Importance of Early Experience

- **Early experience** is the “smoking gun” for both education success and long-term health.
  - Things that happen early in life leave biological memories in your body.
  - “Gets under your skin”
Importance of Early Experience

- Striking disparities in what children know and can do are evident well before they enter kindergarten.
- Brain Architecture
Brain Architecture

- Major Stages of Brain Development
  - Neural tube formation
  - Cell proliferation
  - Cell differentiation
  - Cell migration
  - Cell connections
  - Synaptic pruning
  - Myelination
# Cell Connections/Synapse Formation

<table>
<thead>
<tr>
<th>Birth</th>
<th>2 Years Old</th>
</tr>
</thead>
</table>

- Synapse formation peaks at the rate of 40,000 per second between 3 and 15 months of age.
• Pruning is a highly selective process. It is the phase of brain development in which experience most obviously influences the brain.
The Brain Changes its Structure and Function in Response to Experience

- Plasticity
  - The brain is adaptable and can be influenced by positive experiences.
  - The brain is vulnerable and can be harmed by negative experiences.
Toxic Stress
Toxic Stress

Lead paint poisoning affects over one million children today.

LEADFREEKIDS.ORG

Please don’t put mercury fillings in my little white teeth, Mom. Take me to a mercury-free dentist.

GET THE LEAD OUT

GET THE LEAD OUT OF YOUR HOME.
Toxic Stress

• Some causes
  • Extreme poverty
  • Physical or emotional abuse
  • Chronic neglect
  • Severe maternal depression
  • Substance abuse
  • Family violence
Tolerable Stress

Lally (2007)
Toxic Stress

Lally (2007)
The Body’s Response to Stress

- Increase in heart rate
- Increase in blood pressure
- Increase in breathing rate
Cortisol

- Suppresses the immune system
- Impairs memory/shrinks hippocampus
- Impairs selective attention
- Creates anxious behavior
Cortisol

- If exposed to chronic stress, then level of hormone production becomes “normal.”

- Over arousal and tendency toward impulse
  - Over active
  - Over reactive
  - More aggressive
  - Less attentive
Adverse Childhood Experiences
# Prevalence of ACEs in Study Group

<table>
<thead>
<tr>
<th>Type of ACE</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abuse</td>
<td>28%</td>
</tr>
<tr>
<td>Substance Abuse</td>
<td>27%</td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>11%</td>
</tr>
<tr>
<td>Parental Divorce</td>
<td>23%</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>21%</td>
</tr>
<tr>
<td>Mental Illness</td>
<td>19%</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>10%</td>
</tr>
<tr>
<td>Incarcerated Family Member</td>
<td>5%</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>15%</td>
</tr>
<tr>
<td>Mother Treated Violently</td>
<td>13%</td>
</tr>
</tbody>
</table>

Felitti et al., 1998
ACE – Lifelong Trajectory of Increasing Risks

- Correlated with increased risk of:
  - Heart disease
  - Chronic lung disease
  - Stroke
  - Diabetes
  - Cancer
  - Liver disease

- Suicide
- Injuries
- HIV and STDs
- School failure
- Teen pregnancy
- Criminality
Adverse Childhood Experiences Study (ACE)

- ACE scores of 4 or higher
  - 2x as likely to smoke
  - 7x as likely to be alcoholics
  - 2x as likely to have cancer
- ACE score > 6
  - 30x more likely to have attempted suicide
- ACE score 7+ (no drinking, smoking, or overweight)
  - 360% higher risk of heart disease
ACE – Early Childhood

- By age 5 (1007 children)
  - 55% with 1 ACE
  - 12% > 2 ACE
- 1.8x as likely to have below average
  - Language skills
  - Literacy skills
  - Math Skills
- 3.5x as likely to have poor
  - Emergent literacy skills
  - Attention problems
- 2-3x as likely to have
  - Social problems
  - Aggression

Jimenez et al., 2016
ACE – Early Childhood

- Ages 2-5 (19,957 children)
- 3 or more ACEs before the age of 5
  - 55% with 1 ACE
  - 12% > 2 ACE
- 2x as likely to have
  - 1 or more physical conditions
  - 1 or more developmental conditions
- 9x increase
  - 1 or more mental health and developmental condition
- 7x increase
  - 1 or more physical, mental and developmental condition

Bright & Thompson, 2017
Many chronic diseases of adults are determined decades earlier, in childhood.

- Not by disease, but by life experiences
Adverse Childhood Experiences Study

**LIFE EXPECTANCY**

People with six or more ACEs died nearly **20 years earlier on average** than those without ACEs.
Telomeres

Sections of DNA at the end of each chromosome
Cortisol & Telomeres

- Increased cortisol exposure
- Reduced telomere length
- Higher risk for cardiovascular disease, cognitive decline, diabetes, mental illness, obesity, other poor outcomes
Epigenetics

• The on/off switch
  • Affects gene expression without altering DNA sequence
  • Doesn’t change the operation of the gene

• Genes vs. Destiny
  • Gene expression depends upon the environment/experience
Individual

Same Risk Factors → Different Outcomes

Erikson Institute

Individual
School Readiness
Executive Function & Self-Regulation

• What are executive functions?
  • Working memory
  • Inhibitory control
  • Attention shifting/cognitive or mental flexibility
Executive Function & Self-Regulation

- Skills associated with planning, reasoning, problem solving
- Connecting current and past information and actions
Executive Functions and Educational Disparities

• Executive-function abilities predict academic and social readiness for school.
  • Over-and-above other child characteristics
    • Intelligence
    • Prior academic knowledge
Importance of Attention

• From the ECLS-K
  • 14,537 children in 2,109 classrooms in 895 public and private kindergarten programs

• Attention
  • Attentiveness
  • Task persistence
  • Eagerness to learn
  • Learning independence
  • Flexibility
  • Organization

Georges et al., 2012
Importance of Attention

- Test score gaps
  - Attention problems > aggressive behavior, SES, race/ethnicity, and gender
  - 7% lower in math
  - 8% lower in reading
Self-Regulation in Childhood Predicts Later Outcomes: Health

Moffitt et al., 2011
Self-Regulation in Childhood Predicts Later Outcomes: Wealth

Moffitt et al., 2011
Self-Regulation in Childhood Predicts Later Outcomes: Crime

Moffitt et al., 2011
Self-Regulation in Childhood Predicts Later Outcomes: Single-parent

Moffitt et al., 2011

Percent with Offspring Reared in Single-parent Homes

Low Childhood Self-control in Quintiles High

Moffitt et al., 2011
School Readiness

- Acquiring self-regulation
  - Emotions, behaviors and attention
- Communicating and learning
  - Language, reasoning and problem-solving
- Getting along with peers
  - Parent-child relationship is the first opportunity to experience trust, love, and nurturing, and forms the basis for learning to relate well to others.

(National Research Council and Institute of Medicine, 2000)
Successful Schools

Erikson Institute
Average Academic Achievement, by Grade
National Average, 2009-2013
Average Academic Achievement, by Grade
Evaston, 2009-2013

- National Average
- Evanston Average

Reardon, 2017
Average Academic Achievement, by Grade
Evanston, 2009-2013

Reardon, 2017
Average Academic Achievement, by Grade

Evanston, 2009-2013

Reardon, 2017
Average Academic Achievement, by Grade
Chicago, 2009-2013

Reardon, 2017
Academic Achievement and Socioeconomic Status
All US School Districts, 2009-2013

Reardon, 2017
Achievement Growth and Socioeconomic Status

All US School Districts, 2009-2013

Reardon, 2017
Achievement Growth and Socioeconomic Status
All US School Districts, 2009-2013

Reardon, 2017
Achievement Growth and Socioeconomic Status
All US School Districts, 2009-2013

Reardon, 2017
We Can’t Afford It
We Can Afford It

- Wisconsin and Foxconn: Price per job
  - $3,000,000,000
  - 13,000 jobs
  - = $230,769 per job
Public Expenditures on ECE (GDP)

OECD, 2016

- Iceland: 1.8
- Sweden: 1.6
- France: 1.3
- New Zealand: 1.0
- Korea: 0.9
- OECD-31 average: 0.8
- EU average: 0.7
- Mexico: 0.7
- Australia: 0.6
- Romania: 0.6
- Hungary: 0.6
- Italy: 0.5
- Slovenia: 0.5
- Spain: 0.5
- Slovak Republic: 0.5
- Czech Republic: 0.5
- Japan: 0.4
- United States: 0.3
- Turkey: 0.2
Closing Thoughts
The Importance of Early Childhood Education
The Importance of Early Learning
The Importance of Early Childhood Development
The Importance of Early Experience
Relationships are the "Active Ingredients" of Early Experience
Closing Thoughts

• Focus on early childhood experiences, not just education
  • Risk stays with you your entire life

• “As goes relationships, so goes the child”
  • Relationships-Relationships-Relationships-Relationships
  • Impact of secure relationships is not just emotional or psychological – It is biochemical
  • Kids don’t become resilient alone
Closing Thoughts

• Schools are doing exactly what they are designed to do:
  • Gap in performance when kids ARRIVE at school
  • Is the school doing more than expected (i.e., closing that gap), even if the school as a whole is “under-performing”
1,100 Days

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Thank you