

Core components of effective programs to support early childhood development: A brain science perspective

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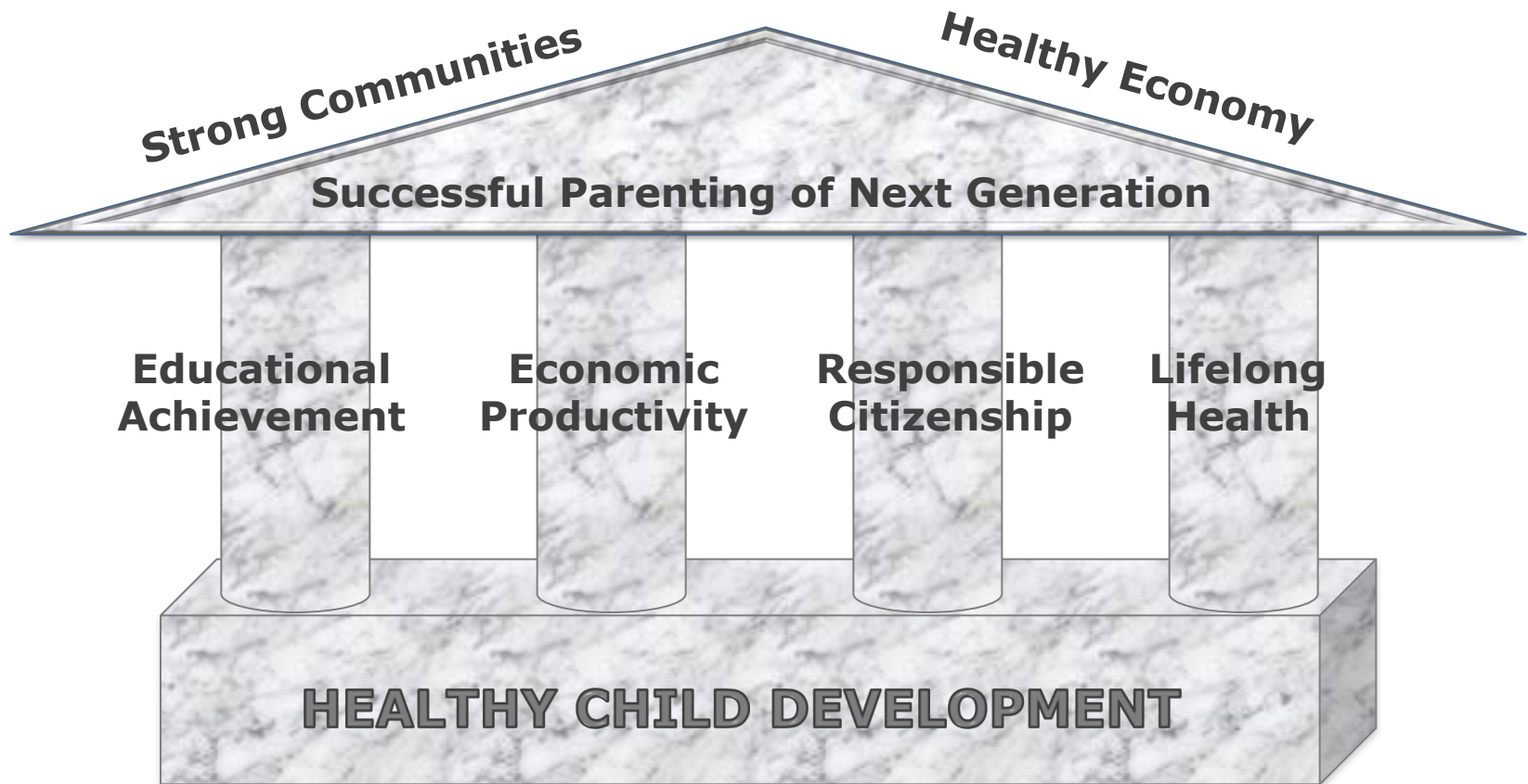
National Institute on Child Health and Development

National Institute on Drug Abuse

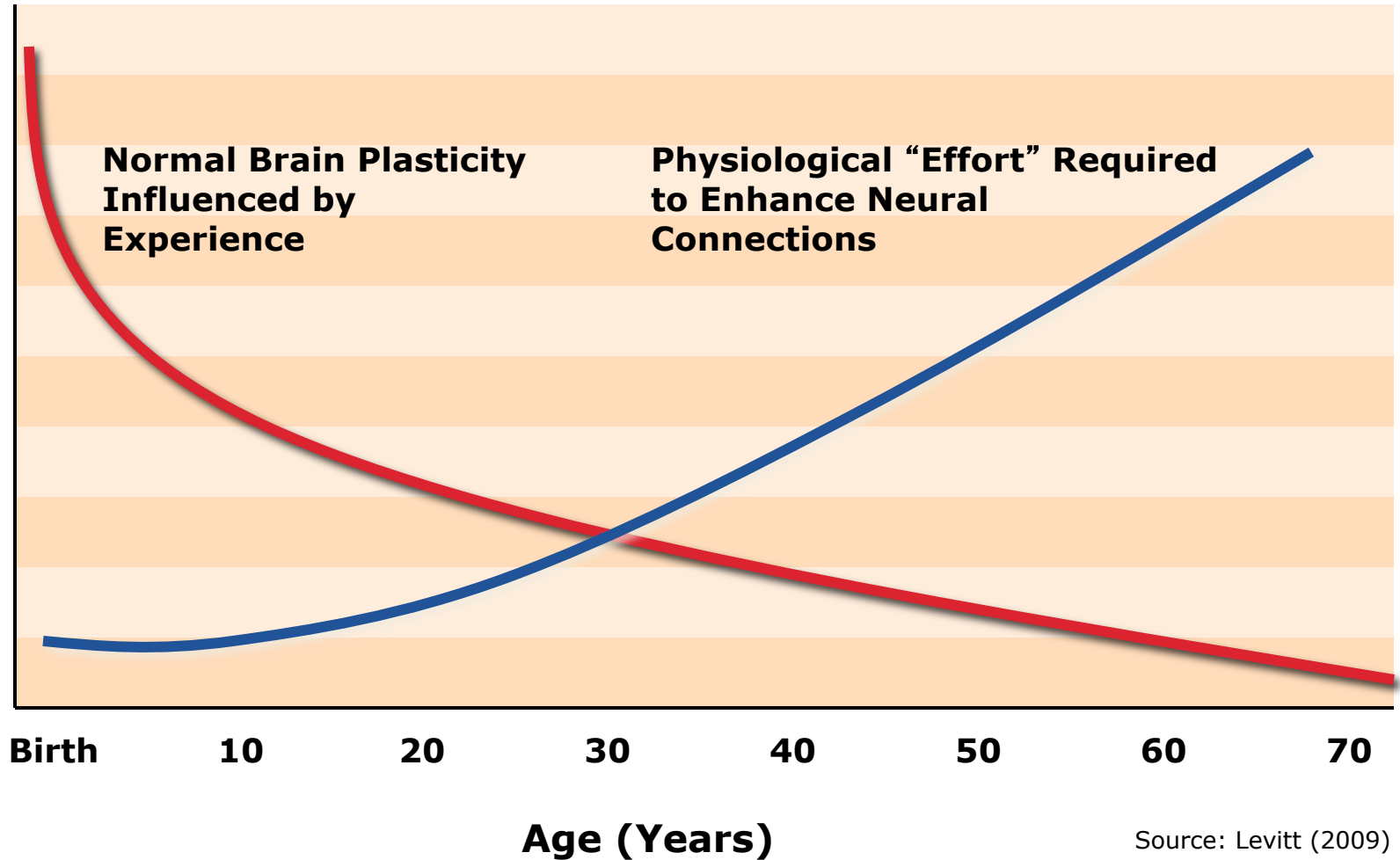


Oregon Social
Learning Center

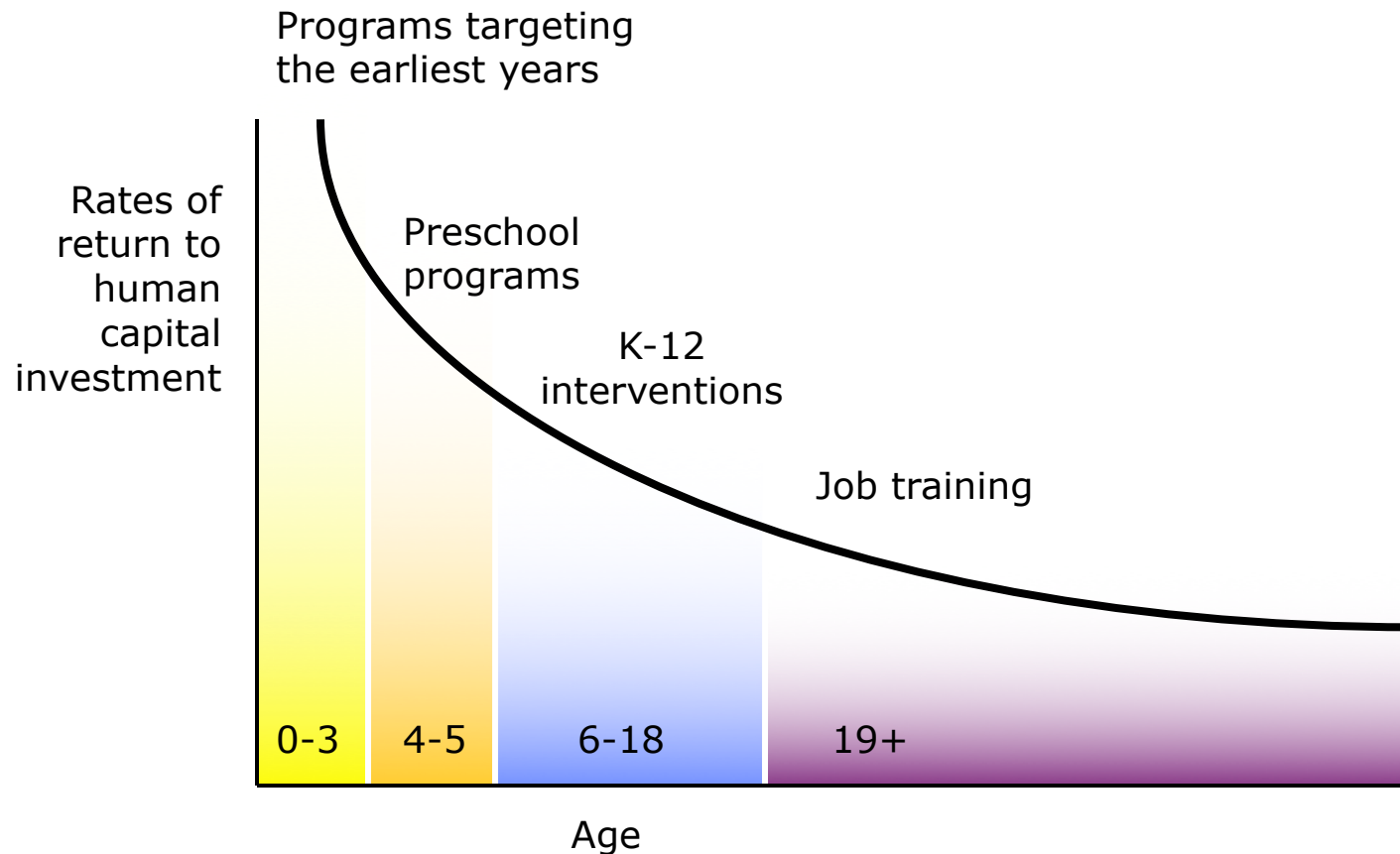
The Foundation of a Successful Society is Built in *Early* Childhood



The Ability to Change Brains Decreases Over Time



Preventive Intervention is More Efficient and Produces Higher Returns than Later Remediation

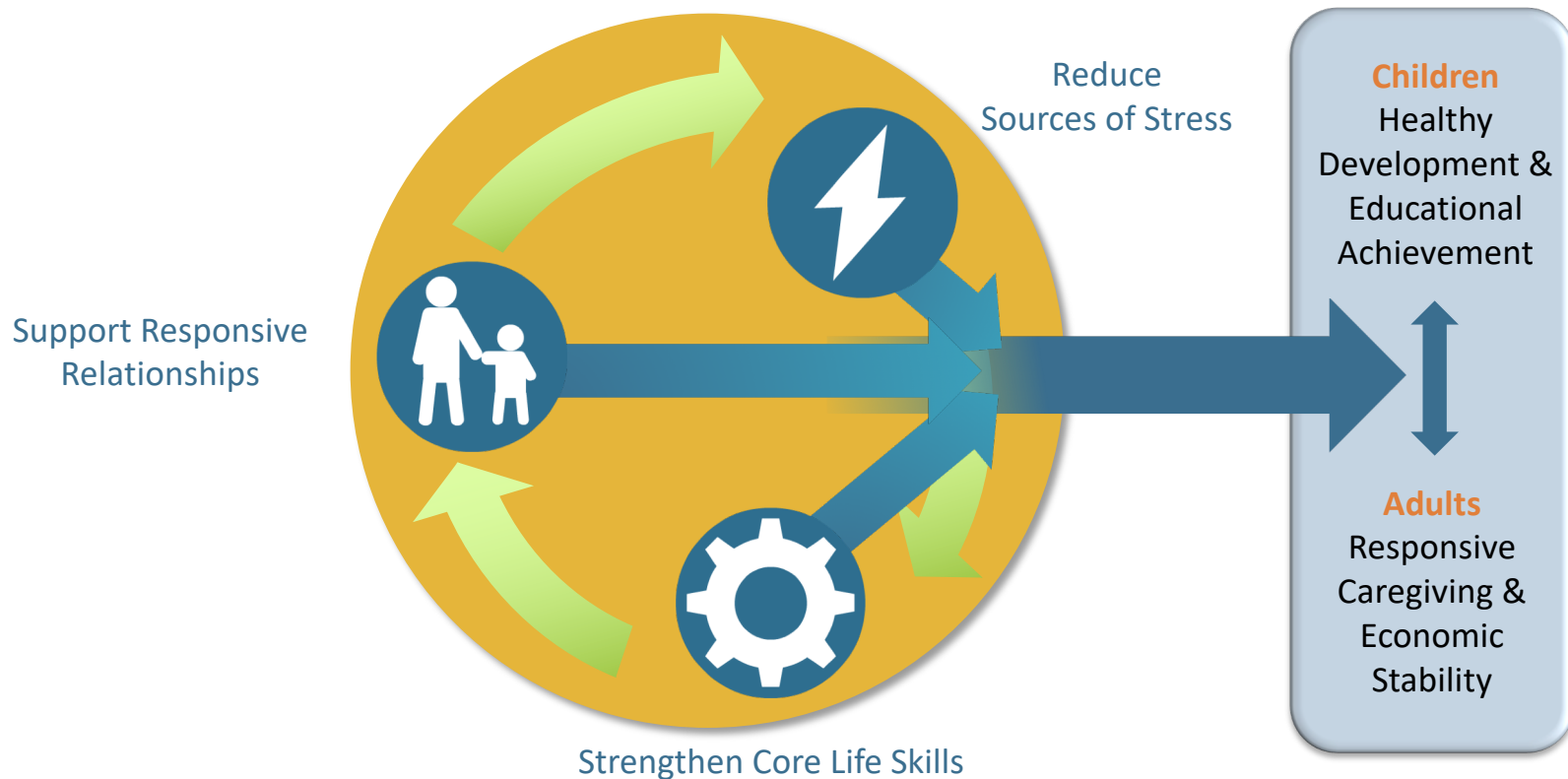


Source: Heckman (2007)

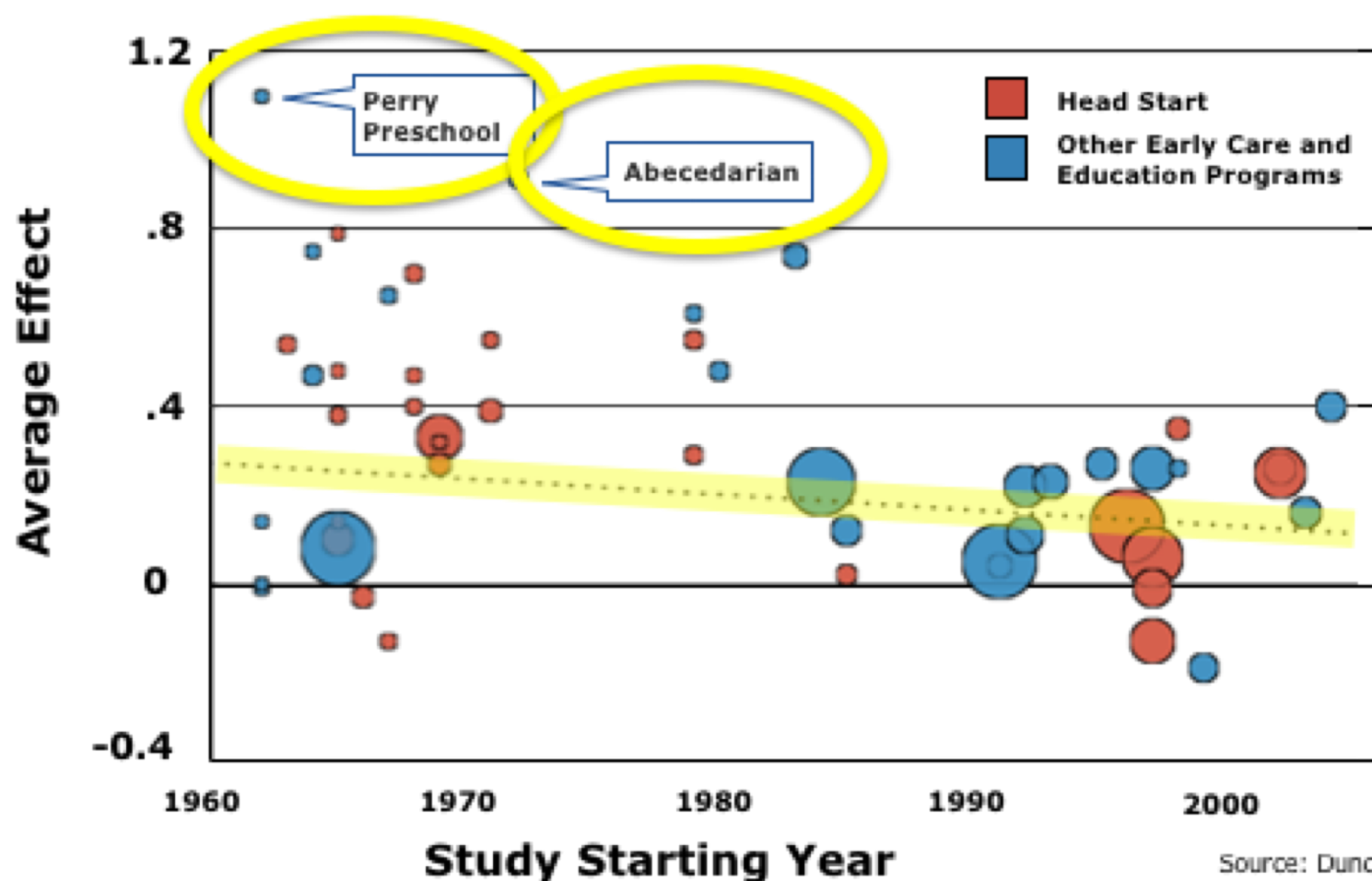
What do we know about improving outcomes in early childhood?



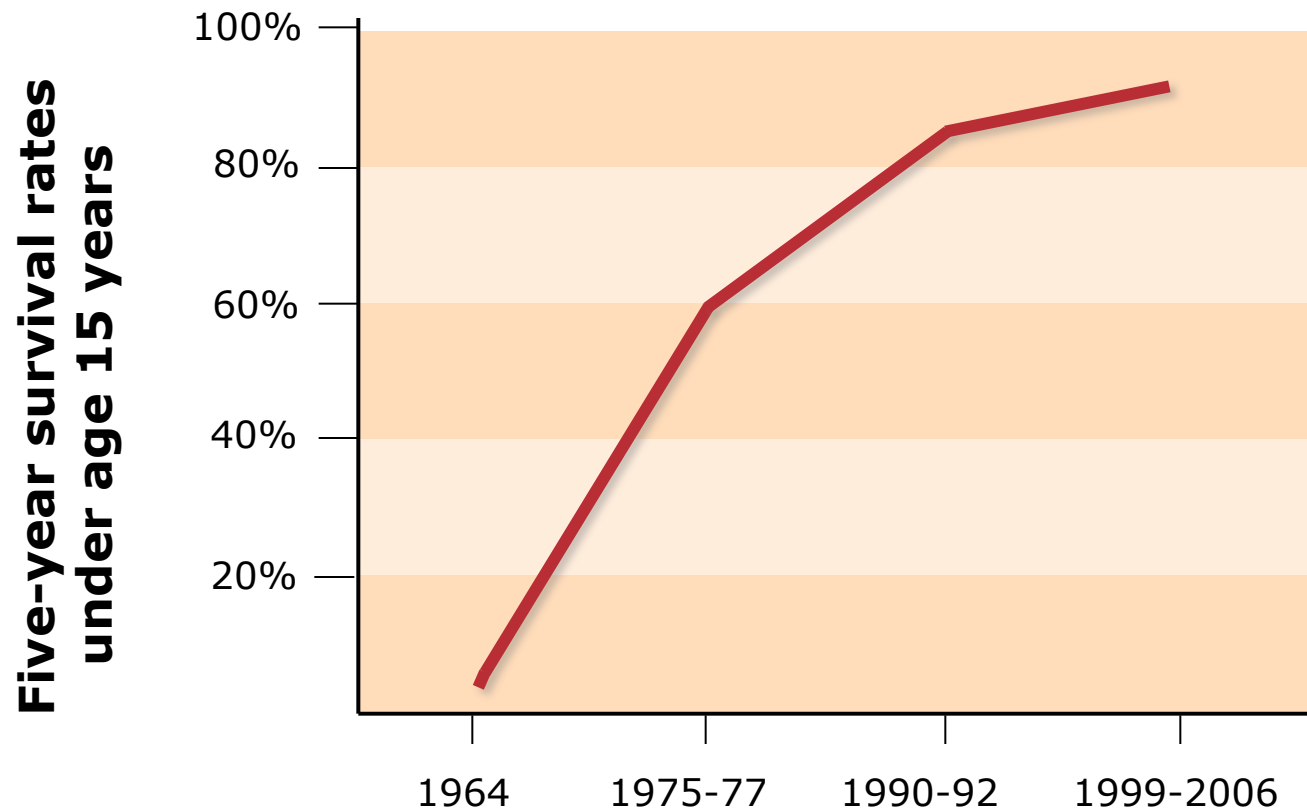
Half full: Three **core components** of effective early childhood programs



Half-empty: the evidence base from 50 Years of early childhood programs



The Vision: Learning from 50 Years of Progress in Treating Acute Lymphoblastic Leukemia



Source: Hunger, Lu, Devidas (2012)

3 CORE CONCEPTS IN EARLY DEVELOPMENT

Core Concept #1

Early experience builds
brain architecture.

Experience Shapes Brain Architecture by Over-Production Followed by Pruning

(700 synapses formed per second in the early years)



birth

6 years

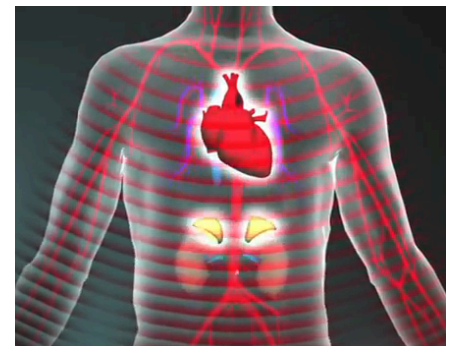
14 years

Core Concept #2

Toxic stress derails healthy
brain development.

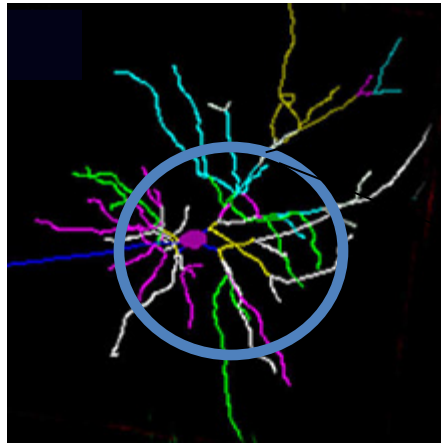
Toxic stress derails healthy development

- When we are stressed, our bodies activate physiological response
- Toxic stress can weaken the architecture of the developing brain



Toxic Stress Changes Brain Architecture

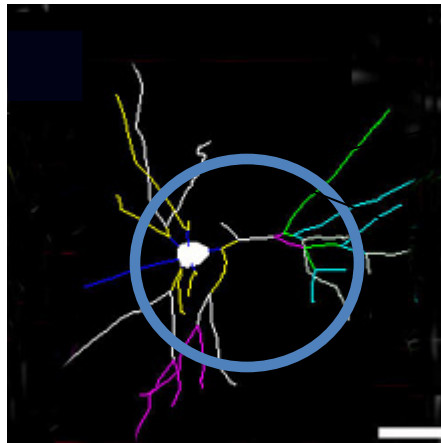
Normal



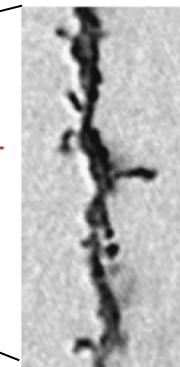
Typical neuron—
many connections



Toxic
stress



Damaged neuron—
fewer connections



Prefrontal Cortex and
Hippocampus

Sources: Radley et al. (2004)
Bock et al. (2005)

The Biology of Adversity: Three Levels of Stress

Positive

Brief increases in heart rate,
mild elevations in stress hormone levels.

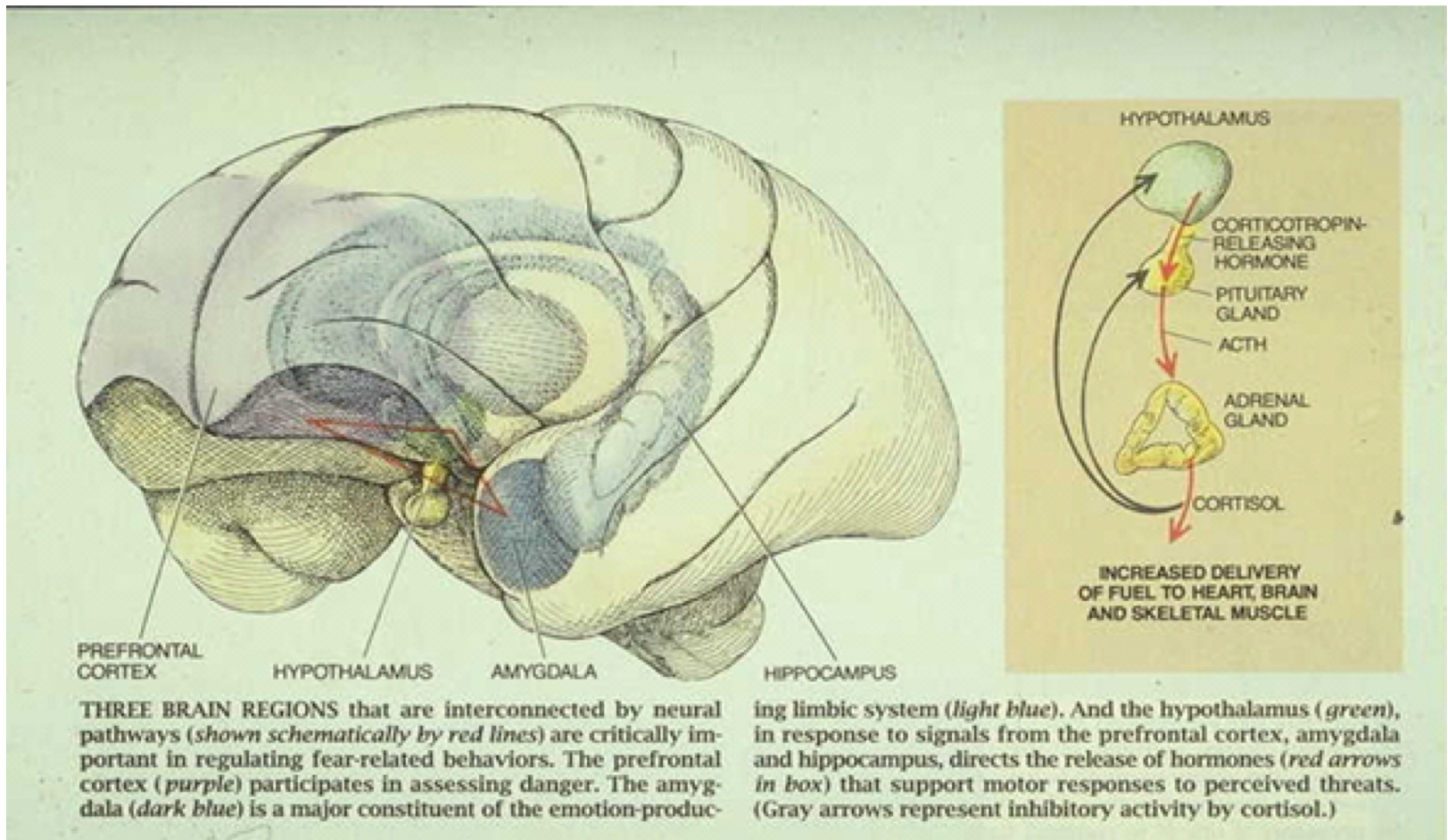
Tolerable

Serious, temporary stress responses,
buffered by supportive relationships.

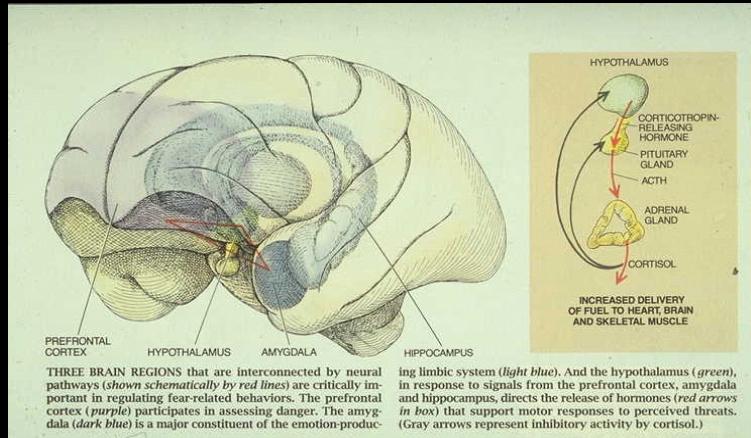
Toxic

Prolonged activation of stress response systems
in the absence of protective relationships.

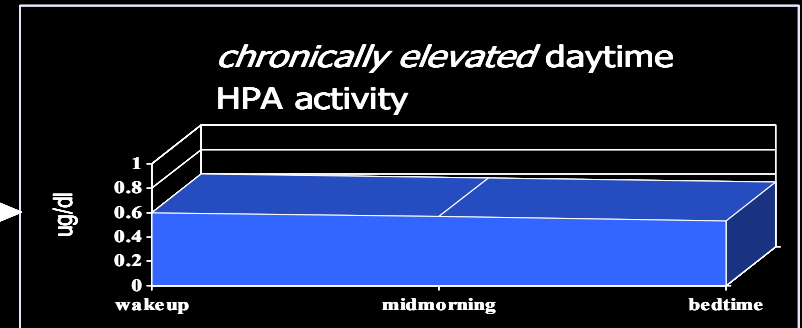
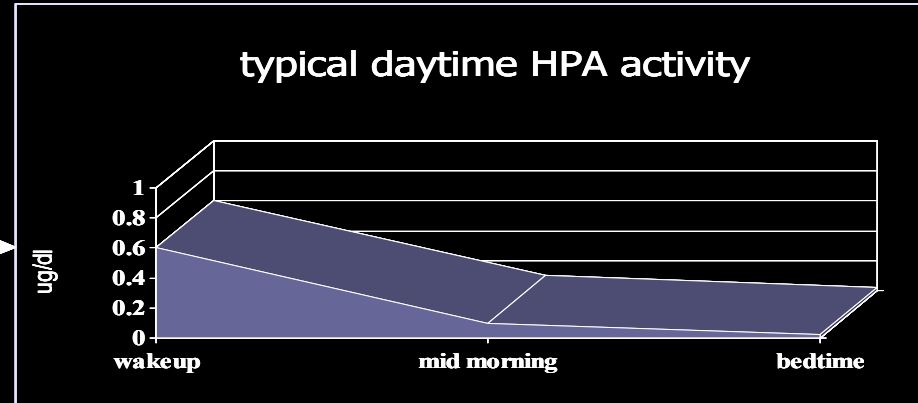
Cortisol levels among preschool aged foster children



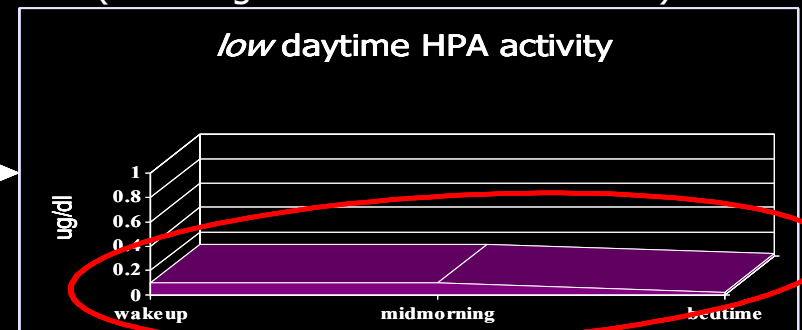
Cortisol dysregulation associated with early life stress



typical



(downregulation via chronic stress)



stress-induced
'blunted'
patterns

Executive Function Skills

Inhibitory Control — filter thoughts and impulses to resist temptations and distractions



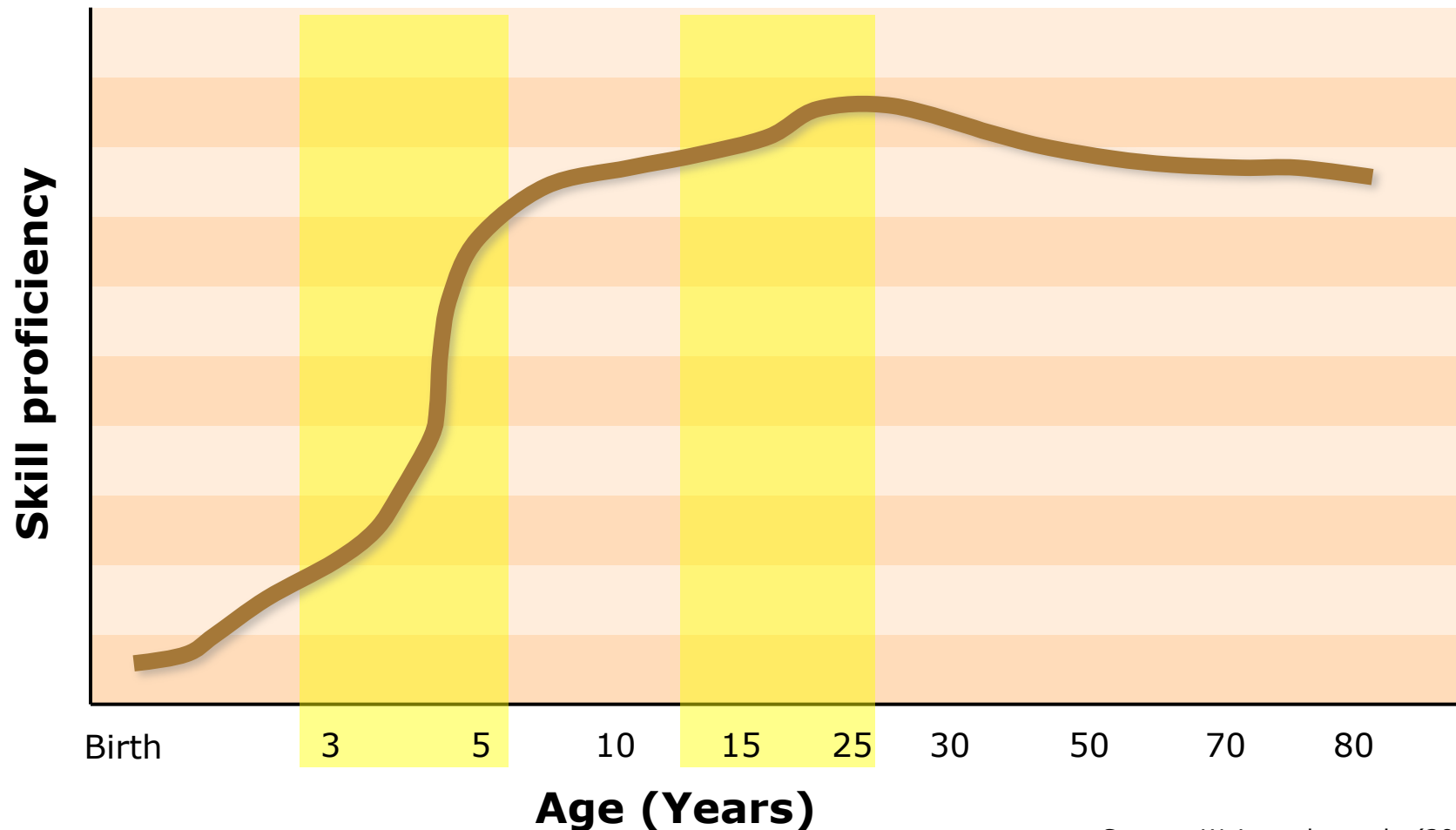
Working Memory — hold and manipulate information in our heads over short periods of time



Cognitive flexibility — adjust to changed demands, priorities, or perspectives



Executive function has a more protracted course of development, thus *both* more vulnerability and potential for intervention



Source: Weintraub, et al., (2011)

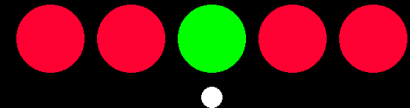
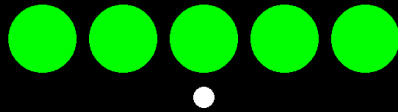


Flanker Task

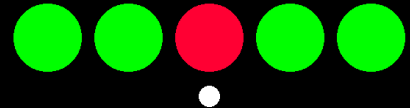
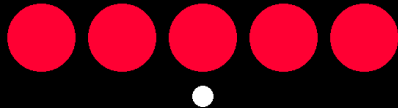
Congruent

Incongruent

Green



Red



Flanker Task Feedback

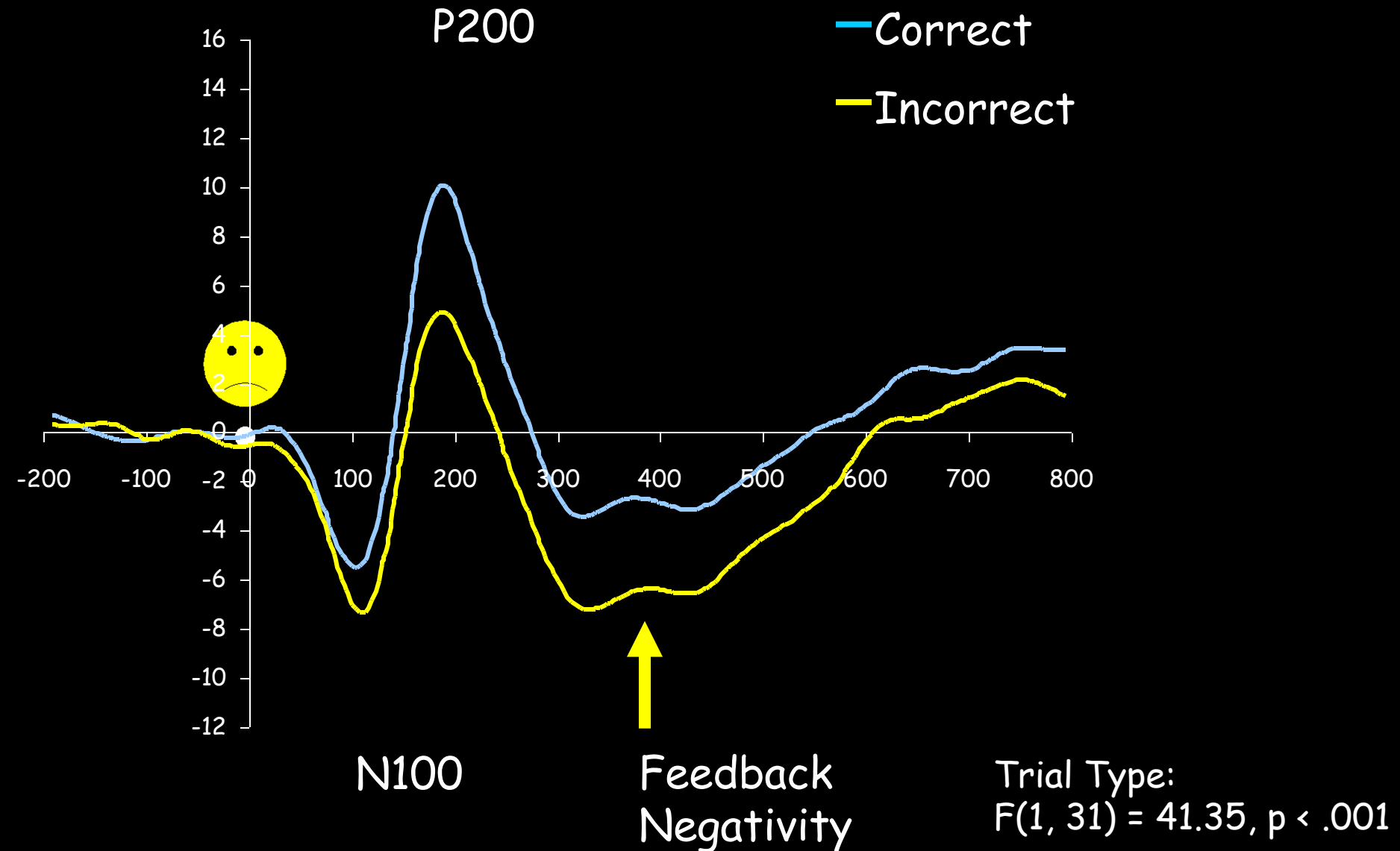
Correct



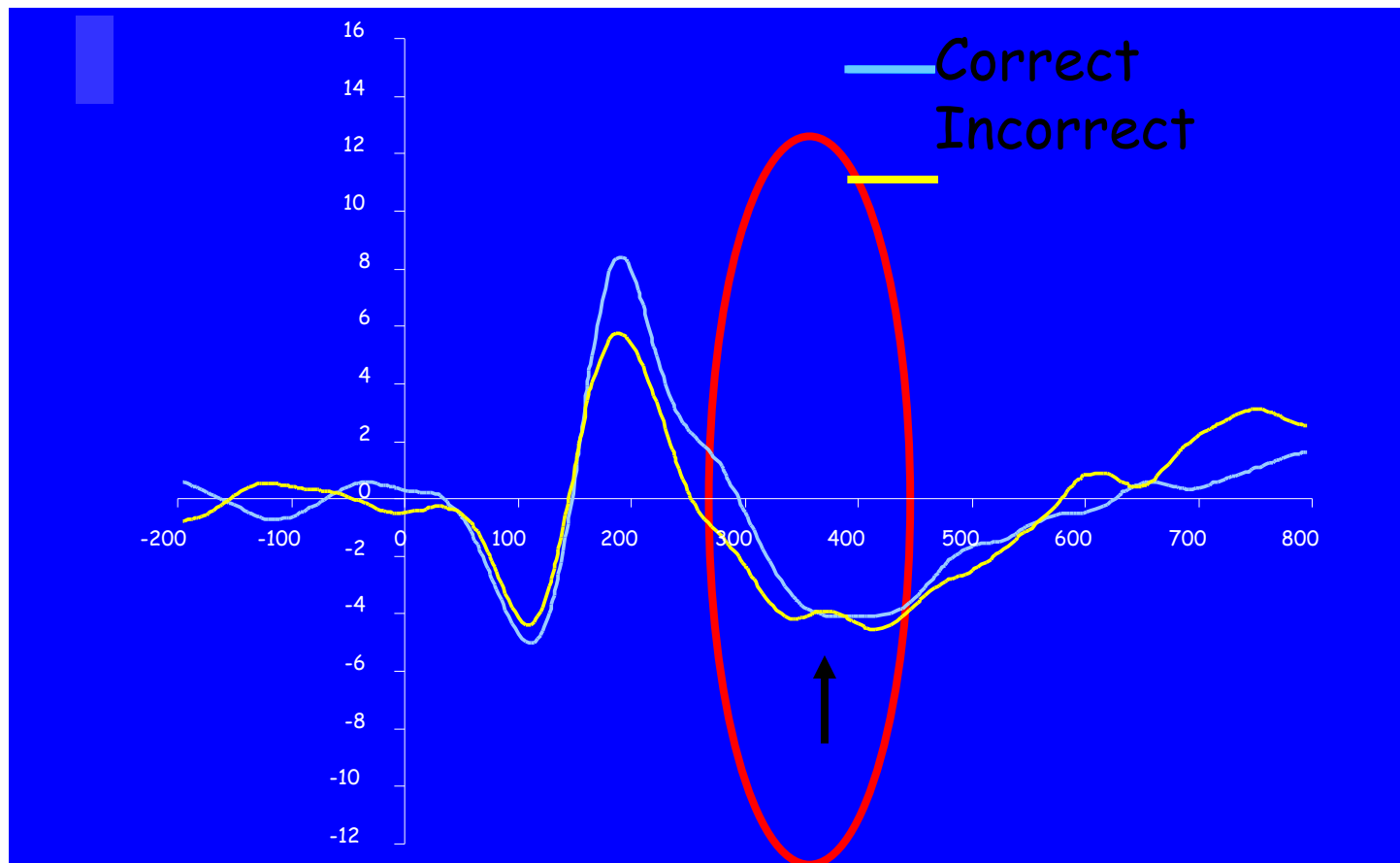
Incorrect



Feedback Negativity at Fz by Trial Type



What we observed in foster children
might cast their learning and behavior
problems in a different light...



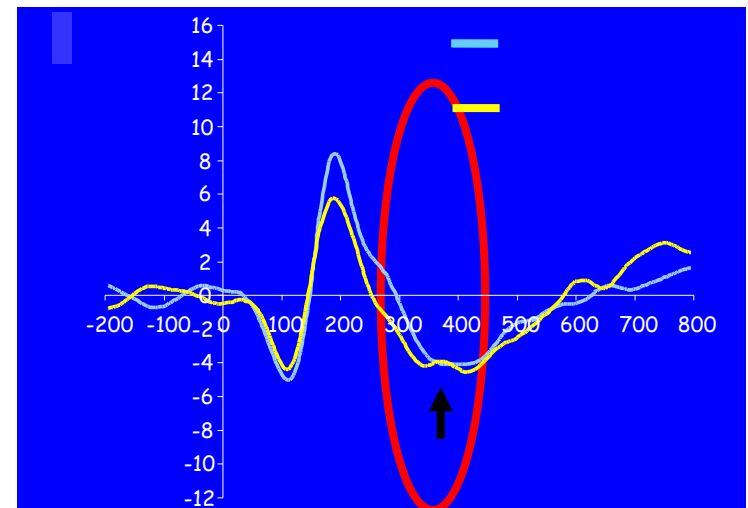
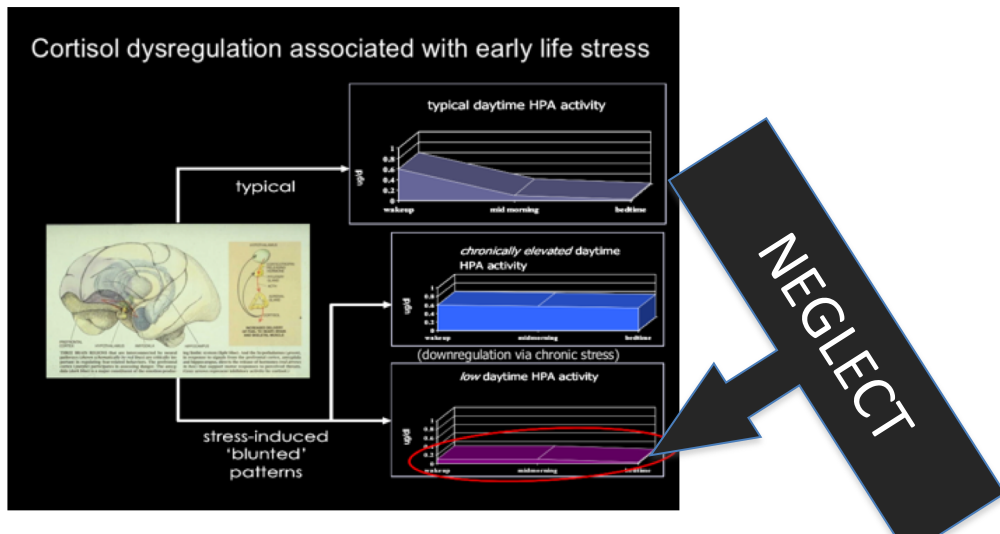
Bruce, Martin-McDermott, Fisher, & Fox (2009)

Core concept #3

Caregiver-child interaction
shapes brain circuitry.

Two IMPORTANT concepts related to Serve and Return

1. The **absence of serve and return** (i.e., neglect but also non-responsive care) is in and of itself a toxic stressor; thus we should consider not only “trauma informed care” but also “**ADVERSITY INFORMED CARE**”

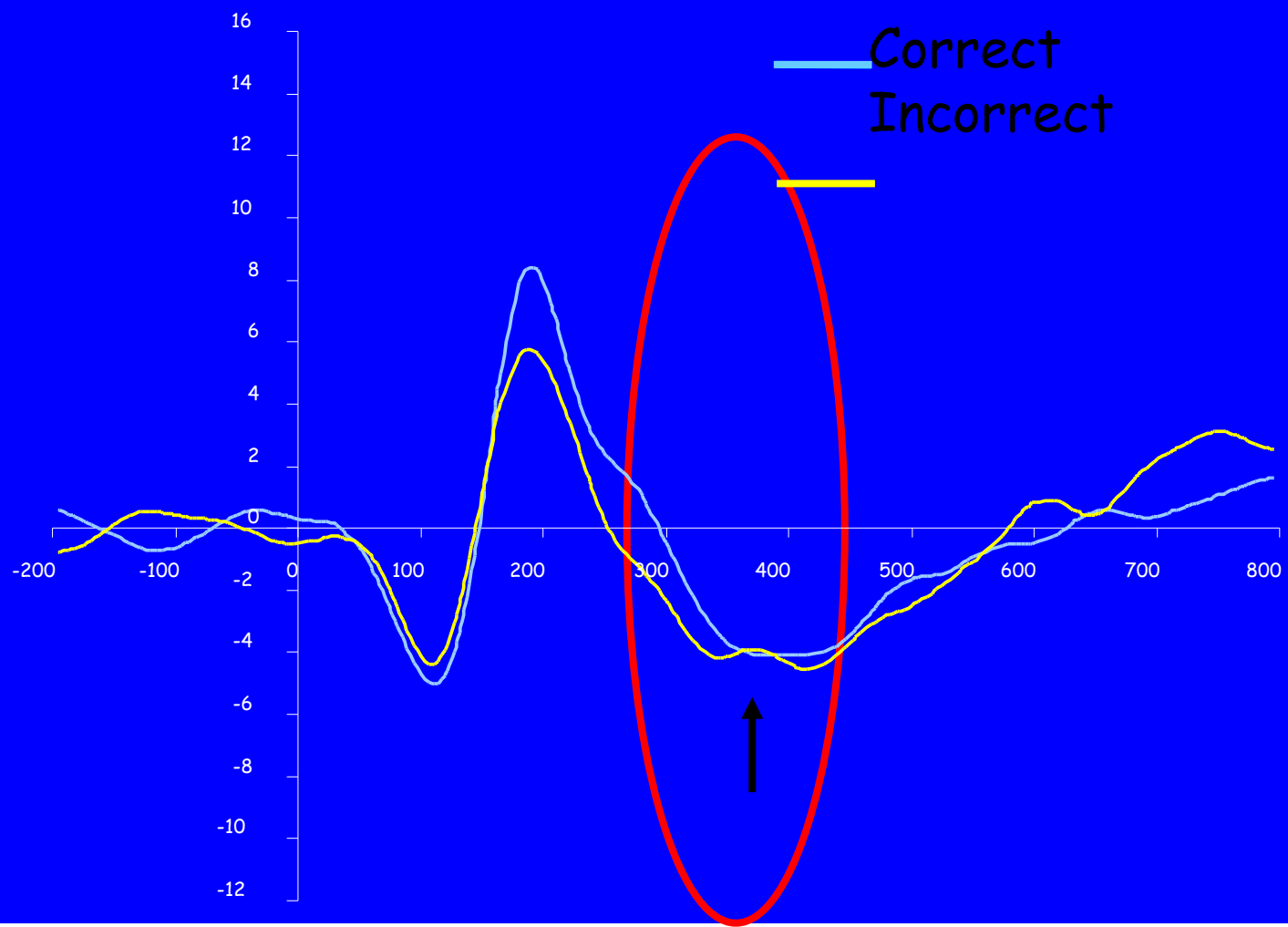


EXTENDING ADVERSITY INFORMED CARE BEYOND MENTAL HEALTH (ACES study)

- TOXIC STRESS IMPLICATIONS FOR
 - EXECUTIVE FUNCTIONING (INHIBITORY CONTROL)
 - ADDICTION
 - IMMUNE SYSTEM
 - INFLAMMATORY RESPONSE
 - METABOLIC FUNCTION
 - GUT-BRAIN AXIS
- COMBINED WITH SOCIAL DETERMINANTS OF HEALTH

Two IMPORTANT concepts related to Serve and Return

2. Serve and Return is a powerful and efficient tool for **promoting resilience**, leveraging the brain's plasticity following early adversity

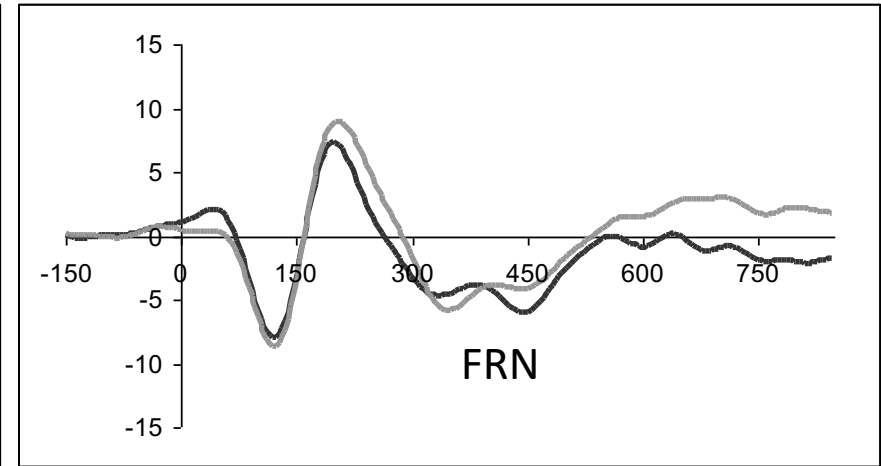
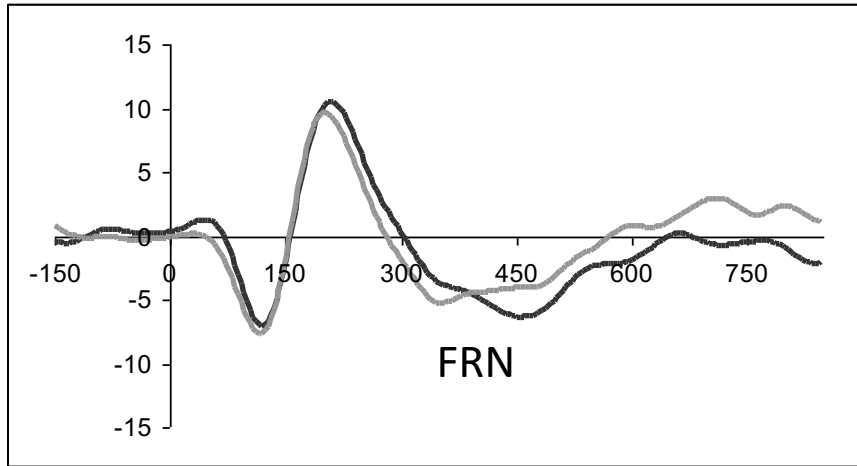


INTERVENTION EFFECTS ON BRAIN ACTIVITY DURING CORRECTIVE FEEDBACK in FOSTER CHILDREN (Pears, McDermott, & Fisher, 2017)

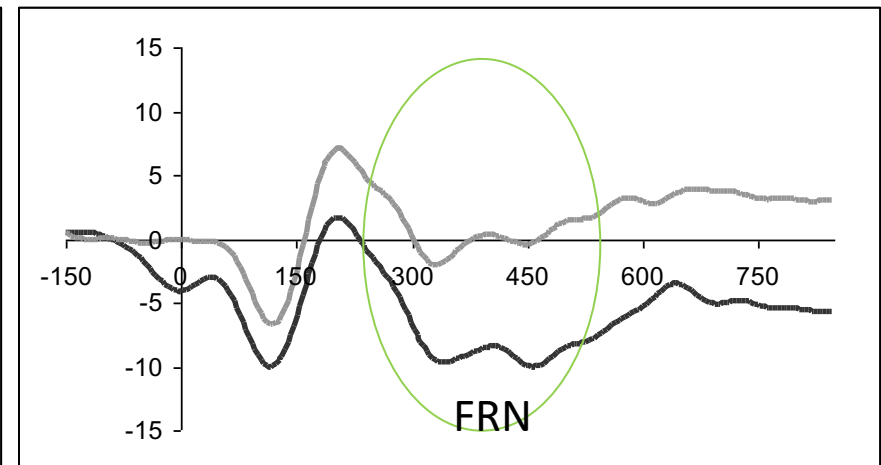
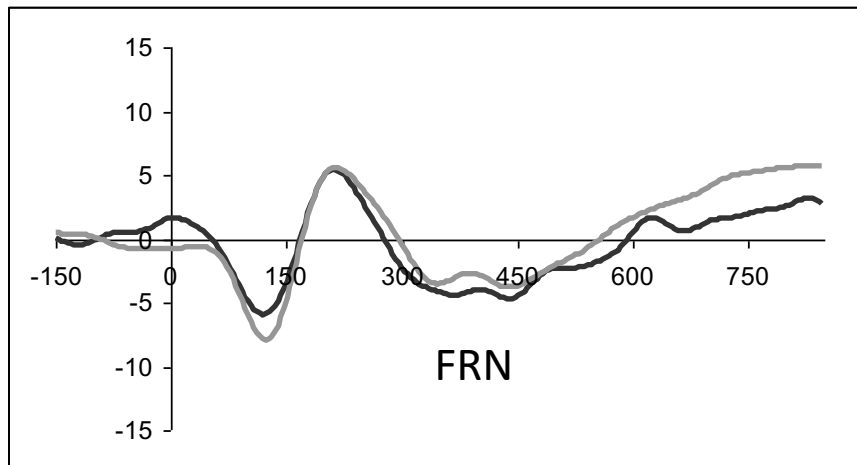
Pre Intervention

Post Intervention

Reg Foster Care



KITS Intervention



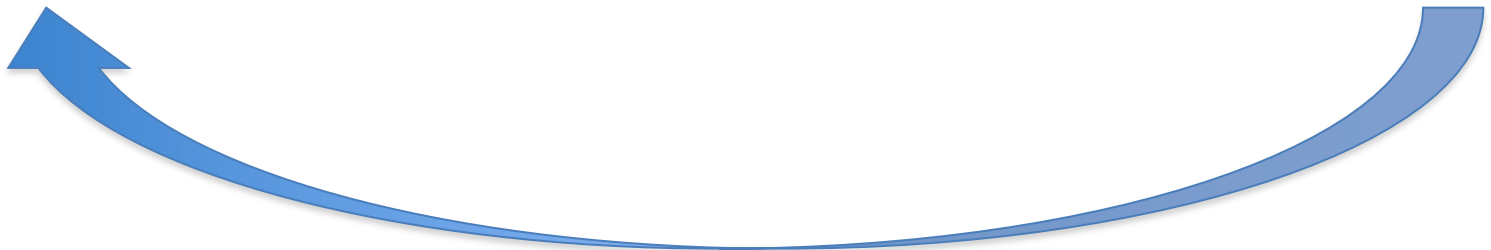


FIND

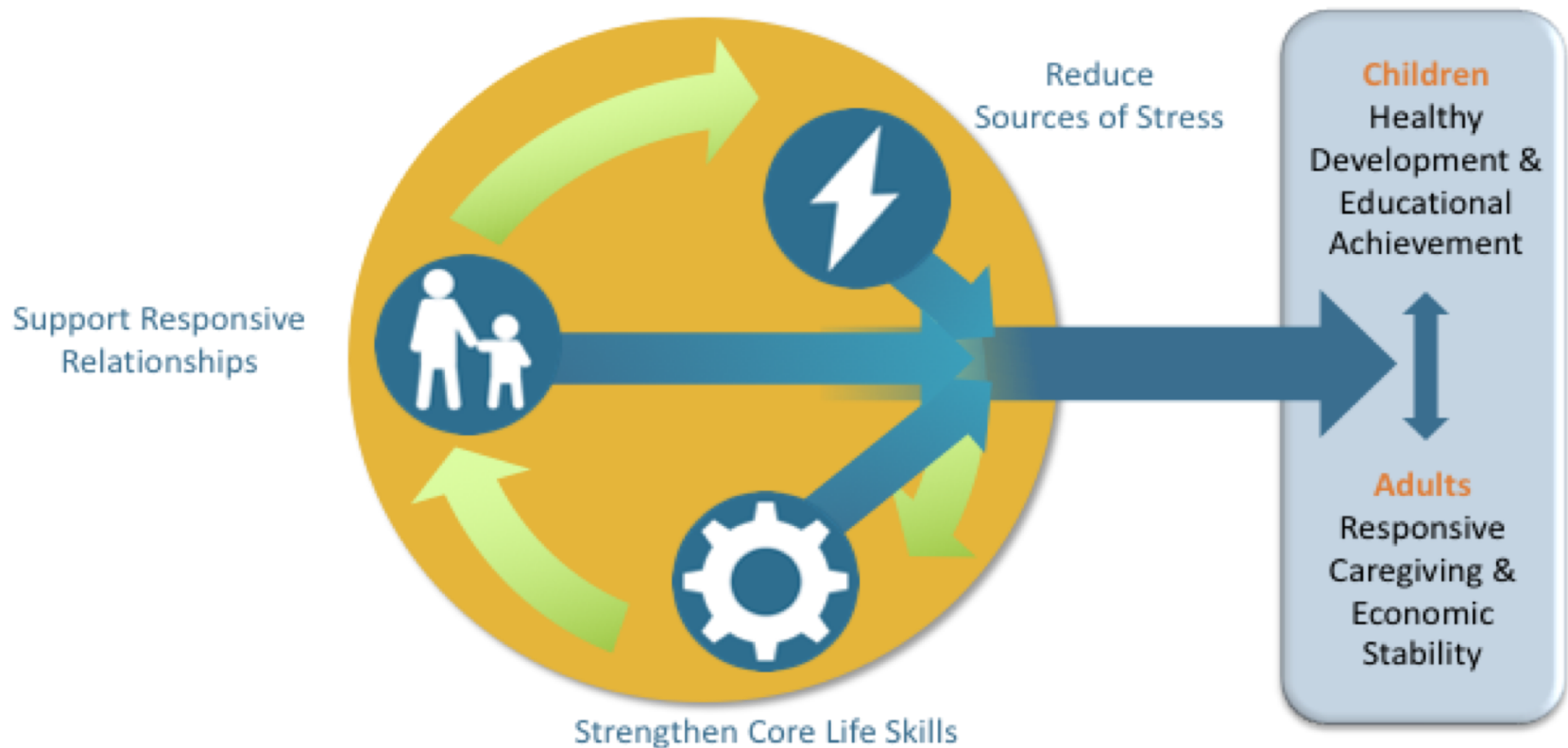
FILMING
INTERACTIONS
TO NURTURE
DEVELOPMENT



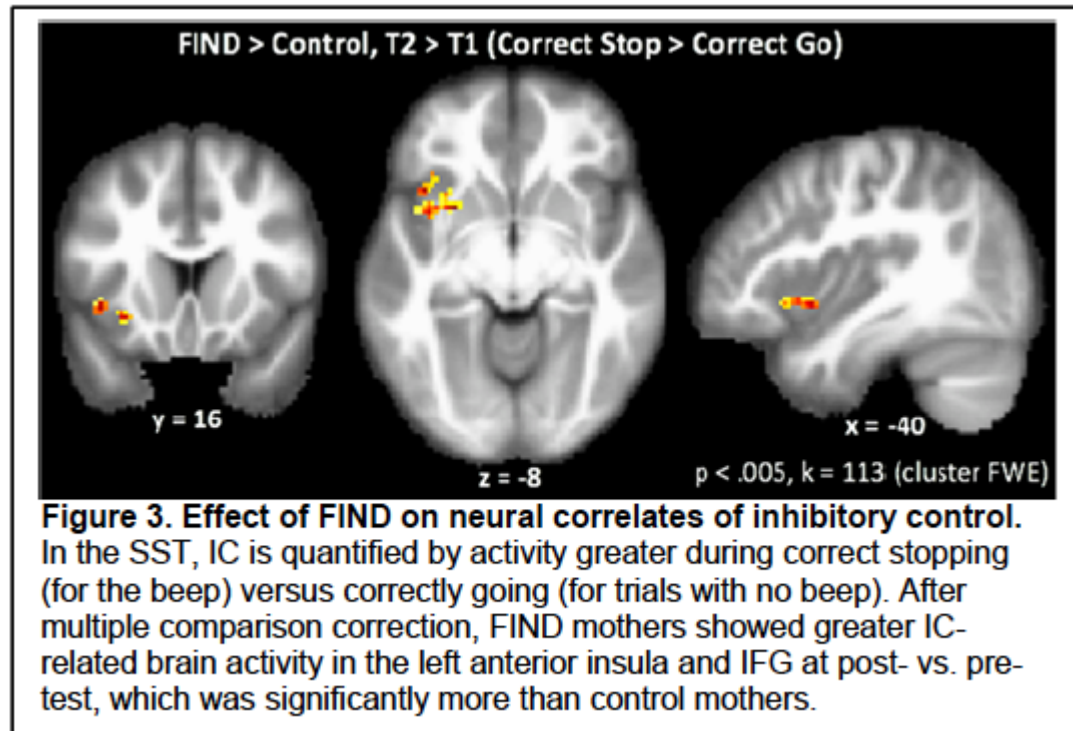
The FIND Process



What have we learned from evaluations of FIND so far?



*Preliminary evidence of intervention effects on **maternal** brain and behavior via FIND video coaching*



Summing it all up

Thank You