

TOXIC STRESS

HOT TOPICS

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Objectives

- Learn about the ACE study
- Learn about the 3 different stresses (positive, tolerable, and toxic stress)
- Know the importance of the nurturing early childhood environment

STRESS OR ADVERSITY

- Definition: “a state of emotional or mental strain or tension resulting from a demanding circumstance”
- Individual variability
 - Perception of stress (subjective)
 - Example: class is noisy and teacher raises her voice
 - Reaction to stress (objective)
 - Responds by previous experience

Adverse Childhood Experiences

- Abuse
 - Emotional
 - Physical
 - Sexual
- Household dysfunction
 - Domestic violence (mother)
 - Mental health
 - Substance abuse
 - Parental separation or divorce
 - Incarcerated household member
- Neglect
 - Emotional
 - Physical

Childhood Adversities → Toxic stress
(Epigenetic Modifications, Disruptions in Brain
Architecture, Behavioral Allostasis) → **Poor**
Adult Outcomes

ACE Score

- ACE CDC study: 17000 people 1995-97, Kaiser HMO, 87% had 2 or more ACE
- Higher ACE score of 4 or more prior to age 18 years
 - Obesity 2x
 - Smoking 2x
 - Alcoholism 7x
 - Illicit drug abuse 4x
 - IV drug abuse 11x
 - Promiscuity 3.5x

Allostasis

- Definition: “the process by which the body responds to stressors in order to regain homeostasis”
- Behavior attempts to reduce stress
 - Smoking
 - Illicit drugs
 - Eating
 - Alcohol
 - Sex

Adverse Childhood Experiences

- Strongly associated with unhealthy lifestyles
 - Obesity
 - Smoking
 - Alcoholism
 - Drug abuse
 - Promiscuity
- May cause poor health decades later
 - Cardiovascular disease
 - Lung disease
 - Liver disease
- Could lead to early death

3 TYPES OF STRESS

- **POSITIVE**
 - Brief, infrequent, mild to moderate intensity
 - Most normative childhood stress
 - Buffered by nurturing adult(s) to return to baseline
 - Builds motivation and resiliency
- **TOLERABLE**
 - More severe and longer lasting adversities
 - Buffered by adult relationships that helps the child adapt
- **TOXIC**
 - Strong, frequent, prolonged adversities
 - Prolonged activation of the stress response can disrupt the architecture of the brain and other organs
 - Insufficient social-emotional buffering

Toxic Stress

- **Adverse Childhood Experiences**
 - Abuse (emotional, physical, sexual)
 - Neglect (emotional, physical)
 - Household dysfunction (mental health, substance abuse, domestic abuse, parental separation, incarcerated household member)
- **Insufficient social-emotional buffers**
 - Lacking: reassurance, support, consolation, helping to adapt
- **Potentially permanent changes with long-term consequences**
 - Epigenetic
 - DNA is the same but depends on which genes are turned on or off
 - Brain architecture
 - Brain development
 - Connectivity

When Children Feel Unsafe or Threatened

- Child's brain focuses on survival
 - Brainstem and limbic system
- Can cause changes in the brain
 - Less development of intellectual brain
 - Smaller brain
 - Fewer brain connections
- Problem behaviors common
 - Difficulty focusing and paying attention
 - Difficulty calming down, anxious
 - Bullying or aggressive behaviors

BRAIN MATURATION

- Maturation is from bottom up
- Primitive, survival brain
 - Brain stem
 - Bodily functions
 - Limbic system
 - Impulsive and emotions
- Intellectual brain
 - Cortex
 - Thinking, decision making, controlling emotions



Off Balance

- Amygdala (limbic)
 - “just do it”
 - Emotional
 - Reactive
 - Impulsive
 - Matures by 18 yrs
- Prefrontal Cortex
 - “think about it”
 - Judgmental
 - Reflective
 - Calculating
 - Matures by 24 yrs

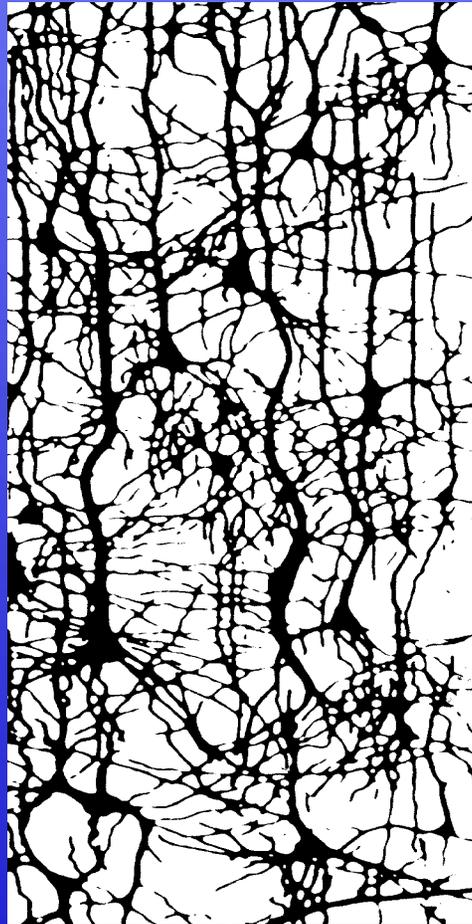
Prefrontal Cortex

- Controls behavior with other parts of the brain
 - More used connections strengthen
 - Less used connections are pruned
- Improves through early adulthood
 - matures ~24 yrs
- Executive function
 - Manages lots of information
 - This is how we work together
 - Better productivity for a better world!

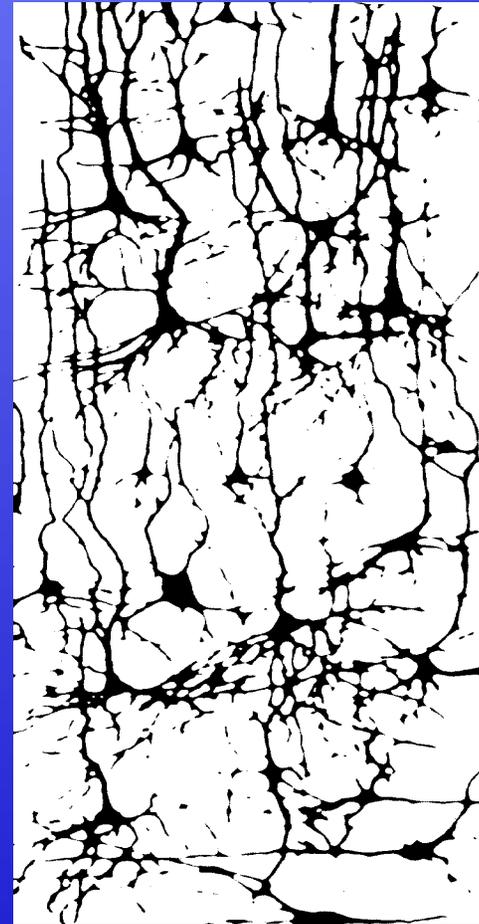
Human
Brain
at Birth



6 Years
Old



14 Years
Old



The Science of Early Brain Development

- **Epigenetics**
 - Alterations in the way the genetic program is read
 - Stress-induced changes in epigenetic markers
 - “Not your parents genes”
 - Which genes are turned on or off, when, and where
 - Environment/experience influences how the DNA is read and utilized
- **Physiology of Stress**
 - Positive (brief increase in HR and mild elevations of hormones)
 - Tolerable (longer increase HR, BP, and stress hormones, but time-limited and buffered back to baseline)
 - Toxic (prolonged activation or stays activated, wear and tear)
- **Neuroscience**
 - Connections are experience and activity dependent
 - Environment/experiences influence how the brain architecture is formed and remodeled
 - Diminishing cellular plasticity limits remediation (Connections & Pruning) (waning by age 5 yrs)

TOXIC STRESS

- **Epigenetics modifications**
 - How the genome is read
 - Which genes are turned on or off
- **Disruption of brain architecture**
 - Positive stress develops cortex (learning, thinking, decision-making, controlling emotions)
 - Toxic stress stimulates survival brain (emotions, impulsiveness, anxiousness, aggression)
- **Behavioral allostasis**
 - Healthy or adaptive coping skills
 - Exercise, yoga, listening to music, meditation, cleaning
 - Risky behaviors or maladaptive or unhealthy coping skills
 - Eating to cope, smoking, alcohol, drugs, sex

What Can We Do?

- Help children figure out how to turn off their stress response
 - Healthy ways (healthy allostasis)
- Intervene early (Early Education and Child Care is an important time)
 - Many children are in child care fulltime (8-10hrs/day)
 - Nurturing, predictable, and safe environments

Strong Brain Architecture

- Serve and Return with caring adults
 - Back and Forth interaction
 - Builds the foundation for learning
 - Cognition
 - Processing emotions
 - Seeing
 - Hearing

Optimal Child Care

- Small group size
- High adult-child ratios
- Qualified staff
- Warm and responsive staff
- Language rich environment
- Safe building/environment

Improve Parenting

- Show them what they are doing right
- Active skill building by coaching and practicing
 - Serve and return
- Build skills for life and learning
 - Executive Function and self-regulation
 - Learn to work with others
 - » Working memory
 - » Inhibitory control
 - » Mental flexibility

HELP CHILDREN GROW HEALTHY BRAINS

- Help me make connections
 - Right experience at the right time
- Be there for me
 - Healthy relationships
- Understand the building blocks of my brain
 - Survival brain → Intellectual brain
- Build my self esteem
 - Praise, encouragement, and positive experiences
- I need to feel safe
 - Safe, predictable, and stable environment
 - Child needs to feel safe and be nurtured
- Keep being there for me
 - Even as teenagers