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HOW PROMOTING LITERACY IS KEY TO
EARLY BRAIN AND CHILD DEVELOPMENT

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SCHOOL OF LIBRARY AND INFORMATION STUDIES
UNIVERSITY OF WISCONSIN-MADISON

MEDICAL DIRECTOR, REACH OUT AND READ WISCONSIN



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 approved use of board books.

CRITICAL

“Oh, that’s so nice...”

A stroll through the Early Brain

Reading Reality

Reach Out and Read

First, a story...

Part One

A Stroll Through the Early Brain

The background of the slide is a reproduction of Michelangelo's famous fresco, "The Creation of Adam," from the ceiling of the Sistine Chapel. It depicts Adam reclining on the left, reaching towards the right, and God reclining on the right, reaching towards Adam. The title "EARLY BRAIN AND CHILD DEVELOPMENT" is superimposed in large, white, sans-serif capital letters across the center of the image.

EARLY BRAIN AND CHILD DEVELOPMENT

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

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

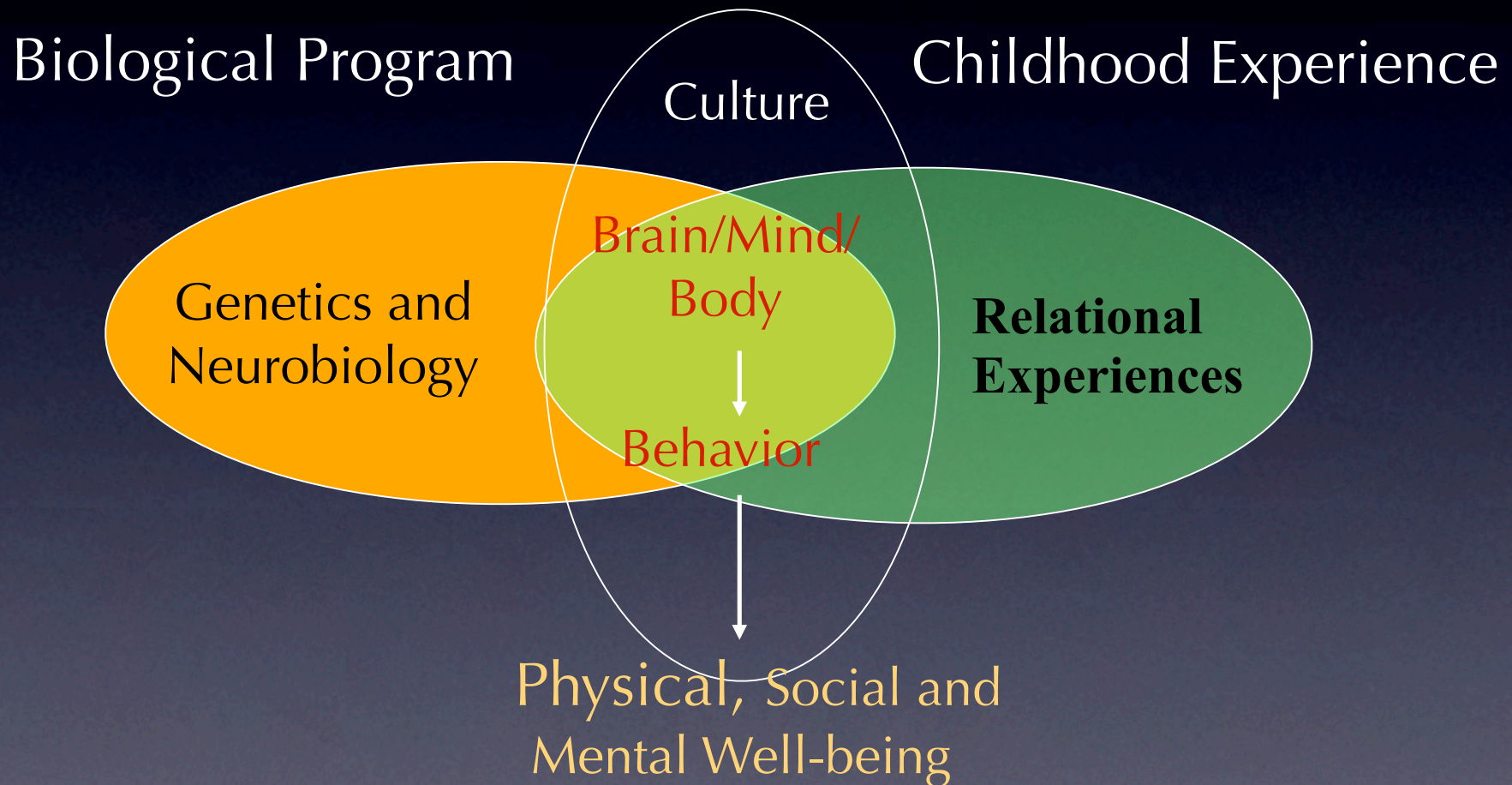
EARLY BRAIN AND CHILD DEVELOPMENT



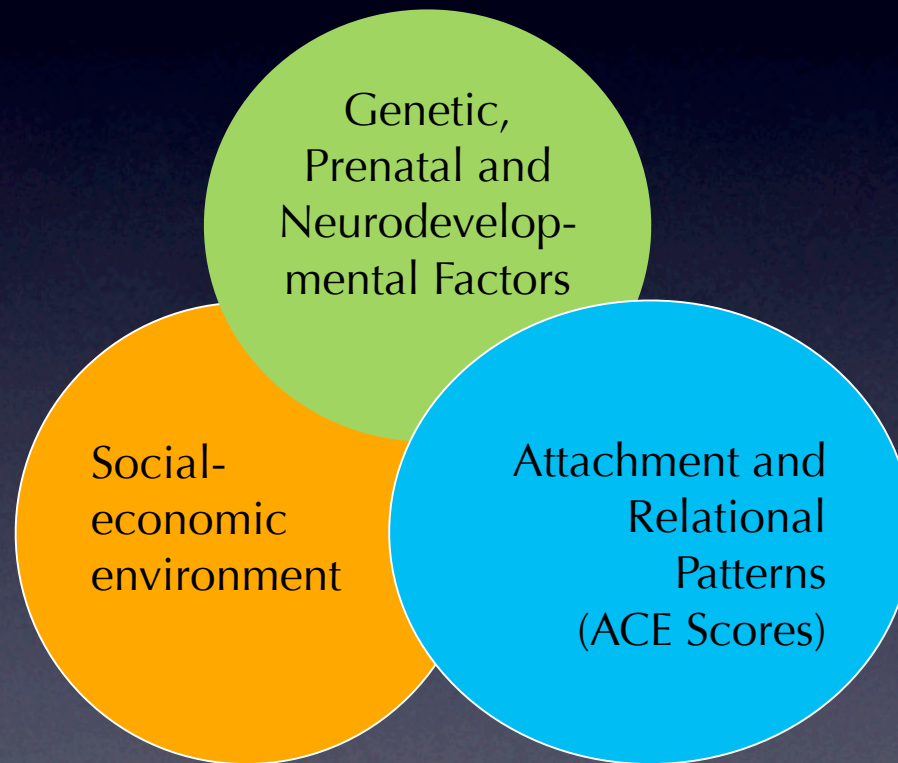
Child development is a foundation for community development and economic development, as capable children become the foundation of a prosperous and sustainable society.

Brains are built over time.

Eco-biodevelopmental Model



“Three-legged stool” for “predicting” developmental and health trajectories



Smoking

Alcohol

Prenatal Toxins

Organo-pesticides

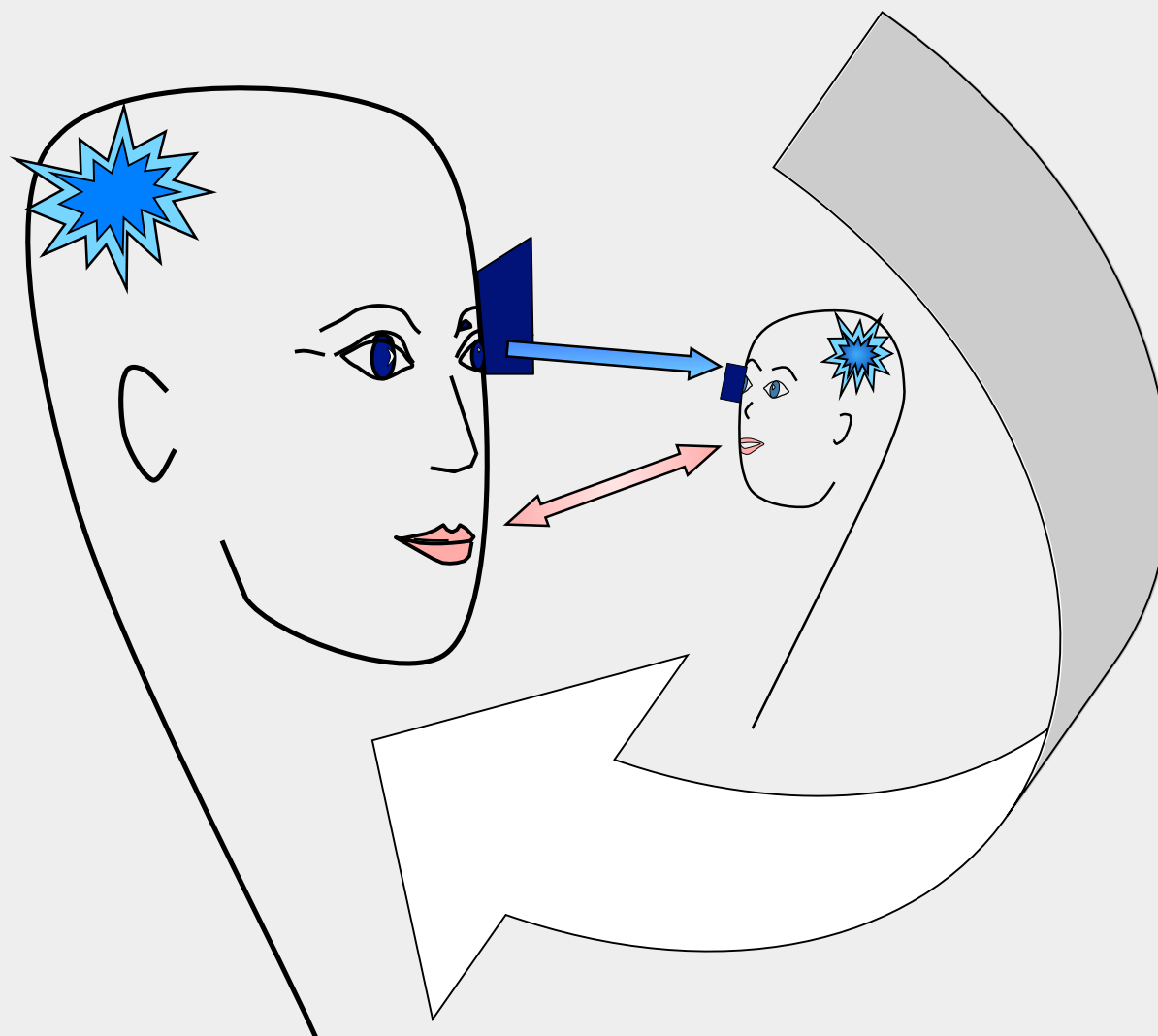
Poor nutrition

Heavy metals

EARLY BRAIN AND CHILD DEVELOPMENT



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.



Brain = organ of social
communication

Mind = exists *between* people

The Social Brain

Dan Siegel, MD (2000)

Mindsight = the ability to *know*
the mind of others

Mind emerges from the
activity of the brain

The flow of energy and
information within and
between brains

The Developing Mind

Emerges at the interface of
neuropsychological processes
and interpersonal experiences

The genetically programmed
maturation of the brain
responds to experience

Humans are “affiliating” beings -
never developing in isolation....

....development proceeds
through and by *relationships*.

The Face to Face Paradigm

Edward Z Tronick





EARLY BRAIN AND CHILD DEVELOPMENT

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.

EARLY BRAIN AND CHILD DEVELOPMENT

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

Three Levels of Stress Response

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.

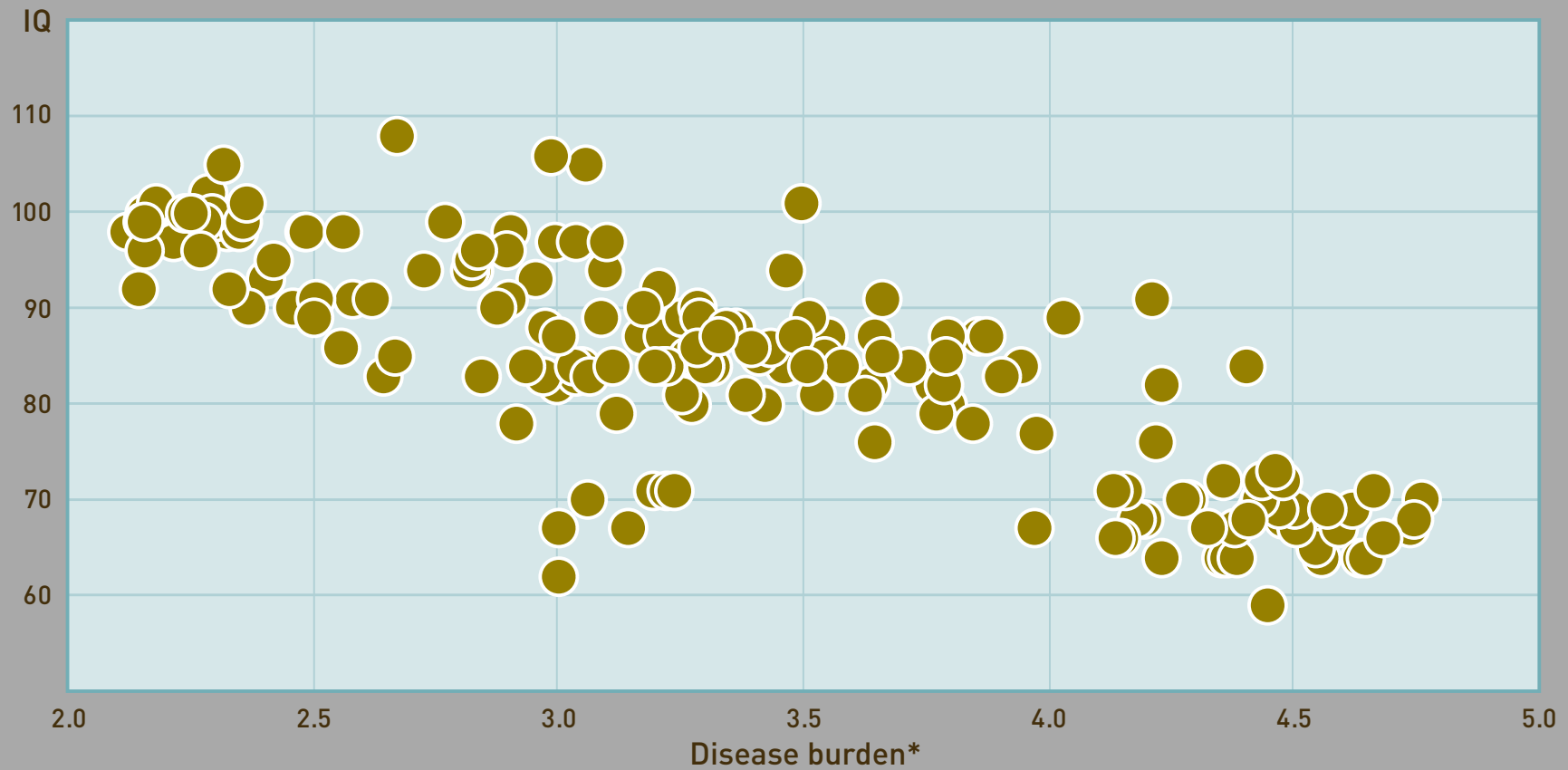
Source: Center on the Developing Child at Harvard University

Social-emotional buffering

Adversity & Toxic Stress

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

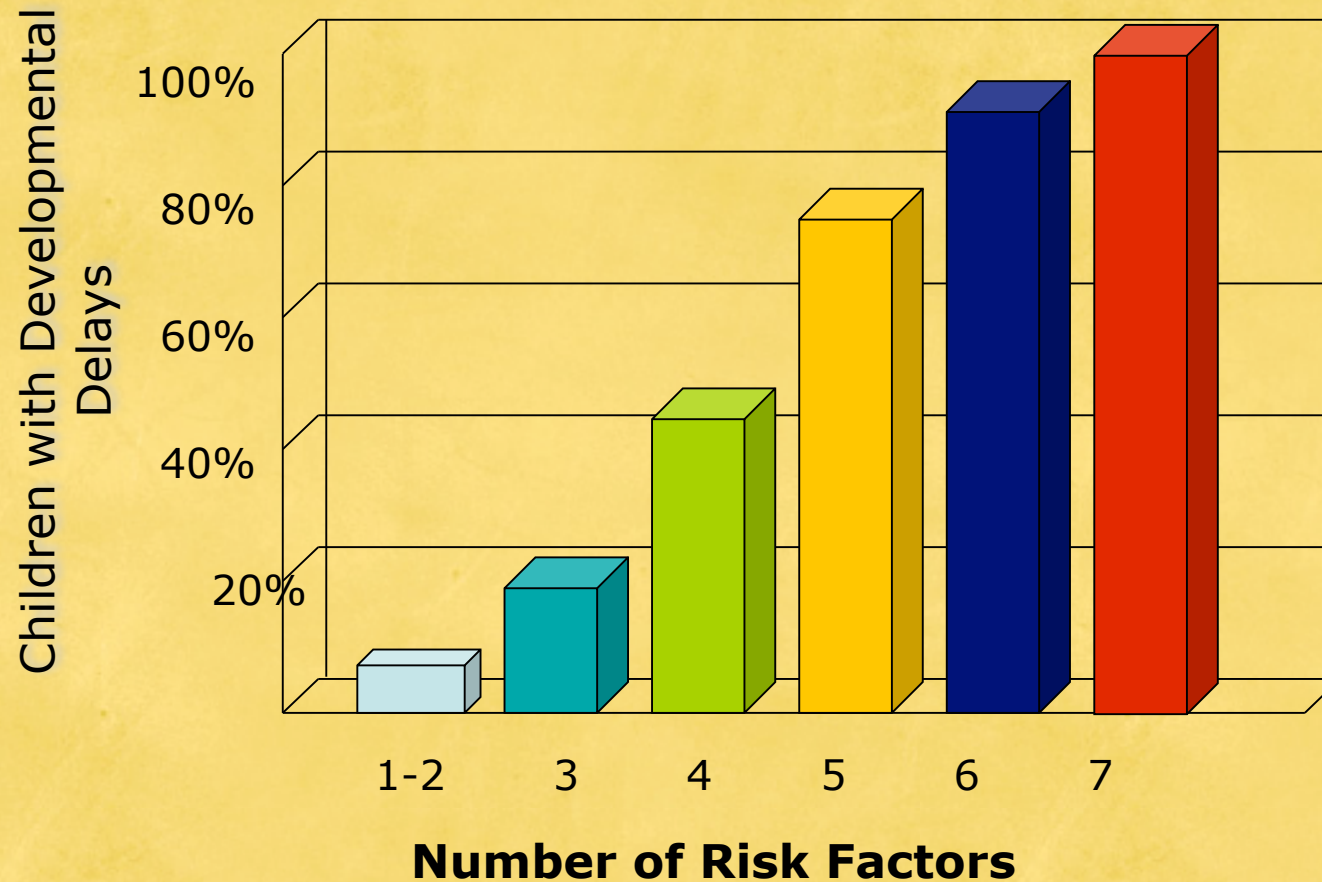
Correlation between IQ and disease burden in 184 selected countries



**The logarithm of disability-adjusted life years (DALYs) lost to 28 representative and important human infectious diseases.*

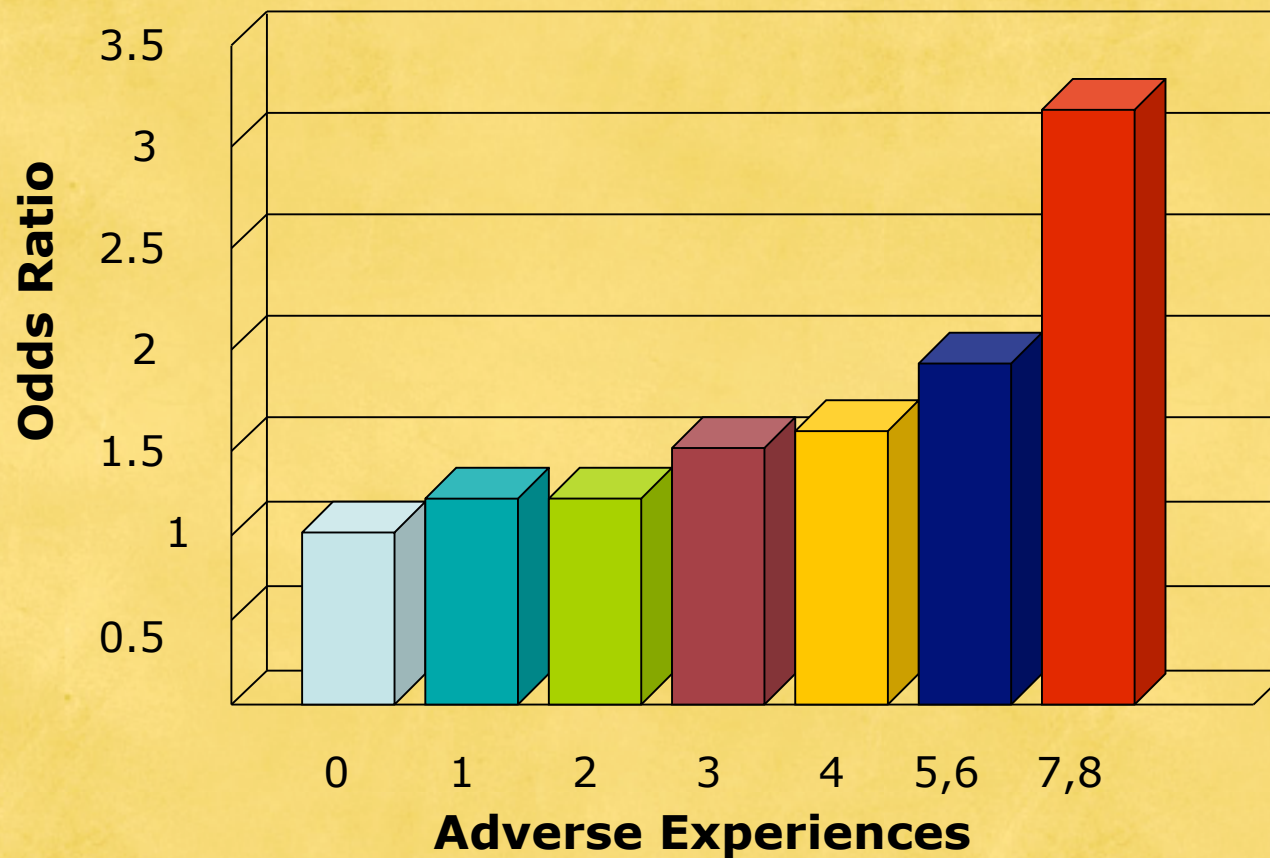
Source: Christopher Eppig,
University of New Mexico

Significant Adversity Impairs Development in the First Three Years



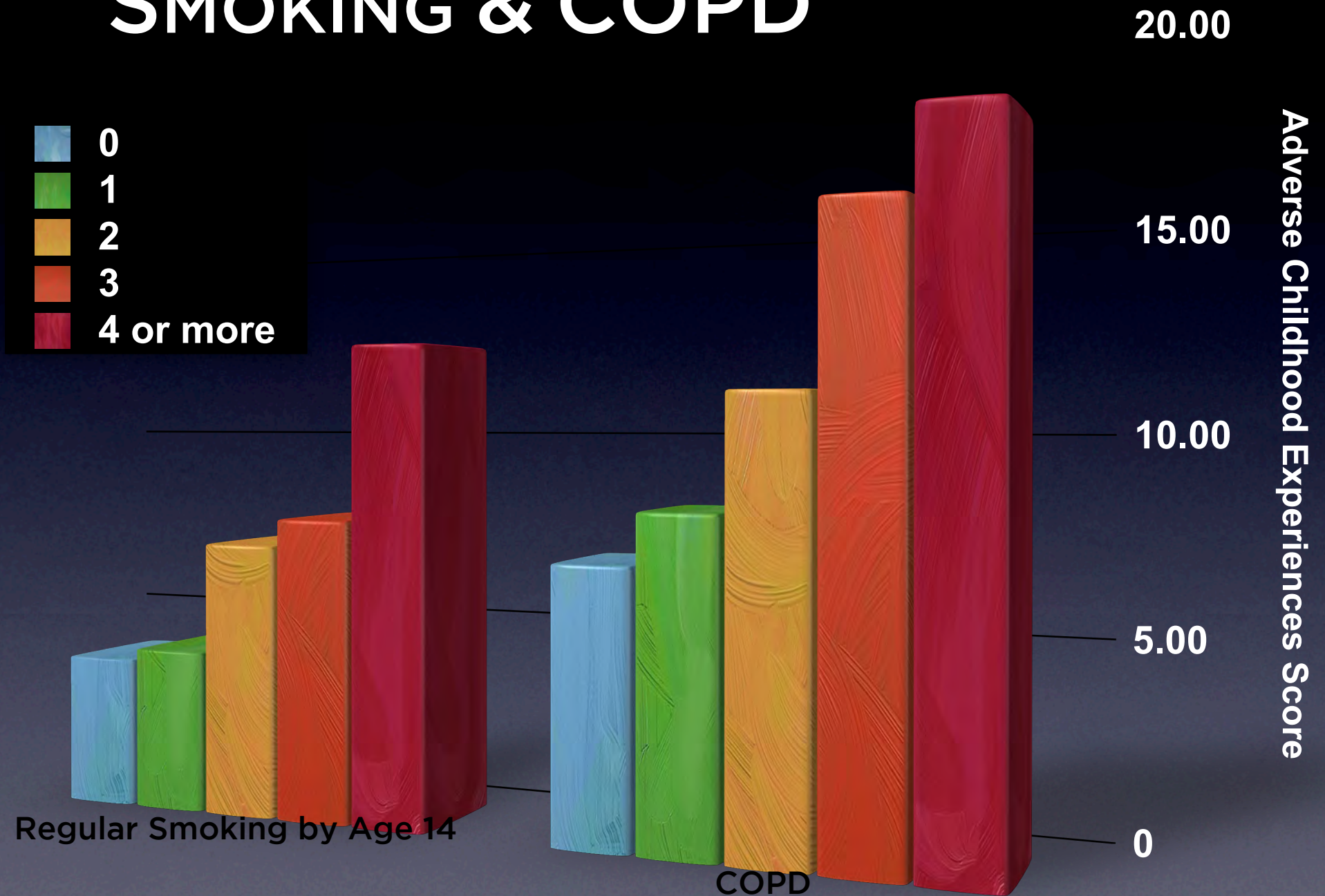
Source: Barth, et al. (2008) *via* Center on the Developing Child at Harvard University

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

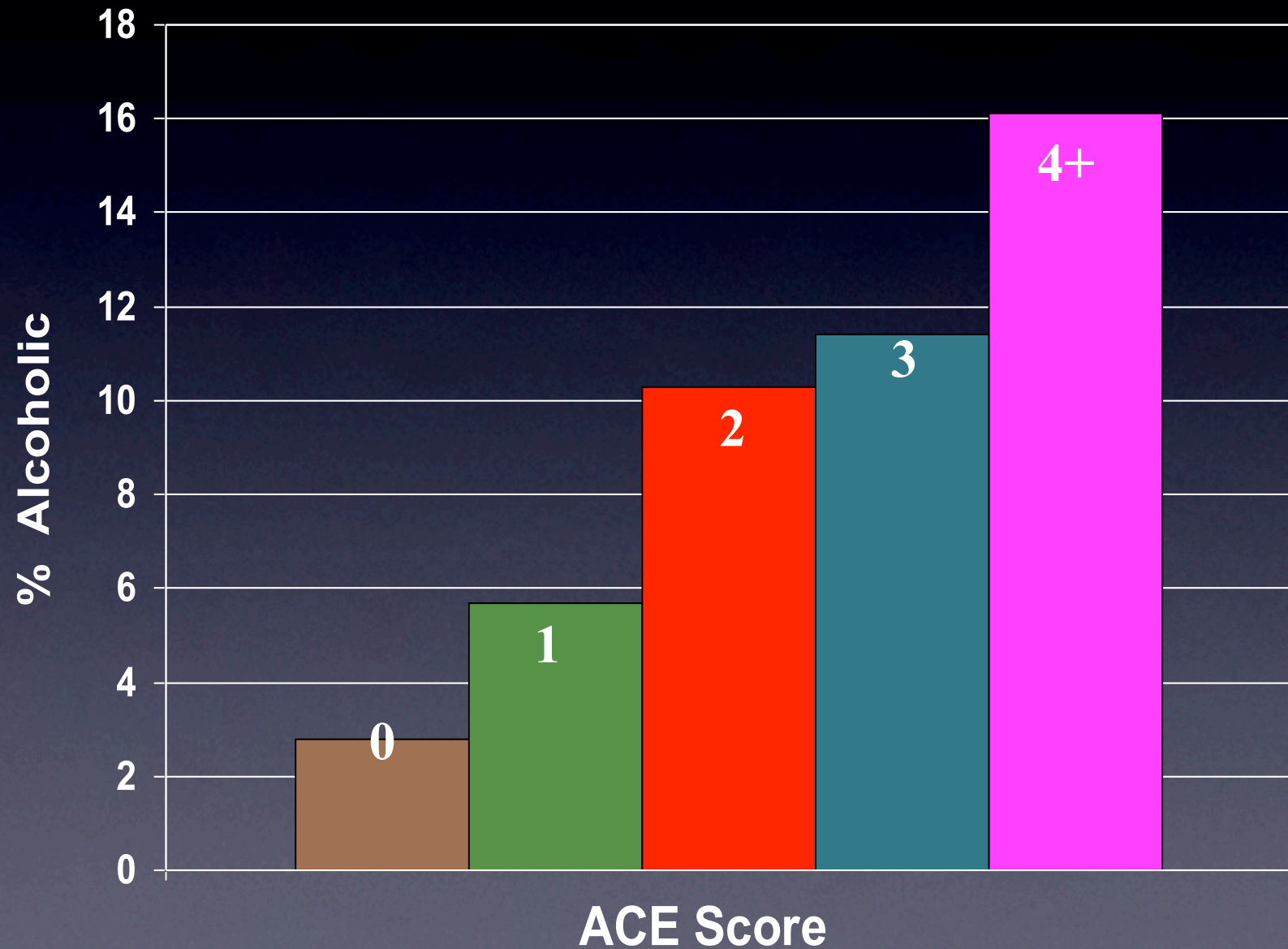


Source: Dong, et al. (2004) *via* Center on the Developing Child at Harvard University

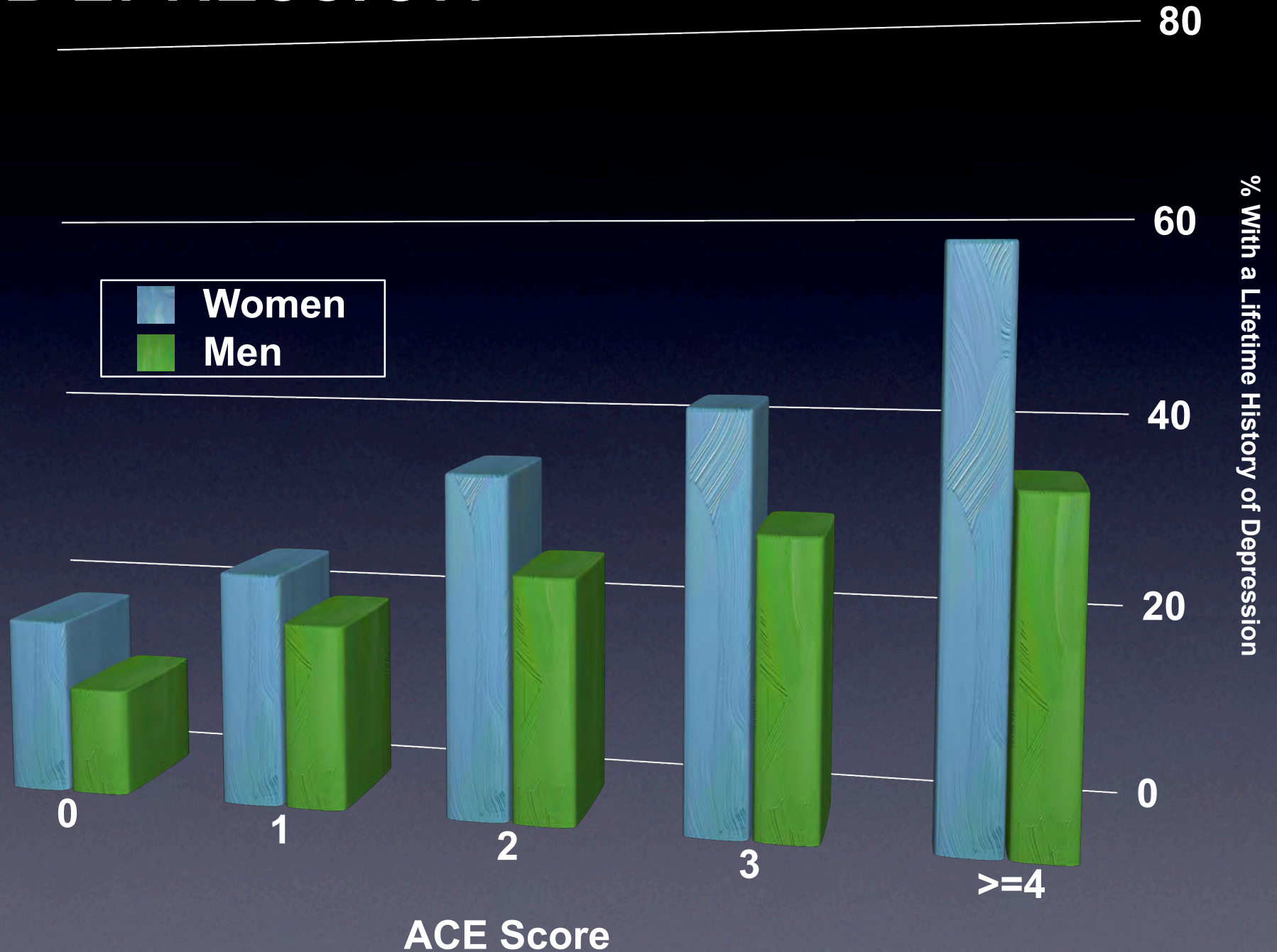
SMOKING & COPD



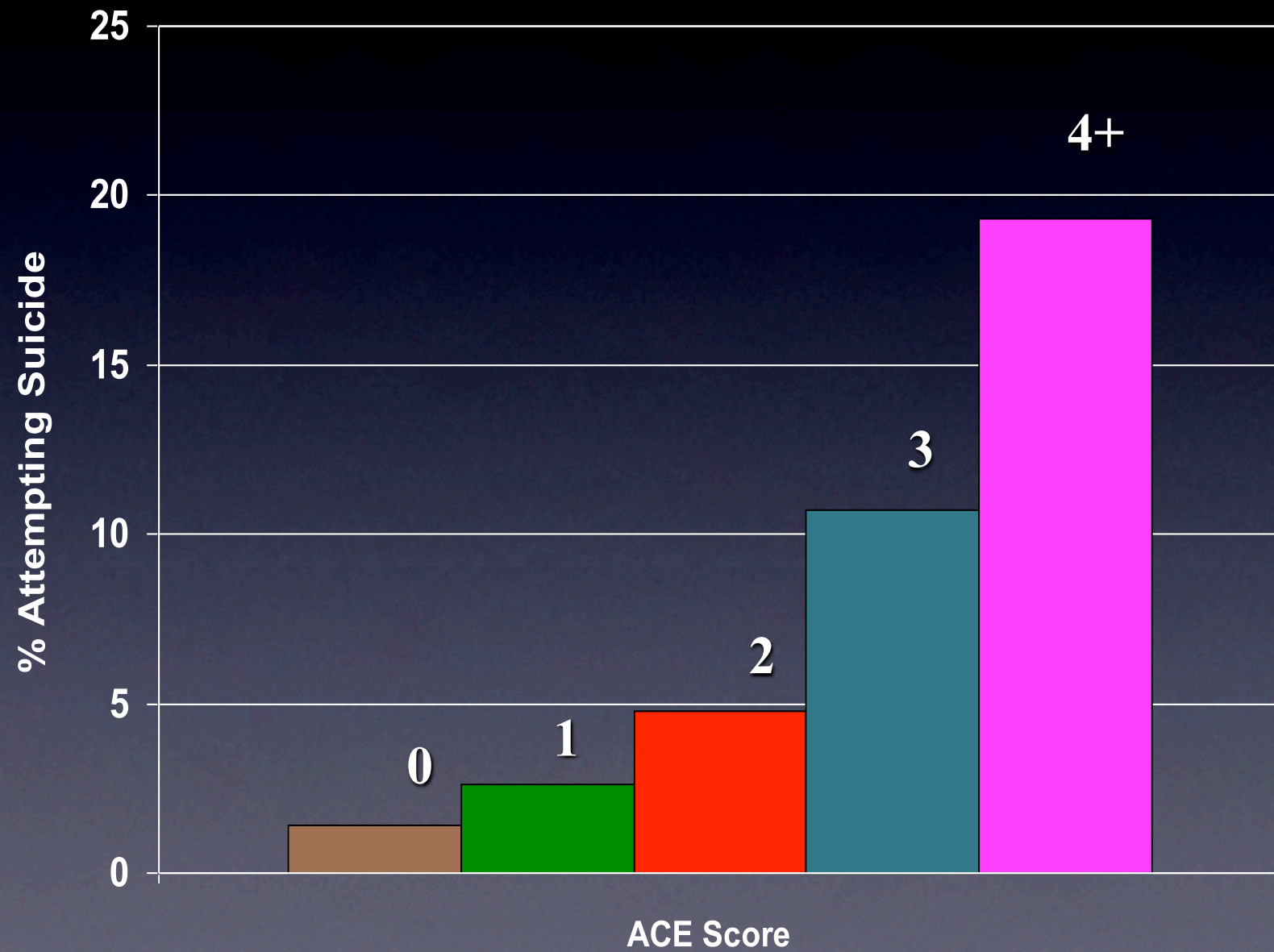
Childhood Experiences vs. Adult Alcoholism



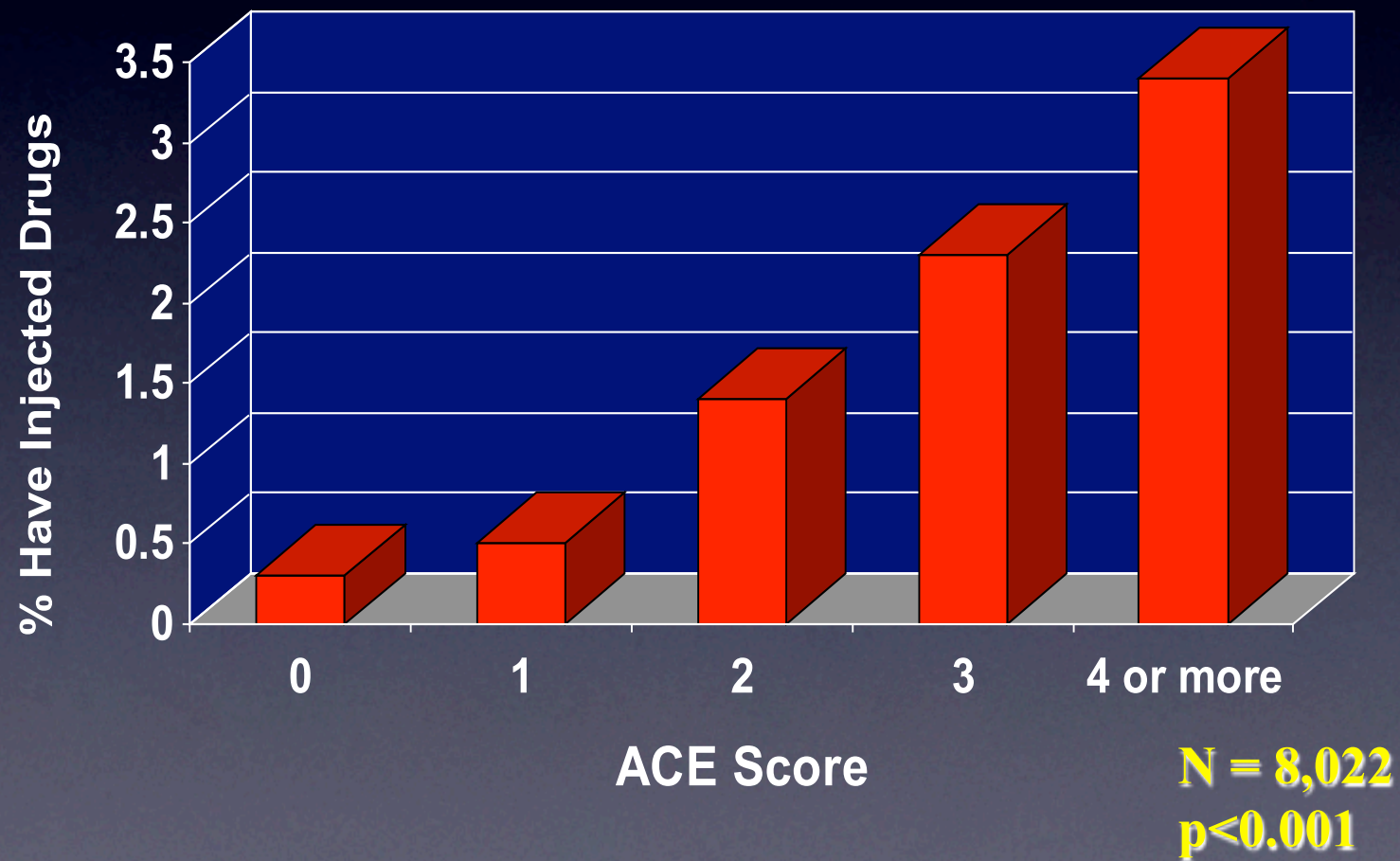
DEPRESSION



SUICIDE



IV DRUG USE

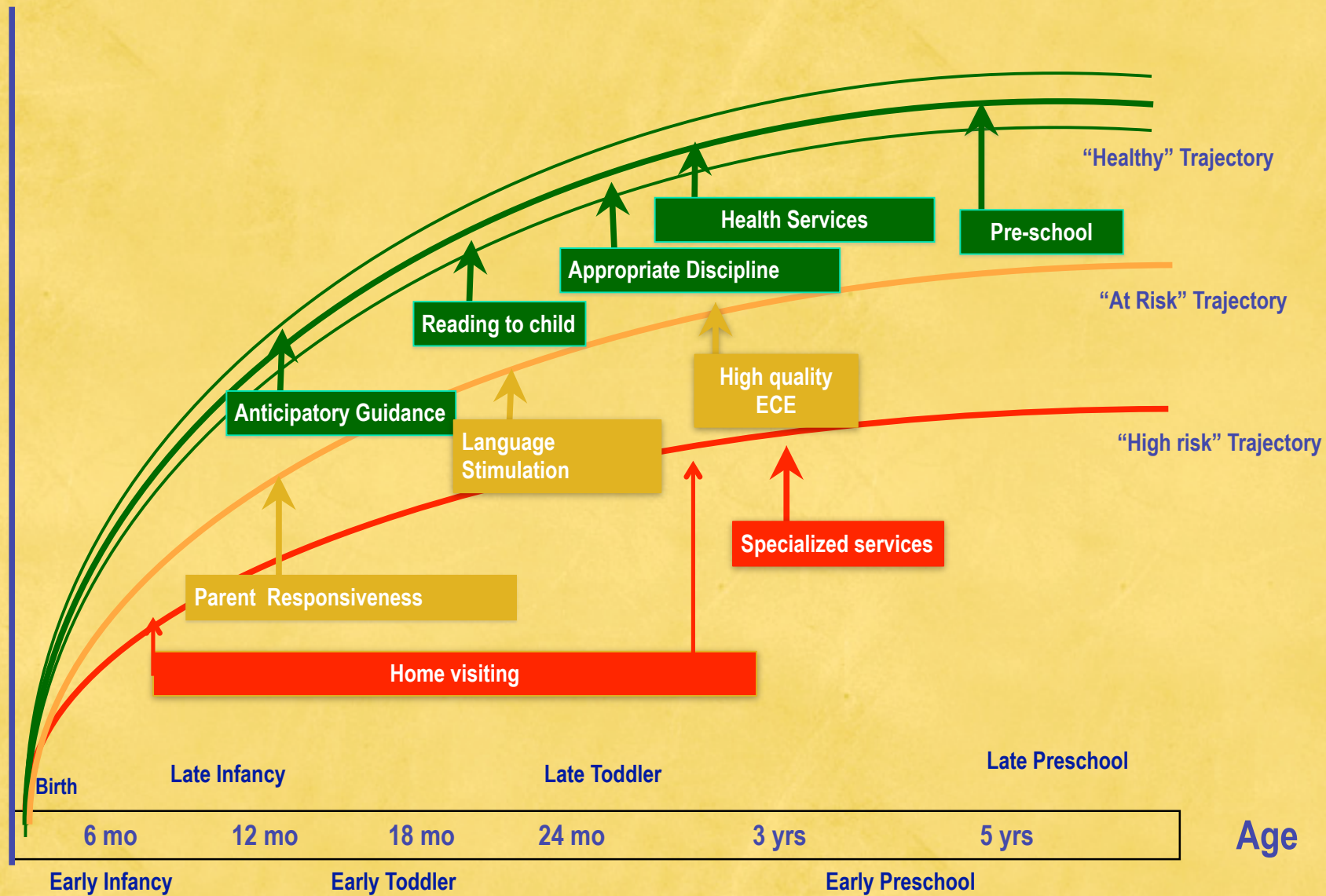


EARLY BRAIN AND CHILD DEVELOPMENT

A young child with light brown hair, wearing a blue and white striped shirt and purple shorts, is sitting on a white surface. The child is focused on playing with several colorful plastic rings (green, orange, red, blue) scattered around them. The child's hands are visible, and they are currently holding a red ring. The background is a plain, light-colored surface.

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

Developmental Progress



Three Promising Domains for EBCD Innovation

Jack Schonkoff, 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.

The New World of Pediatrics: “DEVELOPMENTAL ASSURANCE”

Building a healthy mind & brain
for social purpose.

“Child health is a nation’s wealth.”

National Research Council and Institute of Medicine 2004

Emotional self-regulation

Behavioural self-regulation

Empathy and perspective-taking

School Readiness Skills

Early Childhood Resource Center, RTI

**Communicating needs,
desires & interests
in a pro-social way**

**Understanding cause &
effect sequences**

Interest, motivation, persistence

**Mind emerges from the
activity of the brain**

**The flow of energy and
information within and
between brains**

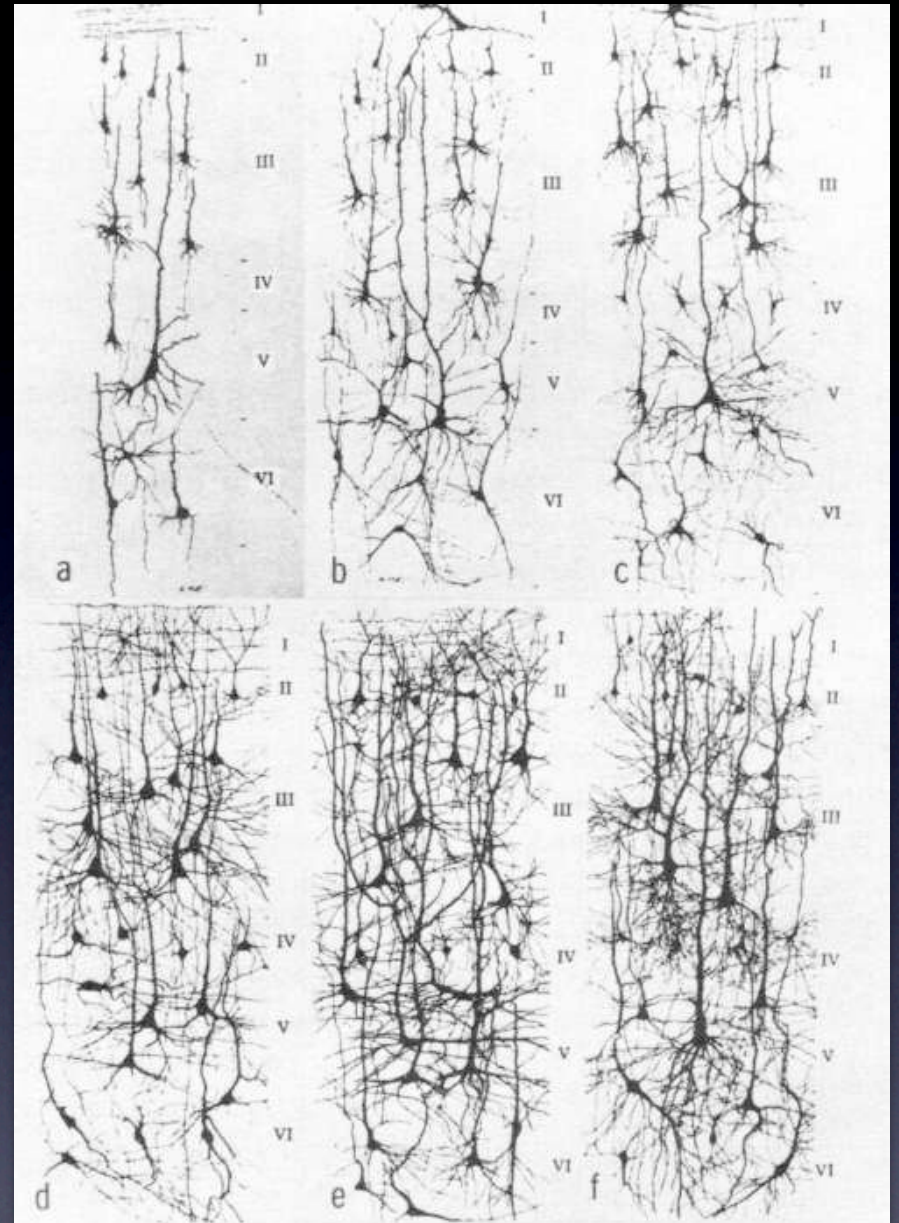
The Developing Mind

**Emerges at the interface of
neuropsychological processes
and interpersonal experiences**

**The genetically programmed
maturation of the brain
responds to experience**

FIVE 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)

(LOW CONEL: TADA-TADA)

18 Months:

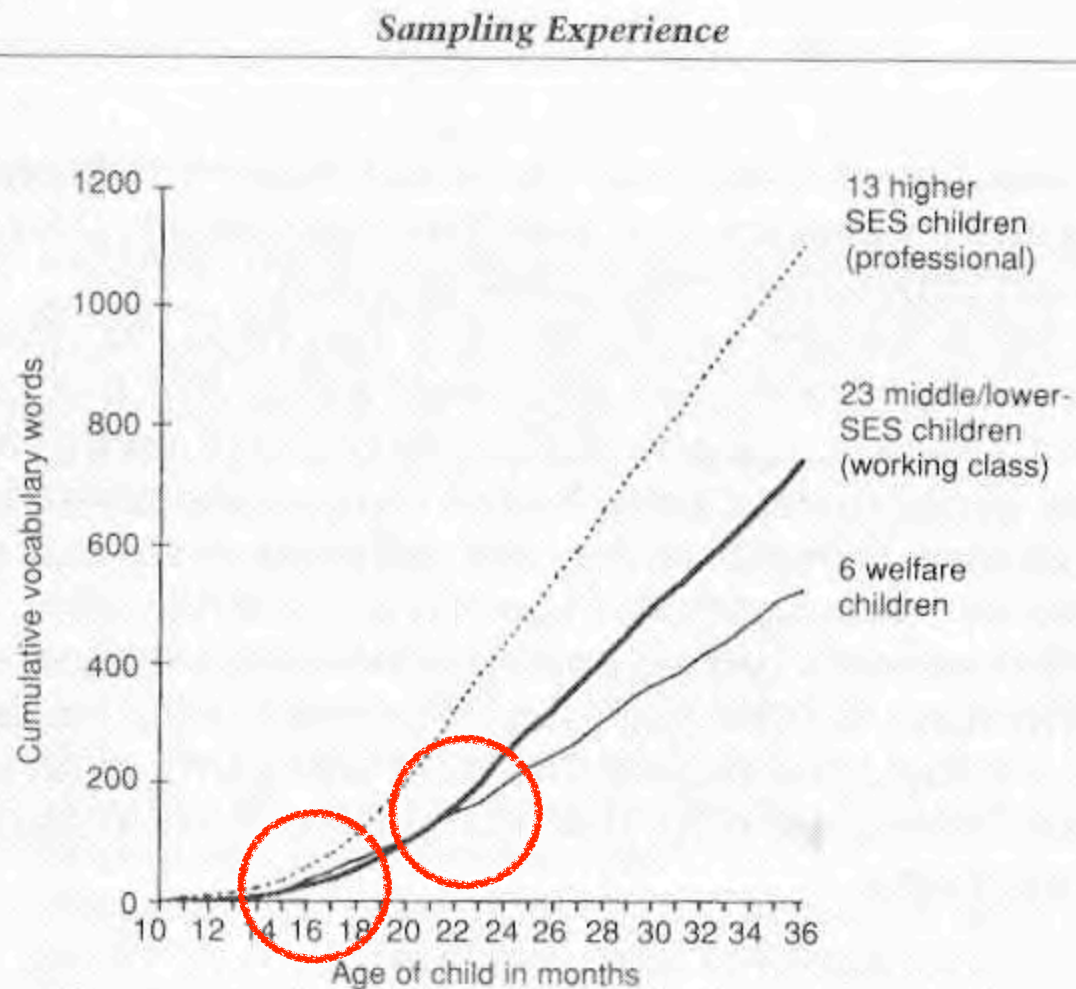


Figure 2. The widening gap we saw in the vocabulary growth of children from professional, working-class, and welfare families across their first 3 years of life. (See Appendix B for a detailed explanation of this figure.)

90-100%

Chance of
Developmental Delays
when Children Experience
6-7 Risk Factors

3:1 Odds

**of Adult Heart Disease
after 7-8 Adverse
Childhood Experiences**

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 effect. The text is overlaid on this background.

\$4-\$9

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

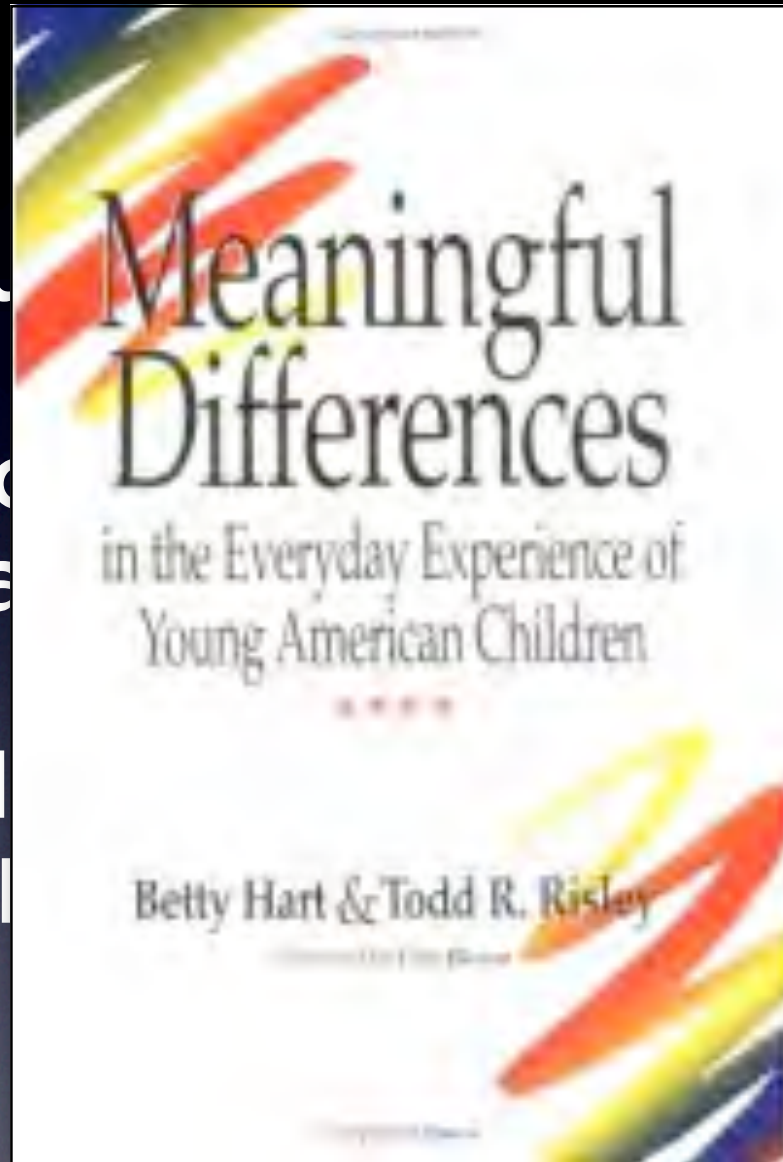


Part Two

Reading Reality

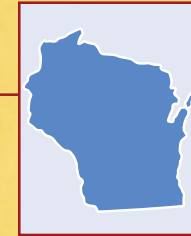
Meaningful
in the
Experience
America

Todd
Betty



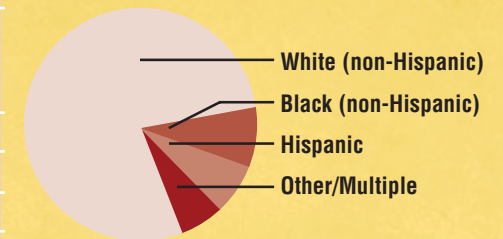
By Age 3...	Welfare	Professionals
Vocabulary Size	525 words	1100 words
IQ	79	117
Utterances	178/hour	487/hour
Encouragements	75,000	500,000
Discouragements	200,000	80,000

Children from low-income families hear as many as **20 million fewer** words than their more affluent peers before the age of 4.

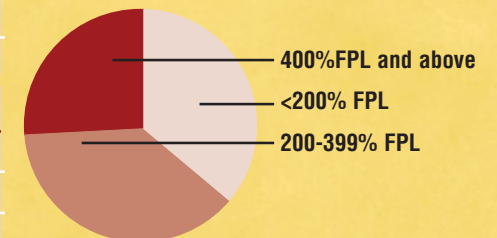


WISCONSIN	STATE	NATIONAL	STATE RANKING
Parental Reading			
% Children ages 0-5 read to daily ¹	46.1	47.8	38
<i>% Daily reading by poverty level ¹</i>			
Less than 200% FPL	33.3	40.3	49
200-399% FPL	51.1	50.1	26
400% FPL or greater	52.2	58.9	43
<i>% Daily reading by race/ethnicity ¹</i>			
White (non-Hispanic)	50.8	55.0	41
Non-White	30.5	37.8	49
Black (non-Hispanic)	/	38.1	
Hispanic	/	33.4	
Other/Multiple Race	/	46.4	
<i>% Daily reading by age ¹</i>			
Children age 0-3 years read to daily	49.5	48.3	26
Children age 4-5 years	41.0	47.0	44
Early Childhood Literacy Resources			
% Children served by ROR ²	6.0	12.8	44
% Children in/near poverty served by ROR ²	15.2	26.0	38
Number of children age 0-5 per public library ³	893	1,368	14*
School Performance			
% Students at or above Proficient in reading, Grade 4 ⁴	33	30	19
% Children age 6-17 who have repeated at least one grade ¹	5.7	11.3	4*

Racial/Ethnic Distribution among Children Age 0-5 in Wisconsin (N~410,000)



Income Distribution among Children Age 0-5 in Wisconsin (N~410,000)



Low-income children are at a disadvantage before school begins

A TYPICAL MIDDLE-CLASS 5-YEAR-OLD IS ABLE TO IDENTIFY 22 LETTERS AND SOUNDS OF THE ALPHABET, COMPARED TO JUST 9 LETTERS FOR A CHILD FROM A LOW-INCOME FAMILY.

(WORDEN AND BOETTCHER, 1990; EHRI AND ROBERTS, 2006)

ABCDEFGHIJKLMNOPQRSTUVWXYZ

MIDDLE-INCOME CHILD'S LETTER RECOGNITION (22 LETTERS)

ABCDEFGHIJKLMN~~**OPQRSTUVWXYZ**~~

LOW-INCOME CHILD'S LETTER RECOGNITION (9 LETTERS)

LOW-INCOME CHILD'S LETTER RECOGNITION (9 LETTERS)

ABCDEFGHIJKLMN~~**OPQRSTUVWXYZ**~~

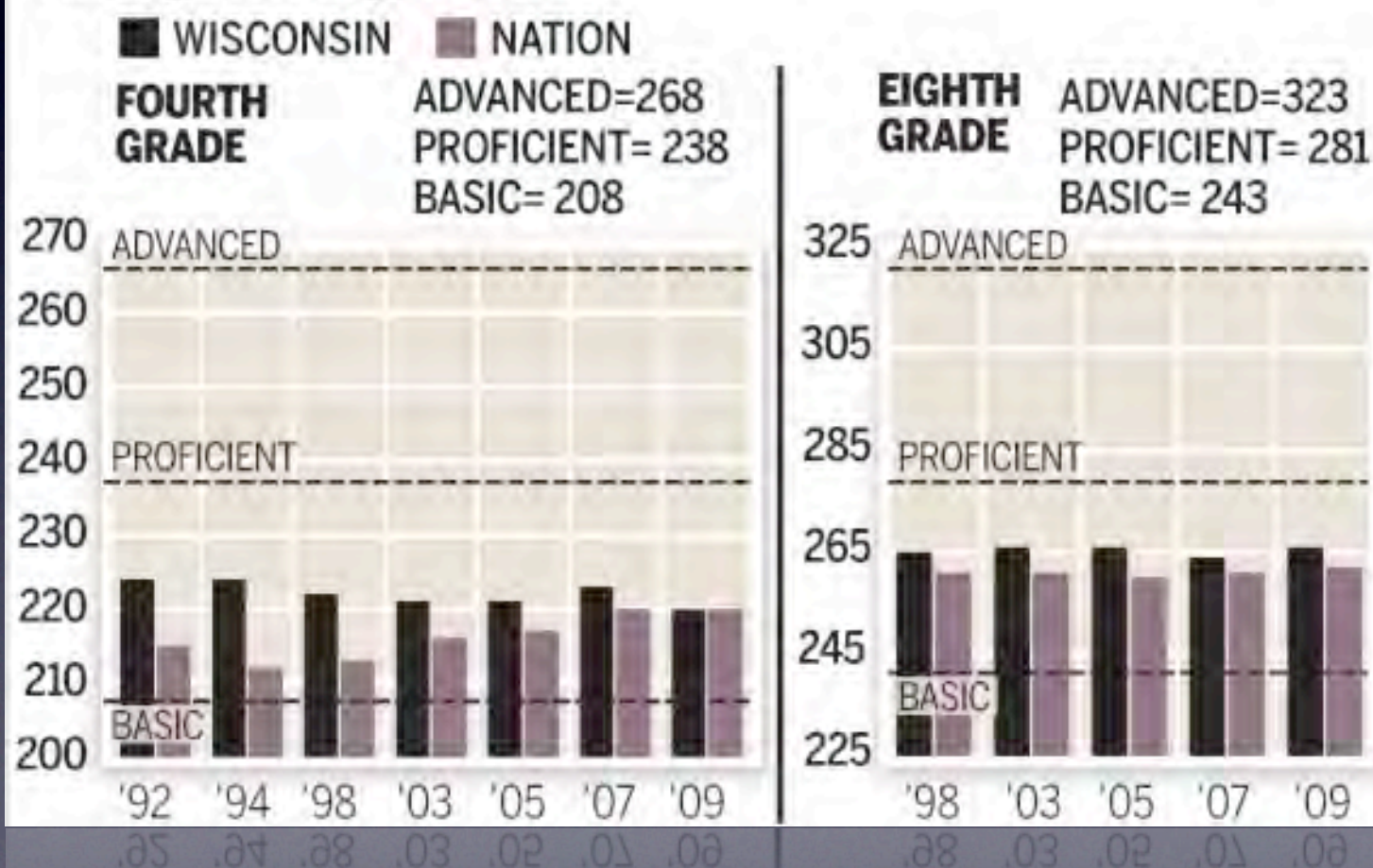
One-third
of children
enter school
unprepared
to learn.



Creative Commons-licensed work by flickr user *horizontal.integration*

According to newly released results from the 2009 reading test administered as part of the National Assessment of Educational Progress, Wisconsin fourth-graders are performing only as well as the national average while the state's eighth-graders still do better than average.

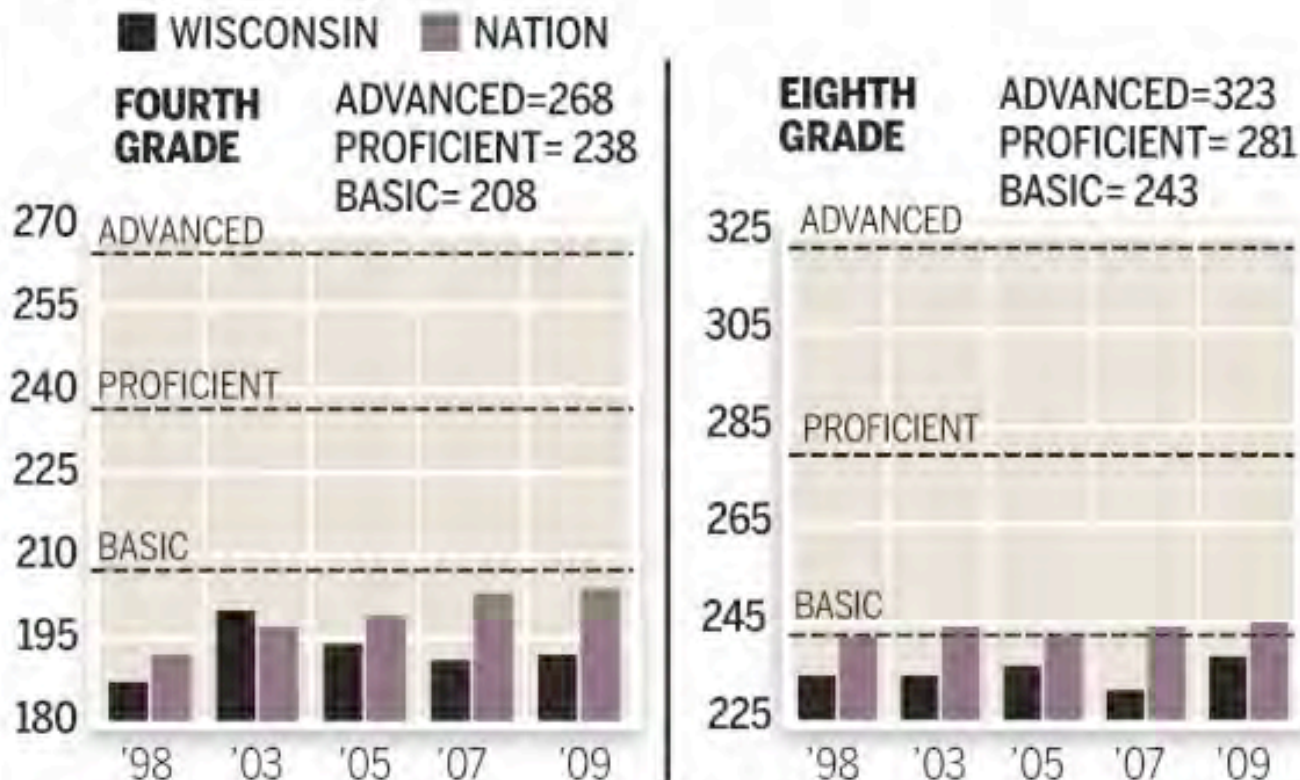
Average reading scores



African-American reading scores

Wisconsin's black students had a lower average score on the fourth-grade reading test than black students in any other state in the 2009 National Assessment of Educational Progress. The state had the second lowest average score, which tied with the scores of three other states, for black students on the eighth-grade reading test.

Average reading scores



Source: National Assessment of Educational Progress

Journal Sentinel

Reading difficulty contributes to school failure, which increases the risk of absenteeism, school dropout, juvenile delinquency, substance abuse, and teenage pregnancy — all of which perpetuate the cycles of **poverty** and dependency.

School intervention is too late. Innate interest in learning and curiosity can be irreparably damaged if reading is not enjoyable at an early age.

Reading to children
may not be a natural skill for adults.

Reading at all may not
be something an adult is capable of.

Reading problems may have
been an issue for generations.

When I think about children growing up in homes without books, I have the same **visceral reaction** as I have when I think of children in homes without milk or food or heat: It cannot be, it must not be. It **stunts them** and **deprives them** before they've had a fair chance.

— Perri Klass, MD



Chicago, 1985



Why Reading?

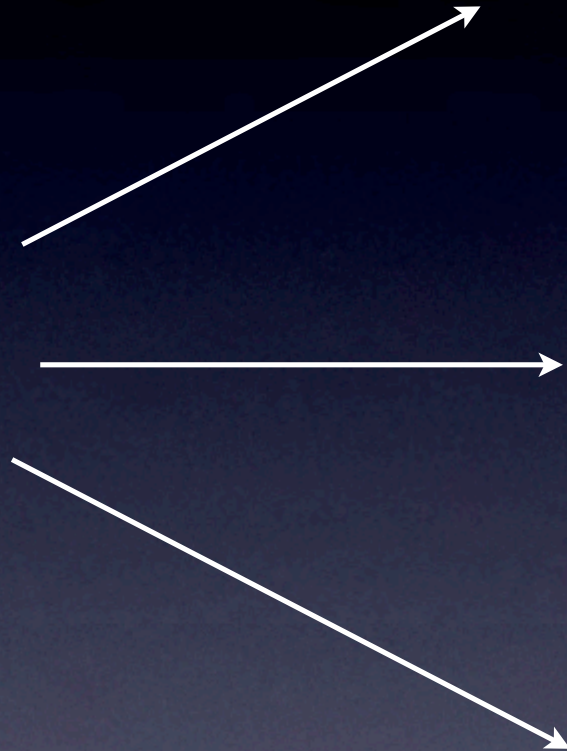
Reading is **the**
fundamental skill
for learning

**Awareness
of books**

**Understanding of printed
words and what they
represent**

**Using background
knowledge and
strategies to obtain
meaning from print**

Fluent reading





In the great
green room...

Some people there are who,
being grown, forget the
horrible task of learning to
read. It is perhaps the single
greatest effort that the human
undertakes, and he must do it
as a child.

John Steinbeck

Extended Vocabulary and Language Development

Phonological Awareness
("dog" vs "dark")

General Aspects of Language Development

Knowledge of narrative

Speech Discrimination
("coat" vs "goat")

Part of routine and ritual

Physical closeness

Literacy as a Family Activity

Parent “teaching” to child

Sharing family and other stories

Letter and early word recognition

General Aspects of Print Awareness

Comprehension of physical text

Emergent Literacy:

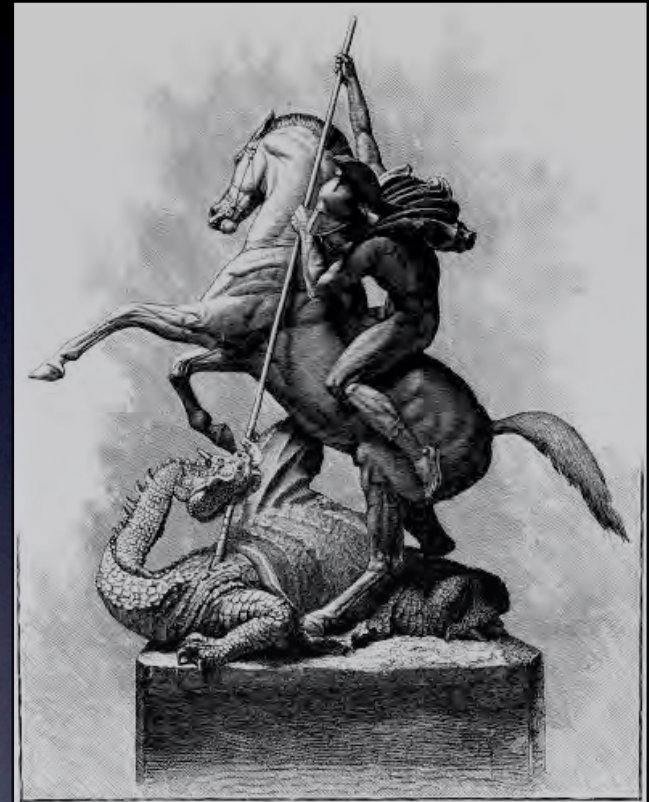
the early display of an awareness by children that **print conveys information**. It is an amalgamation of children's oral language development and their initial attempts at reading and writing. Such attempts include "reading" the pictures of a book, or scribbling. Emergent literacy, **if supported** by meaningful interaction in oral and written language, **evolves into full literacy** skills. (Teale & Sulzby, 1986)

Dialogic Reading:

the adult helps the child become the **teller** of the story by becoming the **listener, questioner, and audience** for the child.

The babe in the
cradle knows about
the dragon; he
needs the stories to
know about Saint
George.

GK Chesterton



Reading should be fun!

Part Three

Reach Out and Read



Reach Out and Read prepares America's youngest children to succeed in school by partnering with doctors to prescribe books and encourage families to read together.

In the exam room, health care providers trained in the developmental strategies of early literacy encourage patients to read aloud to their young children, and offer age-appropriate tips.

Prescription for Reading

Name: _____

Date: _____ Age: _____



R *Read Books*

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

Refills: as requested at local public library

Signature: _____

Dipesh Navsaria, MPH, MSLIS, MD

Pediatrician & Occasional Children's Librarian

Families: Please visit reading.pediatrics.wisc.edu for more information on the joy of sharing books together and how it can make a huge difference in your child's life.

of sharing books together and how it can make a huge difference in your child's life.

Families: Please visit reading.pediatrics.wisc.edu for more information on the joy

Two

The primary care provider gives every child between the ages of 6 months and five years a new, developmentally-appropriate children's book to take home and keep.

" It is a great thing
to start life with a
small number of
really good books
which are your
very own. "



- Sir Arthur Conan Doyle, 1908


Three

Volunteers in clinic waiting rooms read aloud to children, showing parents and children the techniques and pleasures of looking at books together.

Our goal is **not** about

Teaching a child to actually read early

It is about learning to **love** books.



Nearly **90%** of all young children see a child health provider at least annually for a check-up, while **less than one-third** are in any childcare setting, the next most common contact with a formal service system.

Charles Bruner, writing in The Colorado Trust's
Issue Brief: Connecting Child Health and School Readiness,
February 2009

Evidence

14 studies published in
peer-reviewed medical journals

ROR increases the likelihood that
children at-risk will be read to regularly.

ROR improves language scores
in young children at-risk.

ROR improves the home literacy environment.

There is **more** extensive published research
available supporting the ROR model than for
any other psychosocial intervention in general
pediatrics.

**The British *Millennium Cohort Study*
Pediatrics, February 2010**

**12,500 children given vocabulary tests at age 5
Delays of almost a **year** in the poorest homes**

“The research shows that a child who is read to every day at age 3 has a vocabulary at age 5 that is **1.92 months more advanced** than a child who has exactly the same observable characteristics (including income group), but who is not read to every day at age 3.”

“More affluent family circumstances are clearly associated with better parenting behaviours. At age 3, 78% of the richest children were **read to daily** and 91% had regular bedtimes, much higher than the corresponding numbers for the lowest income group.”

“Nevertheless, it is still the case that 45% and 70% of the lowest income parents practiced these beneficial behaviours, providing grounds for optimism that good parenting can be adopted and extended in even the most disadvantaged families.”

**Parenting Behaviours, Perceptions, and Psychosocial
Risk: Impacts on Young Children's Development**
Glascoc FP, Leew S. *Pediatrics*, January 2010
382 families assessed for child language development

“Of the families who seemed to be nonreaders or limited book readers, 21% had children at risk for developmental problems, compared with 12% of the families who were book readers...Families for whom book reading was uncommon were almost **twice as likely to have a child with delays.**”

“By 6 months of age, children whose parents **read aloud frequently outperformed children whose parents read rarely**; this pattern continued through 24 months of age.”

“Differences in communications skills increased with age, and the magnitude of the discrepancy between groups increased steadily with the age of the child.”

“Another critical focus for future studies is to operationalize parenting behaviors/perceptions into developmental promotion interventions that are **brief and workable in busy primary care settings**, following the example of effectiveness research established by the Reach Out and Read program.”

Examples

Videos courtesy of Reach Out and Read – Massachusetts

Larry



6 months

Initially not focused

Calms, brings hands to
midline, focuses

Receives book: his
joy is apparent!

Child

Rudimentary attempts to
turn/stroke pages

What did we see?

Proud of his
interest and glee

Lets him explore book because
provider said it was “ok”

Parent

Has questions and is clearly engaged

Nyla



12–15 months

Constant, happy babble:
exposed to language & books

Calms and tunes to
Dad when she reads

Child

Eagerly explores
book with eyes/
hands/mouth

Holds book and turns
pages easily

What did we see?

Allows Nyla
control of book

Describes enjoyment of quality
time; notice joint attention

Parent

Encouraged not
to give up

Points to objects to
engage and teach

Youcef



5 years

Uses complex language and
proper grammar

Recognizes letters

Child Anticipates outcomes

Asks and answers
questions

Elaborates on storyline

What did we see?

Respond to and expand on child's
questions

Lets child tell story

Parents can...

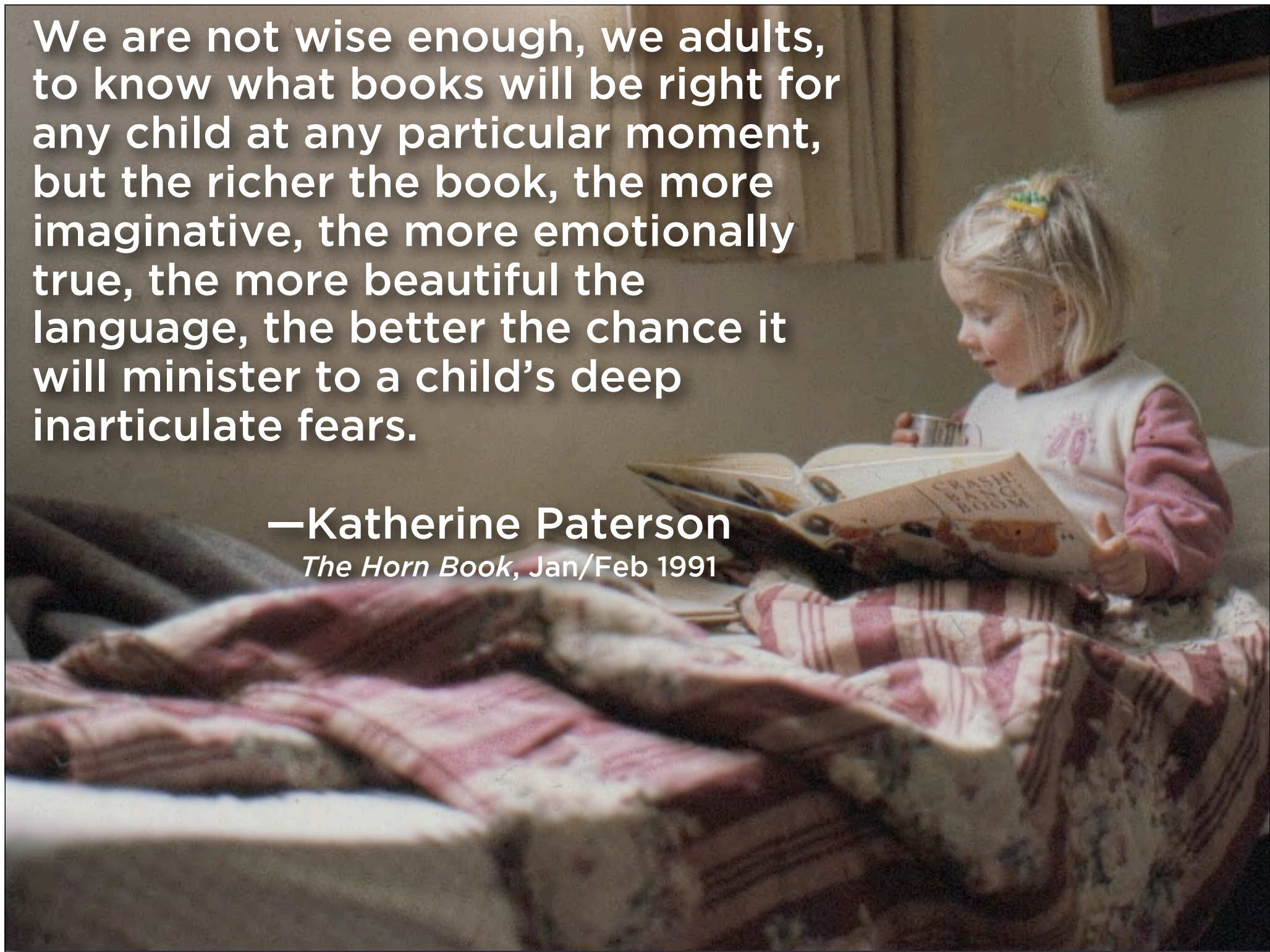
Encourage interest
in books and reading

Provide books about
child's specific interests

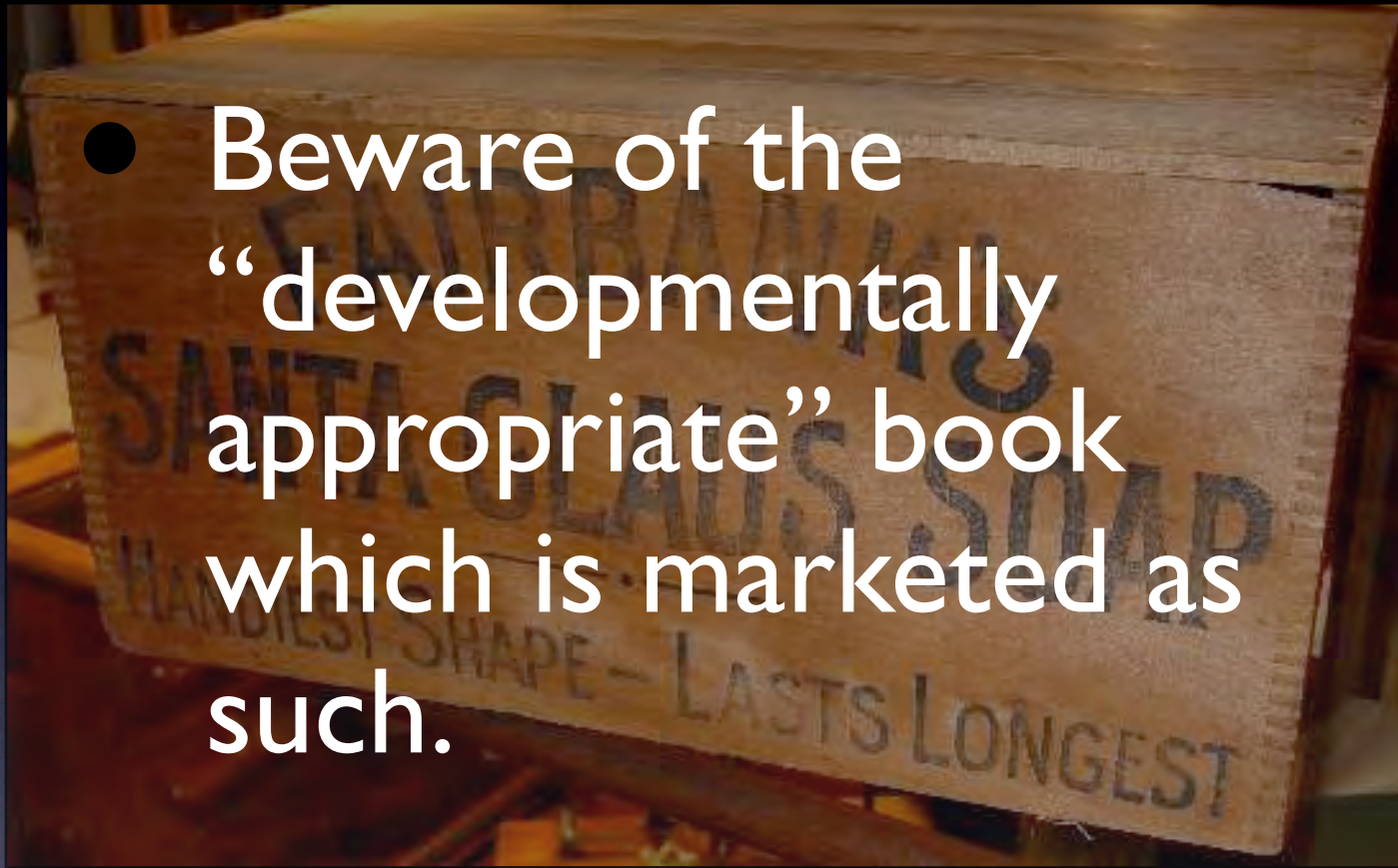
We are not wise enough, we adults,
to know what books will be right for
any child at any particular moment,
but the richer the book, the more
imaginative, the more emotionally
true, the more beautiful the
language, the better the chance it
will minister to a child's deep
inarticulate fears.

—Katherine Paterson

The Horn Book, Jan/Feb 1991



- Beware of the “developmentally appropriate” book which is marketed as such.



Selected Statistics for Major Sources of Spoken and Written Language (Sample Means)

	Rank of Median Word	Rare Words per 1000
I. Printed texts		
Abstracts of scientific articles	4389	128.0
Newspapers	1690	68.3
Popular magazines	1399	65.7
Adult books	1058	52.7
Comic books	867	53.5
Children's books	627	30.9
Preschool books	578	16.3
II. Television texts		
Popular prime-time adult shows	490	22.7
Popular prime-time children's shows	543	20.2
Cartoon shows	598	30.8
<i>Mr. Rogers</i> and <i>Sesame Street</i>	413	2.0
III. Adult speech		
Expert witness testimony	1008	28.4
College graduates to friends, spouses	496	17.3

Adapted from Hayes and Ahrens (1988).

For more depth...

“What the Dormouse Said...”:

An accessible guide to the shadowy
lands between child development,
reading & children’s literature.

Available now at www.navsaria.com
a freely distributable 50+ page PDF

Read aloud together daily.

Have a bedside lamp for your child and allow reading time every night possible.

Limit screen time to less than two hours a day.

No TV, computers or video games in bedrooms.

Audio Books are fine.

Visit your school and public **libraries**.

Have reading be **fun**, not a chore.



READ

*Already
Established*

Access Community Health Centers:

South Side

Wingra Clinic

William T Evjue Clinic

UW Health – 20 South Park

UW Health – East Towne

UW Health – West Towne

UW Health – University Station

*Already
Established*

American Family Children's Hospital –
Inpatient Reading Library
Madison, Wisconsin

A 600+ book professionally–curated collection

Spanning all ages from infants to teens

AFCH Inpatient Reading Library

Compliant with infection
control standards

Amazing future extensions
and opportunities



READ



UW Health Pediatric Hematologist Dr Carol Diamond thinks William Steig's *Amos & Boris* is a tale of a great friendship.

AFCH Inpatient Reading Library & UW Health Reach Out and Read



The Ira and Ineva Reilly Baldwin Wisconsin Idea Endowment

“I shall never be content until the
beneficent influence of the University
reaches every home in the state.”
— UW President Charles Van Hise, 1904



*“Just one more story,
pleeeeeease!”*

“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

dnavsaria@pediatrics.wisc.edu

THE
END

