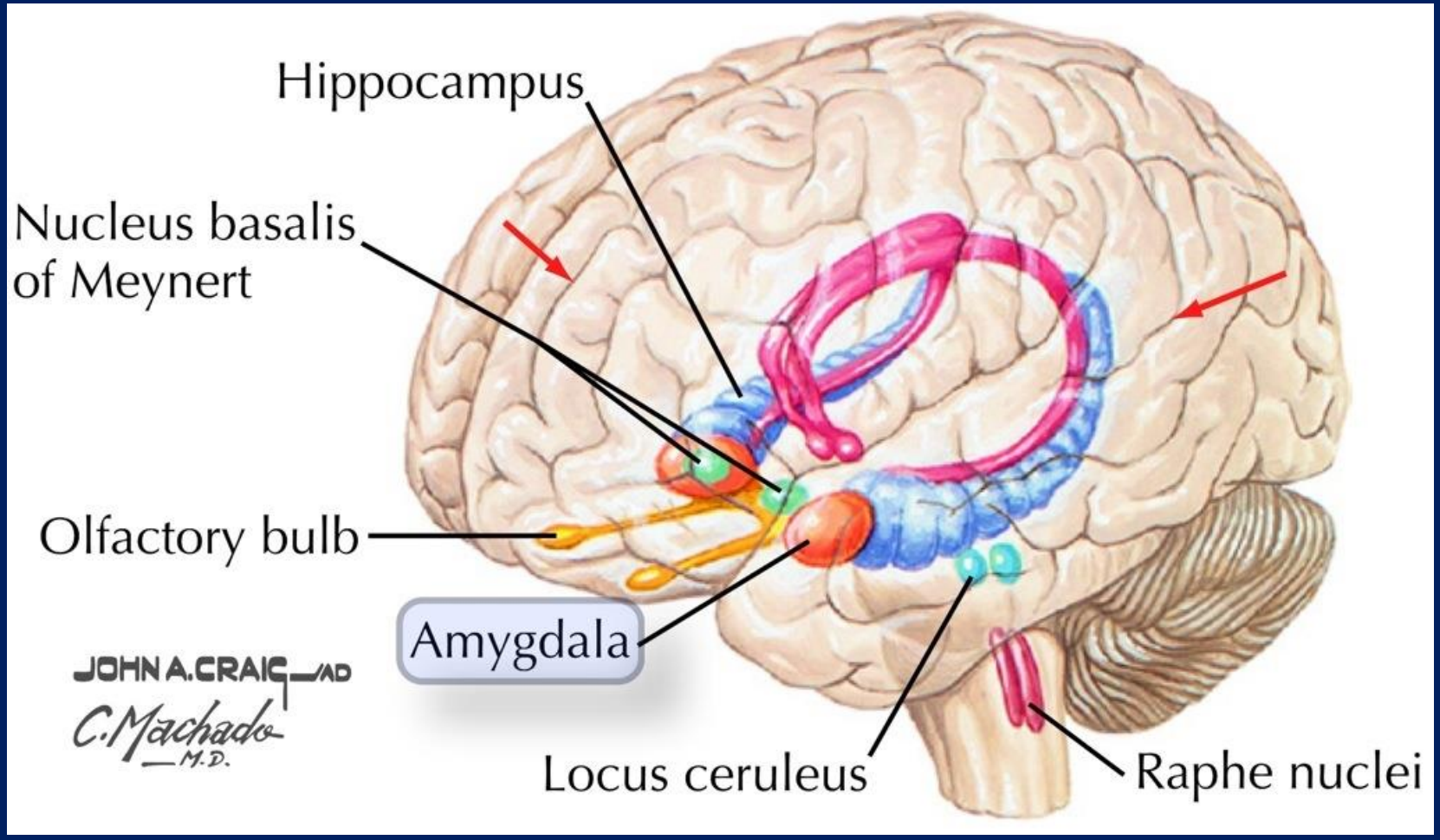
What the Brain Cannot Take!!

- Unpredictable Chronic Adversity
- Restraint
- Isolation
- Drumming



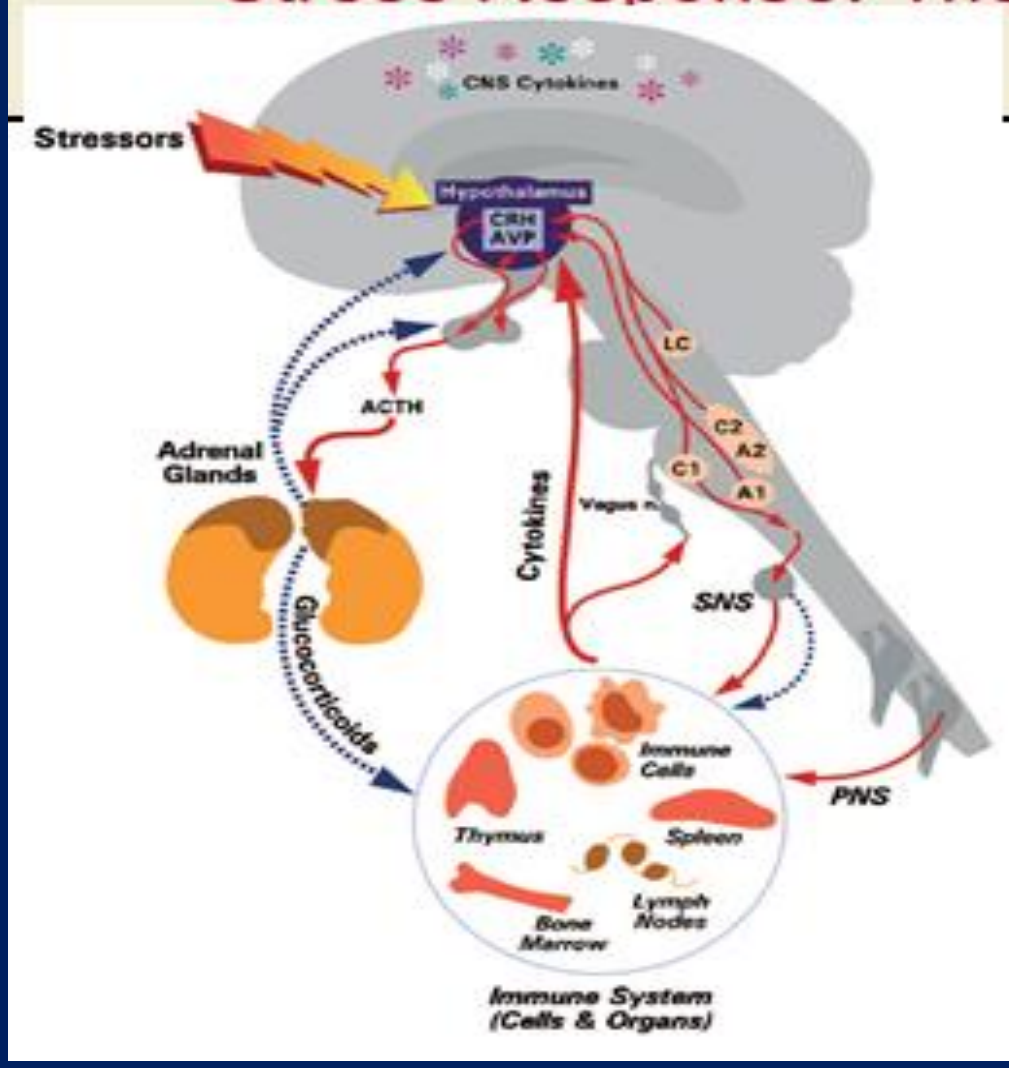
Brain Development What Happens?

Locus Ceruleus! Amygdala! a



Stress Response Systems

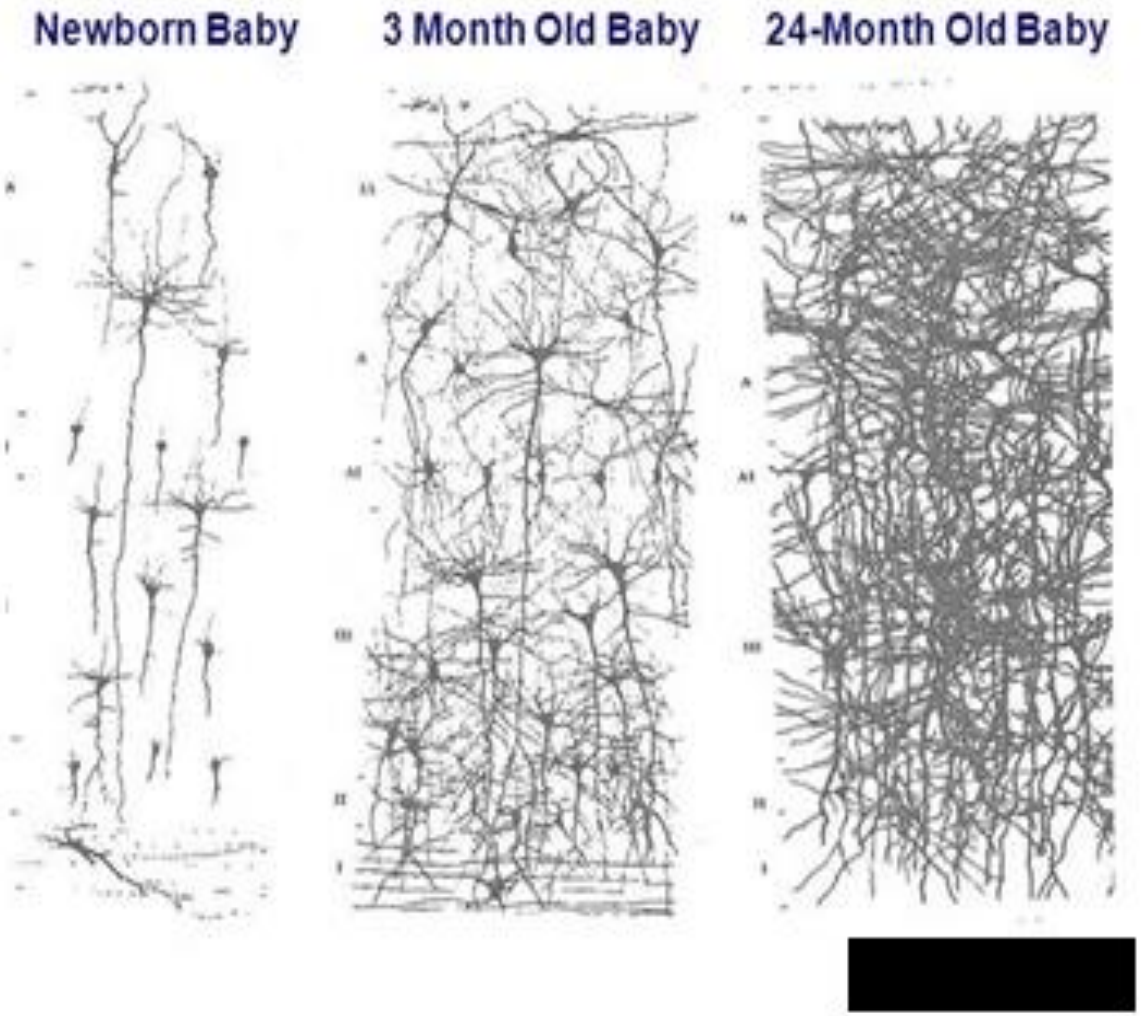
Stress Response: The HPA Axis



- Stress activates
- Release of epinephrine and cortisol.
- Stimulates multiple areas of body and immune system.

Amygdala

- Central to mediating aggression
- So much research!
- Lesions or silencing this structure through Novocain in this area show less aggression
- Texas Tower story
- Charles Whitman 1966- Killed his wife and mother and then climbed the tower killing 16 and wounding 32
- Glioblastoma pushing against the amygdala
- Fear and anxiety
- Unpredictability with anticipatory dread activates the amygadaloid regions.



Rapid Growth

Rapid Growth

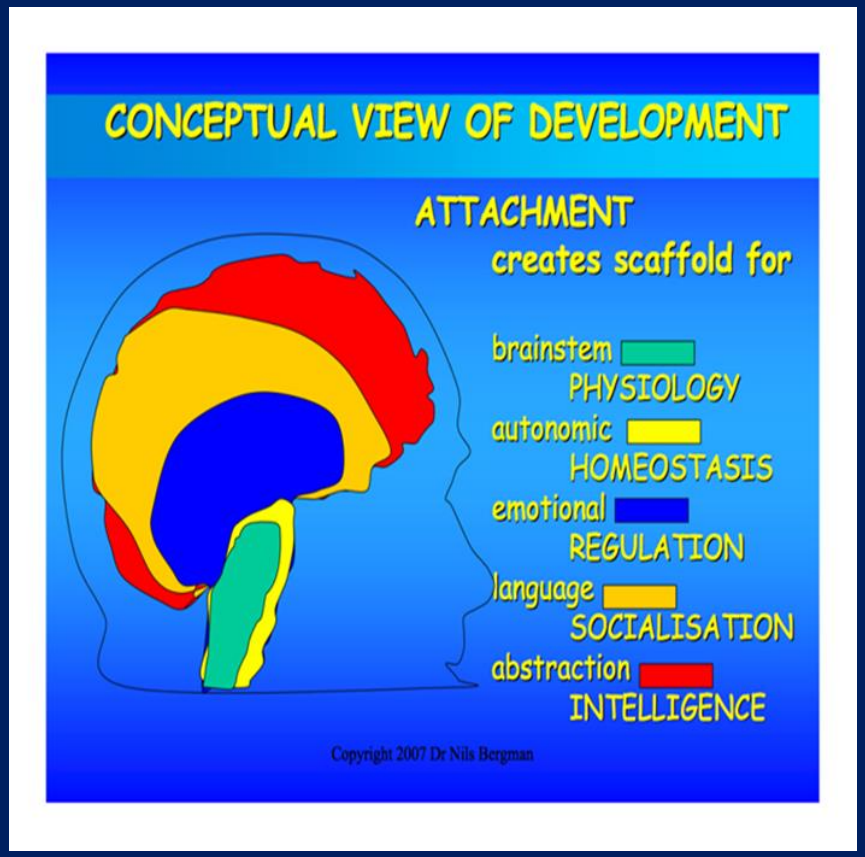
Pruning

Hippocampus and our Stress Response Systems

- 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.

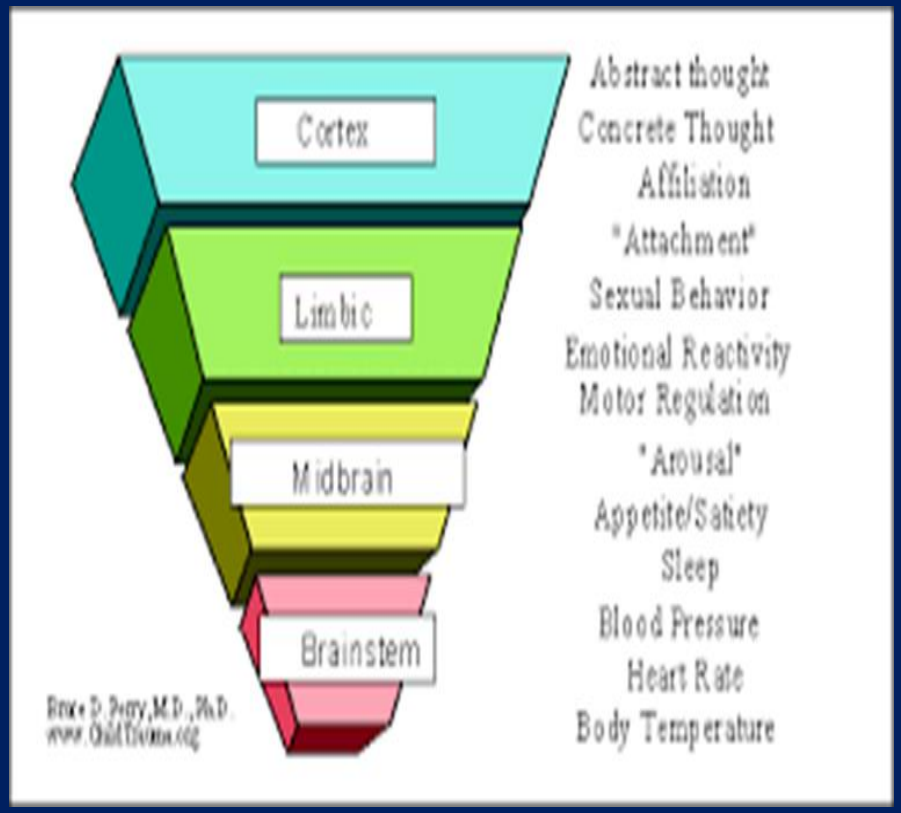
What Grows the Brain?

- Back to front and Inside Out
- Cognition
- Affiliation
- Regulation
- Attachment



Discipline/ Preventative/ Co-Regulation

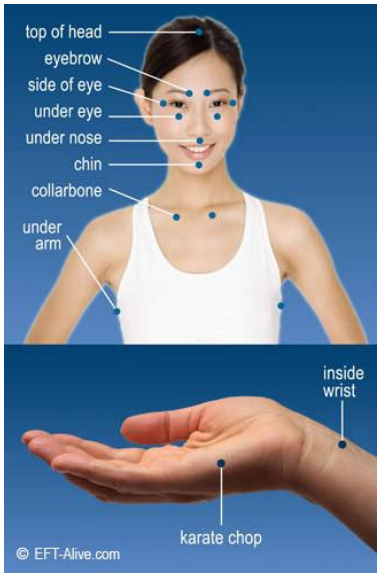
Brain Development

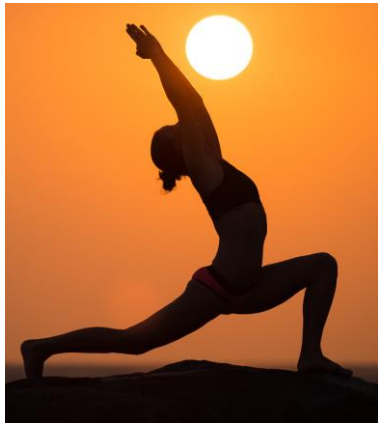


- Language of the brain stem is sensation
- Language of the limbic system is feelings or emotions
- Language of the cortex is words

MOVEMENT= HEALING

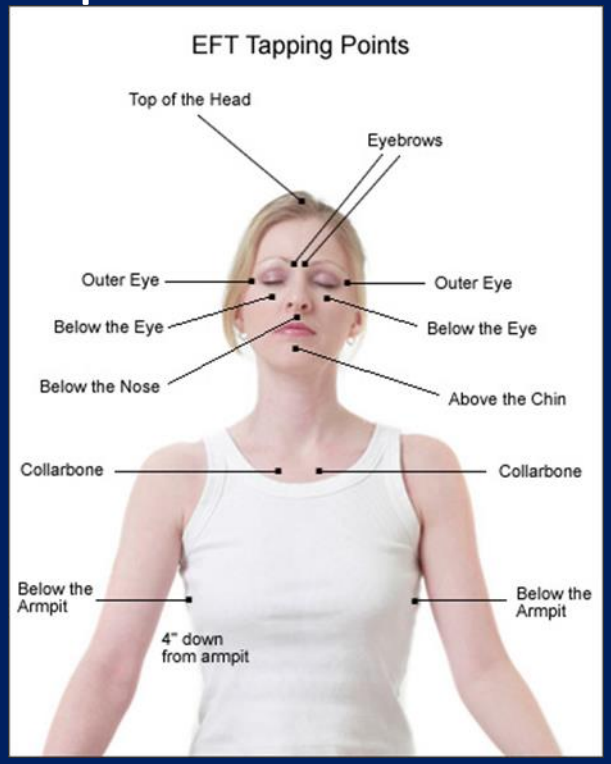
- Tai Chi
- Tension Release Exercises (TRE) - Dr. David Bercelli
- Yoga
- Tapping (EFT)





TRE/ Tapping

- Sympathetic and Parasympathetic Response



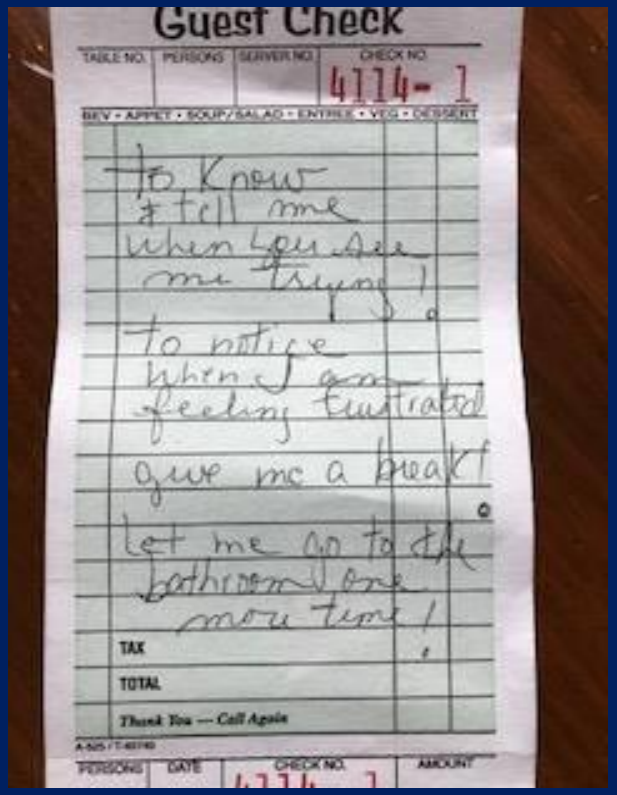
Sensations!

- Language is sensations
- Word Wall of Sensations- Cold
- Warm, hot, sweaty, twitchy, butterflies, stuck, soft, sharp, dull, itchy, shaky, trembly, tingly jittery, weak, empty, full relaxed, calm, peaceful, flowing, spreading, strong, tight, tense, dizzy, fuzzy, blurry, numb, prickly, jumpy, tearful, goosebumpy, racing, tired
- Suckers
- Cheerios
- Swallowing with a straw
- Sound therapy with feeling your vocal chords and mimicking a sound
- Ice pops
- Frozen grapes
- Sucking yogurt through a straw

Breathing and Movement!

- What does mad look like? How big is it? What color is it?
- Metronome and sound machines
- Paint sticks and rhythms
- Show me how you would melt?
- Show me how you would freeze and shiver and then relax? Show me how you would moonwalk?
- Show me a snake pose
- Roll like a ball
- Wall push ups
- Body is a container
- Place one hand on forehead and one on heart … breathe and place hand from forehead to belly!
- Domino Effect / 90 second rule
- Trace until I feel better
- Eye yoga
- Trumpet breath- fill up cheeks with air and repeatedly blow out!
- Guess the sound?
- Horse Lips
- Make a thunderstorm!

Take Your Order



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

- Noticing!
- 2x10 Strategy
- Above or below the Line
- Maslow Hierarchy/ brand new!!!

Dual Brain Sheets

Dual Brain 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 challenge ?
- What are two adjustments we will make the next time?
- How?

Negative or Traumatic Experiences!

- Is there anything you need right now that would ease you mind and your feelings?
- 2. Is there another way you would like to talk about this other than words? I have some paper, pens, crayons, some clay or you could paint a picture?
- 3. If you could list three or four people you need right now who would they be?
-
- 4. Is there a place you would like to rest that feels safe to you until you feel a little bit better?
- 5. Are there any objects or belongings I can find that would comfort you?
- 6. When you are ready, I want you to know I am right here and I am not going to leave you... take the time you need!
-
-

My Brain's Garden

- What is the equivalent to

good soil, water, and sunlight

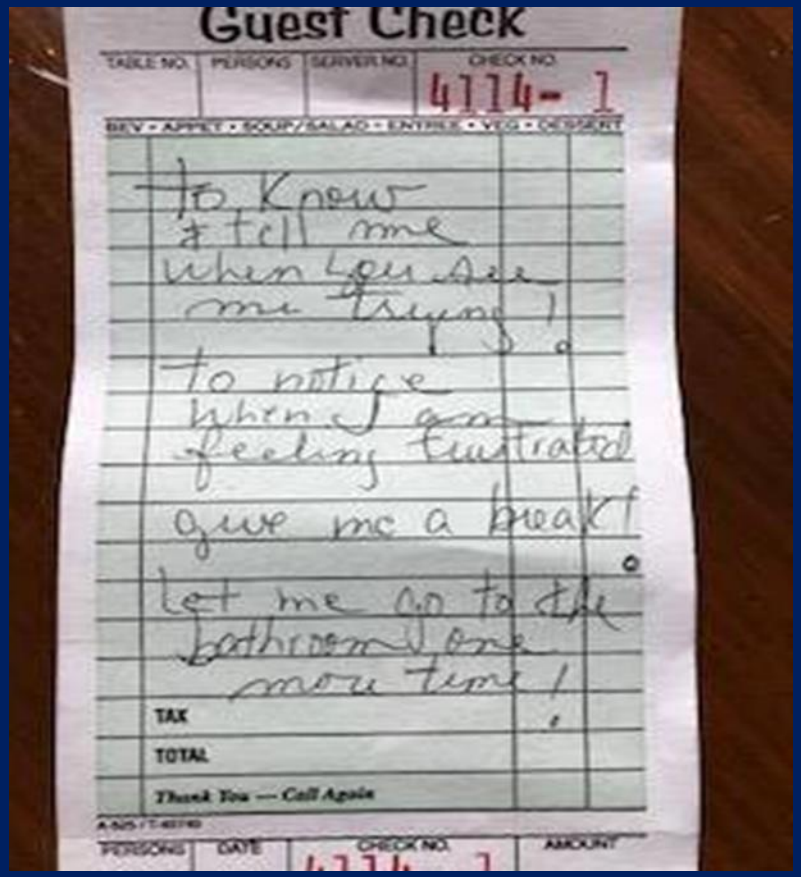
with your own brain

development?

- What are the nutrients for our brain development- Relationships! (How do the current relationships you have help to support you?)
-
- Sunlight- Who lifts you up and usually makes you feel better? Who notices you and shines a light on your strengths and interests?
- Protecting Your Garden- Do you have a protective fence? Do you have boundaries, routines, and a structure that keeps you safe and comfortable? How could you create this sturdy fence if you do not have one?
- Let's plant a garden in our classroom and in our brains and watch it grow!
-

Attachment and Regulation

- Take Your Order
- Dual Brain Sheet



- I want to work for you today! What do you need from me?
- How can I help you this morning?
- I am ready!

Attachment

- Noticing
- Just as we design and build our homes, we sometimes need to design the academic journey for our students creating forced islands of success

- Emotional and academic designer- These techniques are implemented for students in a frozen stress response state, which often takes the form of a student looking like he or she just does not care. This seemingly uncaring surface attitude, though, often masks a sense of hopelessness and despair in young people coming from adverse places. This strategy is process oriented and builds over a one to six week time period.

Active Constructive Responding

- Let's have a Cup of Coffee
- • Where were you when you saw this or heard this? Who was with you? What were you doing right before this happened?
- • What were you doing when this happened? How did this feel? Now, how will this change things for you?

- Active constructive responding. Shelly Gable, professor of psychology at the University of California at Santa Barbara, has shown that how you actively share, celebrate, or respond to an event or experience with another individual is critical for the development of a connection with that person. This process means stepping into the experiences with another and responding with questions, details, and interest. It is a form of questioning that asks and focuses on details when another individual shares something about an experience, event, idea, or relationship.

Validation and Questions!

- 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.
- 90 SECOND RULE!

- What do you need?
- How can I help?
- What can we do to make this better?

2 by 10 Strategy!

- Here, teachers focus on their most difficult student.
- For two minutes each day, 10 days in a row, teachers have a personal conversation with the student about anything the student is interested in, as long as the conversation is G-rated.
- Wlodkowski found an 85-percent improvement in that one student's behavior. In addition, he found that the behavior of all the other students in the class improved

- Noticing
- New Shoes
- Haircut
- How a student walked into class
- A smile
- A gesture

NEW RTi/ MTSS/ 504 Snapshot for Students!

- 504/ IEP Snapshot for Complex Developmental Trauma Disorder/ Regulation and Relationships

- Schoolwork Accommodations:
- 1. Seating at the front of the class / NEED A SEAT WHERE I FEEL THE MOST SAFE
- 2. Graph paper to line up math problems / TWO ADULTS IN THE BUILDING I CAN TRUST AND A PLACE TO WALK TO WHEN I BEGIN TO FEEL TRIGGERED
- 3. Multiplication table and math facts chart/

- A PERSONALIZED ROUTINE OF THREE INTERVENTIONS/ I CAN IMPLEMENT IF I BEGIN TO FEEL ANXIOUS, ANGRY, OR NEGATIVE IN ANY WAY

- Repetition and explanation of directions when needed/ ACCESS TO THE SENSORY AREA OR TABLE IN OUR CLASSROOM (For patterned repetitive activities
- 4. Pre-printed classroom notes from teachers/ A SET OF MY ACCOMMODATIONS GIVEN TO ALL WHO WORK BESIDE ME
- 5. Extra set of textbooks for home, depending on the class/ MY CAREGIVERS NEED ACCESS TO THESE ACCOMODATIONS AS WE PRACTICE AND SHOW THEM WHAT THIS LOOKS LIKE IN SCHOOL!
- 6. My Test Accommodations Extended time (25% more) / EXTENDED TIME TO REGULATE IF I NEED THIS AND ACADEMIC SCULPTORING OF MY ASSIGNMENTS WHEN I AM DYSREGULATED
- 7. Quiet testing room with small group setting Multiplication table and math facts chart? QUIET AREA FOR ME TO USE WHEN I NEED TO REGULATE MY NERVOUS SYSTEM
-

A Snap Shot/ 505/ RTi

- Triggers
- Smells
- A look or tone of voice
- Being yelled at!
- Lots of noise
- Too much work!

- ***Strengths to Help Me with My Goals***
- I love to learn. I'm seen as a leader and good friend by others.
- I have a great imagination
- I know how I feel and learn best!
- I work quickly
- I notice everything
- I am good at sensing others and all nonverbal communication

Brain Aligned Classroom Discipline and Leadership

"+" "—"

Reinforcement/Self and Educator Assessments and RTi/MTSS Plans. Check-ins. Adjustments. Adapt new plans, Incent desired behaviors.

Omission Process for Group Behaviors. Incentives. Noticing what is going well. Together, choose behavior troublesome for class. Work together to eliminate through gradual process. Reduce the number of time behavior occurs. Preparation focused on process. Begin with an attainable benchmark and number.

Omission Process for Individual Behaviors and Negative Brain States. How do I choose one behavior that I want to see less of? Students track and record their behaviors with teacher feedback. Emotional, Social, Academic Challenges!

Simple Incentive Systems. How do I structure the first hour or morning? What is our class challenge? Brain intervals and time to connect after work! Not rewarding. Creating "time" for rejuvenation and service.

Positive Connections/Regulation of Brain State. Resiliency touch points. Intentional signals. Warm eye contact. Greeting students. What is your title? Take Your Order. Noticing Sheets and 2 x 10 Strategies.

Large Back Up Systems. Office is involved. Before re-integration, hold restorative practices. RTi/MTSS Snapshot is reworked & implemented. Emphasis on relationships/regulation. Brain-aligned re-integration plan with strengths, challenges, triggers, and 3 alternative changes for re-entry that are collaborative/acceptable for all.

Medium Back Up Systems. Big Gap here. Fundamental to discipline shift. Leadership/relationships required. Who can build relationships with our most emotionally challenged students. Co-regulation is critical. What area is available for co-regulation? Dual Brain Sheet.

Small Back Up Systems. Routines and a sanction taught, practiced, & modeled. Amygdala reset room where students move to regulate. Areas are neutral; do not equate to "time out" areas. Use amygdala area to model when you are feeling anxious/overwhelmed. "What do you need when you return to work? How can I help?"

Complex Incentive Systems. Individualized. Tied to RTi snapshot for individual systems; chunking assignments, frequent check-ins & feedback. Individualized plans for working through a process of emotional/cognitive growth. Identify strengths/challenges & 2-3 steps needed to begin process of movement.

Limit Setting (Never go Public). Emotional contagion; anger is fear's body guard. When you call a student out who is triggered, we unintentionally escalate the nervous system. Use your body, not your words; signals, post-its.

CLASSROOM STRUCTURE AND ROUTINES: FOUNDATION OF DISCIPLINE
Teacher Brain State/Well-Being. Routine & Procedures. Teaching Neuroanatomy. Creating environment of relaxed alertness

Brain Aligned Discipline

- ***CLASSROOM STRUCTURE AND ROUTINES: FOUNDATION OF DISCIPLINE***
- ***Teacher Brain State/Well-Being***
- ***Routine & Procedures***
- ***Teaching Neuroanatomy***
- ***Creating environment of relaxed alertness***

1. ***Positive Positive Connections/Regulation of Brain State +***

- Resiliency touch points and regulation interventions in the form of brain intervals, focused attention practices, brain aligned bell work, rhythm, and morning meetings.
- Intentional signals.
- Warm eye contact
- Greeting students
- What is your title?
- Take Your Order.
- Noticing Sheets

Brain Aligned Discipline

- 2 x 10 Strategies
- Active Constructive Responses
- Classroom Roles and Responsibilities- Kindness Keeper, Noticer, Researcher and Resource Manager,
- Class Procedures when a student goes awry- who puts on the music, who organizes the groups, dims the lights, and begins to co-teach?
-

1. ***Limit Setting (Never go Public)***

- 2. Emotional contagion; anger is fear's body guard. When you call a student out who is triggered, we unintentionally escalate the nervous system.
- Use your body, posture, facial expression, and tone of voice -not your words. I need to be regulated when I redirect!
- Create signals
- Post-its
- Redirect with a task or leadership responsibility
-

New Research

- Bruce Perry
- Three parts to trauma- event, experience of the person of the event, and the effects, meaning what happens to the SRS's over time which determines perception and this is neurodevelopment
- 45,000 cases looking at the first year of development
- 2 months and younger- without emotional buffers, then 14 years of nurturing child and adolescent struggles greatly!
- 2 months- with adversity and emotional buffers, then 14 years of much chaos and adversity, the children and adolescents do well even with later adversity!

Why? Neurodevelopment

- Regulatory networks develop and organize and integrate in utero and first few months from the bottom up and if they organize poorly, there can be life time consequences.
- Sensitized stress response system- brain is constantly telling us to stay alert and that there is a threat occurring! The capacity to tolerate new things is extremely compromised!
- Resiliency- this is the therapeutic web where home school and community take on the touch-points of the child- this doesn’t happen when we see a therapist for 45 minutes once a week!

Adversity/ Development/ Stress Response Systems

- New Research on the Stress Response Systems and Development
- Joseph LaDoux
- Tom Nickels
- Dr. Sapolsky
- Dr. Purges

- Brain is the greediest organ of the body! Memory, neural tissue, and development all change with repetitive patterned activity.
- The adolescent brain processes instructions, procedures, and emotions and memory through subcortical and more ancient systems…amygdala!
- Readiness is neurological! Dr. Joan Deak

Neurodevelopment

- First 20 years of our lives is not about college and career readiness/ not about full cortical development but NEUROLOGICAL EXPERIENCES… play, movement, sensation, rhythm, etc.
- Our juvenile justice system is NOT based on our biology. Makes no sense when you understand development of the brain. The Frontal Cortex makes you do the right thing when it is the hardest thing to do!
- 25% of men on death row have a history of head trauma/ trauma to the frontal cortex region. This is an organic impairment and they are unable to regulate their behaviors.
- SES matters with brain development! By age 5 our SES is a predictor of our stress hormone levels.
- If a car's brakes are broken, you don't punish the car!

Dr. Joseph LaDoux

- Emotions and the Brain and Our Stress Response Systems
- Our survival brain state is a defensive survival circuit. In the US 20% of the population is experiencing fear and anxiety disorders and it is estimated to cost 40 billion dollars annually for reactive treatment.
- Defensive survival circuits are not produced by conscious feelings of fear. The purpose of these survival systems is to help the organism to adapt, not to wear us out or make us feel bad.
- This defensive survival circuit is part of our evolution and is doing the thinking for us! After my initial response, then I consciously begin to process the emotion , so the amygdala is not really all about the fear or the fear center of the brain, but more of the place where a threat is detected to keep the organism alive.

Creating New Experiences and a New Story

- The conscious experience of this threat is uniquely human. Fear is in the moment , the feeling you have in the presence of a threat. Anxiety is anticipating or worrying about a threat. Anxiety is anticipating experiences that are not in the here and now!

- Fear is in and of itself, a conscious state to certain kinds of nonconscious ingredients that come together and are cognitively interpreted. This is the perception of the child or adolescent who has experienced adversity.

Physical Impact of Trauma

Brain Architecture
Shrinkage in prefrontal cortex, corpus callosum, and hippocampus. Enlarged and more reactive amygdala. Resolution: safe and stable nurturing relationships, walk in nature, touch, exercise

Neural Pathways
Need to 'rewire' our brain from old thought patterns and habits of mind, conscious, and unconscious. Resolution: neurofeedback, meditation/ mindful action, positive self-talk

Hormones
Prolonged high cortisol and ghrelin creates greater reactivity to stress. Long term damage to cells, structures of the body, and other homone glands (thyroid). Resolution: oxytocin ("the love hormone")

Toxin Elimination
Intestines and kidneys less able to eliminate toxins (slow gut or unbalanced flora). Resolution: salt baths, sauna

Nervous System
Supercharged sympathetic nervous system. Parasympathetic nervous system not engaged to bring back into balance. Resolution: yoga, breathing, or other physical/emotional regulation

Immune System
Resistance to cortisol or lower cortisol creates unchecked inflammation. Cause of many diseases: asthma, arthritis, etc.) Resolution: meditation/mindful action, walking in nature, diet, rest

Brain Waves
Predomination of wrong brain waves in wrong part of the brain leads to anxiety, unable to concentrate, and seizures. Resolution: neurofeedback

Neurotransmitters
Vulnerable to addiction because dopamine transmitters/receptors not developed or damaged. Reduces motivation & focus, creates fatigue. Low seratonin causes depression.

Cellular Change
Shortens telomeres which prematurely ages and reduces reproduction of cells & can cause cancer. Resolution: social support

Epigenetics turns genes on or off in adaptation to dangerous environments. Effect can last generations. Resolution: Safer environment (perception of)

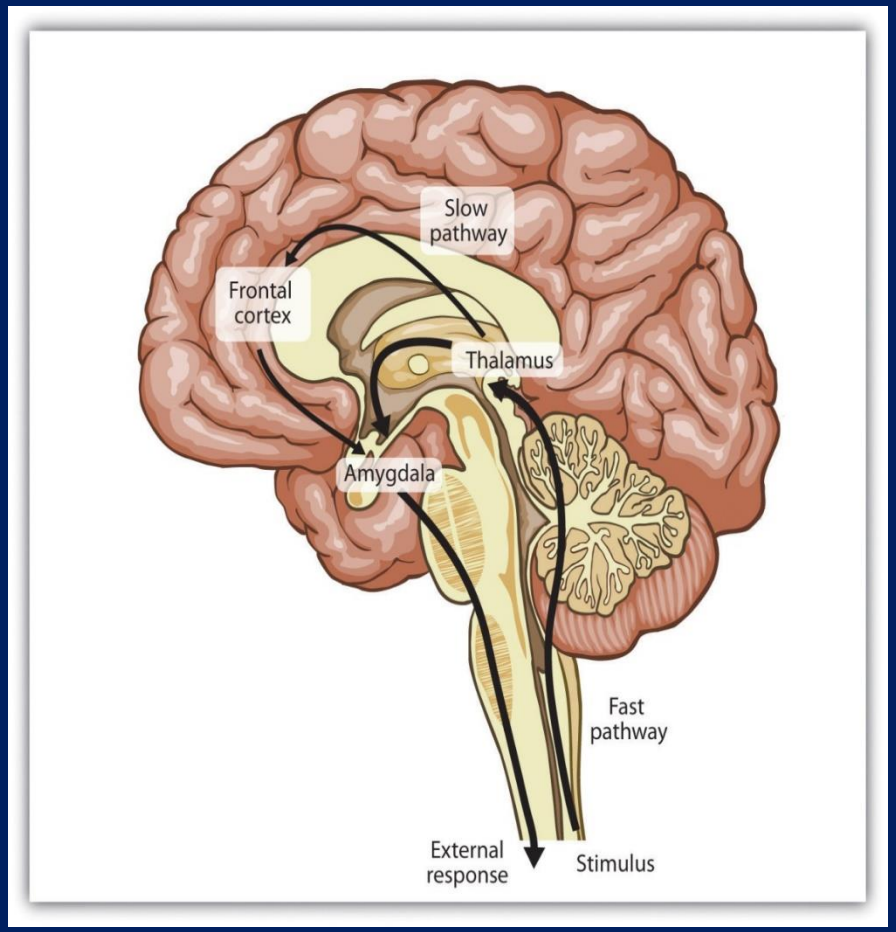
echo
www.echotraining.org

Locus Coeruleus-

- Locus Coeruleus- likened to a huge norepinephrine cell. It is the launching pad for anxiety, our fight flight survival response. The Adrenaline gland of the brain!! Like a pacemaker, it keeps us awake as does caffeine. It has inhibitory receptors, and one of those is serotonin. Serotonin responds through movement and exercise calming this area.
- 90% cases of hypertension are caused by anxiety and stress. Clonidine lowers blood pressure and turns on the brake for norepinephrine, quieting the activity of the Locus Coeruleus, but other higher order areas of the brain stay alert and awake.

Threat Appraisal

- Threat Appraisal- appraised either in the cortex or the amygdala. The cortex is more precise and is called the reality tester where threats processed in the amygdala originate from a crude primitive patterned recognition and here we are designed to respond to threats
- HPA Axis/ SNS



HPA Axis

- Hypothalamus regulates biological drives and rhythms and is responsible for sex drive, appetite, sleep cycles, etc. It is affected in depression. When hypothalamus has been activated, it secretes CRF (corticotrophin Releasing factor) to the pituitary gland which produces ACTH which then activates receptors in the adrenal cortex producing cortisol and then cortisol moves throughout the body but can be turned off by the hippocampus as this area has a rich amount of glucocorticoid receptors …

- Epinephrine- is adrenaline and is produced in the adrenal glands. It is a hormone and a neurotransmitter and plays a major role in fight/ flight
-
- Norepinephrine / Noradrenaline- organic chemicals produced in brain cells …

Attachment and Development

- Development
- Early maturation of the brain requires social experiences. We need epi-genetic social experiences which impact the genome- all the genetic material in our bodies. These changes are created in the mother/ caregiver attachment process.
- 2008 Modern Attachment theory- Affect regulation theory has evolved out of attachment theory. We are now looking at a paradigm shift with regard regulation.

- Early Childhood Attachment in school!
- To regulate the nervous system, we have implemented rocking, movement, breathing, sensation, and sound with our little ones with much success. As I thought of how to end the semester, I was intuitively reminded of how the social brain is so much of who we are!

My Buddy

- When we are emotionally wounded by often the caregivers in our lives, through neglect, abandonment, threat and chronic unpredictability, we lack trust security, and relationships that are steadfast. We often, do not know how to be kind, empathetic, or compassionate because those life skills were never modeled for us.
-

- My Buddy eases the loneliness, the sadness and anger creating an opportunity for us to share ourselves though touch, art, and communication.
-
- How?
-

1. Breathe with our buddies
2. Talking with our buddies
3. Drawing and coloring with our buddies
4. Caring for our buddies
5. Playing and creating with our buddies
6. Rocking and sleeping with our buddies

My Buddy

- When we talk to our buddies, we are talking to ourselves and this helps us to release those negative emotions and into a safe place...
-
- Questions for our Buddies!
- What will be your new buddy's name?
- How old is your buddy?
- What does your Buddy like to do?
- Who will be your buddy's friends?
- What are two things you would like to share with your buddy?
- Is there a secret you would like to share with your buddy?
- What is your Buddy afraid of?
- What angers your Buddy?
- What makes your Buddy Sad?
- WHO DOES YOUR Buddy trust?
- Who does your buddy not trust?
-

- Routines and Rituals

1. Pick up our buddy and rock him awake!
2. Take five deep breaths with our buddy to awaken him for the day!
3. Sometimes we drum or move with our buddies to awaken them.
4. If we are upset, we can choose to move, tap, rock or sit with our buddy.
5. We can read and sing to our buddy, and even share a snack with our buddy.

- https://www.psychologytoday.com/us/blog/the-guest-room/201407/more-just-teddy-bears
-
- https://www.heliyon.com/article/e00252
-
- http://childmind.org/wp-content/uploads/Child-Mind-Intitute-Parents-Guide-Traumatic-Event.pdf
-
- https://www.jpost.com/Health-and-Sci-Tech/Health/Stuffed-animals-can-relieve-trauma-in-children-exposed-to-war-and-terror-TAU-study-says

Polyvagal Theory

- Dr. Steve Porges
- “I feel myself, therefore I am”
- Polyvagal Theory
- “The opposite of love is not hate, it is indifference! The biology of strong love and strong hate are very similar.”

- Brain Stem- Mediates autonomic regulatory functions (ancient system)
- Limbic Function is central to emotion and that feeds our best and worst behaviors.
- Every limbic structure wants to influence the hypothalamus! Why? Because of its importance in regulating our bodies systems… It is the interface between levels one and two between core regulation and emotional regulation.

Brain Functions

- Midbrain and brain stem send projections or signals back and forth down the spine which is the ANS which affect PNS and SNS that work together and apart!
- Limbic System indirectly regulates autonomic function and hormone release affecting behavior.
- Cortex- Most sensory information flows here… after passing through thalamus and it is the crown jewel. The cortex and limbic system are not separate as axonal projections course between the two! Cortex interfaces between 2 and 3.
- Amygdala- Central to mediating aggression/ fear and anxiety
- In Youth, sometimes, anxiety is produced when we are wondering our social status/ Being unsure of your place in social hierarchies is unsettling.
- Thalamic and Cortical Pathways- what is the difference?

Polyvagal Nerve

- DPFC- newest and last to come on line / decider/ most rational and cognitive and unsentimental
- Ventromedial PFC- Many connections with the limbic system/ impact of emotion on decision-making! / damage to this area show up in social and emotional decision-making and eliminates gut feelings!
- Medial PFC- seat of self-awareness and this shuts down with chronic adversity/ therefore sensory stimulation is so important! Bring students to present moment…
- Neuroception – detecting danger or safety in the environment/ as sensory information is processed rapidly and intrinsically through association and the nervous system's natural evolutionary biological processes.
- We try to mobilize and we keep moving so we do not shut down!

Poly Vagal Theory

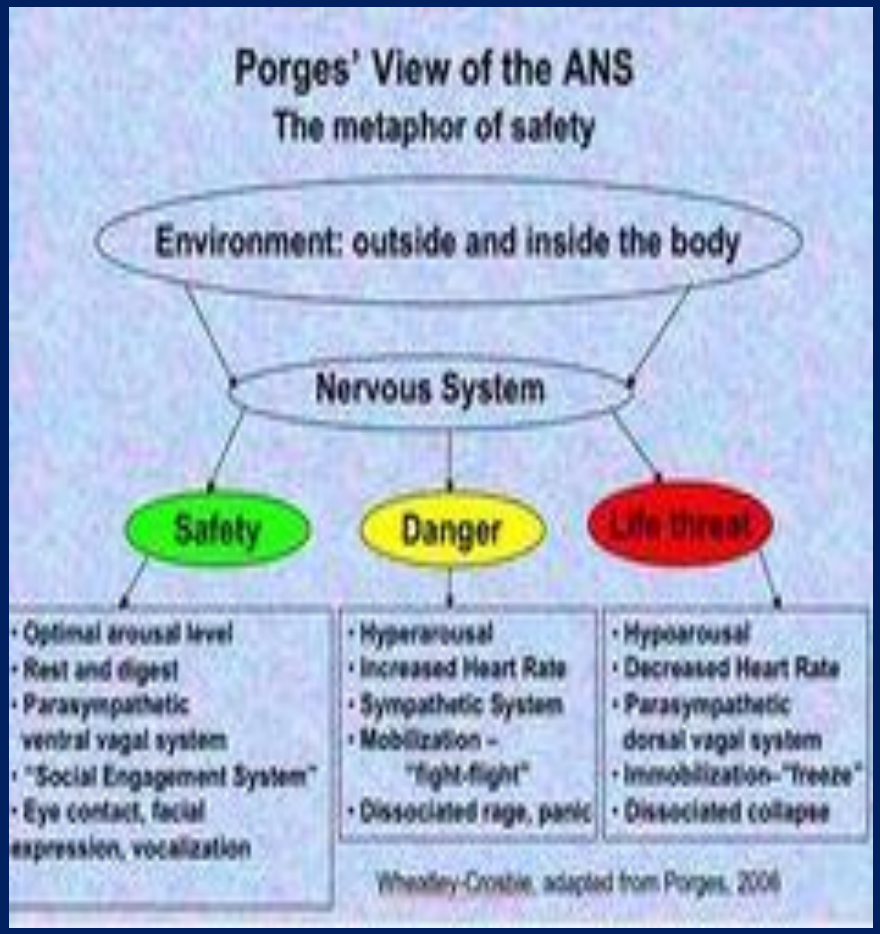
- Vagal nerve is the 10th cranial nerve- regulates many organs in the body and is driven by brain projections.
- 80% of its fibers are sensory sending signals up to the brain through the brain stem.
- Dorsal Vagal Pathway / unmyelinated/ ancient/ immobilization/ turtle/ and affects organs below the diaphragm
- Ventral Vagal Pathway- Social Engagement System/ myelinated / unique to mammals/ above diaphragm and regulates the organs connected to the brain and heart/ middle ear opens up/ co-regulation happens here through prosodic tones, gentle facial expressions.
- Major role of an interaction is to regulate and caregiving! It is reciprocal nurturance.

PolyVagal Theory

- Restraint and isolation affect neural expectancy- nervous system expects to move and be attached to others! When violated our bodies change! Mammals need to move …want to move, and relationships help us to mobilize without as much fear! When we feel safe, we can lie down and sleep. When we feel safe, we can stop and rest!
- A dangerous environment is perspective!
- Our new vagal can downregulate our fight / flight
- Neuroregulation= Social Engagement
- “We wear our hearts on our face and we project our hearts in our voices.”

Polyvagal Theory

- What is a neural exercise? Interactions with others!
- Neural Exercise is play, social reciprocity and interaction
- Danger= fight or flight
- Under severe life threat/ I may die!= Frozen/ We may move to the unmyelinated vagal pathway where there is less oxygen flow and there are longer lasting physiological consequences!
- Our nervous systems make their own decision!



Research

- Bruce Perry and Maia Szalavitz, The Boy Who Was Raised As a Dog (New York: Basic Books, 2006), 92.
- Bessel van der Kolk, The Body Keeps the Score (New York: Penguin Books, 2014), 81.
- Peter Levine and Maggie Kline, Trauma Through a Child's Eyes (California: North Atlantic Books, 2007), 27.
- Ibid., 28.
- Center on the Developing Child, Harvard University, "InBrief: The Impact of Early Adversity on Children's Development," last accessed August 26, 2018, https://developingchild.harvard.edu/resources/inbrief-the-impact-of-early-adversity-on-childrens-development/.
- Center on the Developing Child, Harvard University, "InBrief."
- Perry and Szalavitz, The Boy, 232-233.
- Raymond Wlodkowski, Motivational Opportunities for Successful Teaching [Leader's Guide], (Phoenix, AZ: Universal Dimensions, 1983).
- Shelly Gable, et al., "What Do You Do When Things Go Right? The Intrapersonal and Interpersonal Benefits of Sharing Positive Events," Journal of Personality and Social Psychology, 87 (2004): 228-245.
- Nicholas J. Long, Frank A. Fecser, and Mary M. Wood, Life Space Crisis Intervention, Talking with Students in Conflict, (Austin: PRO-ED, Inc., 2001), 87-94.
- Lori Desautels, "Navigating Confrontations with Parents," Edutopia, May 21, 2018,
- https://www.edutopia.org/article/navigating-confrontations-parents.
- Perry and Szalavitz, The Boy, 80.
- Christine R. Ludy-Dobson and Bruce D. Perry, "The Role of Healthy Relational
- Interactions in Buffering the Impact of Childhood Trauma," Working with Children to Heal Interpersonal Trauma: The Power of Play, ed. Eliana Gil (New York, NY: The Guilford Press, 2010), 26-43.

Connect With Me

- To understand our neurobiology is to know the secret of life!
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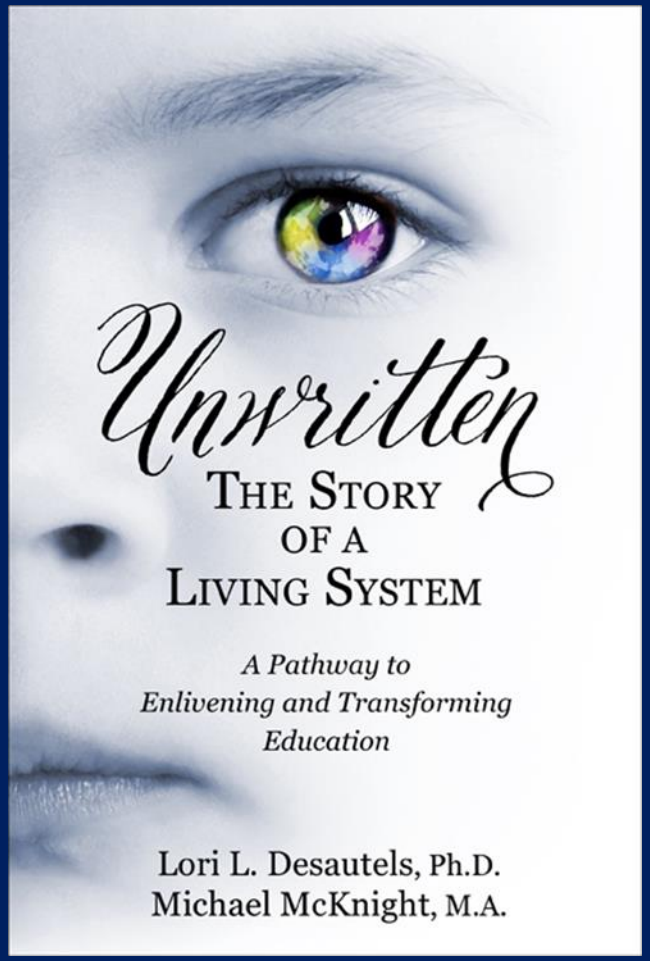
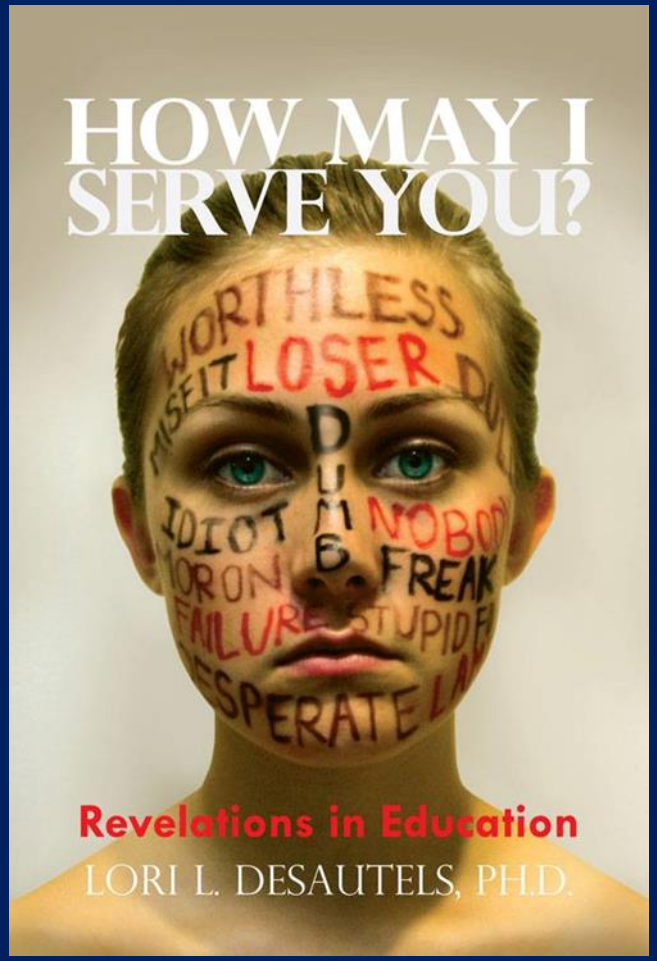
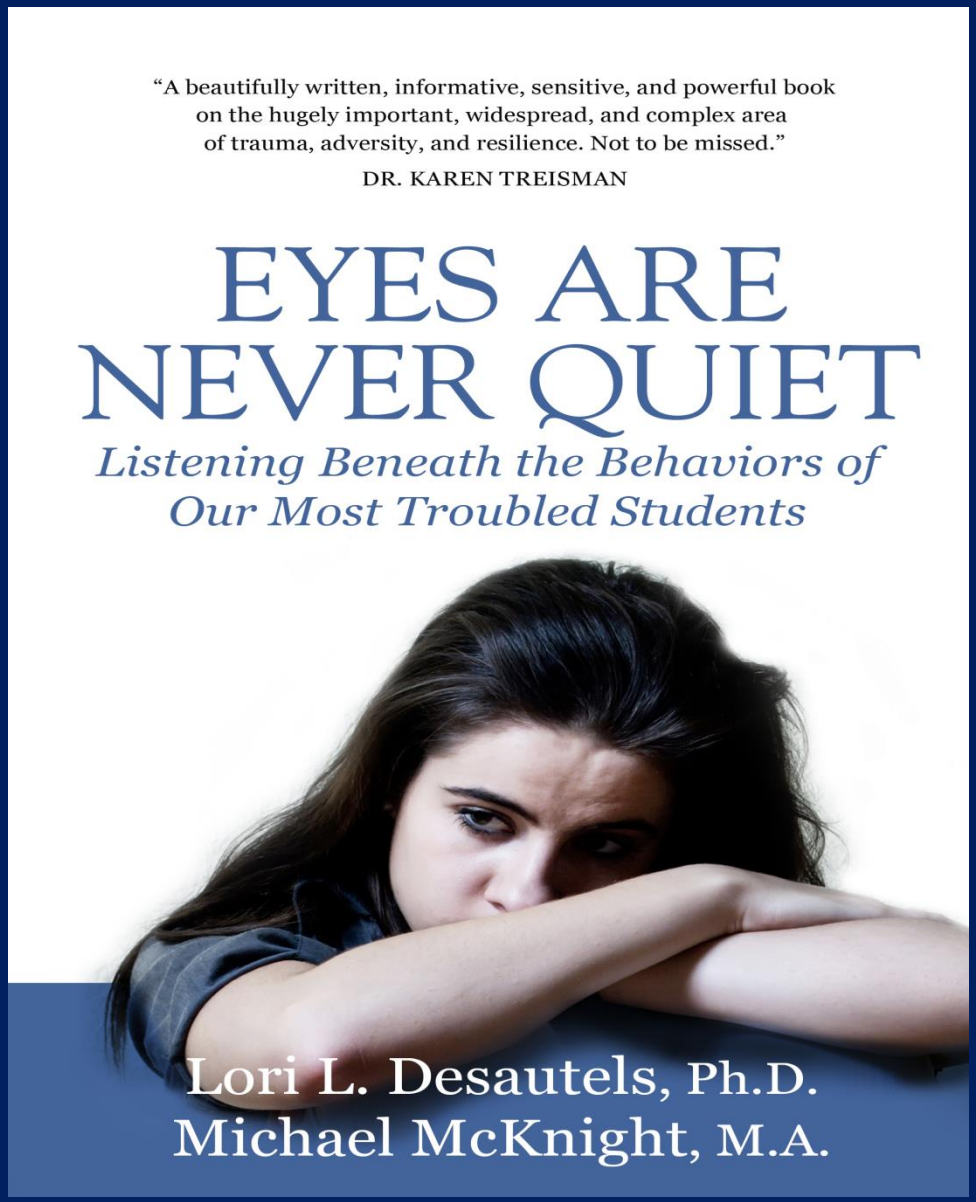
- Who are YOU?" said the Caterpillar.
- This was not an encouraging opening for a conversation.
- Alice replied, rather shyly,
- "I-I hardly know, sir, just at present - at least I know who I WAS when I got up this morning, but I think I must have been changed several times since then."

  - Alice's Adventures in Wonderland, Lewis Carroll

Thank you so much!!!!






"A beautifully written, informative, sensitive, and powerful book on the hugely important, widespread, and complex area of trauma, adversity, and resilience. Not to be missed."
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EYES ARE NEVER QUIET
Listening Beneath the Behaviors of Our Most Troubled Students
Lori L. Desautels, Ph.D.
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