Early Experiences Matter: The Effect of Childhood Adversity on the Brain and Body

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Four Key Research Findings from Brain Science That Can Inform Policy

1. Early life experiences are particularly impactful for the developing brain

2. Negative experiences and toxic stress affect development and long-term outcomes

3. Risk and opportunity can be transmitted intergenerationally (e.g., through poverty)

4. New parents experience changes in their brain structure and activity
Fetal and Early Life “Programming”

Humans have big, underdeveloped (and therefore “plastic”) brains in early life.
Early Life is a Critical “Sensitive” Period
Little Scientists: Learning Begins in the Womb!

• Pregnant mothers were asked to read to their babies in the last trimester.
• At birth, babies demonstrated they could recognize the specific passages they heard.
Plasticity Advantage: Infants Hear Languages Adults Don’t!
The Fetal and Infant Brain is Under Active Construction and Pruning
Prenatal Stress Hormone Exposure and Later Development

- **Infant Behavioral State**
  - Time (min)
  - Low Prenatal Maternal Cortisol
  - High Prenatal Maternal Cortisol

- **Anxious/Depressed**
  - Low Prenatal Cortisol
  - High Prenatal Cortisol


Even While Sleeping, Infants Track Family Conflict

• Sleeping infants listened to audio recordings of adult voices.
• Infants’ brains respond to angry adult voices while sleeping.

Adolescence is also an Important Time for Brain Development
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What are Adverse Childhood Experiences (ACEs)?

• Developed in an landmark study that began in 1995 in Southern California with over 17,000 Kaiser patients.

• An ACE score can range from 0-10, and is a count of whether each of 10 negative experiences occurred before the age of 18.

• ACEs include:
  – physical, sexual, or emotional abuse
  – emotional or physical neglect
  – domestic violence
  – living with someone who suffered from mental illness, was substance abusing, or was incarcerated
  – parental divorce
What is Toxic Stress?

When chronic or significant stressors (ACEs) happen....

and supportive, responsive adult caregivers are not available.
High Stress Exposure + Low Buffering = Risk
What are the Long-term Effects of Chronic Stress?

- increases susceptibility for, or seriousness of, a number of diseases
- increases risk of “risk” factors such as obesity
- can impair cognitive functioning
- increases risk for mental health problems
- can accelerate aging
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<tr>
<th>Risk Factor</th>
<th>Effect on Life Expectancy</th>
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<tr>
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<td>Obesity</td>
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<td>High blood pressure</td>
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<tr>
<td>Childhood stress</td>
<td>20 years</td>
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How do ACEs Influence Health and Well-Being?

For more information: http://www.cdc.gov/ace/
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Infant Brain Volume and Family Income

Child Vocabulary and Family Income

Cumulative Language Experiences

Size of child’s vocabulary

Number of words heard

Vocabulary Growth - First 3 Years
Whole Brain Cortical Surface Area (Ages 3-20) and Family Income

Look how rapidly brain growth increases between $0 and $50k/year

Intergenerational Transmission of Risk and Opportunity: Parents and Environment Matter

Intergeneration transmission of risk can be transformed through intergenerational interventions.
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Two Open Windows: Infant & Parent Neurobiologic Change

Supported and released by Ascend at the Aspen Institute.
The Framework

First & Most Important Sensitive Period

The social, emotional & educational environment

The agent of change

A changing agent
Parenting Changes Your Brain!

• Changes the way stress is handled
• Promotes positive emotions and bonding
• Increases parental motivation
• Promotes caregiving behaviors
• Changes occur in the reward circuit, the social information circuit, and the emotion regulation circuit
Changes in the Reward Circuit

• New mothers and fathers during the first few months postpartum exhibit structural growth of the reward circuit.

• The amount of the growth is associated with positive feelings mothers reported about their baby (e.g., beautiful, perfect).

• More functional brain activity in this region also occurs when looking at pictures of one’s own baby vs. other infants.
How Do Stressed Parents’ Brains Respond?

Parents with decreased responses to infant cries and images are more likely to be experiencing chronic stress, depression, and substance abuse.
Why is this Science Important for State Policymakers and What Can be Done?
Why is this Science Important for State Policymakers to Know?

• Most major taxpayer concerns and government fiscal obligations are connected to these issues

• Early and chronic (toxic) stress likely increases:
  – Lost productivity (and therefore lost revenue)
  – Educational expenditures and resources by schools
  – Crime
  – Mental and physical illness
  – ER visits
  – Low workforce preparation
  – Intergenerational disadvantage
  – Health and continued economic disparities

• Prevention and EARLY Intervention for stressed families therefore could save resources and prevent problems across sectors
ACEs Can Be Prevented

PREVENTION STRATEGIES

- Economic supports for families
- Changing social norms: support families & positive parenting
- Provide early high quality care & education
- Enhance parenting skills
- Intervene to lessen harms & prevent future risk
- Sector involvement
- Monitoring & Evaluation

Don’t Forget about Adolescents

Focus is often on their limitations in:

- Decision-making
- Risk taking
- Emotion regulation

Adolescence is also a positive, sensitive period and a reset opportunity.
What questions could legislators ask during policy deliberations?

• What programs exist in our state?
  – Examples: Home visiting, prenatal care, education, healthy marriage funds, healthy babies programs, early childhood education, or rehabilitation

• Can existing programs use this information about brain science?
  – Are staff and participants of these programs aware of the current research on stress and its costs?
  – Can education/training help (e.g., adding continuing ed requirements)?

• Can existing or proposed programs be evaluated in this light?
  – “Does your program directly tackle the effects of stress?”
  – “How would your program work differently for children and families living in high-stress situations?”
  – “How does your program consider the interconnected needs of parents and children?”
Four Takeaway Messages

• Early adversity impacts lifelong well-being.

• Children need supportive, responsive caregivers to buffer their stress so it doesn’t become toxic.

• New parents and infants experience brain changes at the same time, thus two-generation approaches can be highly effective.

• Early, family-focused prevention and intervention efforts are particularly efficient and cost-effective.