

Overview of Brain Development & the Impact of Trauma

Illinois Family Violence Coordinating Councils
November 2, 2011

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Learning Objectives

By participating in this training, you will:

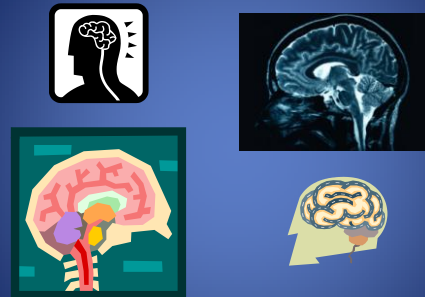
- 1) Gain a better understanding of child and adolescent brain development and behavior
- 2) Be exposed to the impact of traumatic events on children and youth, and
- 3) Learn general strategies that will help children and adolescents cope better with their experiences

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Child and Adolescent Development

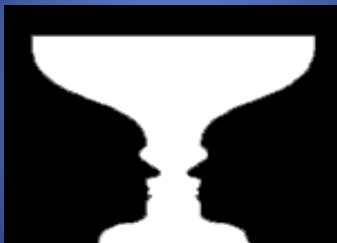


Calvin and Hobbes



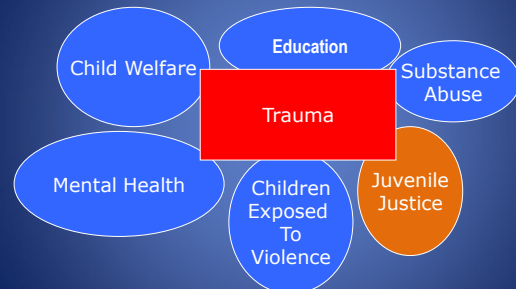
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Child Trauma



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A Common Theme for Child Systems

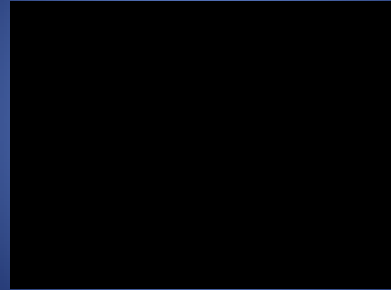


Training Overview

1. The Brain & Adolescent Development
2. Trauma
3. Resilience & Recovery

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Inside the Teenage Brain



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Brain Basics- Development

- The brain is an amazing organ that controls many of the things we do. As the Brain develops (from the bottom up) it addresses different areas of functioning
 - First- **Physical** life functions (breathing, heart rate, blood pressure)
 - Next- **Emotional** (happiness, anger, attachment)
 - Last- **Thinking** (planning, impulse control)

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Brain Basics- Development

A message comes into a brain cell, the cell does its work and sends the message on to other brain cells



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Brain Basics- Plasticity

- We have more brain cells than we use
- Unused cells die off- pruning
- Neurons that talk to each other frequently develop more synaptic connections
- “neurons that fire together, wire together”

Brain Basics- Plasticity

- **Critical Periods**- for some aspects of brain development, timing is critical. Important abilities will be lost or diminished if they don't develop pat the right time (e.g. vision, attachment, language)
- Childhood experiences impact how the brain develops

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Brain Basics- Plasticity

- **Activity-Dependent Changes**-
 - Events can cause changes in the brain. A single, powerful experience can affect our brain for life. Repeated smaller experiences can also change our brain.
 - This is why we practice (sports, art, studies, etc.)- the more we repeat things the stronger the brain connections become
 - This is why there is always hope that youth can get better with new, positive experiences

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Babies and Toddlers



CHILD DEVELOPMENT

- Early Development
 - Physical
 - Emotional
 - Cognitive
- Milestones
 - Walking
 - Attachment
 - Talking
- Brain Development
 - Memory

Teenagers



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Teenage Development

- Adolescence begins around ages 10 – 13 and involves changes in
 - Physical Appearance (puberty)
 - Emotions (feelings and identity)
 - Thinking (cognitive/intellectual)
- A teenager's physical development will often occur AHEAD OF his or her emotional or cognitive development.

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Cognitive and Intellectual Development

- Science has taught us that the part of the brain that develops last during adolescence is the prefrontal lobe, which controls
 - Complicated Decision-Making
 - Thinking Ahead
 - Planning
 - Comparing Risks and Rewards

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Teenage Development

- Adolescence is like giving a teenager a car with
 - A new body with a lot of horsepower (physical);
 - A sensitive gas pedal that can go from 0 – 60 mph in a few seconds (emotional); and
 - A brake system that won't work completely for several years (cognitive);



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"Normal" Teenage Development



From "Zits" by Jerry Scott and Jim Borgman

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Adolescent Development

- Recall your teenage behavior: did you do anything that could have gotten you stopped by police?
- Would you deal with that same situation differently now as an adult?

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Cognitive and Intellectual Development

- So, what are some of the types of thinking that will change between adolescence and adulthood?
 - Self-Control
 - Short-Sightedness
 - Susceptibility to Peer Pressure

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Self-Control

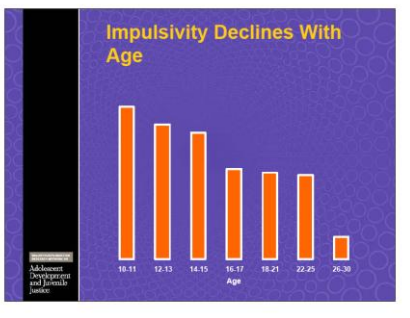


Teens and Decisionmaking

- Teens make decisions differently than adults. They rely more on their “emotional” centers than their “thinking” centers
- Teens often think before they act but they are using a different set of “values” to make these decisions
- Teens often choose actions that are much riskier than adults would choose

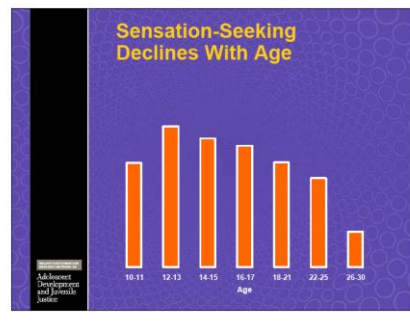
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Impulsivity Declines With Age



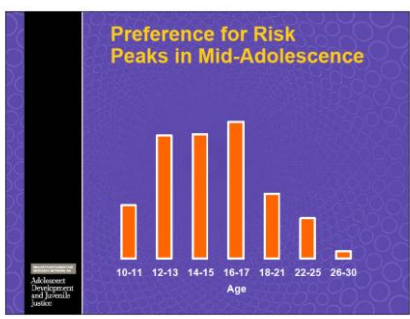
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Sensation-Seeking Declines With Age



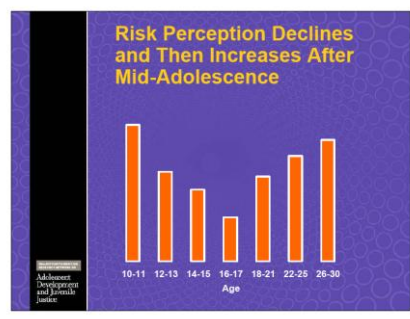
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Preference for Risk Peaks in Mid-Adolescence



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Risk Perception Declines and Then Increases After Mid-Adolescence



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Short Sightedness



Teenage Development

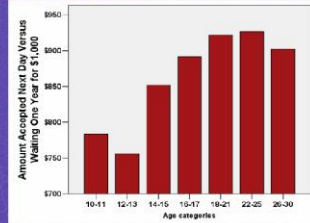
- Teens focus
 - more on gains and
 - less on loss
- Teens focus
 - more on what they will get right now, and
 - less on what might happen in the future
- But, we know from the new brain research that the teenage brain will continue to mature and that, over time, teens will begin to think more like adults



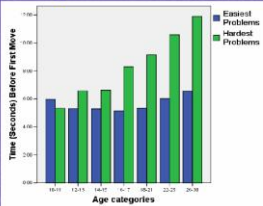
Future Orientation Increases With Age



Older Individuals Are More Willing to Delay Gratification



With Age, Longer Time Spent Thinking Before Acting



Susceptibility to Peer Pressure

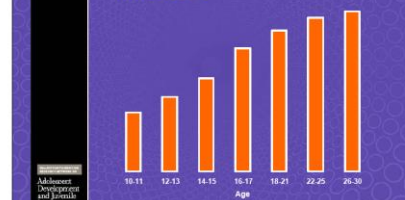


Influence on Development: Peer Pressure

- Looking for affiliation
- Social approval and risk
- When you were a child, most of your world revolved around home and family. When did that start to shift to your peers?
- When did you stop telling your parents everything you did with your peers?

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With Age, Individuals Become More Resistant to Peer Influence



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Peers Increase Risky Driving Among Teenagers and College Students But Not Adults



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Given what we've learned about adolescent development, how would you expect a teen to act

- When he or she is angry?
- When he or she is frightened?
- When he or she feels rejected?

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Coming up- How would you expect a teen to act

- When he or she has adverse experiences in early childhood?
- When he or she has a mental health issue?

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Training Overview

1. The Brain & Adolescent Development
2. **Trauma**
3. Resilience & Recovery

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Child Trauma



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WBEZ- The Mind of Mario



What is child trauma?

The experience of an event by a child that is emotionally painful or distressful which often results in lasting mental and physical effects.*

* National Institute of Mental Health

DSM IV Diagnostic Criteria for Post Traumatic Stress Disorder (PTSD)

- After experiencing the event, the person must exhibit:
 - Re-experiencing
 - Avoidance
 - Hyperarousal
- Not all children who have been traumatized qualify for a diagnosis of PTSD.

Trauma and Human Existence by Robert D. Stolorow (2007)

- Trauma plunges the person into recognition of death as a constantly threatening possibility, leading to the collapse of everyday significance... When one is traumatized one can no longer have a normal sense of being-in-the-world. Trauma is singularizing, isolative, and non-relational, and its terror unendurable.

National Child Traumatic Stress Network (2008)

- At least 75% of children in the Juvenile Justice System have experienced traumatic victimization
- As many as 50% of these youth may have symptoms of Post Traumatic Stress Disorder.

Adverse Childhood Experiences that may result in Child Trauma include

- A youth experiencing:
 - Physical abuse and neglect
 - Emotional abuse and neglect
 - Sexual abuse
- A youth growing up in a household with:
 - An alcohol or drug abuser
 - An incarcerated household member
 - Someone who is chronically depressed, suicidal, institutionalized or mentally ill
 - Domestic Violence

Felitti, 2009

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The Impact of Adverse Experiences

- Exposure to these adverse experiences increases a youth's risk for:
 - Major Mental Illness
 - Substance Abuse
 - AIDS and Sexually Transmitted Diseases
 - Academic Difficulties
 - Impaired Physical Health
 - Early Death

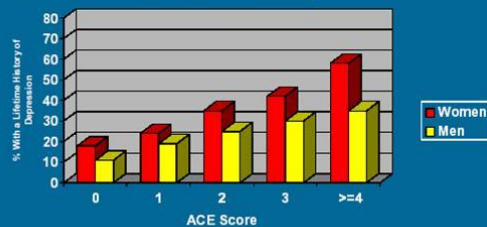
Felitti, 2009

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Trauma & Mental Health

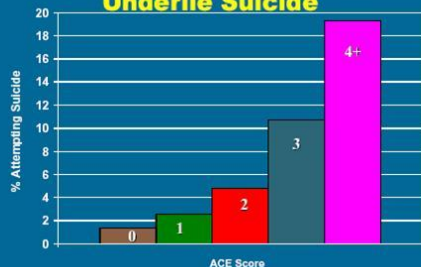
- Trauma Increases the Odds for Major Depression nearly two-fold.
- Trauma Increases the Odds for suicide
- Trauma is associated with poor response to antidepressant medication and poor overall treatment outcomes.

Childhood Experiences Underlie Chronic Depression



WWW.ACESTUDY.ORG

Childhood Experiences Underlie Suicide

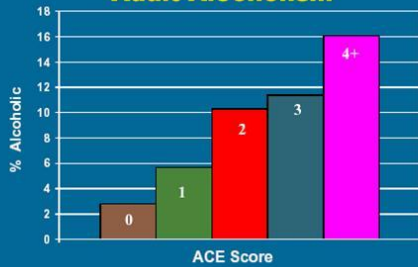


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Trauma & Substance Abuse

- Trauma significantly increases the risk for alcohol and drug abuse in adolescents.
- Trauma is the best predictor of drug and alcohol abuse in women.
- Trauma is associated with poor treatment outcomes and increased treatment drop out.

Childhood Experiences vs. Adult Alcoholism

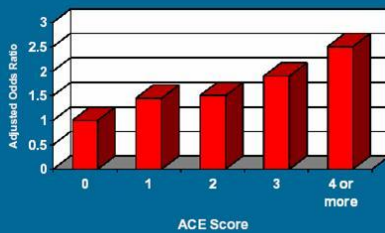


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Trauma & HIV/STD Risk

- Childhood Trauma dramatically increases risks for HIV-risk behavior.
- ACES correlate w/ Increased Sexual Partners
- ACES Correlate w/ History of STD

Adverse Childhood Experiences vs. History of STD



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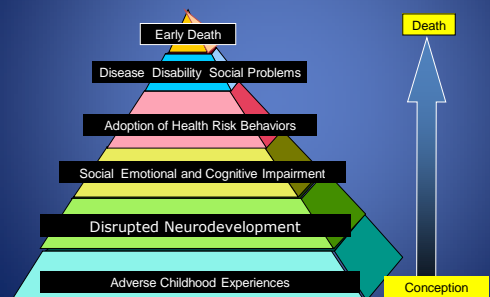
Trauma & Academics

- Impact of trauma on school readiness
- Impact of trauma on school performance
- Impact of trauma on cognitive functioning that may result in behavioral difficulties
- Increased likelihood of dropping out of high school

Trauma & Physical Health

- Adverse Childhood Experiences Study
 - Smoking
 - Obesity
 - Heart Disease
 - Cancer
 - High Risk Behaviors
 - Early Death

Adverse Childhood Experiences: Influence on Health and Well-being over the Lifespan



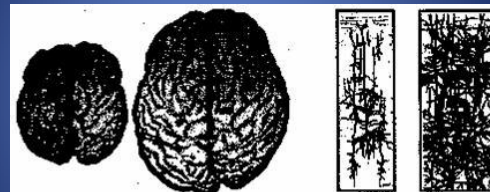
Trauma as Disrupting Brain Development

- Brain Plasticity- a youth's brain development responds to the youth's experiences
- Stress
 - Alarm System as a Survival Mechanism
- After Trauma
 - Youth overreacts to normal situations
 - Youth is on Constant Alert
 - Youth may overinterpret signs of danger

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Brain Growth



Newborn 6 Year old Newborn 6 Year old

Disrupted Brain Development From Childhood Experiences



Perry, 2002

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Trauma and Alarm



- Alarm System as a Survival Mechanism
- Extreme or frequent threats can damage the alarm system
- With trauma, the alarm system is too easily triggered and too slow to shut down



Altered Neurobiology in CEV (Perry)

- Use-dependent alterations in the key neural systems of the brain related to the stress-response
- A dysregulated, sensitized stress-response
- Increased startle response
- Higher resting heartrate
- Dissociation and decreased heartrate

www.childtrauma.org

Bruce D. Perry, M.D., Ph.D., ©2011

A Traumatized Youth's Response Types

- Fight/Flight
 - Hypervigilant
 - Easily Offended
 - Over reactive
 - Avoidant
- Dissociation
 - Freeze/Numb
 - Overwhelmed
 - Nonresponsive
 - Self-Mutilation
 - Passing Out

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Fear Changes the Way We Think (Perry)

Sense of Time	Extended Future	Days Hours	Hours Minutes	Minutes Seconds	Loss of Sense of Time
Primary secondary Brain Areas	Neocortex Subcortex	Subcortex Limbic	Limbic Midbrain	Midbrain Brainstem	Brainstem Autonomic
Cognition	Abstract	Concrete	Emotional	Reactive	Reflexive
Mental State	Calm	Arousal	Alarm	Fear	Terror

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Fear Changes the Way We Act (Perry)

Adaptive Response	Rest	Vigilance	Freeze	Flight	Fight
Hyperarousal Continuum	Rest	Vigilance	Resistance	Aggression	Aggression
Dissociative Continuum	Rest	Avoidance	Compliance	Dissociation	Fainting
Cognition	Abstract	Concrete	Emotional	Reactive	Reflex
Mental State	Calm	Alert	Alarm	Fear	Terror

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Trauma and Triggers



- After Trauma
 - Youth is on Constant Alert
 - Youth may overinterpret signs of danger
 - Youth overreacts to normal situations



Physically Abused Children See Anger Where Others See Fear

Graphic by: Seth Pollak, courtesy PNAS



American Academy of Child and Adolescent Psychiatry

- “there is clinical consensus that children with severe PTSD may present with extreme dysregulation of physical, affective, behavioral, cognition, and/or interpersonal functioning that is not adequately captured in current descriptions of PTSD diagnostic criteria. Some of these children may be misdiagnosed with...”

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American Academy of Child and Adolescent Psychiatry

- Bipolar disorder
- Attention Deficit Hyperactivity Disorder
- Oppositional Defiant Disorder
- Panic Disorder
- Anxiety Disorders
- Major Depression
- Primary Substance Abuse Disorder
- Psychotic Disorder

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Trauma as a Family Issue

- Intergenerational Issue
 - Child
 - Parent
 - Grandparent
- Breaking the Cycle
- Redefining 'Normal' Events
- Respecting the Culture