ALL THE FRIGHT WE CANNOT SEE
Recognizing and Responding to Trauma

Disclosures

• In the past 12 months, I have had no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this activity.

I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.

Learning Objectives

• Be familiar with recent science on the biology of adversity and variable response to trauma
• Understand the concept of toxic stress and its effects on children and their developing brains
• Develop a strategy for the school setting to address children at risk from adversity or impacted by trauma
Children have often experienced a variety of adversities.

Adversities can be catastrophic.

Adversities can be routine.
Alex Kotlowitz: Thomas has experienced many adversities and a lot of violence
Overview

A. The Adverse Childhood Experiences Study and its impact
B. What trauma looks like in children
C. The developing brain
   a) Development and Neuroscience 101
   b) Toxic stressors impact
D. A * B + C: How children exposed to toxic stress present
E. How to identify and respond
Life course science: Link between childhood experience and adult outcome

Adversities in childhood linked with adult outcomes: academic, health, productivity

ACE's Study: Maltreatment and household dysfunction associated with poor health as adult
<table>
<thead>
<tr>
<th>Num br of ACES</th>
<th>Women N=9367</th>
<th>Men N=7970</th>
<th>Total N=17337</th>
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<tbody>
<tr>
<td>0</td>
<td>34.5</td>
<td>38.0</td>
<td><strong>36.1</strong></td>
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<tr>
<td>1</td>
<td>24.5</td>
<td>27.9</td>
<td><strong>26.3</strong></td>
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<tr>
<td>2</td>
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<td>16.4</td>
<td>15.9</td>
</tr>
<tr>
<td>3</td>
<td>10.3</td>
<td>8.6</td>
<td><strong>9.5</strong></td>
</tr>
<tr>
<td>4 or more</td>
<td>13.2</td>
<td>9.2</td>
<td><strong>12.5</strong></td>
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</table>

Cumulative ACES & Mental Health

Cumulative ACES & Chronic Disease
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What trauma looks like in children

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Interlude on Neurodevelopment

- Brain starts as single cell – develops into ten billion cells
- Neurogenesis
- Neuronal migration
- Arborization
- Synaptogenesis
- Apoptosis
- Myelination


Brain not complete at birth, development guided by environment
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E. How to identify and respond
How are events in childhood “biologically embedded”

Effecting outcomes like behavior and physical and mental health decades later

Toxic stress triggers potentially permanent changes thru 2 mechanisms
- Brain connectivity
- Epigenetics
Neurobiology of Trauma

Hypothalamic-Pituitary-Adrenal Axis (HPA)

- Stress activates axis.
- Peripheral release of epinephrine and cortisol.
- Stimulates multiple areas of body and immune system.

Trauma

- Stress and the tiger
  - Bodies designed to respond to stress
  - Adrenalin and cortisol help us run from tiger or hide
  - Threat of short duration
BUT…when the tiger lives in your home, neighborhood or life

Neurobiology of Trauma

Amygdala

- Amygdala: Input from sensory, memory and attention centers
- Emotional memory system = The brain’s alarm system
Neurobiology of Trauma

**Hippocampus**
- Interface between cortex and lower brain areas.
- Major role in memory and learning.
- The brain’s file cabinet or search engine.

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**Prefrontal cortex**
- Executive function
- Impulse control
- Working memory
- Cognitive flexibility
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If Thomas came for services…

- Concerns brought to medical provider:
  - Not sleeping
  - Overeating
  - Asthma worse, often gets headaches
  - Short attention span
  - Academic difficulty

Not sleeping

<table>
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<tr>
<th>FUNCTION</th>
<th>CENTRAL CAUSE</th>
<th>SYMPTOM(S)</th>
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<tbody>
<tr>
<td>Sleep</td>
<td>Stimulation of reticular activating system</td>
<td>1. Difficulty falling asleep 2. Difficulty staying asleep 3. Nightmares</td>
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</tbody>
</table>
If Thomas came for services…

- Concerns brought to medical provider:
  - Not sleeping
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Impact of toxic stress on immune system

- Developing system is chronically pressed into action
  - Excessive cortisol suppresses humoral immunity, increasing risk of infection
  - Inflammatory response persists after it is no longer needed
  - Somatic perception impaired
If Thomas came for services…

- Concerns brought to medical provider:
  - Not sleeping
  - Overeating
  - Asthma worse, often gets headaches
  - Short attention span
  - Academic difficulty

ADHD, really?

Prior to this conference – might consider

- Not getting medications
- Under-medicated ADHD – needs higher dose
- Need to switch medications
- ODD/conduct issues
- Depression
- Developmental delay
- Parenting issues
Response to Trauma: Development and Learning

AGE IMPACT ON WORKING MEMORY

Infant/toddler/pre-schooler: Difficulty acquiring developmental milestones

School-aged child: Difficulty with school skill acquisition; losing details can lead to confabulation viewed by others as lying; difficulty keeping up with material as academics advance

Adolescent: Difficulty keeping school work and home life organized; trouble keeping up with material; confabulation increasingly interpreted by others as integrity issue

IMPACT ON HISTORICAL CONTROL

Frequent severe tantrums; aggressive with other children; attachment may be impacted; frequently in trouble at school and with peers from fighting and disrupting; impulsive actions which can threaten health and well-being; actions can lead to involvement with law enforcement and increasingly serious consequences

IMPACT ON COGNITIVE FLEXIBILITY

Easily frustrated; organizational difficulties; can look like learning problems; difficulty assuming tasks of young adulthood which require interpretation of information: driving, functioning in workforce

Childhood experience not destiny

What explains variable response to adversity
Diathesis stress model: due to genetic vulnerability some do poorly with adversity

Diathesis stress: No genetic advantage, why would vulnerability alleles be conserved?

Orchids and Dandelions: Biological differential sensitivity to context
Some children less swayed by experiences

Other kids predisposed to being more sensitive or reactive to environment

Advantage to each depends on context
In Frozen we have an orchid (Elsa) and a dandelion (Anna)…

Dopamine D4 receptor: externalizing behaviors when maltreatment BUT respond ++ to positive parenting technique

Kids with high cortisol reactivity rated as less pro-social when living in adverse contexts, more pro-social when living in more nurturing contexts.

Implication: The very children who struggle the most under adversity are likely to have been the luminaries of the next generation.

Brain and physiologic changes allow adversity to embed
- Ways that are adaptive in short term, maladaptive in life course.
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Trauma Responses: Adaptive and Protective When in Threatening Situation

- Same bodily functions and behaviors may be maladaptive when children are removed from the stressor
- When not examined within the context of past traumas can be misinterpreted as pathologic
- “YOU MEAN IT’S NOT MY FAULT”

“Kids are doing the best they can.”

Helping families understand trauma
Invisible suitcase

• I am in danger
• I am worthless
• I am powerless
• You are not reliable
• You cannot protect me
• You will be dangerous or rejecting
Helping caregivers understand and respond

Building capacity for emotional control
- What is needed to feel safe
- Triggers
  - Look for modifiable stressor
  - Media can often be trigger
  - Triggers that are not expected may be cause of unexpected reactions

Response with Trauma Lens

- Addressing complaints practically
  - Distraction:
  - Cognitive coping (self-talk):

- Relaxation techniques:
- Massage:
- Pain diary:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Description</th>
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- Diet – fiber, water:

![Fiber and water icons]

![Images of healthy foods]

![Images of exercise]

![Images of children playing]

3/23/17
Sheet of resources to keep on hand

- Parenting supports
  - Parenting programs: Triple P, Circle of Security
  - Early Intervention
  - Quality childcare options
  - School resources
  - Grandparents raising grandchildren resources
- Exercise programs — YMCA, Boys and Girls Club
- Mindfulness training, prayer groups, yoga classes

Identify resources in your community

- Trauma focused therapies best supported by evidence
  - Young children
    - Child-Parent Psychotherapy (CPP): 0-4 years
    - Parent Child Interaction Therapy (PCIT): 2-12 years
    - Children and Adolescents (3-18 yo)
    - Trauma Focused – Cognitive Behavioral Therapy (TF-CBT)
  - Complex trauma
    - Attachment, Self Regulation and Competency (ARC)
    - Integrative Treatment of Complex Trauma for Children and Adolescents (ITCT-C, ITCT-A)

Implications for policy and systems that support children and families

- Investment in social services – consider long term cost of not investing
Implications for research

- Biomarkers: Methylation patterns and telomere length
- Cortisol levels
- Inflammatory mediator levels

Alex Kotlowitz: Thomas has witnessed an incredible amount of violence
- Thomas: If it happens again, I don’t think I could stop.

Tertiary care
Quaternary care

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