The Brain Explains: Neurobiology of Stress and Understanding Vicarious Trauma

Trauma-Informed Schools Webinar Series: Part 1

Linda Chamberlain PhD MPH
State of Alaska Family Violence Prevention Project
Chronic Disease Prevention and Health Promotion

About the Series

› All Segments:
  • Brain Rules of Learning
  • Brain-based strategies to promote resilience & healing
  • Part 1: Brain, Stress and Vicarious Trauma
  • Part 2: Adverse Childhood Experiences
  • Part 3: Trauma-Informed Practices and Resources

Before We Start....

› We have to take care of ourselves first to be able to help others
› Talking about how early adversity can affect children may trigger memories & feelings
› Working with children and families that are suffering affects us
› Our brains have the capacity to change and heal across our lifespan

What We’re Talking About Today

› Brain basics
› Stress and the brain
› Tools and Lessons from the field (Part 1)
› Vicarious/secondary trauma

“Stressed children can’t learn.”
—Jim Sporleder, Former Principal, Lincoln Alternative High School

Being Trauma-Informed Starts With Us

› Trauma is common and diverse
› Be aware of how you feel and take care of yourself first
› Choose to only do what you are comfortable doing (movement, closing eyes etc.)

Trauma-Informed Approach

Healing starts by understanding how early trauma affects health and behavior

ADVERSE CHILDHOOD EXPERIENCES (ACEs)

ACEs MAY BE PART OF OUR PAST. BUT THEY ARE NOT OUR DESTINY
Healthy relationships
Social and emotional skills
Mastery of school
Special skill
It's never too late

ACEs Can Be Overcome

Wellness Lens

- It's about building resiliency skills and resilient programming
- Paradigm shift from what is wrong to where we want to go

Resilience Skills Reduce Effects of Childhood Trauma

In the National Survey of Adolescent Health:
- Building resilience – being able to stay calm and in control when faced with a challenge – increased rates of school engagement among children experiencing adversities (ACEs)
- Among children with special needs who had 2 or more ACEs, those with resilience skills were nearly half as like to have repeated a grade as those without resilience skills

Bethell et al, 2014

Child and Youth Resilience Measure (CYRM-12)

- Reduced version of 28-item CYRM which has been validated cross-culturally
- 12-item brief measure evaluated with multi-service using youth and school-based sample of youth (northern Canada)

www.resilienceresearch.org

Liebenberg et al, 2013

Playing a Poor Hand Well, Mark Katz

Reduced version of 28-item CYRM which has been validated cross-culturally
12-item brief measure evaluated with multi-service using youth and school-based sample of youth (northern Canada)
www.resilienceresearch.org

11/30/2015
The Brain Explains!

Neuroplasticity = Risk and Resilience
- Ability of human brain to adapt and change in response to experience and environment
- It's Never Too Late to Change Your Brain

PLAYFOAM EXERCISE

Sequential Development: From the Bottom-Up
- Abstract Thought
- Problem solving
- Affiliation
- Attachment
- Emotional Reactivity
- Motor Regulation
- Sleep
- Digestion
- Blood Pressure
- Heart Rate
- Respiration
- Body Temperature

Peter Camburn

Optimal Brain Development: The Right Experience at the Right Time
- SYNAPSES = WIRING OF BRAIN
- Experience builds the brain
  - birth: 50 trillion synapses
  - 1 year: 1,000 trillion
  - 20 years: 500 trillion

NATURE and NURTURE

IN ONE WORD, WHAT BUILDS BRAIN CONNECTIONS?
- 700+ NEW BRAIN CONNECTIONS are formed every second during early childhood
- Adult brains can keep adding connections too!

TO DO LIST: Put down your “smart phone” and spend 10 minutes non-electronic time with a child
TO DO LIST: Share a meal or cup of coffee with a friend

www.connectionsmatter.org

Emotional Development Starts Early
- Emotions are set by the limbic system and prefrontal lobes
- Limbic system forms an emotional blueprint for later use
- Developing and connecting in first year of life

Center for Educational Enhancement and Development

“I’ve got a plan...”
The Most Essential Life Skill: Self-Regulation

- Ability to deal in appropriate ways with one's own feelings and regulate our thoughts
- Anterior cingulate, located in back & mid-part of frontal lobes, associated with self-regulation → need to be in cortex

Self-regulation of emotion and attention is a prerequisite for both children and adults in order for learning to occur. (Semple, Lee & Miller, 2006)

Children faced with stressful and/or dangerous living circumstances often have less access to social supports that enhance self-regulatory processes (McCelland & Cameron, 2011)

Moment for Reflection

- Recent survey with lower-income, primarily minority children
- 20% of 1-year-old children own tablet computer
  - By 4 years old, three-quarters of children own their own device and half are using more than one device at a time
- 65% of parents said they give a mobile media device to child to keep them calm and 29% use device to put their children to sleep

Consider throughout this webinar series how the use of mobile media devices (smart phones, tablets etc.) may influence brain development, resilience and self-regulation

How Important is Self-Regulation?

- Self-regulation predicts school achievement in reading and mathematics above and beyond the effects of IQ, ethnicity and parent education level (Blair, 2003; Blair & Razza 2007; McCelland & Cameron, 2011)

- Children with poor self-regulation at ages 3 to 11 have worse health, earn less and commit more crimes 30 yrs. later compared to children with better self-regulation, controlled for IQ, gender, social class... (T. E. Moffitt et al, 2011)

Rethinking Adolescence!

- Frontal Cortex
  - THE SHORT LIST!
  - Controlling Impulses
  - Good judgment
  - Solving problems
  - Processing emotions
  - Self-control
  - Planning & organization
  - Motivation and setting goals

- Hand-brain exercise
  - Base of hand = base of skull
  - Palm of hand = brainstem
  - Thumb folded into your hand = limbic area
  - Fingers folded over thumb=cortex
  - Now flip your lid!

The Amazing Adolescent Brain

<table>
<thead>
<tr>
<th>POTENTIAL CHALLENGES</th>
<th>WINDOWS OF OPPORTUNITIES</th>
</tr>
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<tbody>
<tr>
<td>Rigid thinking—can’t see all the options</td>
<td>Major remodeling of most advanced areas of brain</td>
</tr>
<tr>
<td>Limbic region matures before cortex</td>
<td>Natural drive for innovation &amp; adventure</td>
</tr>
<tr>
<td>Increased intensity of emotions</td>
<td>Creativity</td>
</tr>
<tr>
<td>Weigh risk differently</td>
<td>Peak memory capacity</td>
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<table>
<thead>
<tr>
<th>Positive Stress</th>
<th>Tolerable Stress</th>
<th>Toxic Stress</th>
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<tbody>
<tr>
<td>Normal and essential part of healthy development</td>
<td>Body’s alert systems activated to a greater degree</td>
<td>Occurs with strong, frequent or prolonged adversity</td>
</tr>
<tr>
<td>Brief increases in heart rate and blood pressure</td>
<td>Activation is time-limited and buffered by caring adult relationships</td>
<td>Disrupts brain architecture and other organ systems...</td>
</tr>
<tr>
<td>Mild elevations in hormonal levels</td>
<td>Brain and organs recover</td>
<td>Increased risk of stress-related disease and cognitive impairment...</td>
</tr>
<tr>
<td>Example: tough test at school. Playoff game.</td>
<td>Example: death of a loved one, divorce, natural disaster</td>
<td>Example: abuse, neglect, caregiver substance abuse</td>
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Intense, prolong, repeated, unaddressed

Social-Emotional and coping skills, Nurturing caregivers, supportive relationships, Effective intervention
We need to feel safe to think and learn, but stress can push us DOWNSTAIRS in our brain...

**UPSTAIRS: THINKING & LEARNING BRAIN**
- Trouble focusing at school or work
- Say or do things impulsively
- Lose temper easily
- Can't get along with others

**DOWNSTAIRS: SURVIVAL BRAIN**

**Stress and the Brain: Freeze, Fight and Flight**
- **Amygdala**: Brain's rapid response system to fear that sends the body into high alert.
- **Hypothalamus**: Controls the autonomic nervous system and signals the release of stress hormones.
- **Hippocampus**: Receives input from the amygdala and calms the body if the threat is determined to be insignificant.

**When Stress Goes Toxic: Hijacked Amygdala**

**Hanging Out In Survival Brain**

**NORMAL**
- Cortical: 10
- Limbic: 8
- Brainstem: 1

**TRAUMA**
- Cortical: 10
- Limbic: 8
- Brainstem: 1

Cortical Modulation Ratio

2:1 ratio

~1:1 ratio

**Maltreatment Alters Fear Circuitry in Brain**

- Weaker connections between prefrontal cortex and limbic region (hippocampus)
- Fear circuitry can’t work the way it should—"These kids seem to be afraid everywhere."

Herringa et al, 2013
“Peak inside a Classroom”

Jasmine, a 2nd grader is looking for a fight (not someone who will run because she can’t release what’s been triggered…). She’ll pitch a pencil to the side of someone’s head from 20 feet, has thrown a chair over her head with ease... The trigger could be something she saw, heard, smelled, touched or even tasted—it’s locked in her non–verbal memory and associated with intense fear. Her brain is in “fight or flight” response and we don’t know why because we can’t see what happened to Jasmine.

Progressive Relaxation for Children

Listen carefully and do what I say, even if it sounds silly. Pay attention to your body—think about how your muscles feel when they are all wound up and tight and when they are loose and relaxed.

1. You are a sled dog and you want to stretch…stretch your arms out in front, now higher, now drop your arms to the side, let’s try again
2. Be a turtle and go in and out of your shell
3. You have lemons in your hands, squeeze hard to get all the juice out, now let go, squeeze again, now drop the lemon… -------
4. Fly on your nose—no hands!
5. Here come a walrus and your tummy is the bridge! One walrus, two walruses....

Potential Neurodevelopmental Changes

- Organizational
- Brain chemistry imbalances
- Structural

Healthy Child Severe Emotional Neglect

How This Affects Learning

- Affect dysregulation— hyper–aroused or dissociated
- “Always on the ready”
- Shame—which can produce overwhelming dysregulation
- Difficulties with memory
- Language delays
- Need for control—conflict with teachers & students
- Attachment difficulties
- Poor peer relationships—even greater need to teach social emotional skills

Calmer Classrooms, 2007

Executive Function (EF) = Self–Regulation

Diverse activities have been shown to improve children’s executive function: computerized training (i.e., Cogmesh, games*, aerobics, martial arts, yoga, mindfulness and school curriculum. Dimond & Lee, Science, 2011

Core EF includes cognitive flexibility, self–regulation and working memory and depends on neural circuit in which PFC is central
Classroom Strategies for Self-Regulation

- Survey classroom environment to reduce distractions (visual and audio)
- “Fidgets” (worry beads, disc cushions, exercise bands) help students to stay calmly focused and alert
- Very predictable schedules and use sounds (chime vs. buzzer, drum, gong) for in-class transitions

Adapted from [www.self-regulation.ca](http://www.self-regulation.ca)

School Tools and Lessons from the Field

“Trauma can take the wheels off the wagon of learning especially for SEL.”
- Chris Blodgett

It doesn’t matter how great the curriculum and teachers are if children can’t engage.

School-Wide Positive Behavioral Intervention & Supports (PBIS):

- a broad range of systemic and individualized strategies for achieving important social and learning outcomes while preventing problem behavior
- www.pbis.org

For caregivers:
- 5th grade reading level
- Six key factors about trauma and brain development

Free hard copies: jo.gottschalk@alaska.gov or call 907 269-3454

Social Emotional Learning (SEL) Skills

- SEL skills are learned, taught, modeled, and practiced
- Reduce the impact of trauma and increase test scores when program is trauma-informed
- From preschool through high school:
  - [http://casel.org/](http://casel.org/) for national review of SEL programs
  - [http://www.lionsquest.org/](http://www.lionsquest.org/) - Lions Quest evidence-based program

Resource: The Amazing Brain Series
“Neuroscience suggests that mediating the impact of adverse childhood experiences involves not only education and emotional and practical support but also the introduction and application of neurological repair methods such as mindfulness training.”

Bryck et al, 2012

Physiology of Stress

As stress increases, heart rate, blood pressure, and muscle tension go up—can initially enhance performance but past a certain level, performance drops off dramatically.

Performance of efficiency

Yerkes-Dodson Curve

Stress/Anxiety

In the same room and same building at Harvard Medical School....

- Freeze, Flight Freeze = physical ability to react to stress serves as survival mechanism
  - Release hormones to ↑ heart rate, breathing rate, blood pressure, metabolic rate and blood flow

60 Years Later!

- Relaxation Response = also survival mechanism to heal and rejuvenate body
  - Dramatic decrease in heart rate, breathing rate, blood pressure (if elevated) & metabolic rate... exact opposite of FFF response

FFF, Walter B. Cannon
RR, Herbert Benson, 2000

Stress Management Tool: Relaxation Response

- Focusing on your breathing and mindful movement calms your brain = Relaxation Response
  - Quiets brain & creates state of deep relaxation that is opposite of “freeze, fight or flight”
  - Increases brain activity in areas associated with attention focus and decision-making
  - Releases chemical messengers in brain that are calming and give sense of well-being

(Benson H; 2000, 2005; go to www.relaxationresponse.org)

What Can We Learn from Head Start Trauma Smart?

I felt so incompetent as a parent. Now I have skills that work not only with my 4-year-old, but also with my 13-year-old son. I am becoming a calm, confident parent... And my son is becoming a calm, confident teenager.

Parent

Children in pre-kindergarten programs have expulsion rates 3X higher than K-12

Gillen, 2001

Relaxation Response (RR): Essential Components

1. Quiet environment
2. Mental device—sound, word, phrase repeated (silently or aloud) or fixed gazing at object
3. Passive attitude—disregard distracting thoughts, redirect to repetition of word or gazing—don’t judge, just let it happen
4. Comfortable position—usually sitting to avoid undue muscle tension*

RR can be evoked with activities—walking, running, yoga, rowing, knitting
Foundation for Calm Classroom Curriculum
Making the Brain-Body Connection

- Children need simple strategies to calm their amygdala
- Deep breathing helps children to focus and calm down

https://www.youtube.com/watch?v=bXzKVps6zH8

Luke’s Story

Paradigm Shift

It’s about giving children choices and skills to respond to themselves vs. adult jumping in and taking control

KEY STEPS

1. Tune-in
2. Validate child’s emotions
3. Help child find way to shift

What’s in Luke’s Toolbox?

- Looks at his bracelet (always there)
- Take 3–4 deep breaths
- Gives himself a hug
- And if that does help he can go to calm corner
- “Sensation box”
- Seek help from an adult

(Teaching Children to Calm Themselves by David Bornstein, New York Times, Opinion Pages, March 19, 2014; these strategies are being shown to be effective across race, class, geography)

Be a S.T.A.R.

- Smile
- Take a deep breath (inhale)
- And
- Relax your eyes (exhale)

Repeat:

- Relax your eyes (exhale)
- Relax your shoulders
- Relax your body

S.T.A.R.

Head Start Trauma Smart Outcomes

- Children in clinical range of concern moving to normal range by kindergarten
  - Includes emotional reactivity, anxious/depressed, attention problems, aggression, ADHD, ODD, pervasive developmental problems...
  - Improved CLASS scores (positive classroom climate, teacher sensitivity, emotional support...)
  - Staff and parents report improved self-care & life-long skills to manage stress

Crittenton Children’s Center, Saint Luke’s Health System, Kansas City, Missouri

T.I.P.s: Trauma-informed Practices

- Behavioral problems may be transient and driven by trauma-related anxiety
- Every classroom should have a calm down/safe corner
- Be a detective to environmental cues that may be triggers
- Children cope by re-enacting trauma through play & social interaction (others can be pulled into replay)

Child Trauma Toolkit for Educators, www.nctsn.org
Weathering the Storm Inside: Your Personal Weather Report

Sitting Still Like a Frog: Mindfulness Exercises for Kids
by Eline Snel, 2013, Academy for Mindful Teaching, Netherlands

MindUP Evaluation: Ages 3–3rd Grade
- 96% of 3-year-olds demonstrated increased inhibitory response
- 54% of 2nd & 3rd graders increased inhibitory response
- Over 1/3 of all students demonstrated greater emotional control
- 73% of 3rd graders demonstrated improved planning & organizational skills

Poll Question #3
What is one of the most effective, inexpensive strategies we know of to calm the brain (children and adults)?
1. Trauma-focused therapy
2. Mindful breathing
3. Anti-anxiety medications

What About You? Addressing Vicarious Trauma

Vicarious/Secondary Trauma
Having a prevention plan for vicarious trauma is the essential first step to trauma-informed services
Vicarious Trauma

- Changes in our view of ourselves, others, and the world as a result of exposure to the suffering of others
- Symptoms similar to PTSD but acquired through exposure to persons suffering the affects of trauma


IF we are do to our work with suffering people and environments in a sustainable way. We must understand how our work affects us.

Van Dernoot Lipsky, 2008

This work changes us...

Catherine Burns, PhD Vicarious Trauma for Behavior Interventionists and Clinicians, 2010

Vicarious Resilience

There can also be strengths that come from working with clients who have experienced trauma

- witnessing others overcome adversity
- recognizing people’s capacity to heal
- reaffirming the value of the work you do
- Gift of hope

Vicarious resilience can buffer the effects of stress associated with vicarious trauma, strengthen our motivation & give us new, meaningful perspectives.

Vicarious trauma is a process of change

- Unfolds over time
- Cumulative effect of contact with survivors of violence or disaster or people who are struggling
- Process of change is on–going

Vicarious trauma is not a weakness. It is a potential occupational hazard and when we recognize and address it, we become stronger and more effective in our capacity to be trauma–informed in our work. LC, 2014

Personal Signs of Vicarious Trauma

- Isolated from others
- Feeling helpless & not able to make a difference
- Mad, sad, don’t enjoy things you use to like
- Feeling no one understands you
- Can’t bounce back after something hard happens
- Affected deeply by stress of others
- Difficulty concentrating on anything
- Mentally and physically exhausted
- Self medicating
- Reacting angrily to staff, colleagues, students

Dwelling on Days “What About You?” page 44
Organizational Symptoms of Vicarious Trauma

- Widespread cynicism and pessimism
- Lack of communication and frequent miscommunications
- Increase in interpersonal conflicts
- High rates of absences or tardiness
- Ethical or boundary violations
- Unexplained reductions in productivity/service delivery
- Increase in client complaints
- High rates of staff turnover
- Negative atmosphere/low morale
- Less energy & motivation...not willing to go extra mile

The industry needs to make a “paradigm shift” away from blaming helpers for developing compassion fatigue/vicarious trauma to where we see the solution in a larger organizational context rather than focusing solely on individual helpers’ responsibility for self-care.


There is a causal relationship between stress, exposure to trauma and staff turnover.

Vicarious trauma can affect:
- your work, your colleagues, the overall functioning of the organization, and the quality of assistance being provided to those you are working to help.
- Your physical, mental and behavioral health
- The way you act and interact with people you care about

Addressing vicarious trauma and supporting staff will reduce staff turnover and absenteeism leading to improved quality of services, efficiency and reduced costs.

Action Planning for Vicarious Trauma

- Review Organizational Self-Care Checklist for your organization/setting (Page 37)
- Consider options on the checklist as potential next steps for an action plan
- What are 2–3 steps in an action plan on vicarious trauma for your organization that can start now:
  - During recruitment
  - During orientation
  - During employment
  - When leaving position

There is no “one-size fits” all strategy or plan

- Stress is an individual experience—what is stressful to a co-worker may not be stressful for you
- Strength lies in the ability to recognize stressors and understand how you respond
- Remember that the mind and body are constantly influencing and altering one another
  - How you are affected by stress is not static
As a result of the work you do:

1. How has my identity and personal beliefs about myself changed?
2. Have the reasons that I chose to do this work changed from when I started?
3. Am I using my strengths & resources to keep growing with the work or am I in survival mode?
4. Has my perception of things that are under my control changed since I started doing this work?
5. Think about a critical situation in the last few months that affected how you thinking/how you felt outside of work.

Develop an early warning system to let yourself know when you’re getting near the red zone so you can take action
- Can be a 2–minute “how am I doing today” check-in
- What helps you to know you are moving into the caution zone of compassion fatigue/vicarious trauma?

Self–Care Dosimeter

- Do you have a daily transition ritual between work and home?
- Helping professionals say it’s one their best strategies
  - Changing into something comfortable, putting “work” clothes away
  - 10–minute quiet period to shift gears, go for a walk or run, stare at the birdfeeders...

4-Step Breakout Principle

1. Focus on stressful situation by giving it all of your attention
2. Transition briefly from situation to relaxing activity (movement, mindful breathing...)
3. “Breakout” comes with new insights you can have about the challenge when brain transitions (due to Relaxation Response)
4. Return to work on challenge with new insights

(Relaxation Response, Herbert Benson, 2000)

It Starts with Us: Building Resilience and Preventing Vicarious Trauma

- Devereux Adult Resilience Survey (DARS)
- Think about how to strengthen your protective factors
- Self–reflective journal–Building Your Bounce: Simple Strategies for a Resilient You (Mackrain & Bruce, 2009)

http://www.centerforresilientchildren.org/adults/assessments-resources/
PART 2: Trauma-Informed Webinar Series

- Start and end with resilience
- Overview of original ACE Study
- Alaska ACE data with emphasis on effects on children and implications for classroom
- Community resource on ACEs