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E A R L Y E X P E R I E N C E S E L E V A T E E V E R Y T H I N G

EARLY BRAIN & CHILD DEVELOPMENT
AND THE FUTURE OF SOCIETY

DIPESH NAVSARIA, MPH, MSLIS, MD



DEPARTMENT OF PEDIATRICS
UW SCHOOL OF MEDICINE & PUBLIC HEALTH

MEDICAL DIRECTOR, REACH OUT AND READ WISCONSIN

VICE-CHAIR, BOARD OF DIRECTORS, REACH OUT AND READ



www.facebook.com/DrLibrarian Twitter: [@navsaria](https://twitter.com/navsaria)

Live-tweeting encouraged!

DISCLOSURE

I have **no** relevant financial relationships to disclose.

I will **not** discuss off-label use or investigational use in my presentation.

Although...



I don't know if “mouthing” is an FDA-approved use of board books.

“Oh, that’s so nice...”
CRITICAL

The Science The Result The Solution? The Call



First, a story...

Part One

**A Stroll Through
the Early Brain**



EARLY BRAIN AND CHILD DEVELOPMENT

from *The Science of Early Childhood Development*
National Scientific Council on the Developing Child, 2007

...the mind is its own place
...like a man, of Hell; a
- John Milton: "Para

EARLY BRAIN AND CHILD DEVELOPMENT

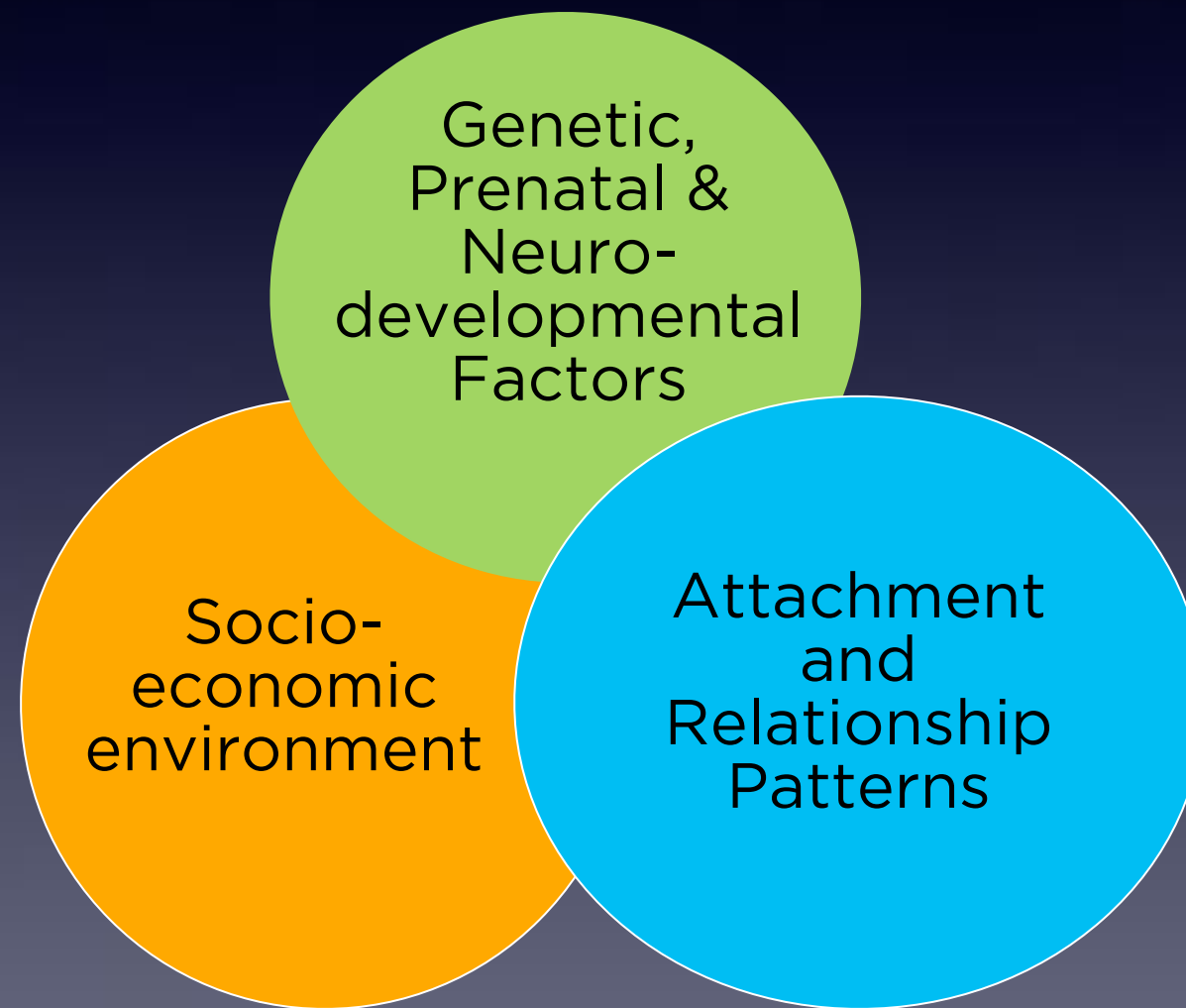
1

Child development is a foundation for **community** development and **economic** development, as capable children become the foundation of a prosperous and sustainable society.

2

Brains are built **over time**.

The **3-legged stool** for developmental and health trajectories



EARLY BRAIN AND CHILD DEVELOPMENT

3

The interactive influences of **genes** and **experience** literally shape the architecture of the developing brain and the active ingredient is the “**serve and return**” nature of children’s engagement in **relationships** with their parents and other caregivers in their family or community.



The Face to Face Paradigm Edward Z Tronick

EARLY BRAIN AND CHILD DEVELOPMENT

4

Both brain architecture and developing abilities are built “from the bottom up” with simple circuits and skills providing the **scaffolding** for more advanced circuits and skills over time.

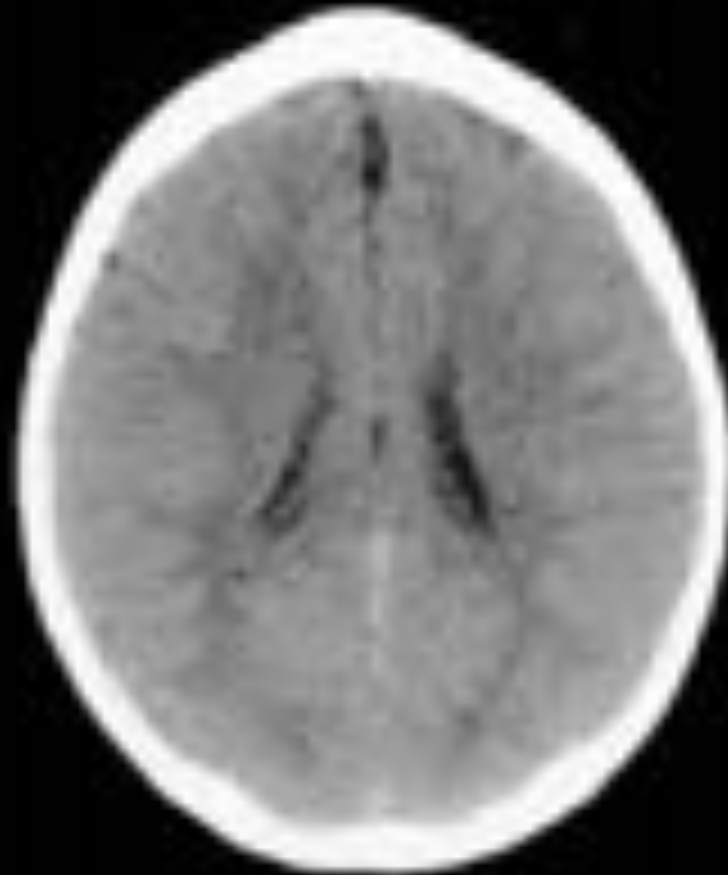
“play is the work of infancy”
— T Berry Brazelton

EARLY BRAIN AND CHILD DEVELOPMENT

5

Toxic stress in early childhood is associated with **persistent** effects on the nervous system and stress hormone systems that can **damage developing brain architecture** and lead to lifelong problems in learning, behavior and both physical and mental health.

3 Year Old Children



Normal



Extreme Neglect

Normal

Extreme Neglect

THE STRESS RESPONSE:

increases in cortisol and epinephrine

Three Levels of Stress Response

Social-emotional buffering
is the **primary factor**
distinguishing level of stress.

Andy Garner, MD

Adversity & Toxic Stress

Toxic stress is the
key intergenerational transmitter
of social and health disparities

What if it's worse?
What if there's no supportive relationships?

Child abuse
Parental substance abuse
Homelessness

TOXIC STRESS



CHILDHOOD STRESS

Hyper-responsive
stress response

decreased
calm/coping

Chronic “fight or flight”

increased
cortisol / norepinephrine

Changes in Brain
Architecture

EARLY BRAIN AND CHILD DEVELOPMENT

The Result

THE ADVERSE CHILDHOOD EXPERIENCES STUDY

**The Most Important Study
You've (Probably) Never Heard Of.**

In 1985, Dr Vincent Felitti noticed many patients in his obesity treatment programs had prior history of abuse or trauma

The CDC worked with Kaiser Permanente and looked retrospectively at over 17,000 patients.

This was the first study to simultaneously assess childhood exposure to multiple types of abuse, neglect, domestic violence and serious household dysfunction.

THE ADVERSE CHILDHOOD EXPERIENCES STUDY

Study participants were middle-class Americans from San Diego, 80% white, 74% attended college, average age of 57, split evenly between men and women.


**Not exactly an impoverished,
“at-risk” population.**

THE ADVERSE CHILDHOOD EXPERIENCES STUDY

Emotional abuse	10%
Physical abuse	26%
Sexual abuse	21%
Emotional neglect	15%
Physical neglect	10%
Mother treated violently	13%
Household substance abuse	28%
Household mental illness	20%
Parental separation or divorce	24%
Incarcerated household member	6%

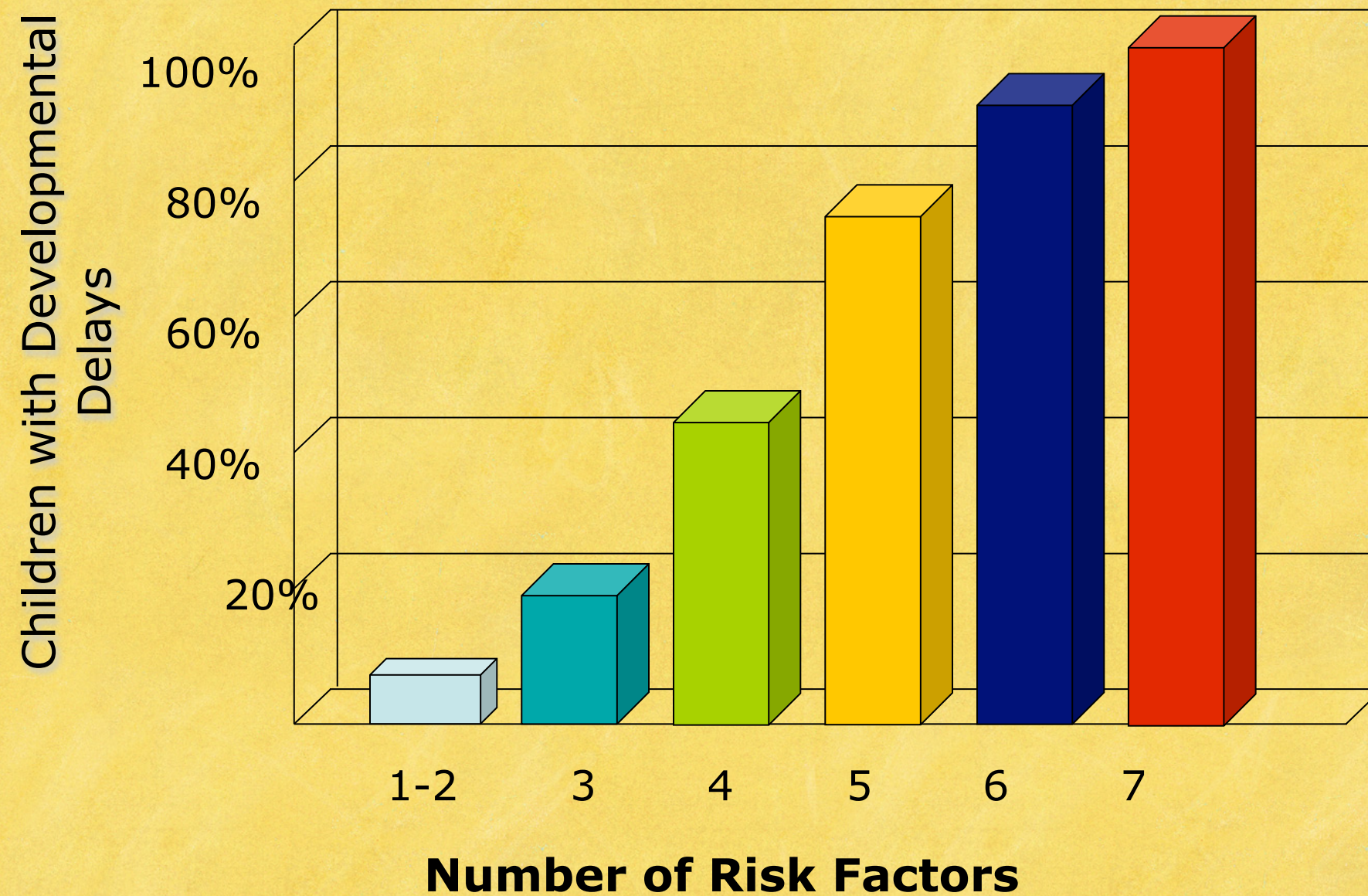


ACE Score (one point for each category listed)	Prevalence in study
0	33%
1	26%
2	16%
3	10%
4	6%
5	5%
6	6%



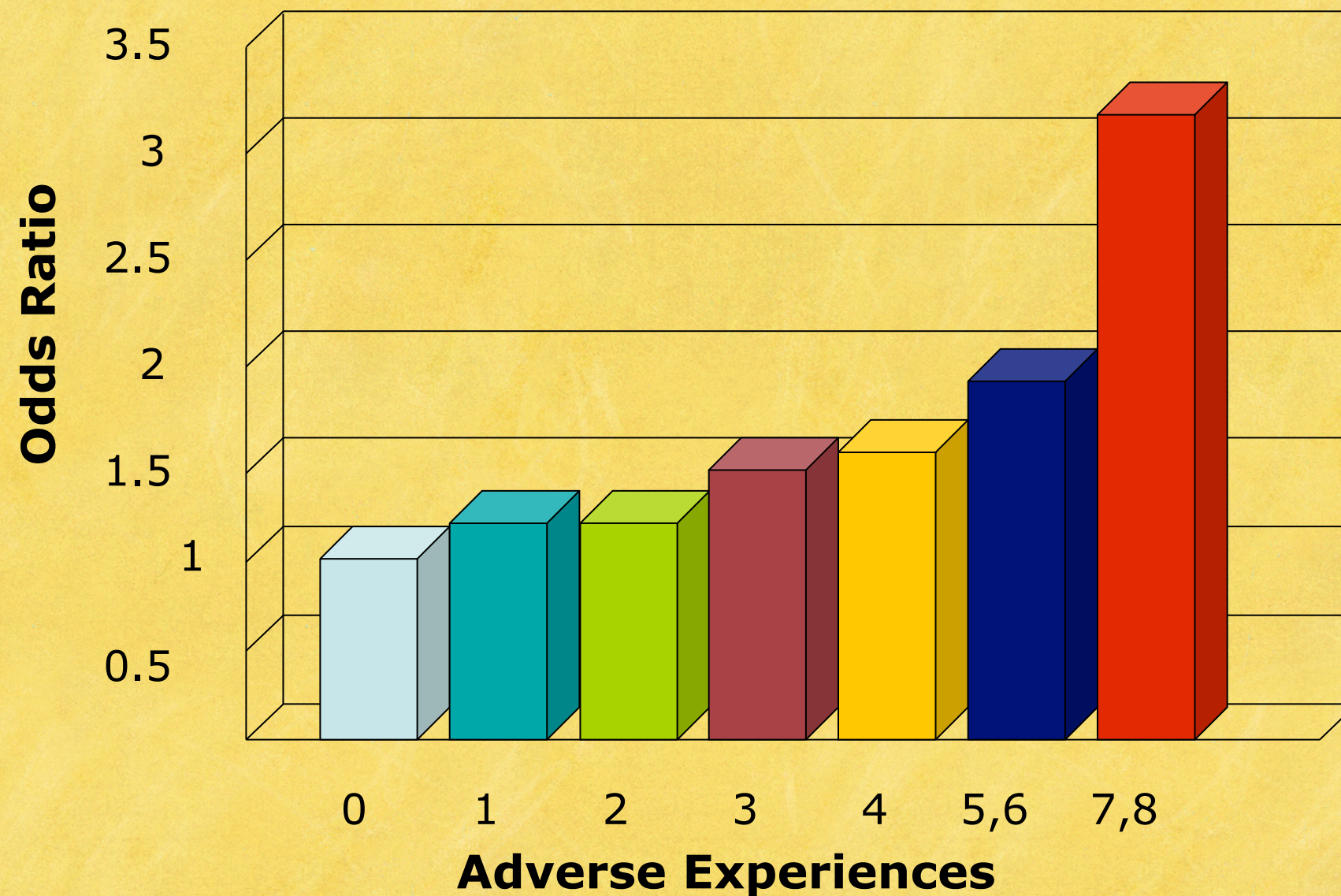
Not only are they unexpectedly common...
...their effects are **cumulative**.

Significant Adversity Impairs Development in the First Three Years



Source: Barth, et al. (2008) via Center on the Developing Child at Harvard University

Risk Factors for Adult Heart Disease are Embedded in Adverse Childhood Experiences



Source: Dong, et al. (2004) *via* Center on the Developing Child at Harvard University

EARLY BRAIN AND CHILD DEVELOPMENT

6

Creating the right conditions for early childhood development is likely to be **more effective and less costly** than addressing problems at a later age.

Three Promising Domains for EBCD Innovation

Jack Shonkoff, MD

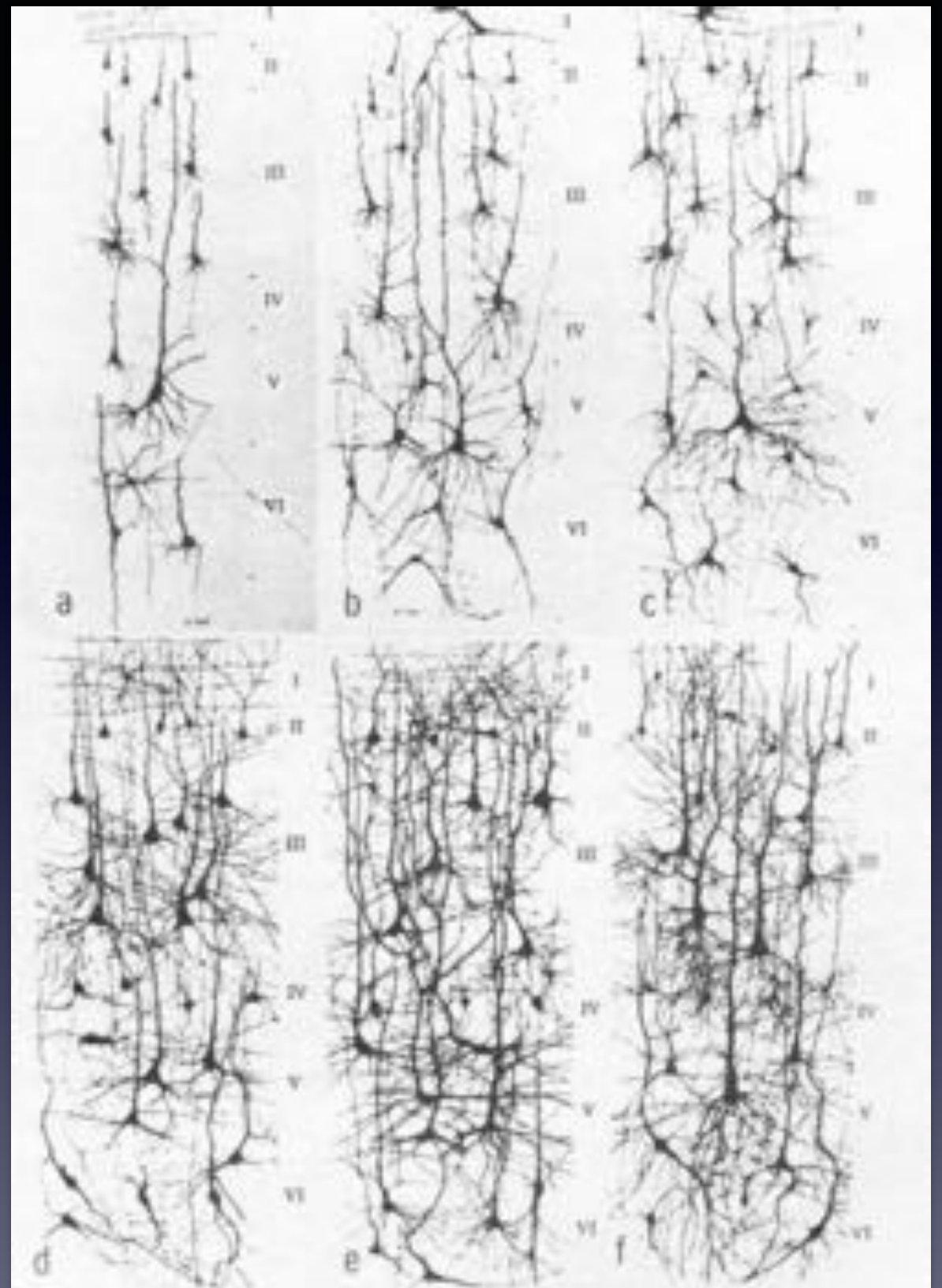
Reduce emotional and behavioral barriers to learning.

Enhance the healthy development of children by transforming the lives of their parents.

Reconceptualize the health dimension of early childhood policy and practice.

NUMBERS TO REMEMBER

700 New Neural Connections per Second



Postnatal development of human cerebral cortex around Broca's Area (FCBm); camera lucida drawings from Golgi-Cox preparations. a: newborn; b: 1 month; c: 3 months; d: 6 months; e: 15 months; f: 24 months.

(from Conel, 1939-1959)

(FROM CONEL, 1939-1959)

PLASTICITY

Synaptic

Variation in
Strength of
connections

“A whisper
to a shout”

Lifelong

Cellular

Variation in
Number of
Connections

“One shout
to a stadium
shouting.”

Declining by
age 5!

Diminishing Cellular Plasticity
Limits Remediation

18 Months:

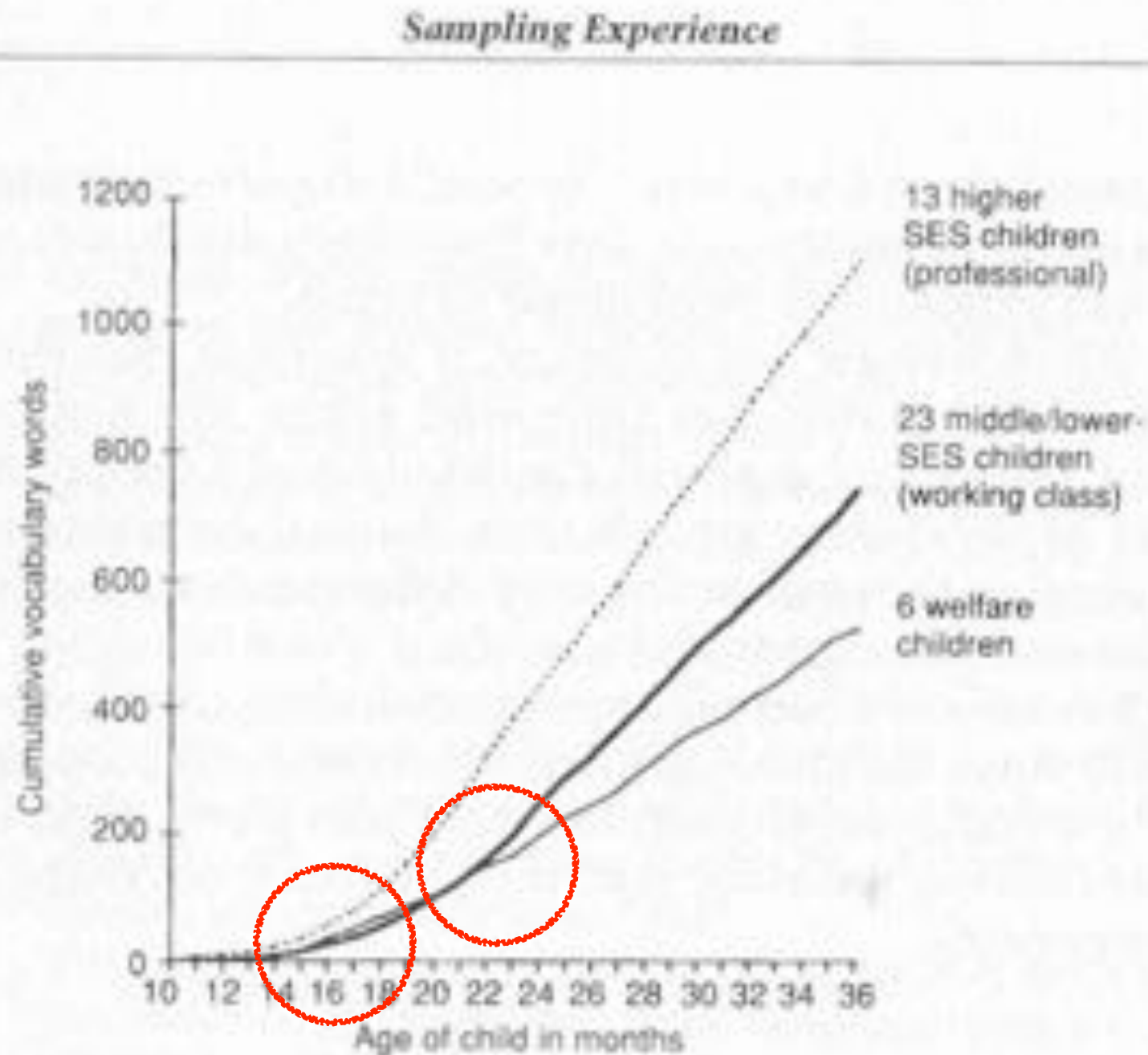


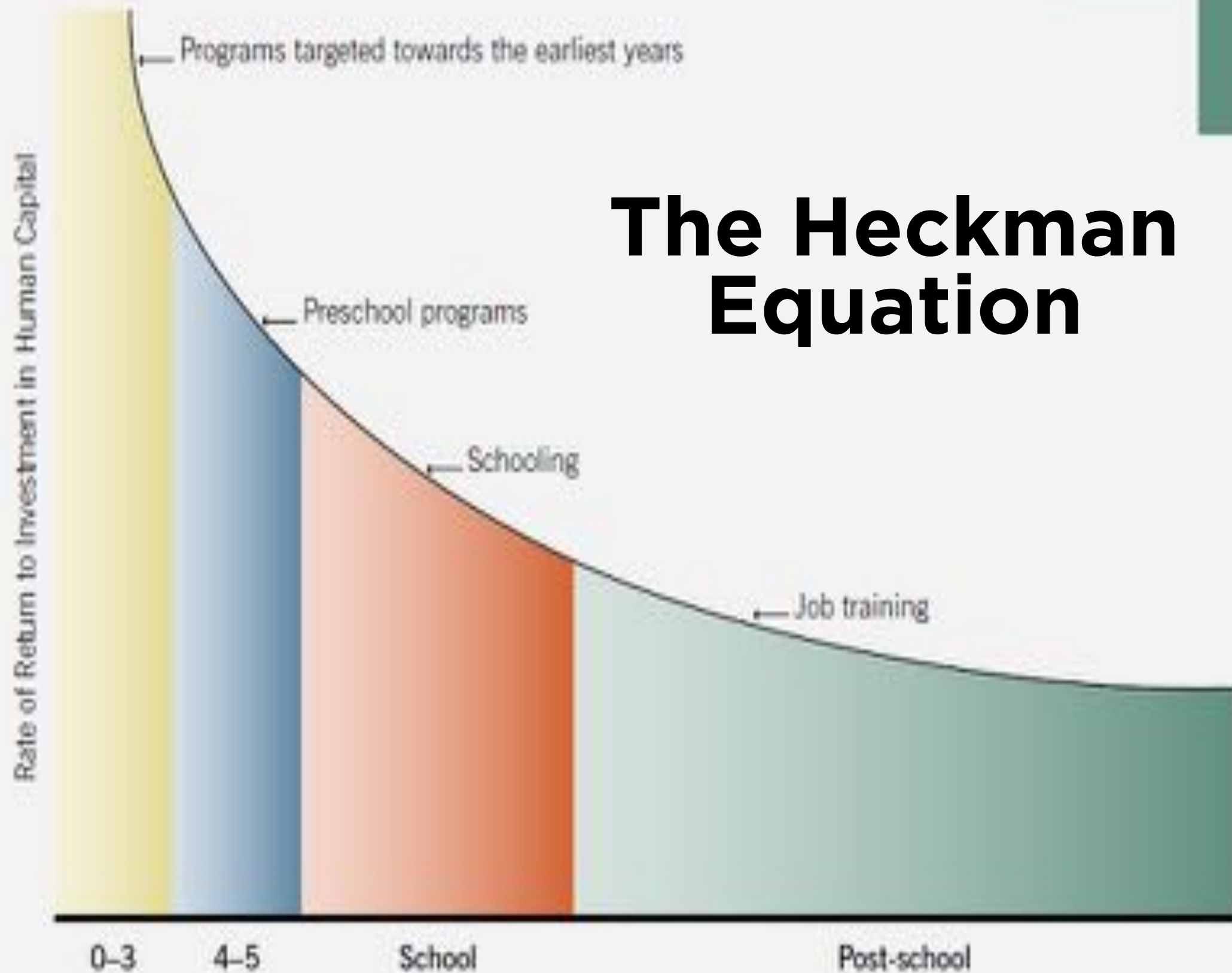
Figure 2. The widening gap we saw in the vocabulary growth of children from professional, working-class, and welfare families across their first 3 years of life. (See Appendix B for a detailed explanation of this figure.)

The background of the slide is a dense, overlapping collage of various US dollar bills, including \$100, \$50, and \$20 denominations. The bills are slightly faded and layered, creating a textured, financial backdrop. The text is overlaid on this background.

\$4-\$9

**in Returns for
Every Dollar Invested
in Early Childhood Programs**

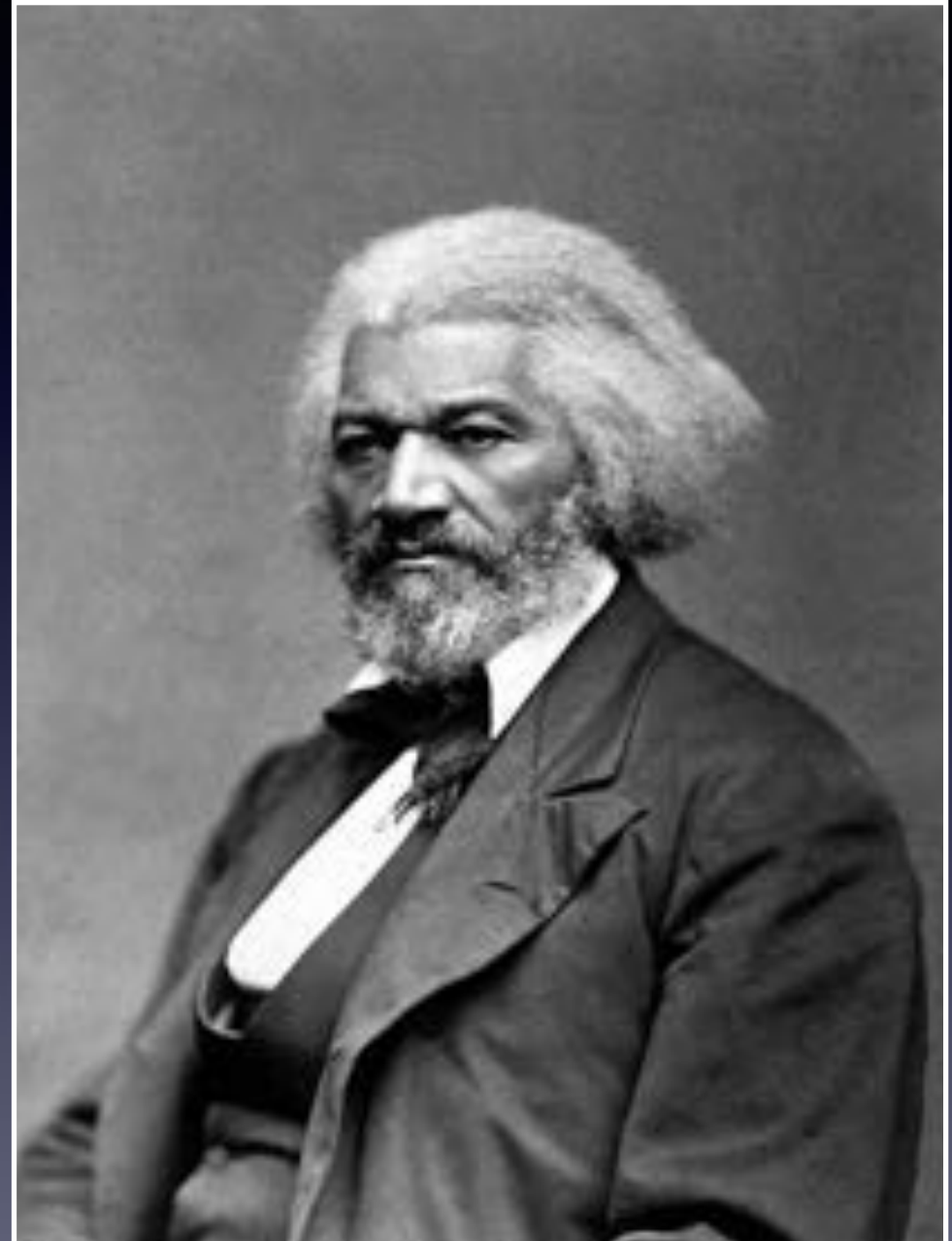
Returns Per Annum to a Unit Dollar Invested



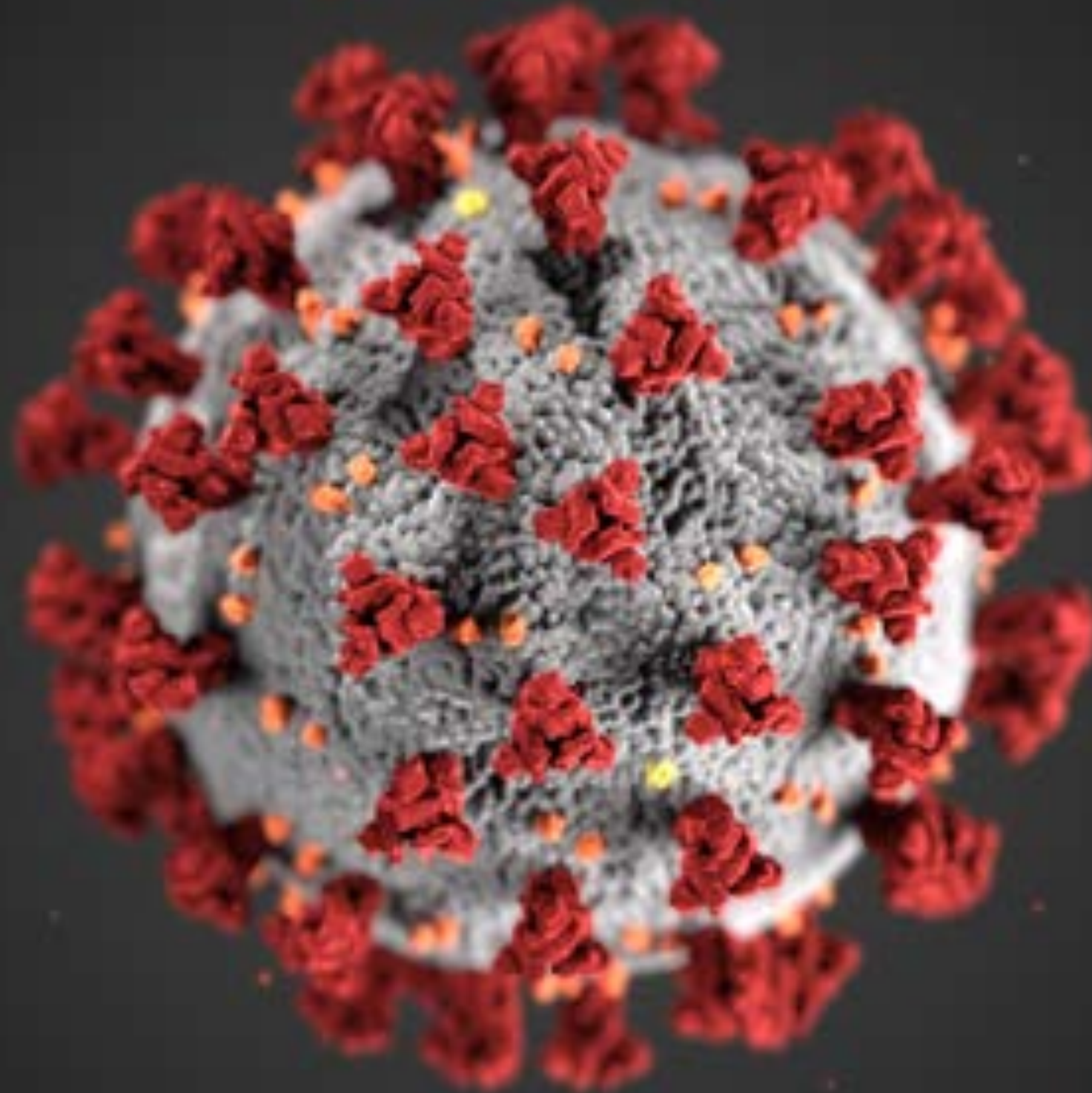
The Heckman Equation

**“It is easier to build
strong children than to
repair broken men.”**

**— Frederick Douglass
(1817–1895)**



The Reality of **Now**



Families Face Challenges





World Map



NEW



U.S. Map



Critical Trends



COVID-19 Dashboard by the Center for Systems Science and Engineering (...)



Total Confirmed

3,247,648

Confirmed Cases by
Country/Region/Sove
reignty

1,046,022 US

239,639 Spain

205,463 Italy

166,628 France

166,443 United
Kingdom162,123 Germa
ny

120,204 Turkey

106,498 Russia

94,640 Iran

Admin0

Last Updated at (M/D/YYYY)
4/20/2020, 12:32:33 PM

187

Lancet Inf Dis Article: [Here](#). Mobile Version: [Here](#).
Lead by JHU CSSE. Automation Support: [Esri Living Atlas](#)
team and JHU APL. Contact US. [FAQ](#).

Total Deaths

229,447

27,967 deaths
Italy26,097 deaths
United
Kingdom24,543 deaths
Spain24,087 deaths
France18,076 deaths
New York

Deaths

Total Test Results in US

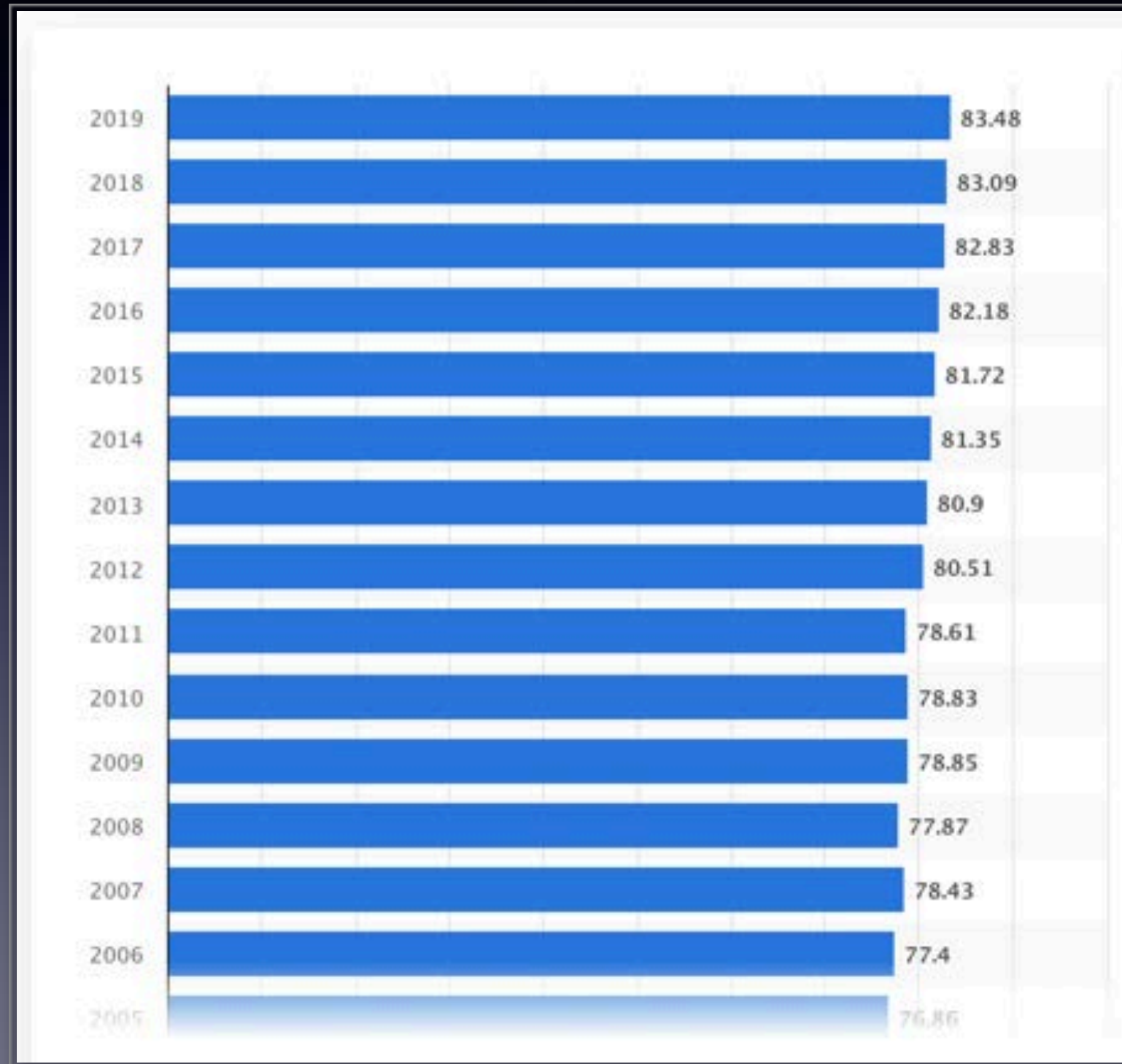
6,065,570

872,481 tested
New York US603,139 tested
California US373,488 tested
Florida US314,790 tested
Texas US265,618 tested
Massachusetts
US

US...



Number of Families in the United States (in millions)





**Struggles have
always been
present.**

**But now
they're laid
bare.**

POLICY STATEMENT

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

American Academy
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

The Impact of Racism on Child and Adolescent Health

Maria Trent, MD, MPH, FAAP, FSAHM,* Danielle G. Dooley, MD, MPhil, FAAP,[†] Jacqueline Dougé, MD, MPH, FAAP,[‡] SECTION ON ADOLESCENT HEALTH, COUNCIL ON COMMUNITY PEDIATRICS, COMMITTEE ON ADOLESCENCE

The American Academy of Pediatrics is committed to addressing the factors that affect child and adolescent health with a focus on issues that may leave some children more vulnerable than others. Racism is a social determinant of health that has a profound impact on the health status of children, adolescents, emerging adults, and their families. Although progress has been made toward racial equality and equity, the evidence to support the continued negative impact of racism on health and well-being through implicit and explicit biases, institutional structures, and interpersonal relationships is clear. The objective of this policy statement is to provide an evidence-based document focused on the role of racism in child and

abstract

**Division of Adolescent and Young Adult Medicine, Department of Pediatrics, School of Medicine, Johns Hopkins University, Baltimore, Maryland; [†]Division of General Pediatrics and Community Health and Child Health Advocacy Institute, Children's National Health System, Washington, District of Columbia; and [‡]Medical Director, Howard County Health Department, Columbia, Maryland*

Drs Trent, Dooley, and Dougé worked together as a writing team to develop the manuscript outline, conduct the literature search, develop the stated policies, incorporate perspectives and feedback from American Academy of Pediatrics leadership, and draft the final version

evidence-based document focused on the role of racism in child and relationships is clear. The objective of this policy statement is to provide an implicit and explicit biases, institutional structures, and interpersonal

American Academy of Pediatrics leadership, and draft the final version the stated policies, incorporate perspectives and feedback from develop the manuscript outline, conduct the literature search, develop Drs Trent, Dooley, and Dougé worked together as a writing team to

My ideal doctor would be my Virgil, leading me through my purgatory or inferno, pointing out the sights as we go. He would resemble Oliver Sacks, the neurologist who wrote "Awakenings" and "The Man Who Mistook His Wife for a Hat." I can imagine Dr. Sacks entering my condition, looking around at it from the inside like a benevolent landlord with a tenant, trying to see how he could make the premises more livable for me. He would see the genius of my illness. He would mingle his daemon with mine; we would wrestle with my fate together.

— Anatole Broyard



Dante and Virgil in the Second Circle of Hell by Joseph Anton Koch (1823)



Dante and Virgil in Hell by Eugène Delacroix (1798–1863)

What can we do about it?

Principles of ~~The~~ Solutions

We **need** solutions which...

Build capabilities

Build capacities

Are based in homes
& communities

Address root causes

Have long-term effects

Address prevention

Leverage the
first 1000 days

Are evidence-guided

Are scalable

Productive, happy adults





Educationally successful





Brain circuitry primed
for school success





Early experiences
molding brain for learning





**Nurturing, responsive
interactions with children**





**Adults with the ability to
put these skills into action**





Adults with capability
and capacity
to interact well
with children



Intensive but
small initiatives



Programs, policies, and advice



Broader but scalable,
larger initiatives

**Reach
Out
& Read®**



where great stories begin™



Prescription for Reading

Name: _____

Date: _____ Age: _____



WISCONSIN
★ Children's Health
Alliance of Wisconsin



Rx Share Books Together

- ☐ Every night at bedtime
- ☐ For _____ minutes every day
- ☐ As needed

Refills: as requested at local public library

Signature: _____

Dr. Dipesh Navsaria, MPH, MSLIS, MD
Pediatrician & Occasional Children's Librarian

Pediatrician & Occasional Children's Librarian

衆瞽
摸象之圖

developmental
surveillance

a book giveaway

an educational
intervention

a toxic stress-
buffering routine

a public health
approach

Reach
Out
& Read®



a relational
assessment tool

It's All These Things.

a parental
capacity-builder

a scalable,
evidence-based
model

THE ELEPHANT IN THE CLINIC

EARLY LITERACY AND FAMILY WELL-BEING



DIPESH NAVSARIA, MPH, MSLIS, MD
AMY SHRIVER, MD



 **ASCEND**
THE ASPEN INSTITUTE



where great stories begin™



The Reach Out and Read Podcast

www.reachoutandread.org/podcast

MMM'L69CpuonfguqL69q'old\boqc92f

Not **merely** advice
or a book giveaway...

...but rather a process of
**parental skill-building
and support...**

by already-existing, skilled,
trusted professionals.

A Solution for **Now**

Families Need Support



Supporting Relational Health



Shared Reading as a Scaffold





Virgil and Dante meeting Homer, Horace, Ovid, and Lucan by Nicola Consoni (1814–1884)

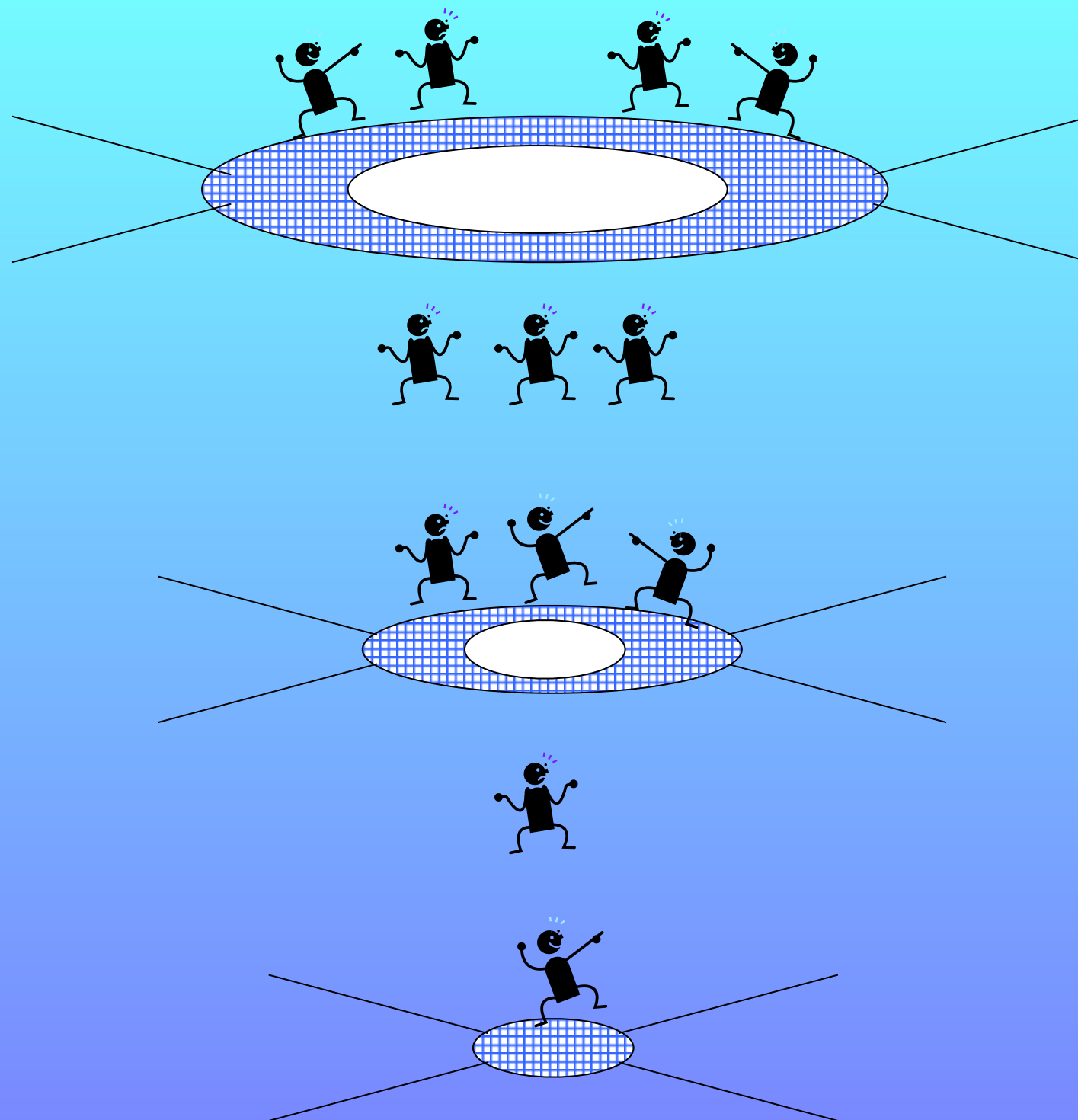


Dante and Virgil in the Ninth Circle of Hell by Gustave Doré (1832–1883)

EARLY BRAIN AND CHILD DEVELOPMENT

The Call

Using A Public Health Approach to Building Healthy Brains



Universal Primary Preventions

Anticipatory Guidance
Bright Futures
Reach Out and Read
Social Supports
Relational Health
High Quality Child Care

Everyone

Screening/Targeted Interventions

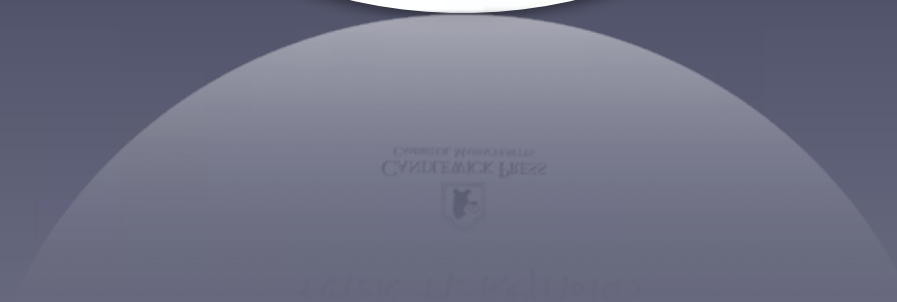
Developmental/Risk Screening
Home Visiting
Head Start
Parenting Education/Support
Early Intervention

At-risk

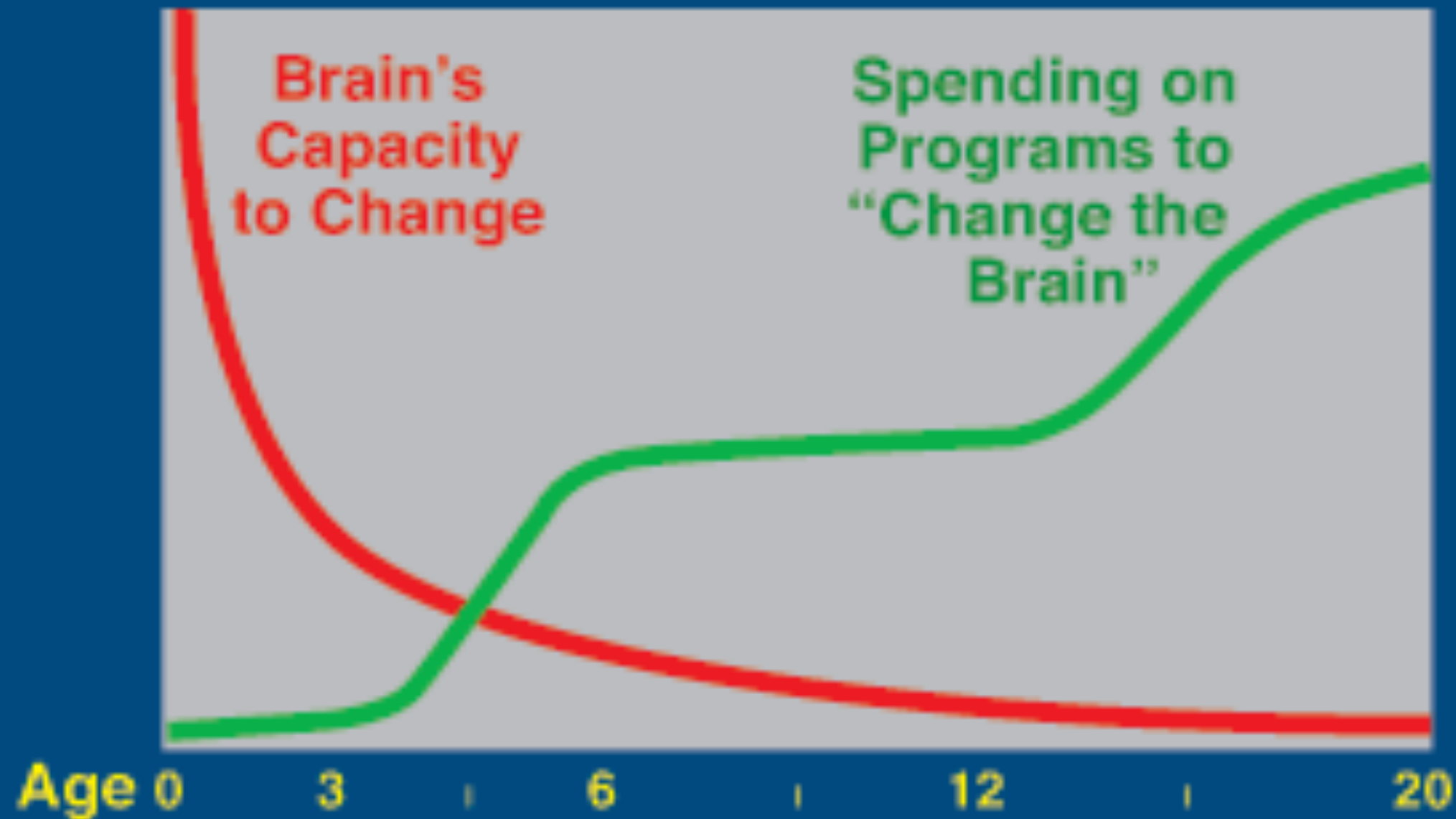
Evidence-Based Treatments

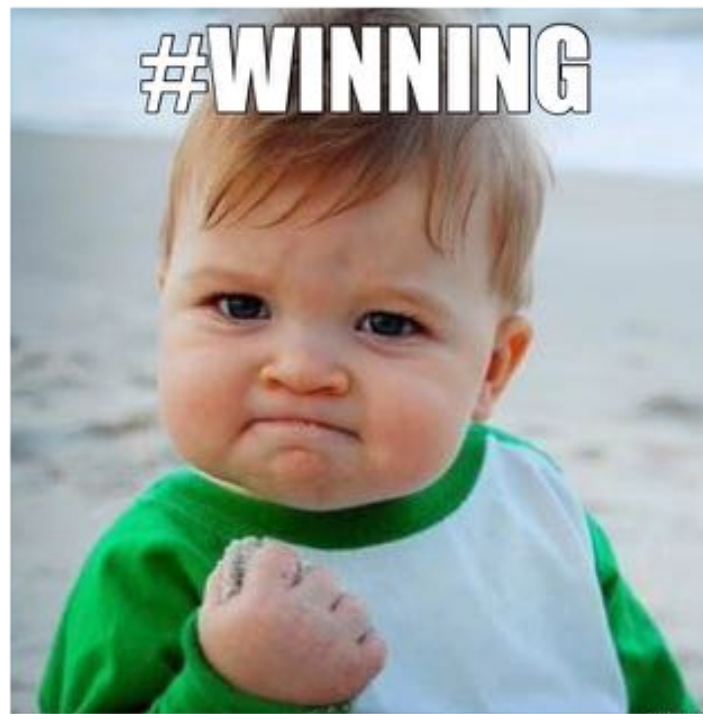
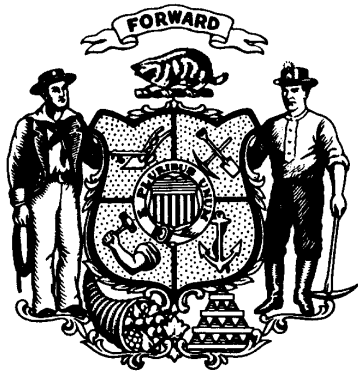
CPP, COS, PCIT, TB-CBT
Intensive Home Visiting
Intensive Parenting Education
Care Coordination

Symptomatic



Public Investment in Children by Age





LRB-3486/1
SRM:eev:ev

2013 SENATE RESOLUTION 59

Resolved by the senate, the assembly concurring, That policy decisions enacted by the Wisconsin state legislature will acknowledge and take into account the principles of early childhood brain development and will, whenever possible, provide the best possible start for every child in Wisconsin. *That* the legislature note the role of early intervention and investment in early childhood years as important strategies to achieve a lasting foundation for a more prosperous and sustainable state through investing in human capital.

(END)

Relating to: early childhood brain development.

Change the First Five Years and You Change Everything

Ounce of Prevention Fund

Accessible at <http://youtu.be/GbSp88PBe9E>

“While schools can do much to raise achievement among children who initially lag behind their peers, all too often pre-school gaps set in train a pattern of **ever increasing inequality** during school years and beyond. Any drive to improve social mobility must begin with an effective strategy to **nurture the fledgling talent in young children** so often lost before it has had a chance to flourish.”

The Sutton Trust

facebook.com/DrLibrarian
twitter.com/dnavsaria
dnavsaria@pediatrics.wisc.edu

THE
END

Public-facing Social Media
Please follow along!

