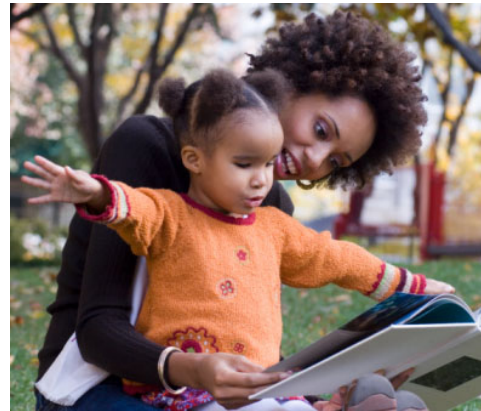


The Importance of Early Brain Development In *Adult Productivity*

Judy L. Cameron, PhD

Department of Psychiatry, University of Pittsburgh
The National Scientific Council on the Developing Child
Working For Kids: Building Skills



The Foundations of Lifelong Success are Built in Early Childhood



Concerns about Dwindling Productivity and Economy



**The accident of birth
is the greatest source
of inequality.**

lower reading skills

lower math skills

smaller vocabulary

antisocial behavior

lower attention



tobacco use

school drop out rates

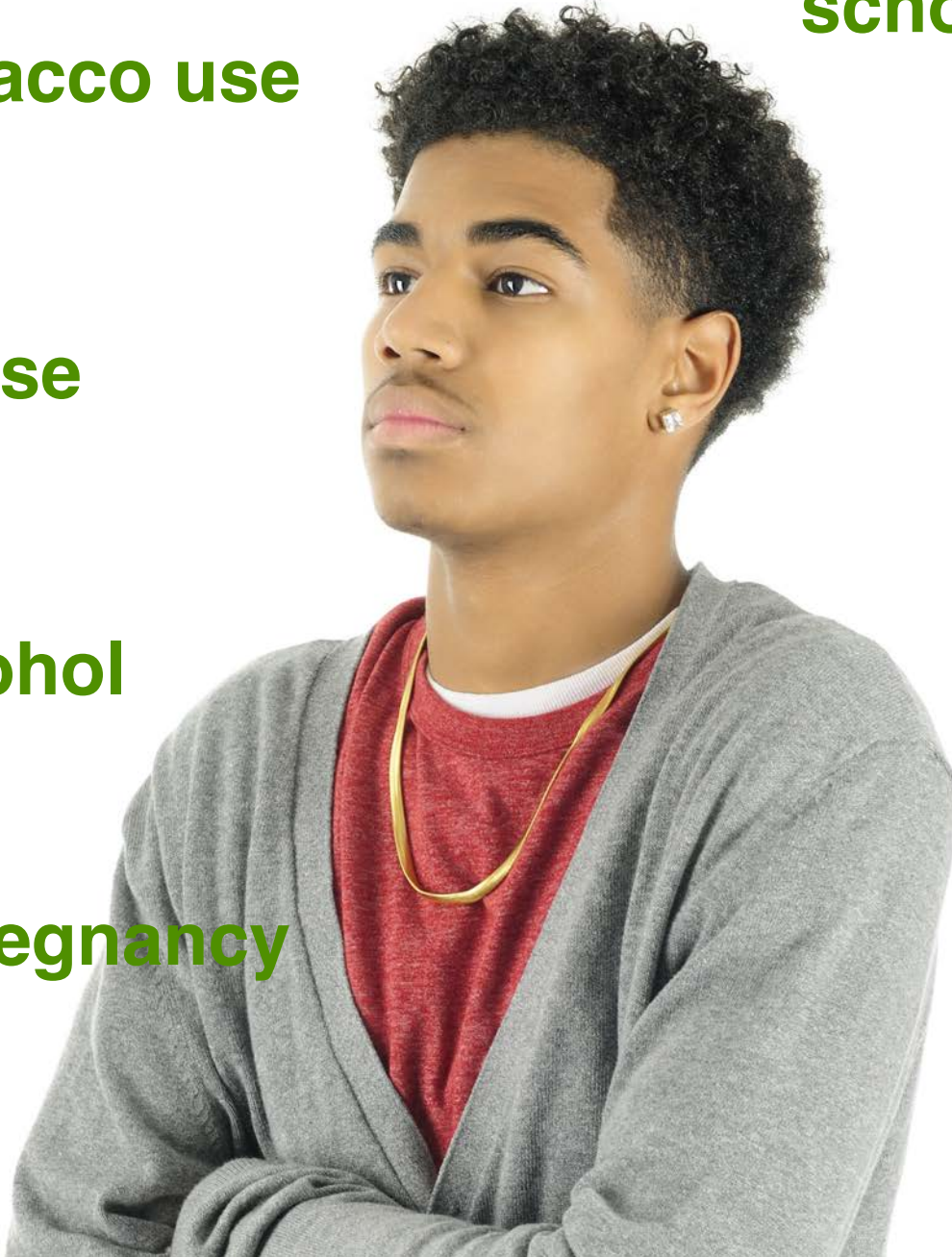
drug use

petty crime

alcohol

serious crimes

teen pregnancy



unemployment

addiction

incarceration

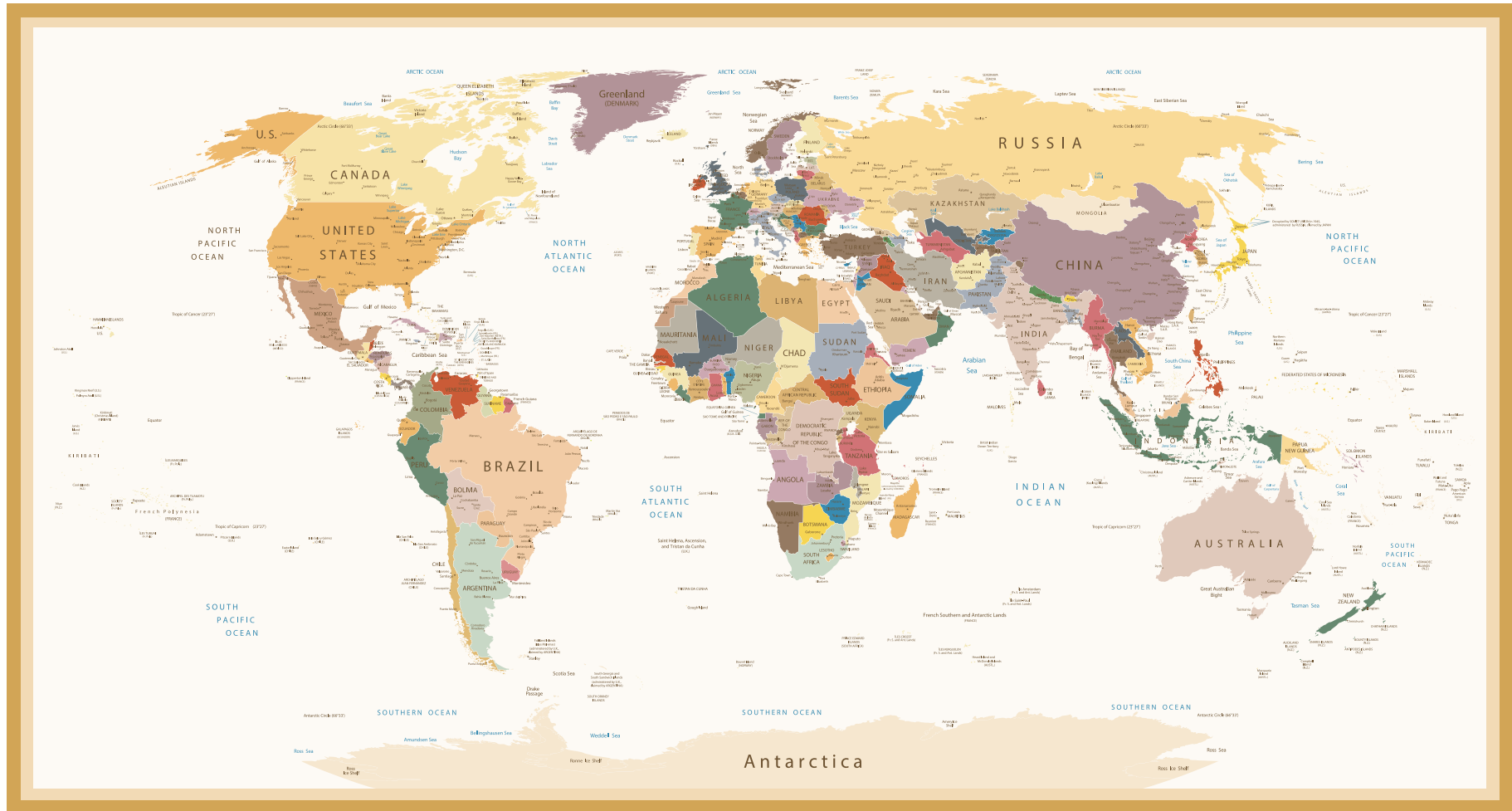
mental health issues

homelessness





Who pays the bill for this gap?



**More
Teachers**

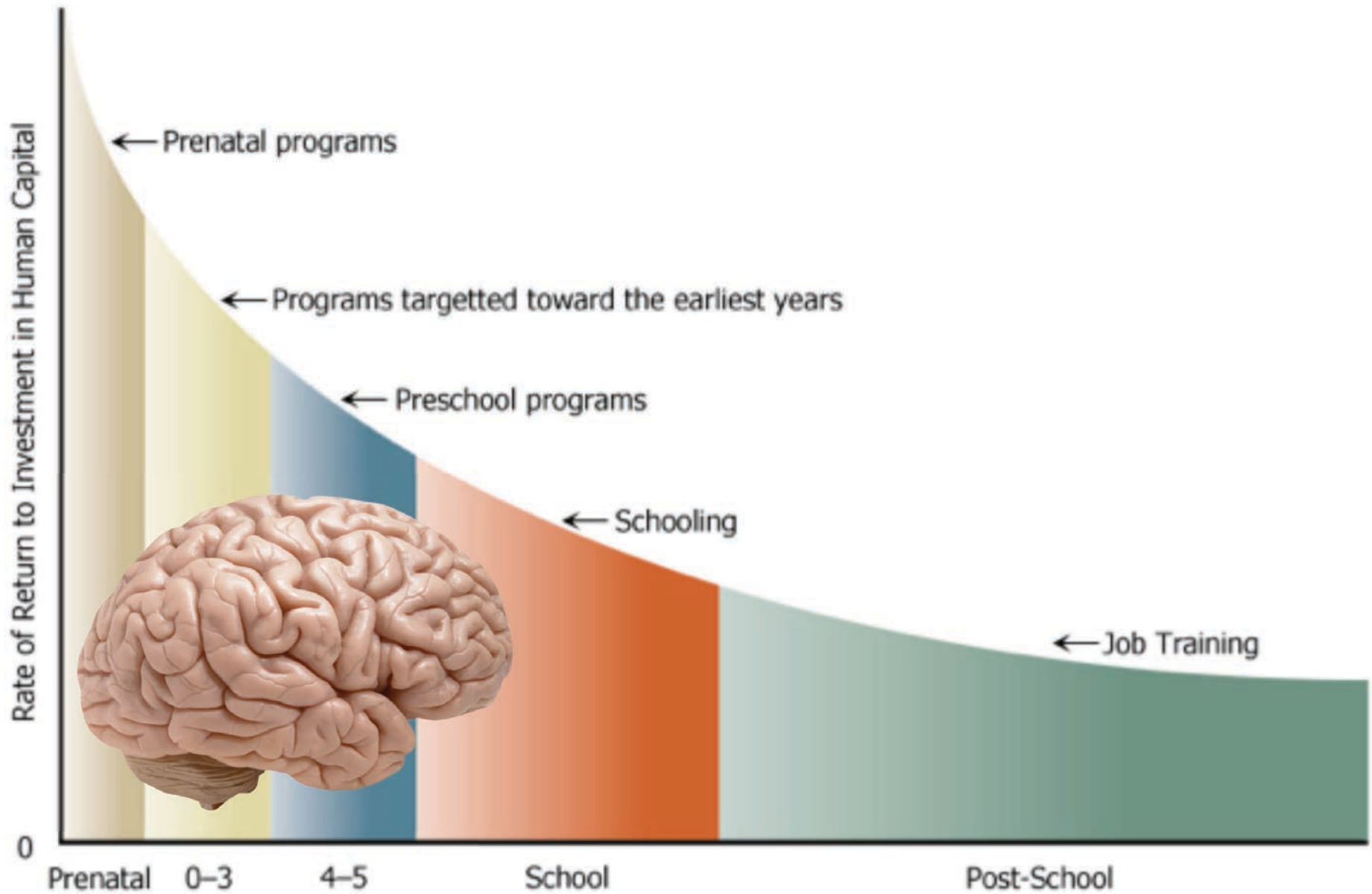
**Standardized
Testing**

**Career
Advisors**

**Job
Training**

Therapy





Source: Heckman (2008)



Reading Programs

Art Programs

Math Programs

Music Programs

Standardized Testing

Anger Management

**Fragmented solutions
don't work —**

**Learning how experiences
shape brain development
is a more comprehensive
strategy.**

Four Core Concepts of Development

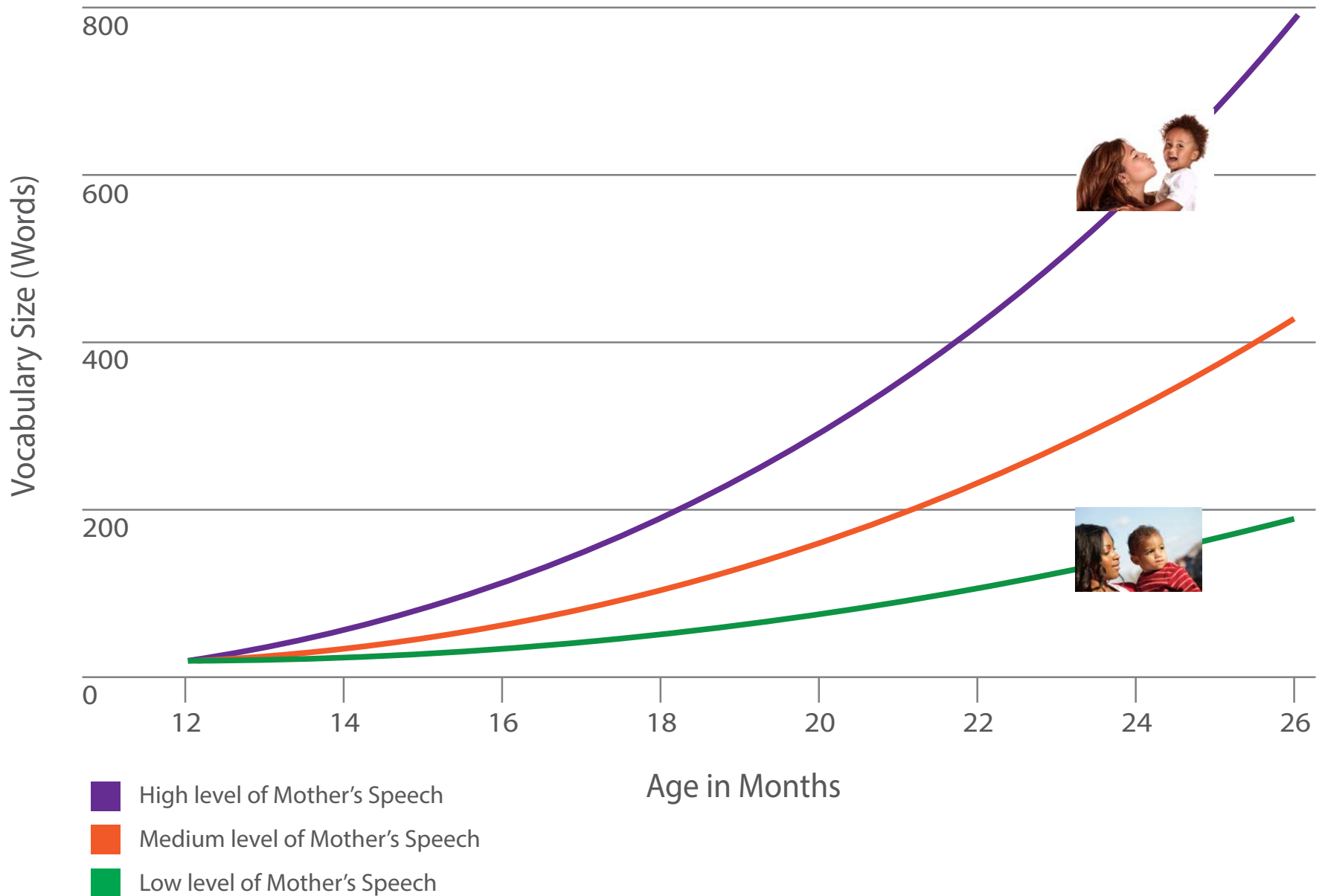
- 1** Brain Architecture Is Established Early in Life and Supports Lifelong Learning, Behavior, and Health
- 2** Stable, Caring Relationships and “Serve and Return” Interaction Shape Brain Architecture
- 3** Toxic Stress in the Early Years of Life (ACE’s) Can Derail Healthy Development
- 4** Resilience can be Built through “Serve and Return” Relationships, improving Self-Regulation, and Executive Functions, and Giving Children a Sense of Mastery.



HEALTHY CHILD DEVELOPMENT

MOTHER'S SPEECH AND CHILD VOCABULARY

Source: Huttenlocher et al., Developmental Psychology 27: 236-248, 1991



Experience Shapes Brain Architecture by Over-Production Followed by Pruning



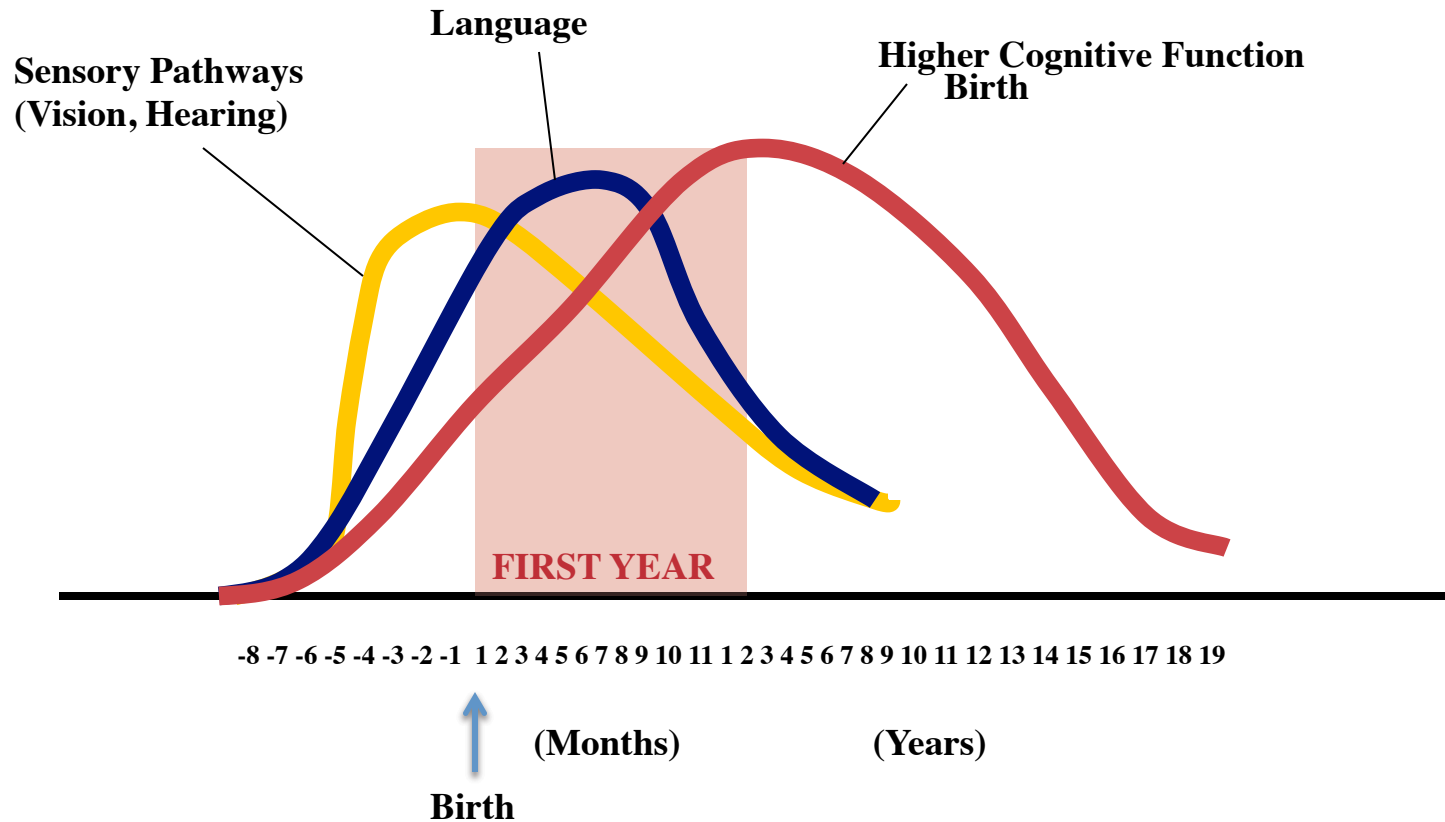
birth

3 years

14 years

Neural Circuits are Wired in a Bottom-Up Sequence

(700 synapses formed per second in the early years)



Experiences Build Brain Architecture



Stable, caring relationships play a key role in building brains



Serve & Return Relationships Buffer the

Developing Brain



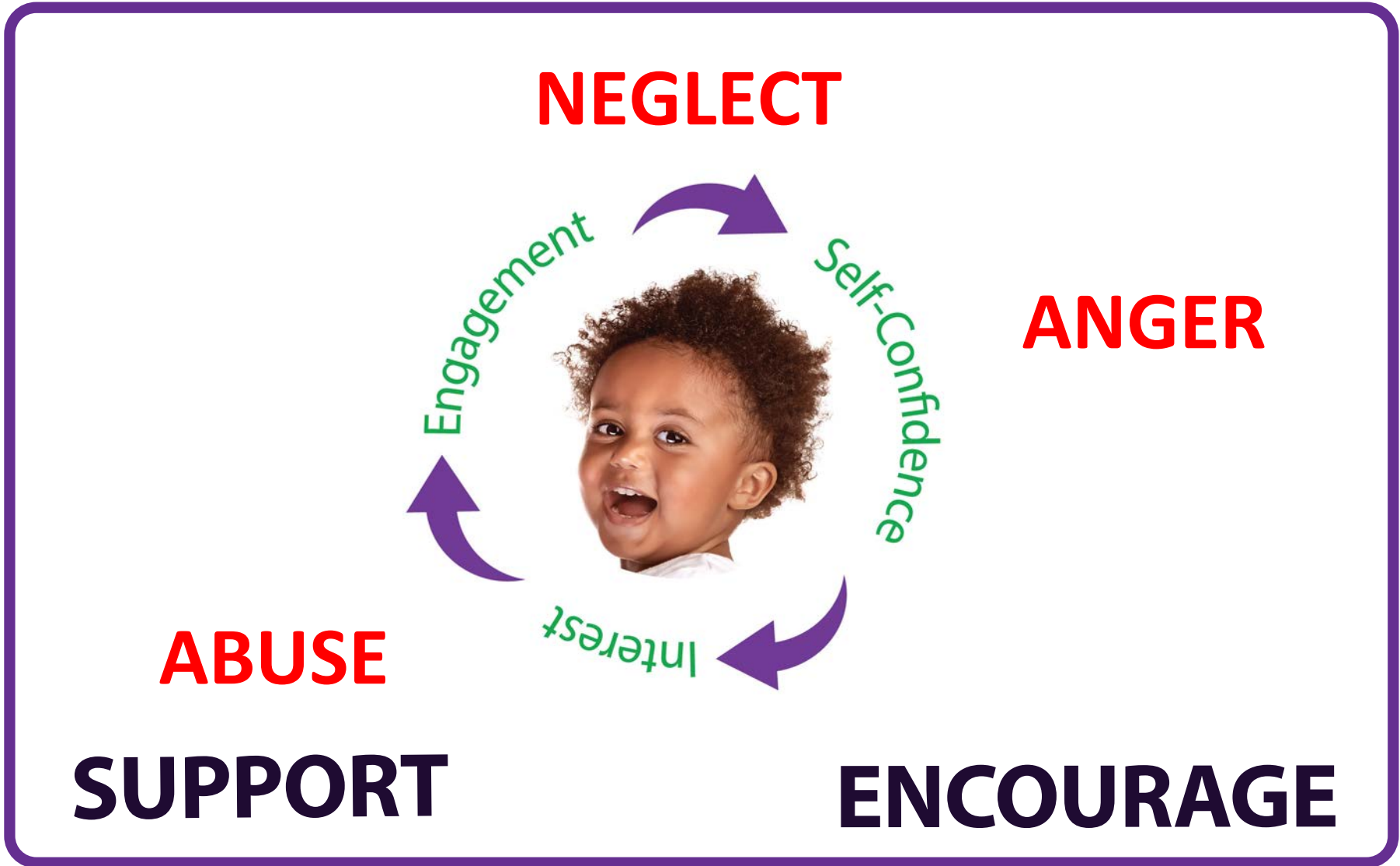
CARE



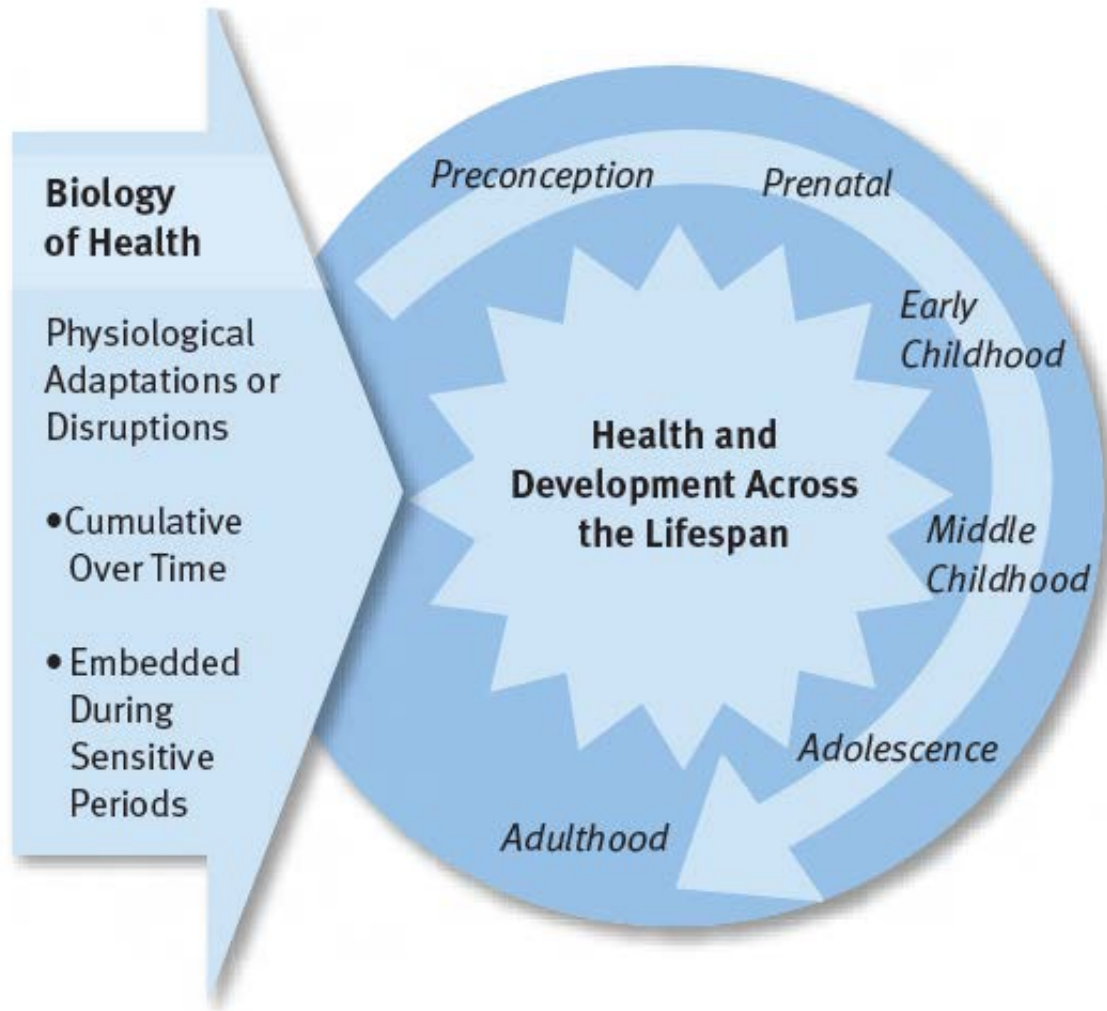
SUPPORT

ENCOURAGE

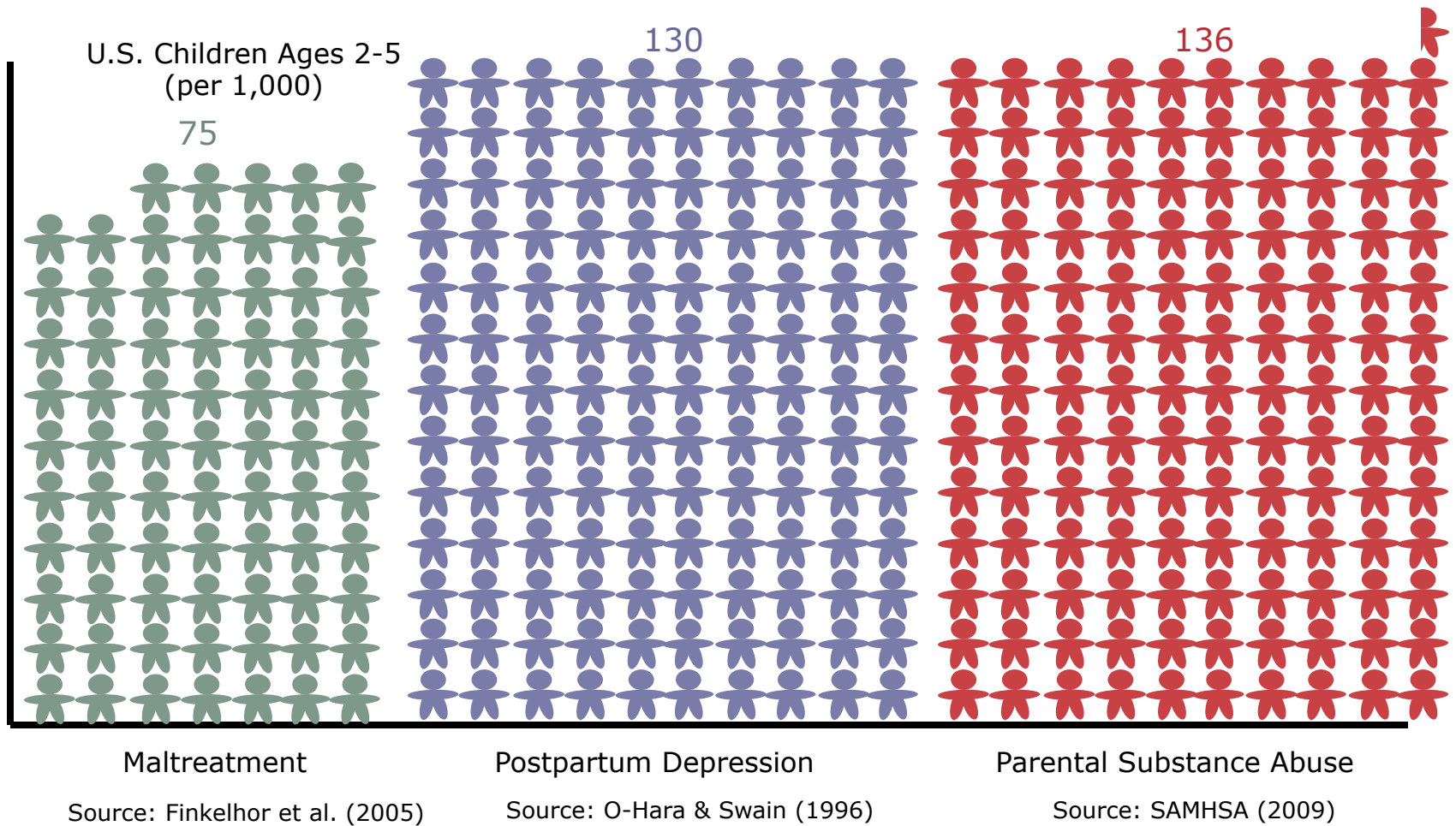
SUPPORTIVE ENVIRONMENTS FOR BRAIN DEVELOPMENT



Early Life Stress Impacts Life-long Health



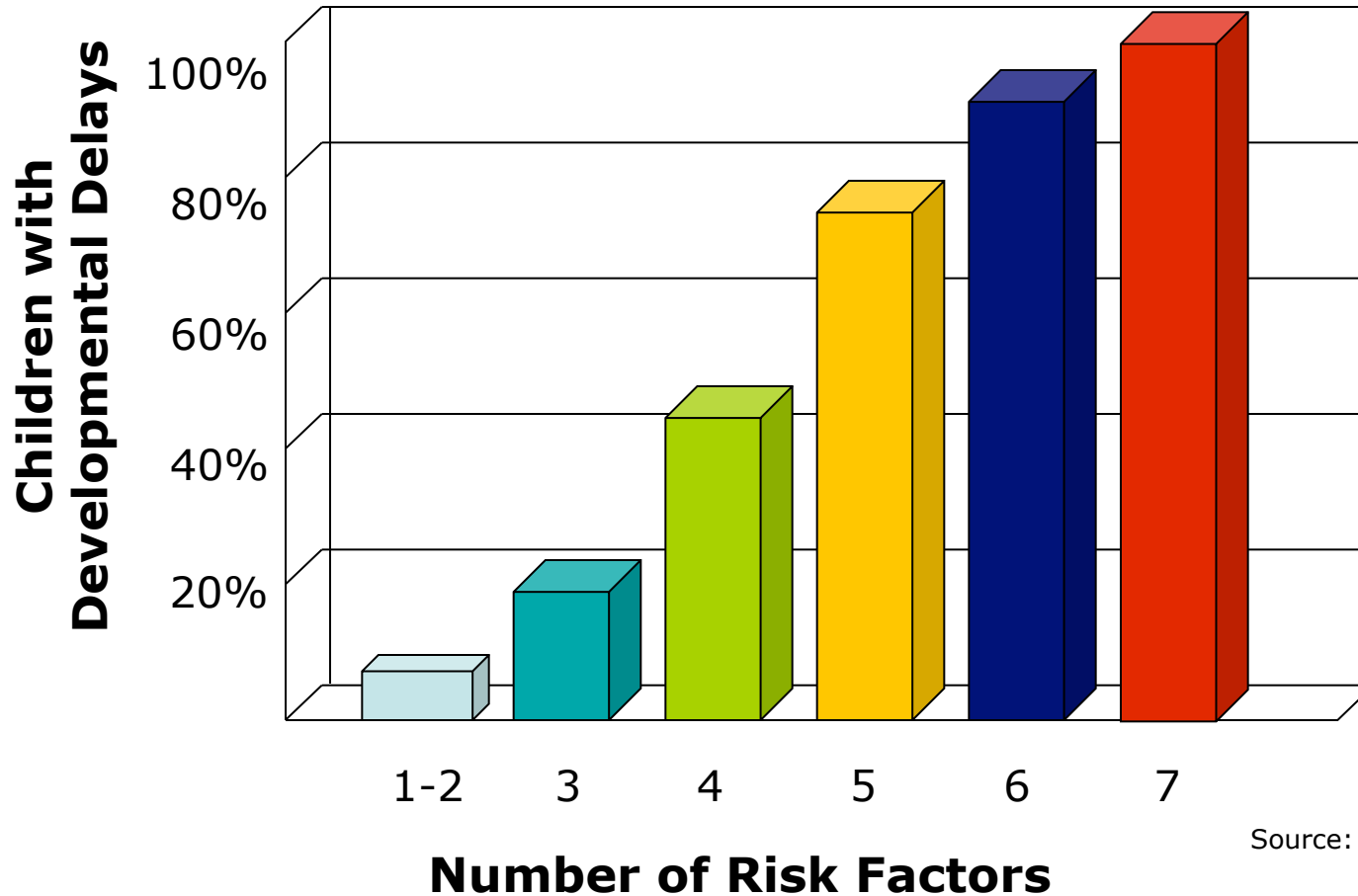
Sources of Toxic Stress in Young Children



NEGLECT

What are the Long-term Impacts of
Toxic Stress in Early Life?

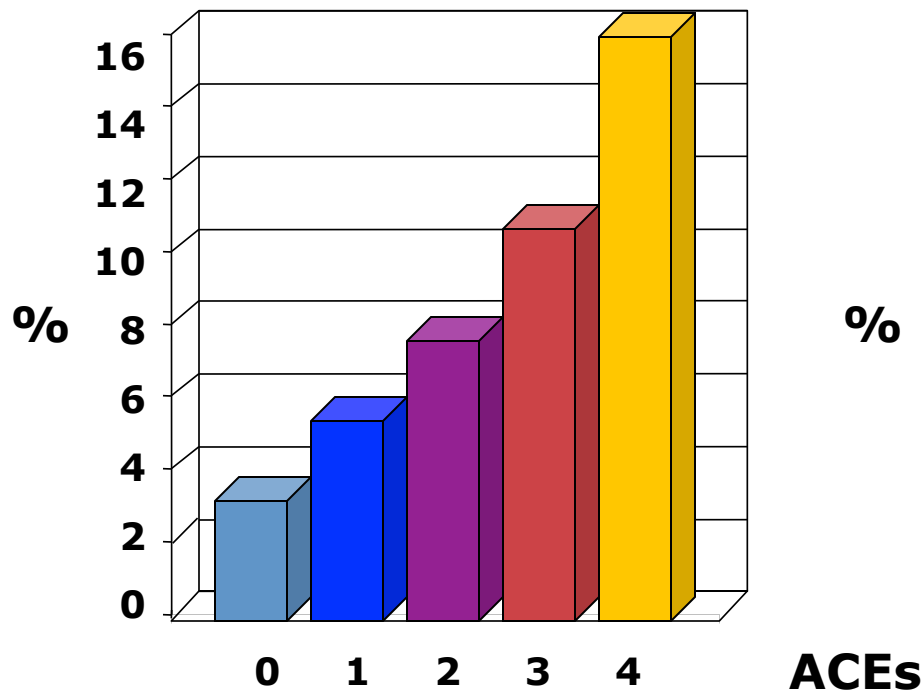
Significant Adversity Impairs Development in the First Three Years



Source: Barth, et al. (2008)

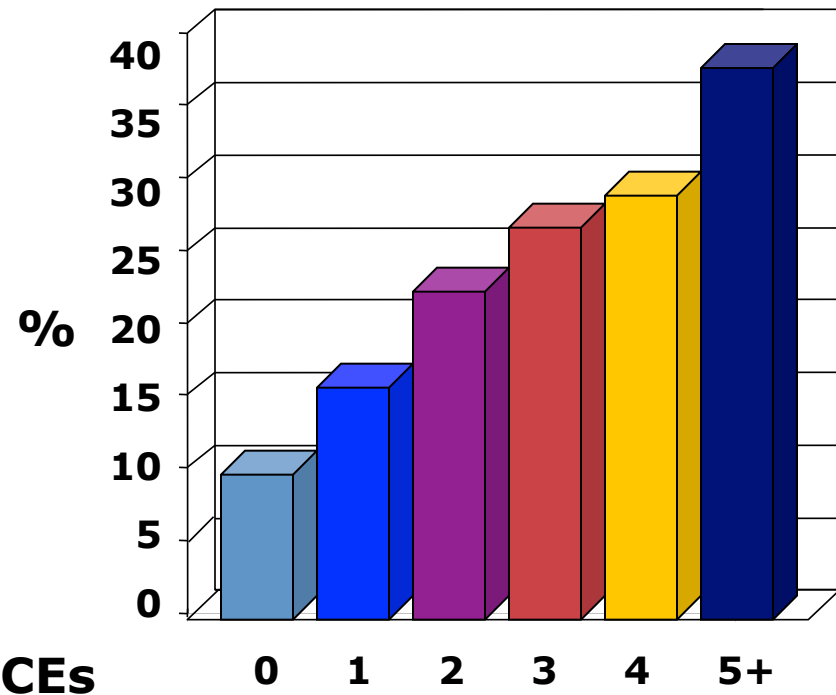
Risk Factors for Adult Substance Abuse Are Embedded in Adverse Childhood Experiences

Self-Report: Alcoholism



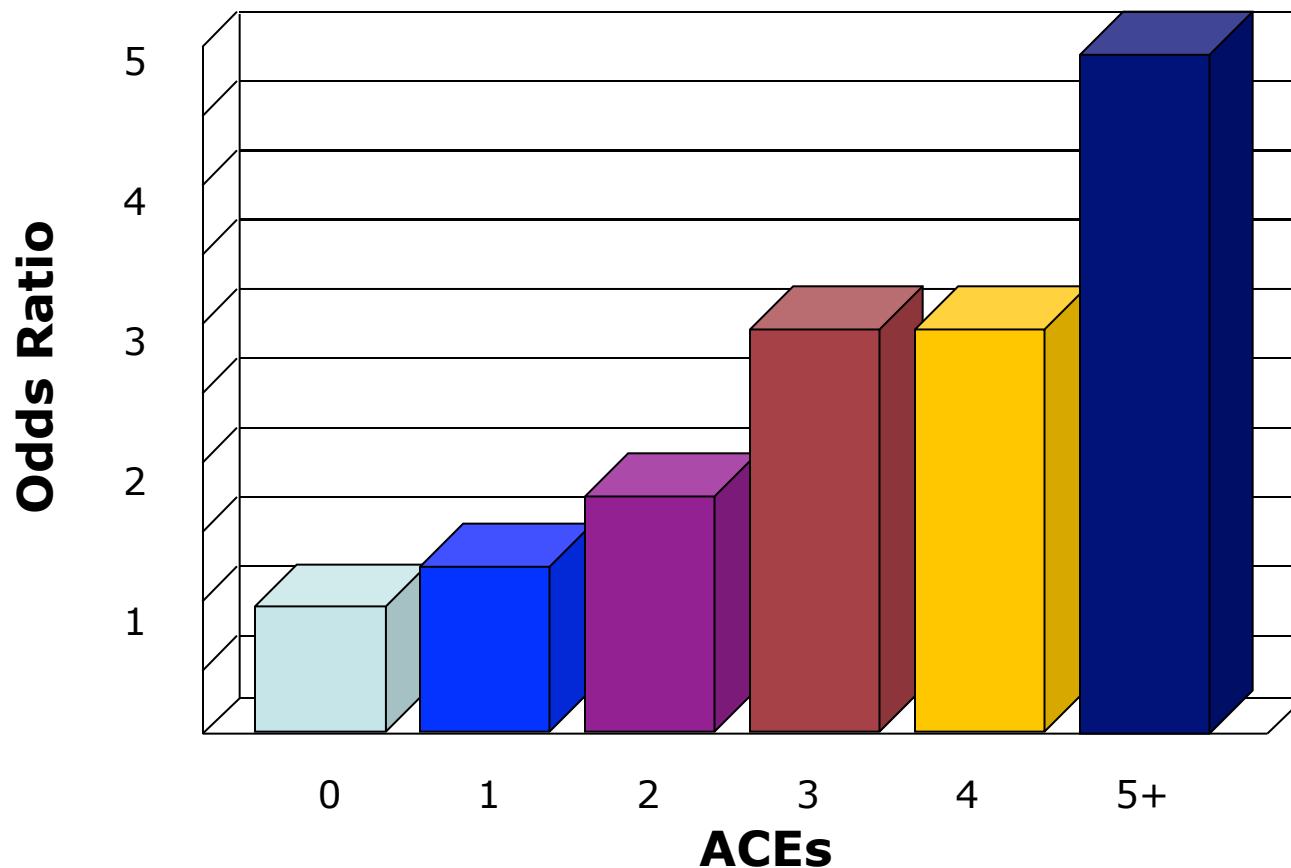
Source: Dube et al. (2002)

Self-Report: Illicit Drugs



Source: Dube et al. (2003)

Risk Factors for Adult Depression are Embedded in Adverse Childhood Experiences



Source: Chapman et al. (2004)

How does neglect impact the brain?

1

Brain Architecture Is Shaped by Early Life Stresses

2

Gene Expression in the Brain Changes in Response to Stress Exposure

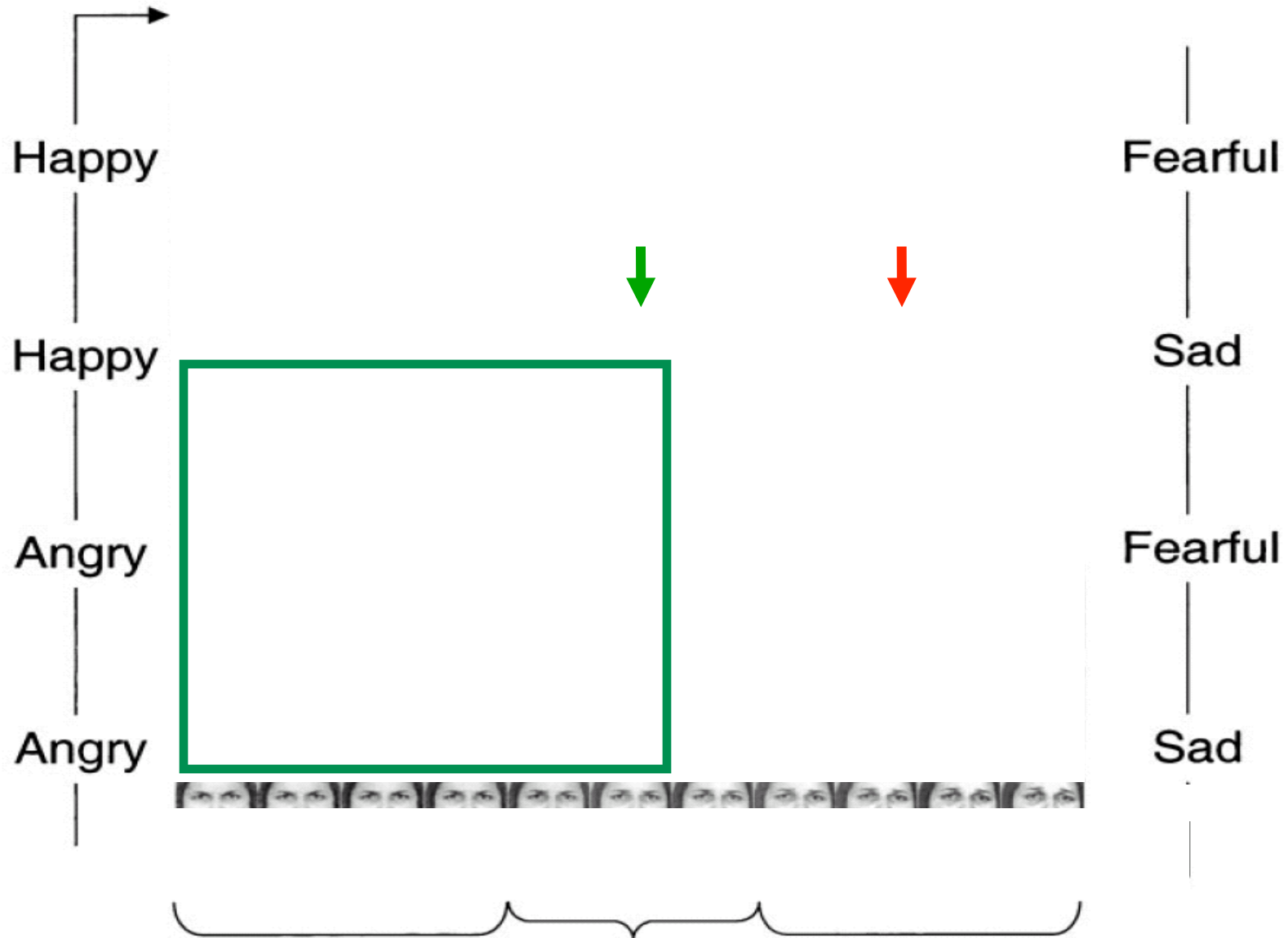
3

Hormone Secretion Changes in Response to Stress Exposure

4

Early Stresses Change the ***Way You See the World***

Adverse Early Life Experiences Change How You See the World

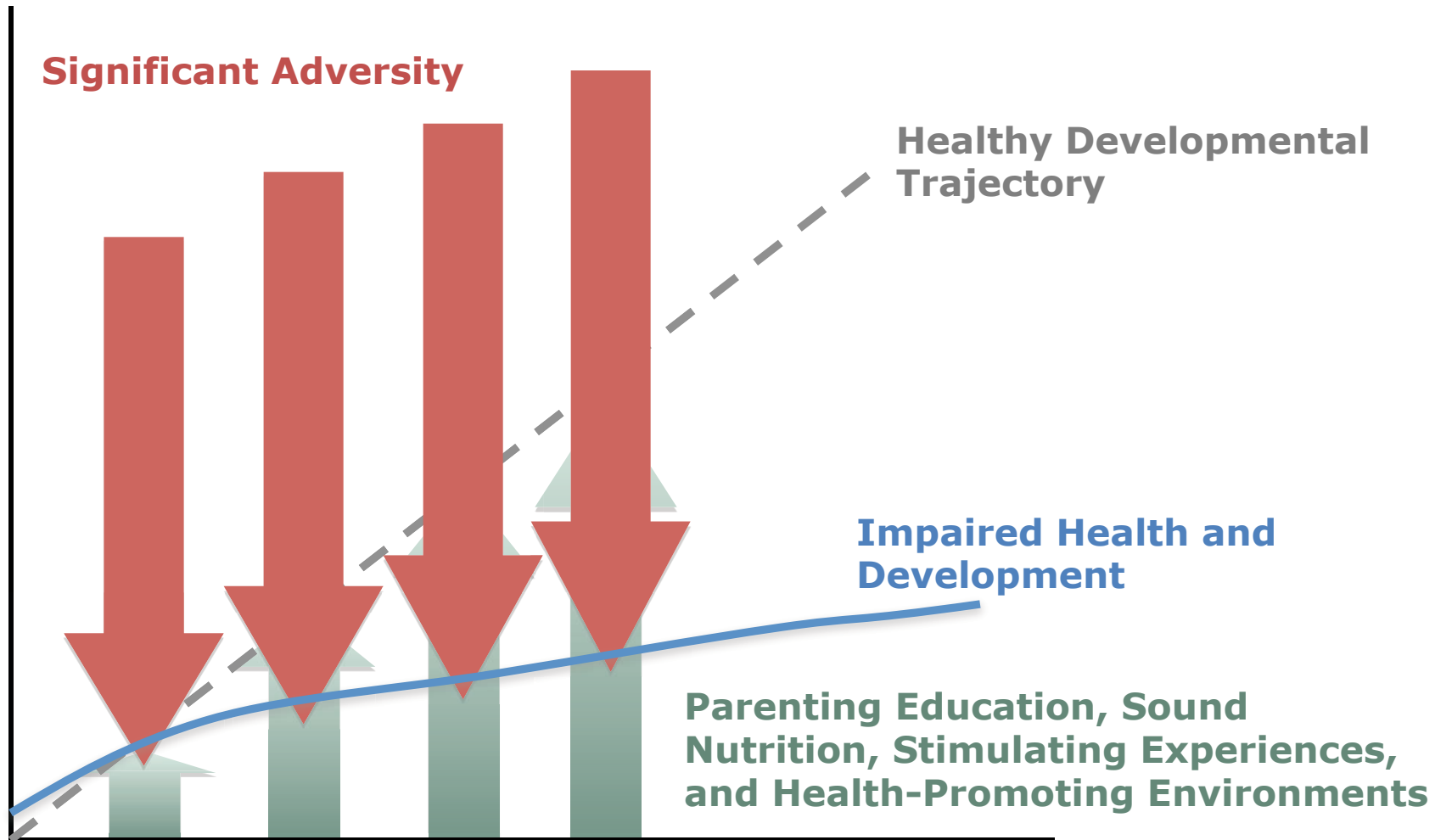


Toxic Stress Derails Healthy Development

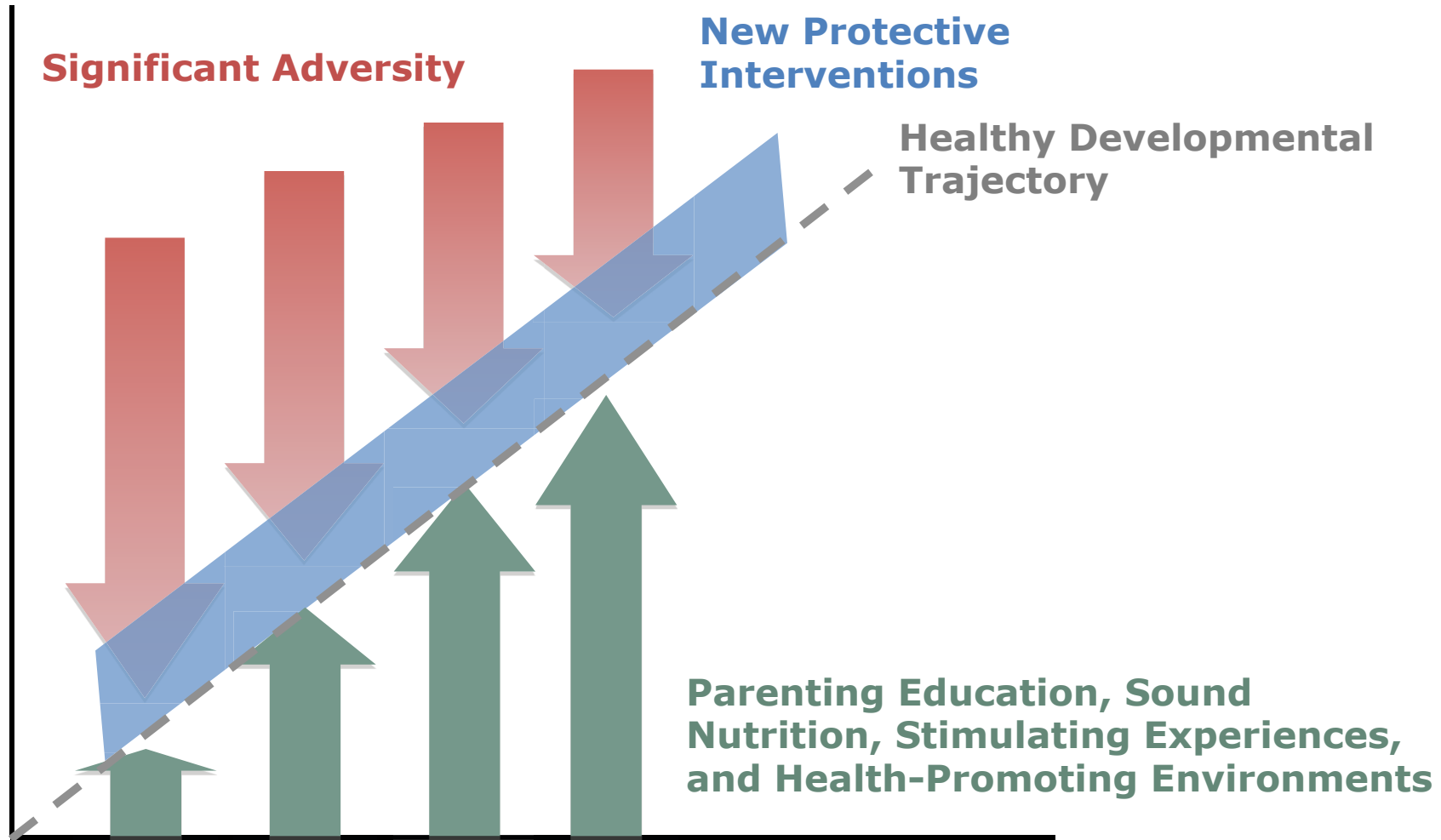


**Can We *Prevent* Long-term Health
Impacts of Early Life
Stress and Neglect?**

Current Conceptual Framework



Protective Interventions Can Improve Life-long Health



Capabilities that help with stress management

Focusing Attention

Problem Solving

Planning Ahead

Behavior Regulation

Controlling Impulses

Adjusting to New Circumstances

Executive Function and Self Regulation



**Working for Kids:
Building Skills**