

Safe, Stable, Nurturing Families: *Early Brain Development aka Neurobiology*

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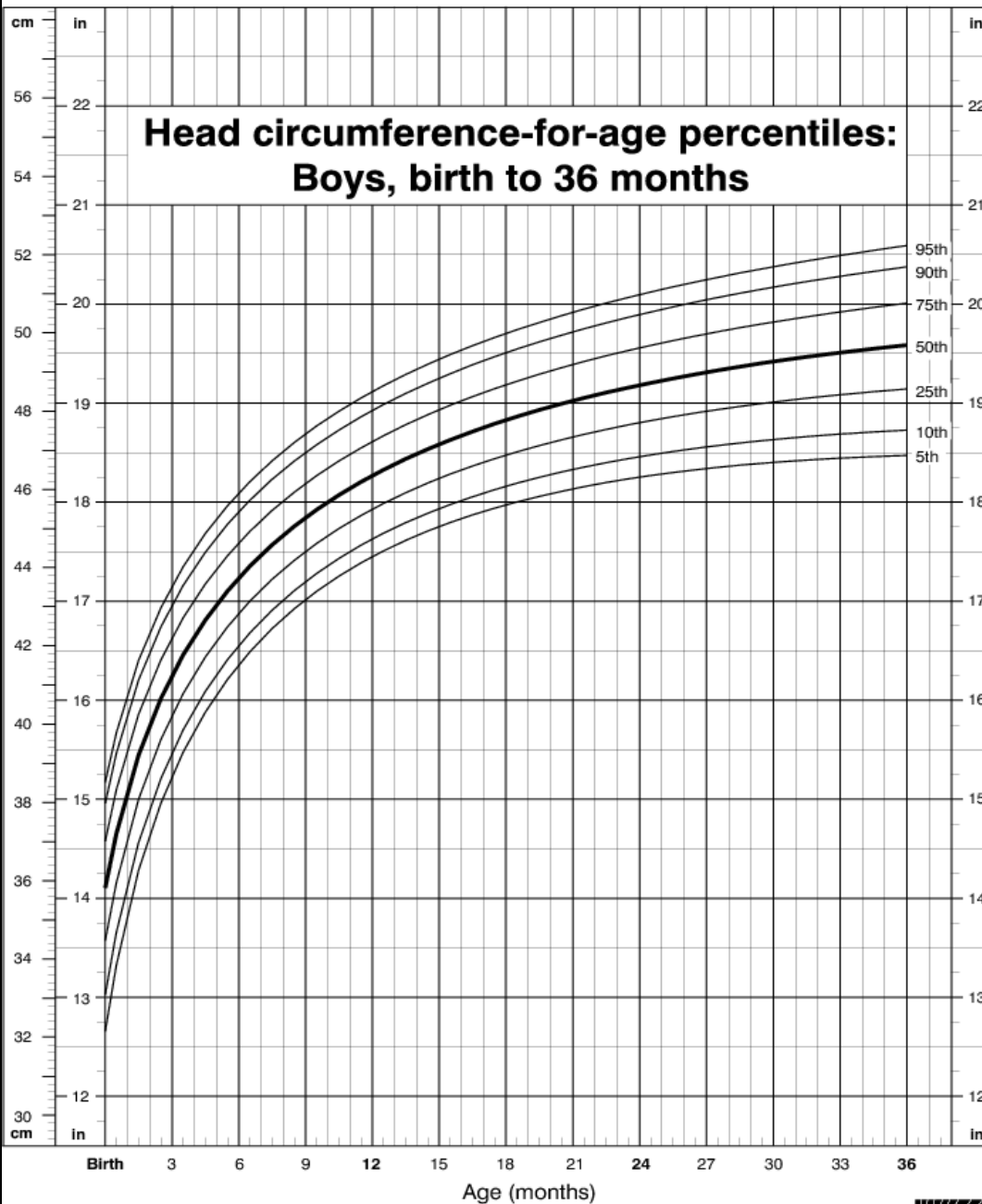


Critical Points

1. Brain grows rapidly in first 3 years of life
2. Genes serve as a blueprint for brain architecture but “epigenetic” mechanisms determine what is turned on and off
3. There is an intersection of neurobiology and epigenetics that determines the brain architecture – i.e., circuits and connections
 - a) That get used get stronger
 - b) That aren't used get pruned
4. Early experiences can change brain development

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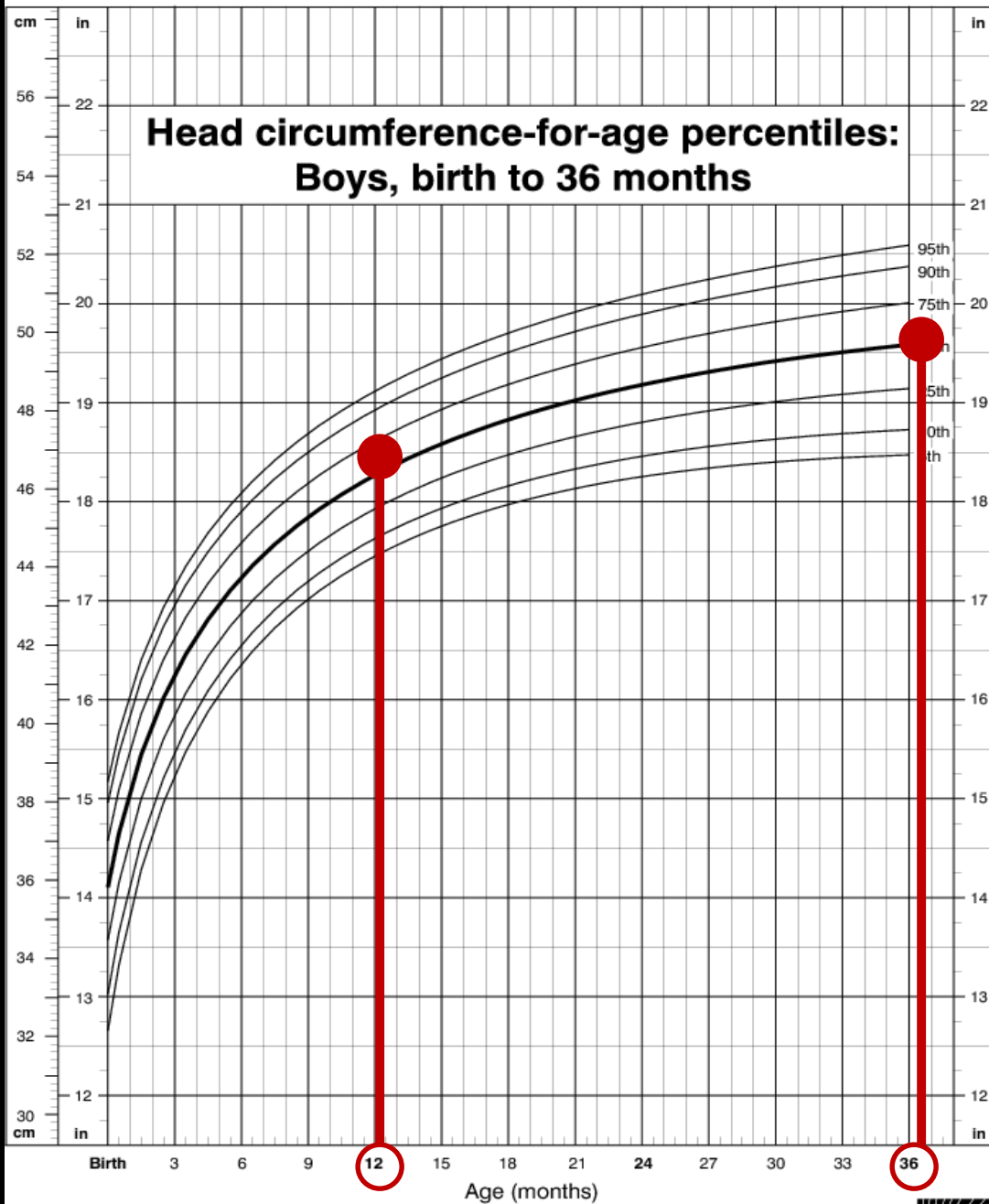


Published May 30, 2000.

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).



SAFER • HEALTHIER • PEOPLE™



Published May 30, 2000.

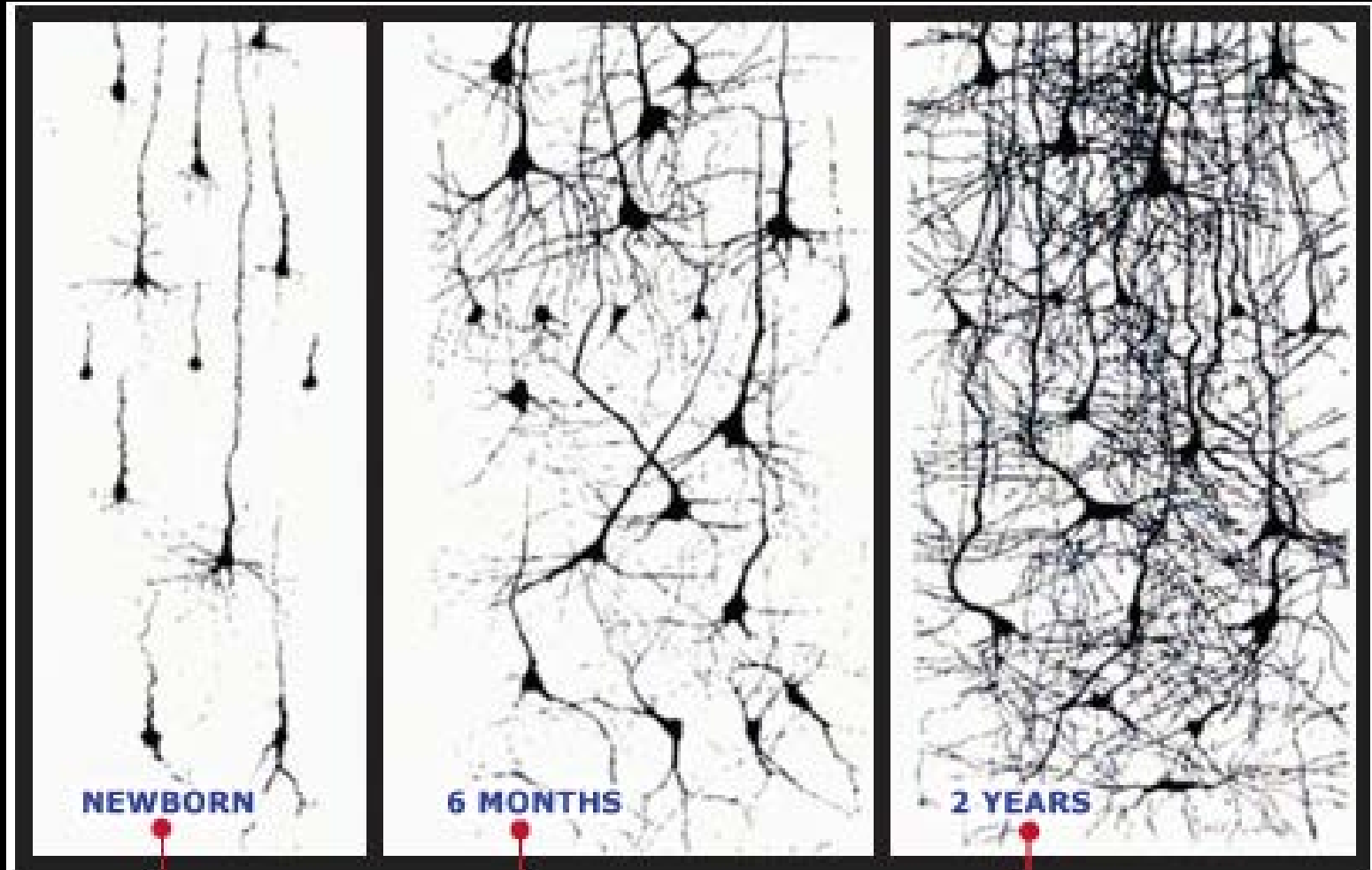
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).



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Neurodevelopmental Biology

Brain is not structurally complete at birth



NEWBORN

6 MONTHS

2 YEARS

Birth

6 months

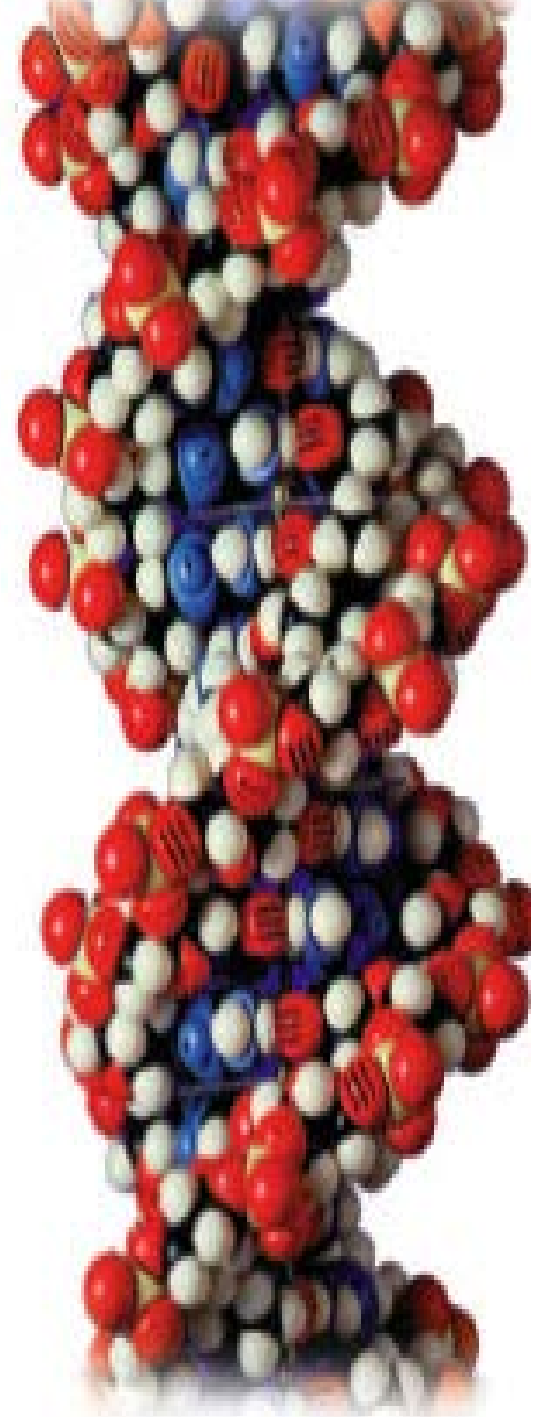
2 years old

Critical Points

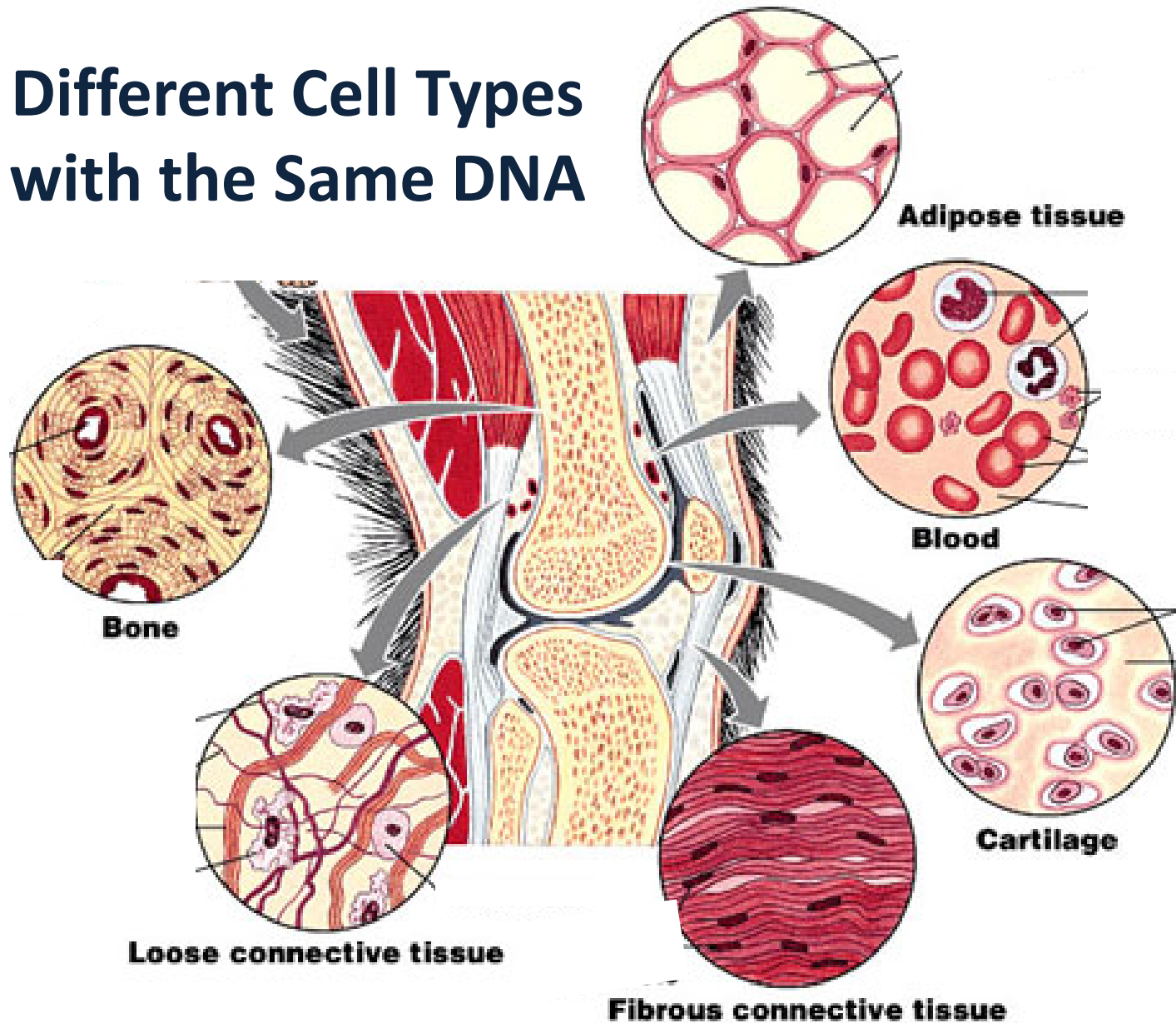
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Deoxyribonucleic acid (DNA)

- Carries genetic information
- Determines our characteristics
- Is the same in every cell



Different Cell Types with the Same DNA



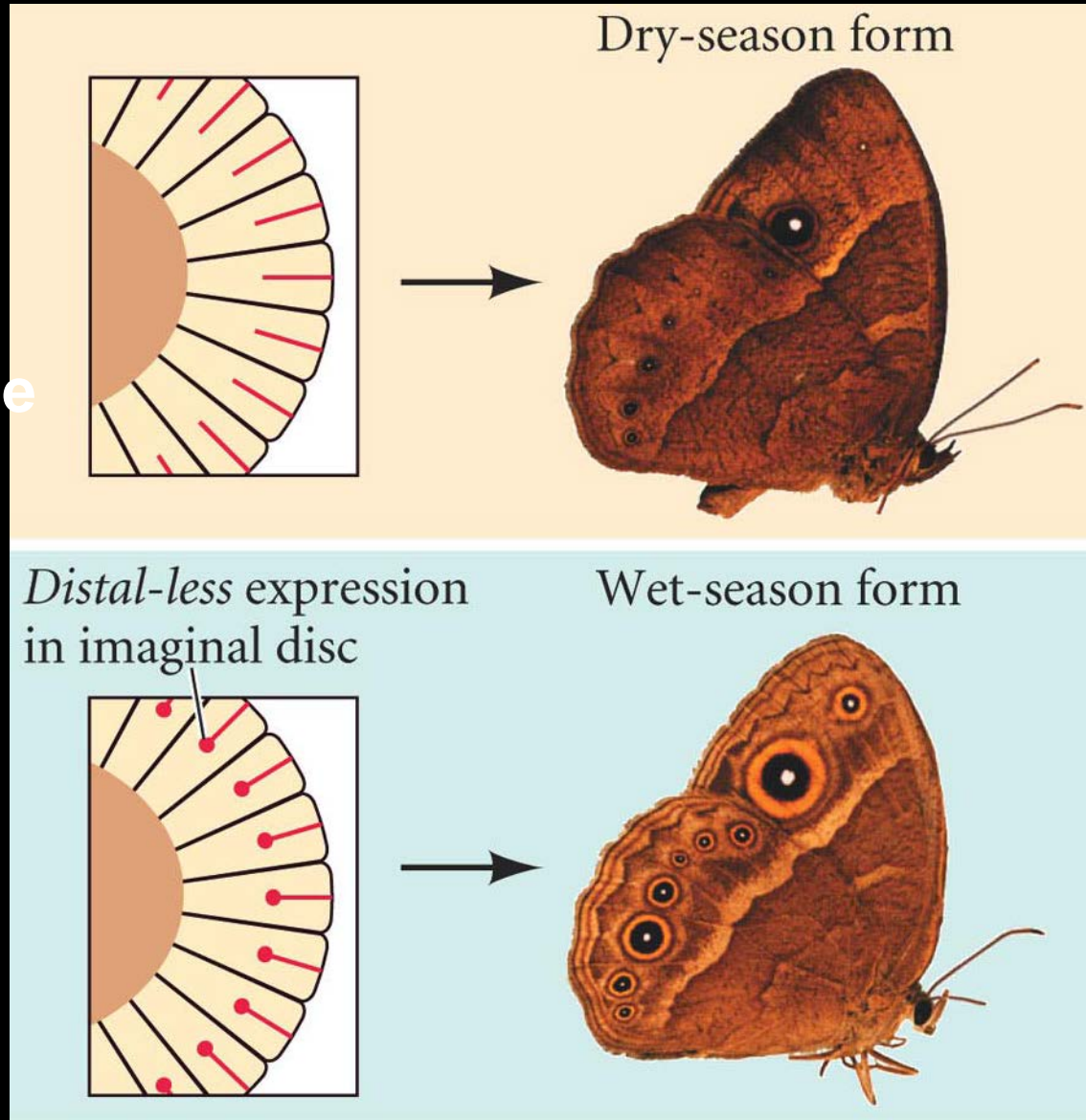
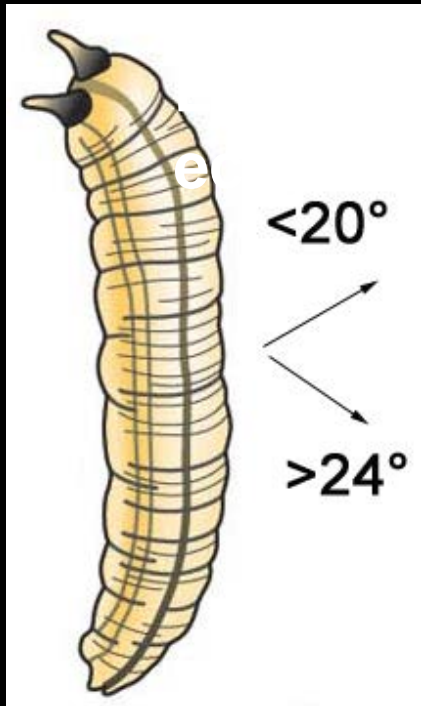
Epigenetics

- Information on top of DNA code –
 - turn the gene expression on and off
 - silencing some genes and activating others
- Two main mechanisms
 - **DNA Methylation**: suppresses gene expression
 - **Histone Acetylation**: makes gene expression easier

**Epigenetic mechanisms not *only* occur
during fetal development,
when cells are specializing**

**BUT also continues after birth and is
influenced by the environment and our
experiences!**

Temperature-Dependent Appearance *Bicyclus*

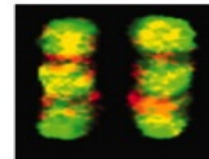
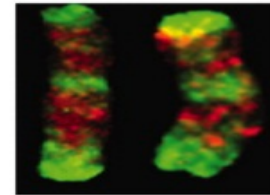
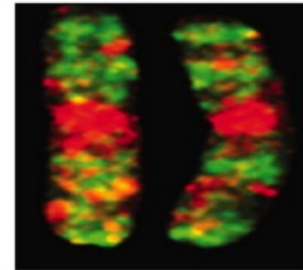
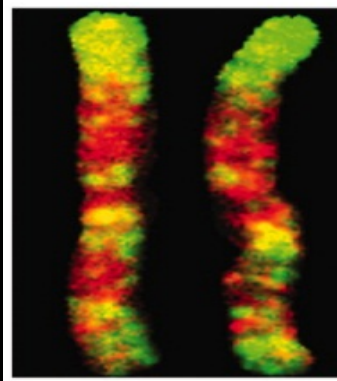
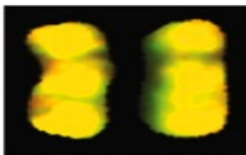
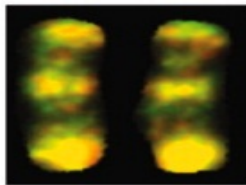
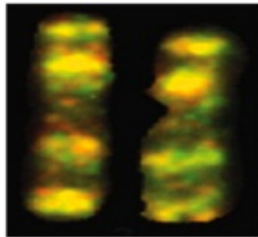
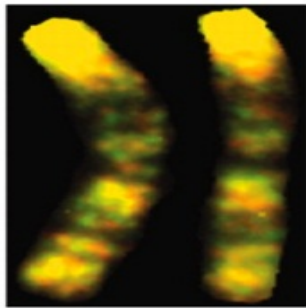




**Genetically
Identical**



**Different
Disease**



3 year old identical twins

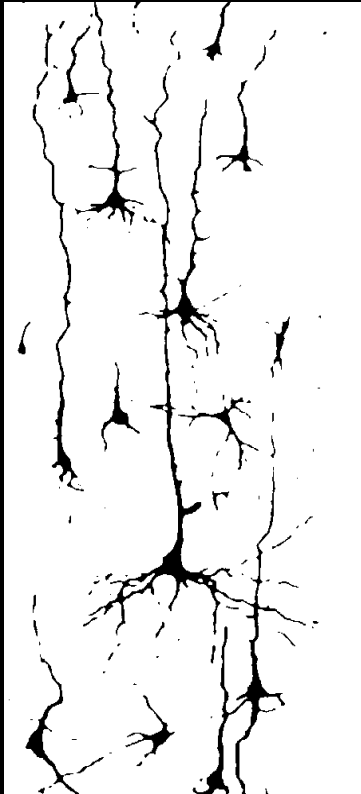
60 year old identical twins

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Brain Grows Rapidly Followed by Pruning

Rapid growth



Birth



6 years old

Brain Grows Rapidly Followed by Pruning

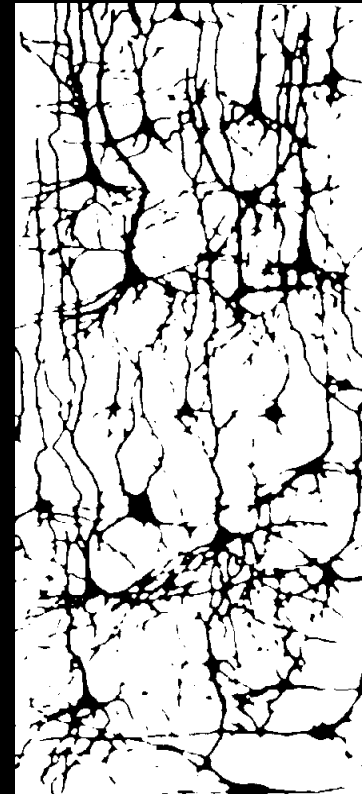
Rapid growth Pruning



Birth

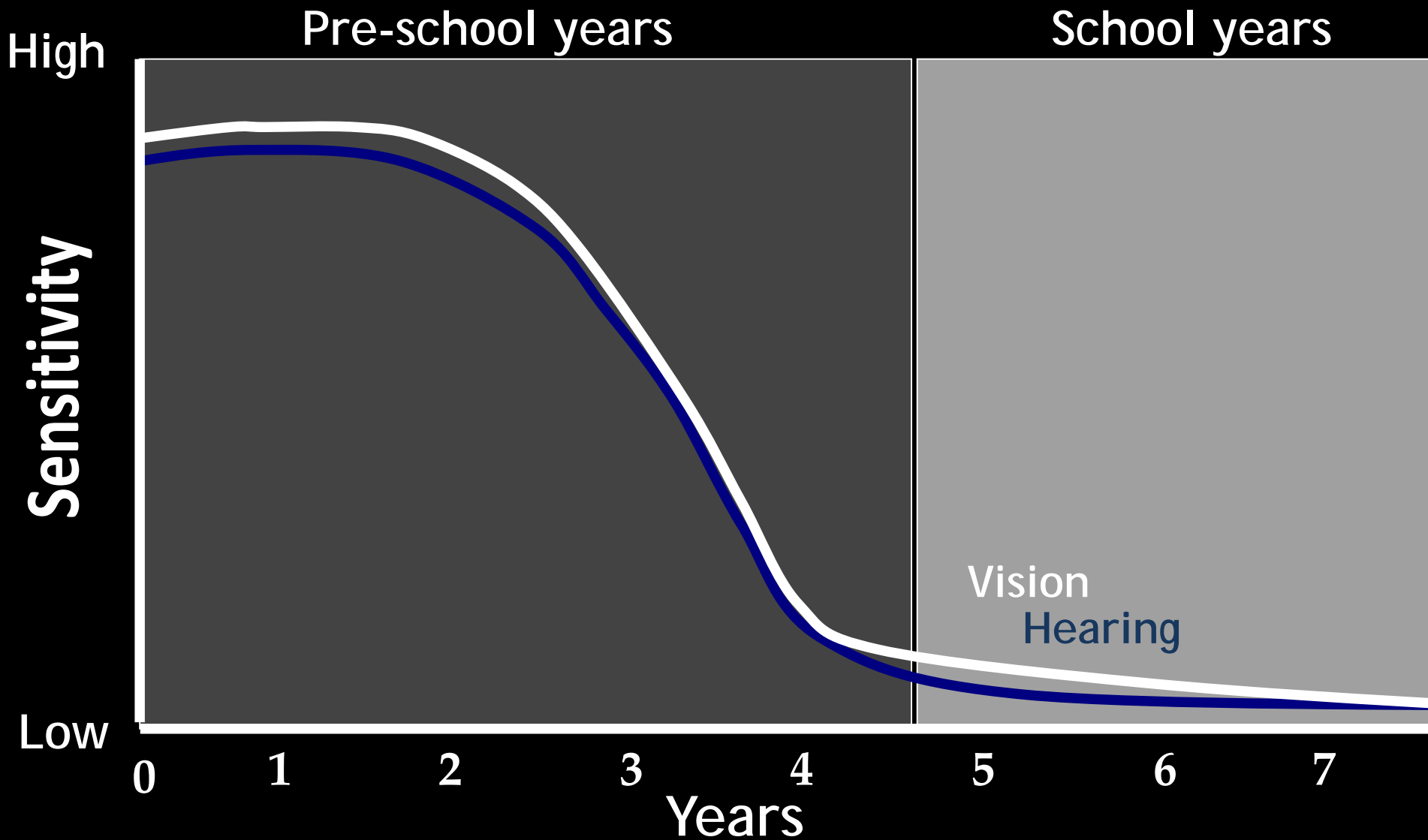


6 years old

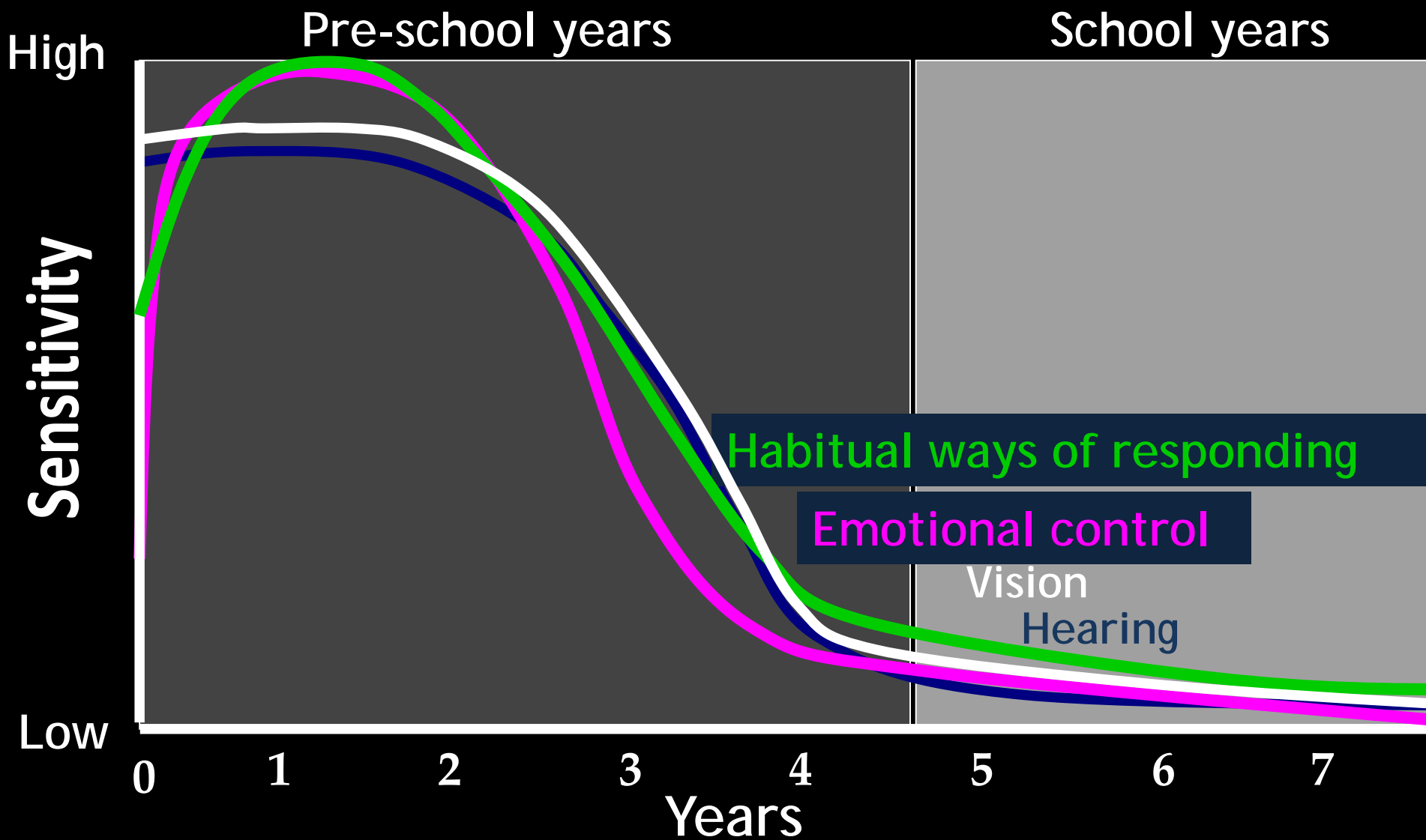


14 years old

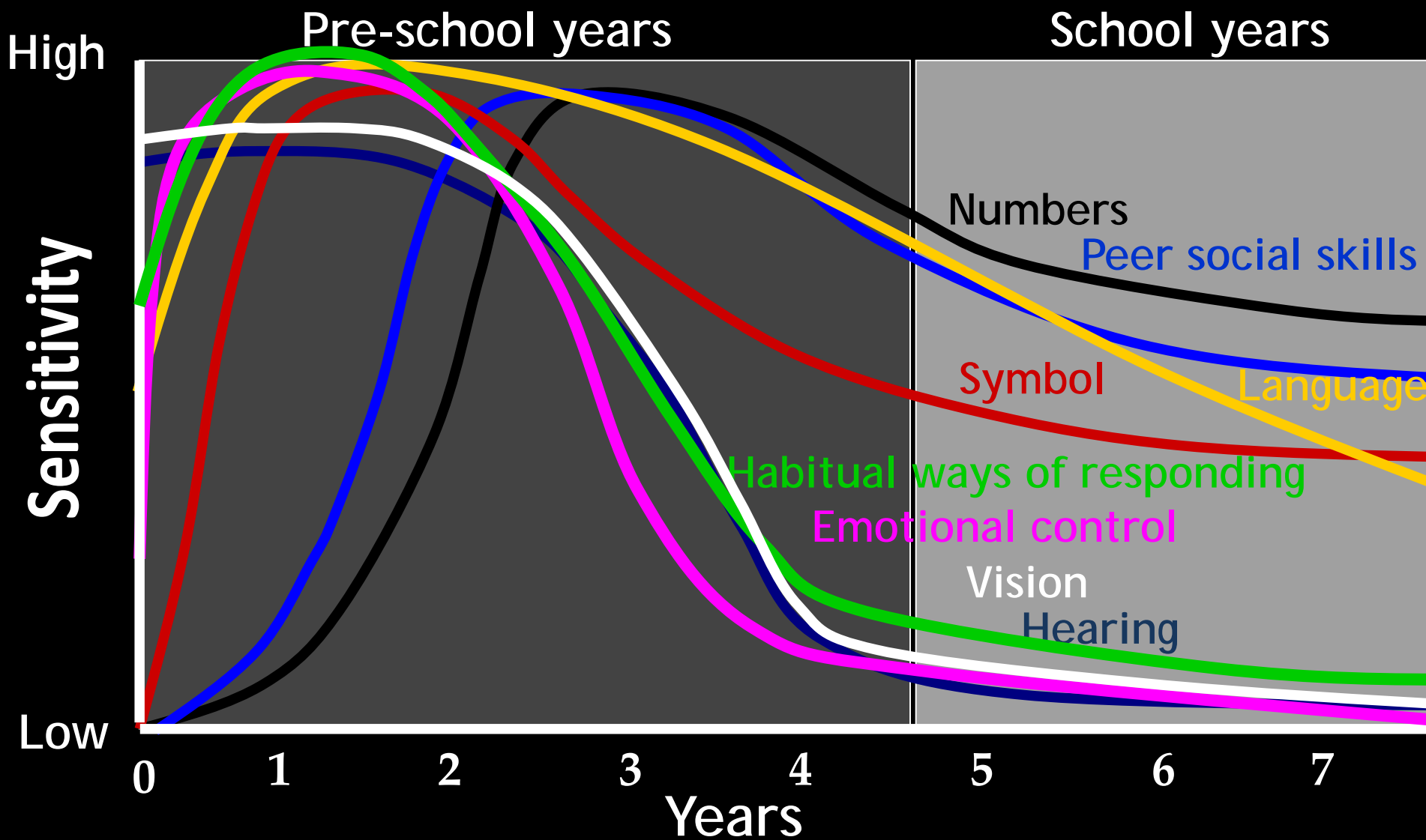
Sensitive Periods in Early Brain Development



Sensitive Periods in Early Brain Development



Sensitive Periods in Early Brain Development



Critical Points

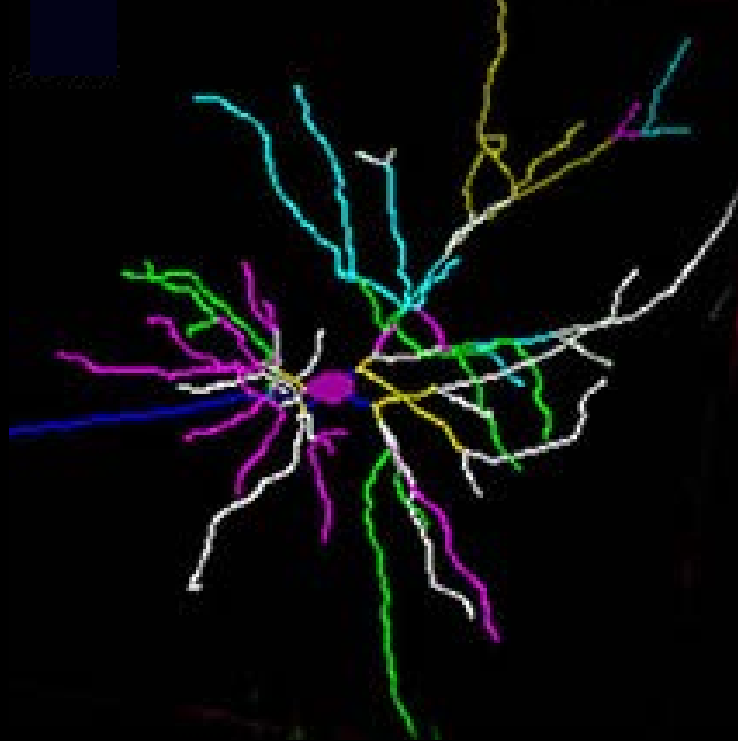
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Toxic Stress Changes Brain Architecture

Radley et al. (2004) ; Bock et al. (2005)

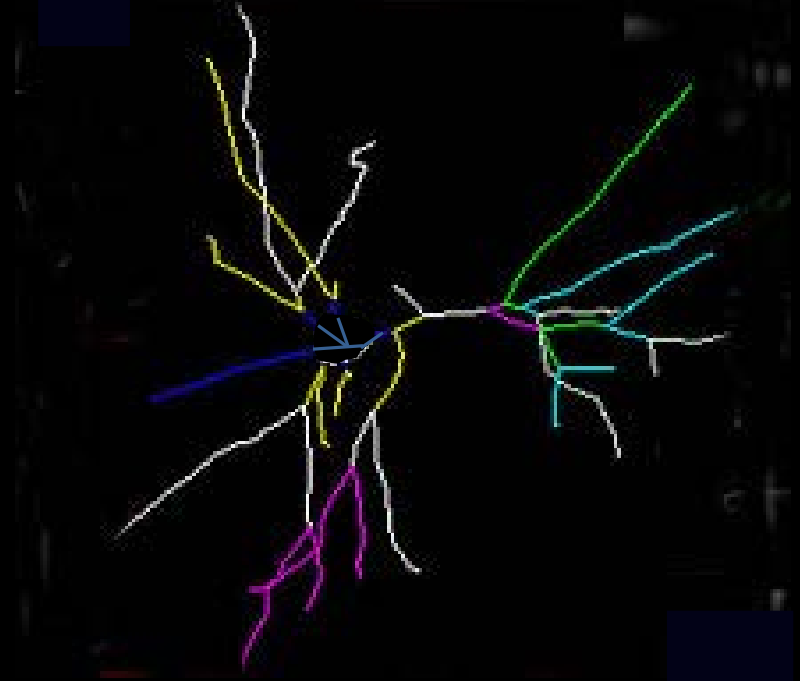
Prefrontal Cortex and Hippocampus

Normal

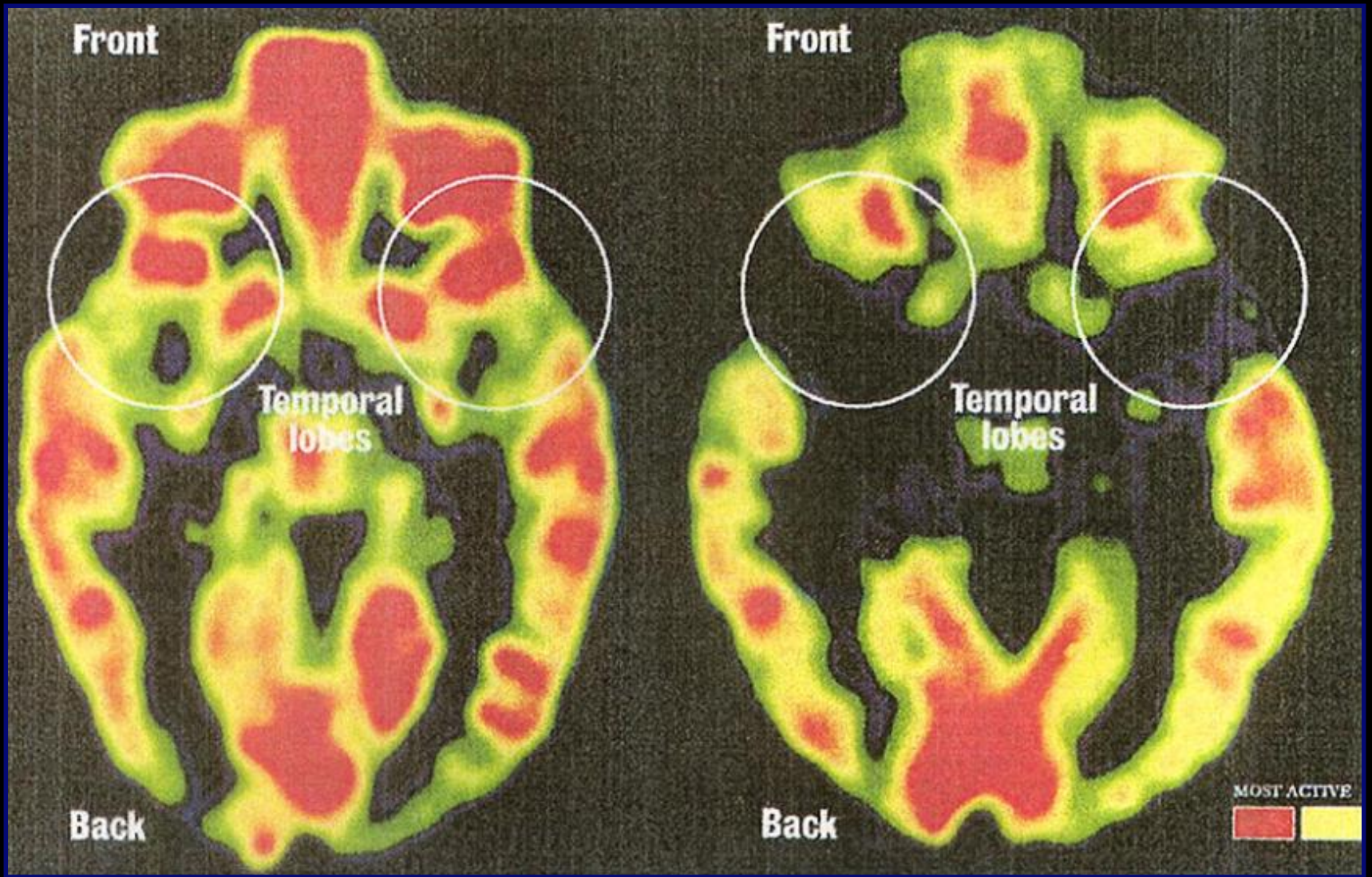


**Typical neuron—
many connections**

Toxic stress



**Damaged neuron—
fewer connections**



Healthy Child

Severe Neglect

Three Levels of Stress

National Scientific Council on the Developing Child, Shonkoff

Positive

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

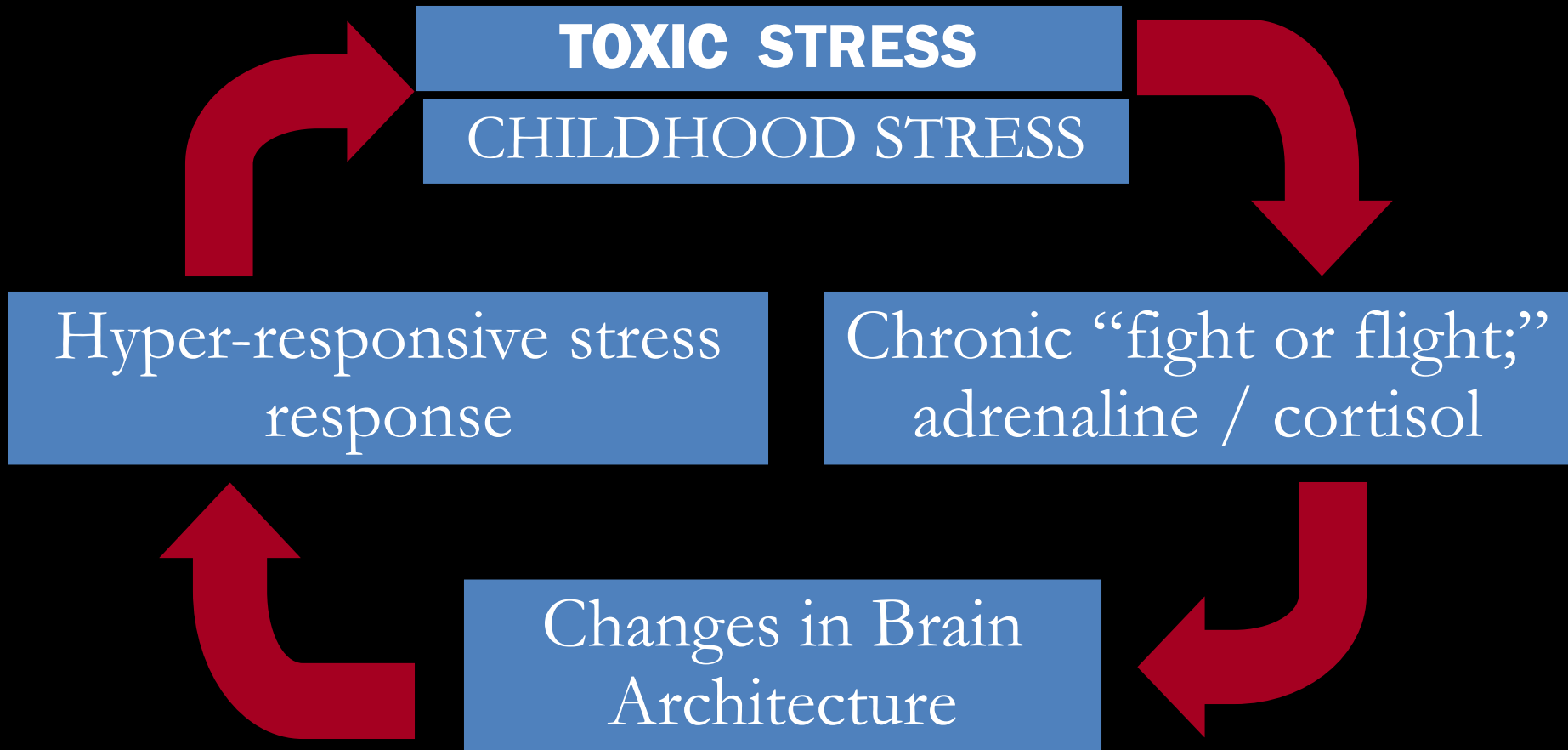
Tolerable

Serious, temporary stress responses,
buffered by supportive relationships.

Toxic

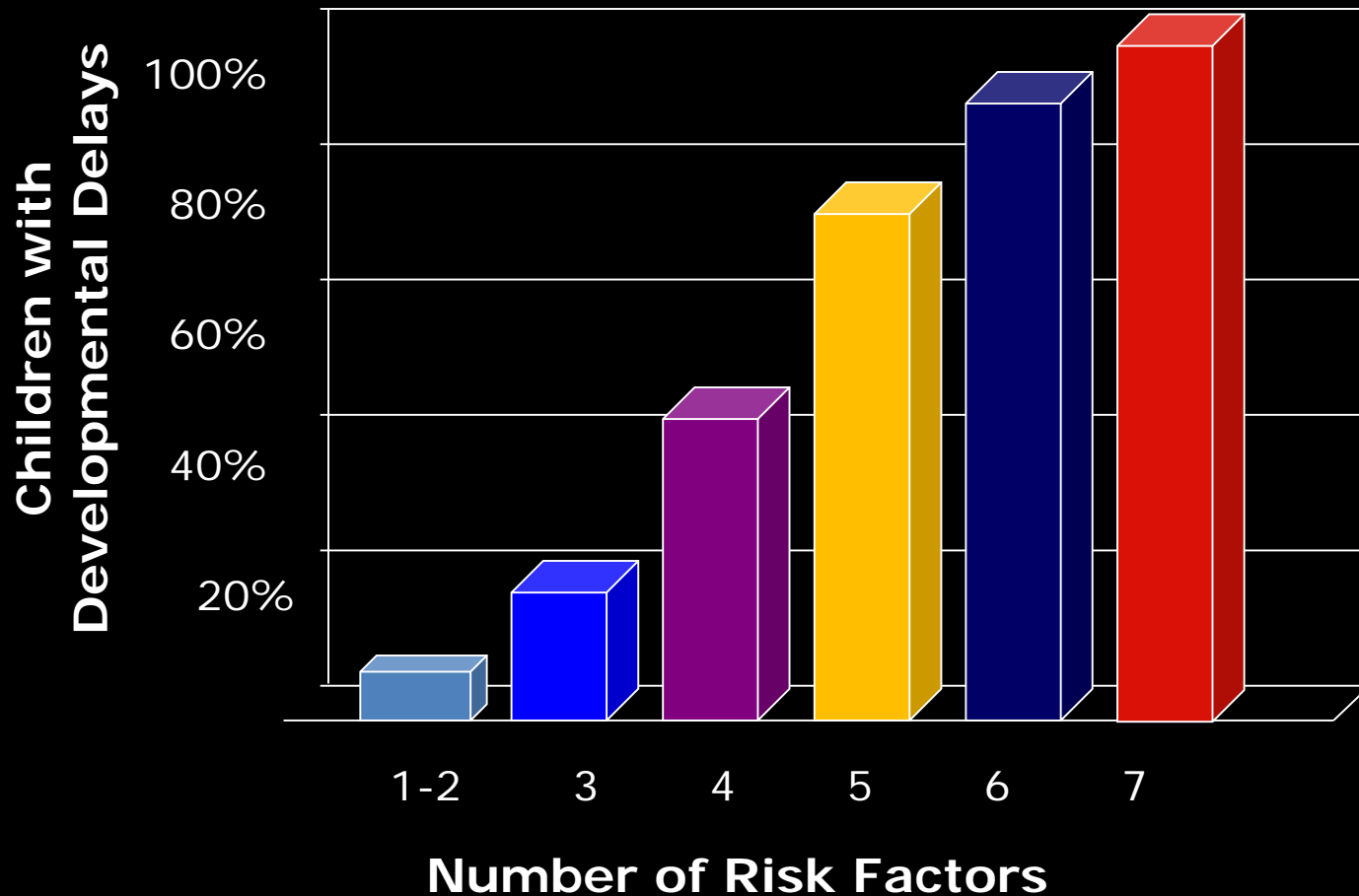
Prolonged activation of stress response systems
in the absence of protective relationships.

Early Toxic Stress, Neuroendocrine Function & Brain Architecture



Garner, Translating Developmental Science into Healthy Lives

Significant Adversity Impairs Development in the First Three Years



Barth, et al. (2008)

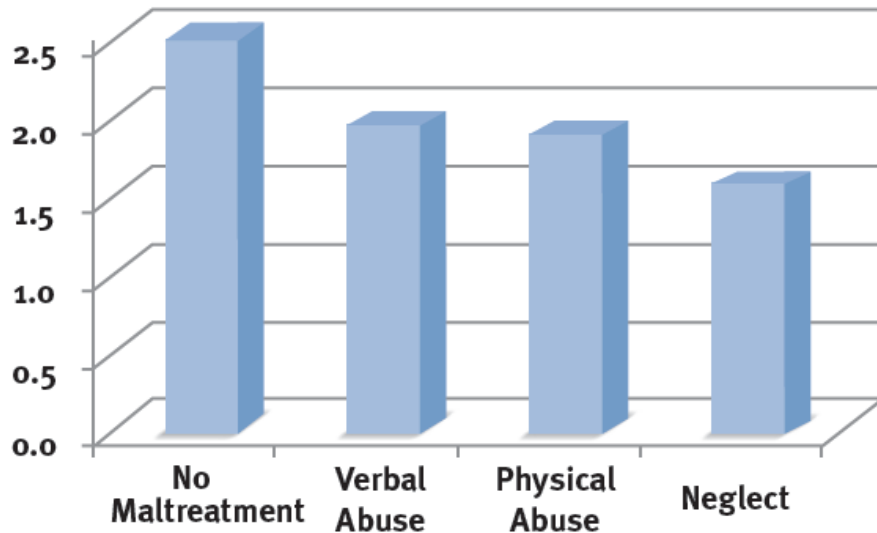
Neglect or Deprivation

- Neglect = absence of sufficient attention, responsiveness, and protection that are appropriate to the age and needs of a child
- Healthy development can be threatened not only by bad things that may happen to children (e.g., physical, verbal or sexual abuse)
- But also by the *absence* of sufficient amounts of essential experiences that are required for their positive well-being

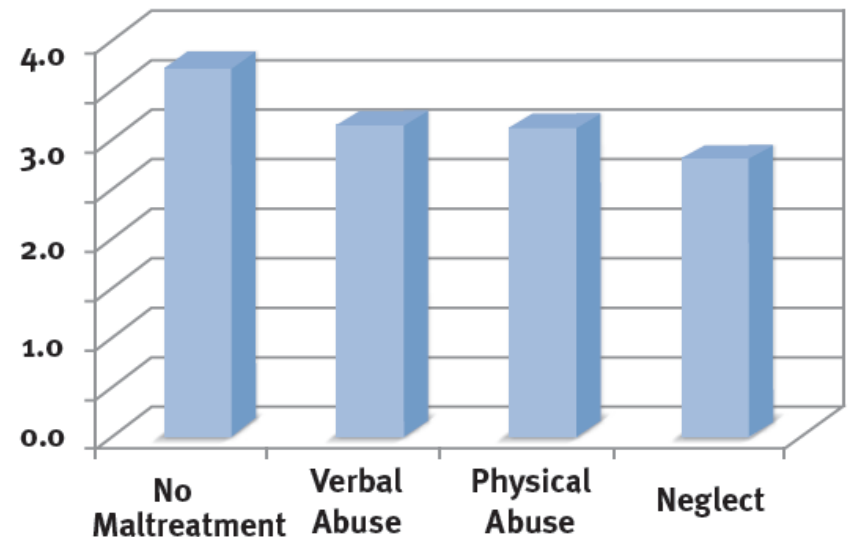
National Scientific Council on the Developing Child. (2012). *The Science of Neglect: The Persistent Absence of Responsive Care Disrupts the Developing Brain: Working Paper 12*. <http://www.developingchild.harvard.edu>

Neglect Can Be a Greater Threat to Development than Abuse

Creativity



Confidence and Assertiveness



National Scientific Council on the Developing Child. (2012). *The Science of Neglect: The Persistent Absence of Responsive Care Disrupts the Developing Brain: Working Paper 12*. <http://www.developingchild.harvard.edu>

Early Experience Matters

Virtually every aspect of early human development - from the brain's evolving circuitry to the child capacity for empathy, is affected by the environment and experiences that are encountered in a cumulative fashion, beginning in the prenatal period and extending throughout the early childhood years.

Neurons to Neighborhoods,
IOM, 2002



Brain Grows Rapidly Followed by Pruning

Rapid growth

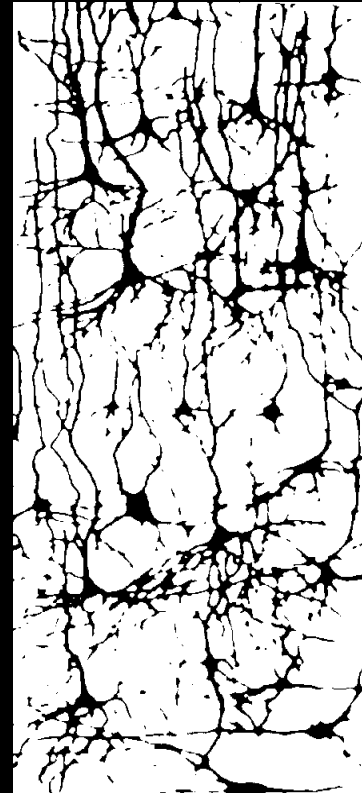
Pruning



Birth



6 years old

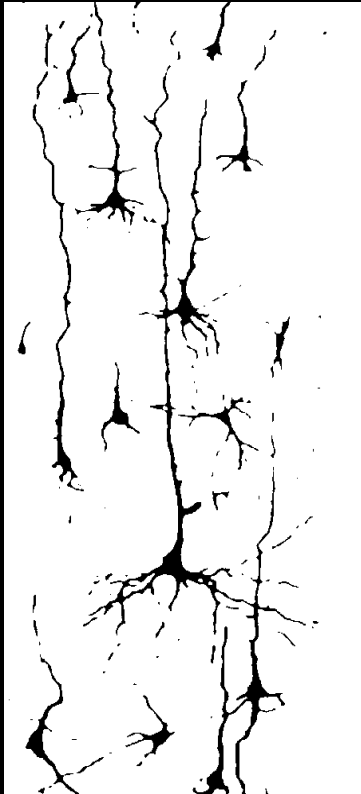


14 years old

Brain Grows Rapidly Followed by Pruning

Rapid growth

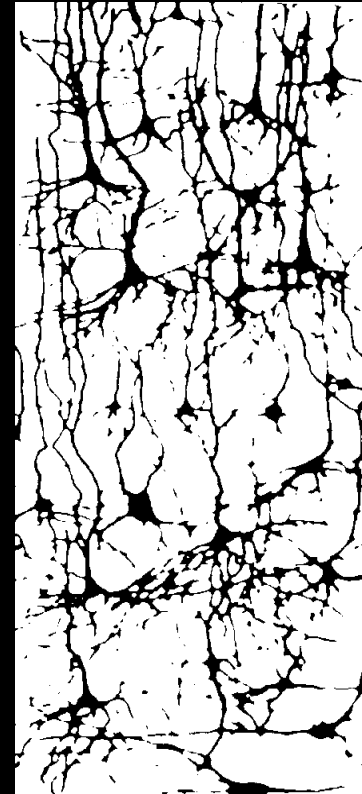
Pruning



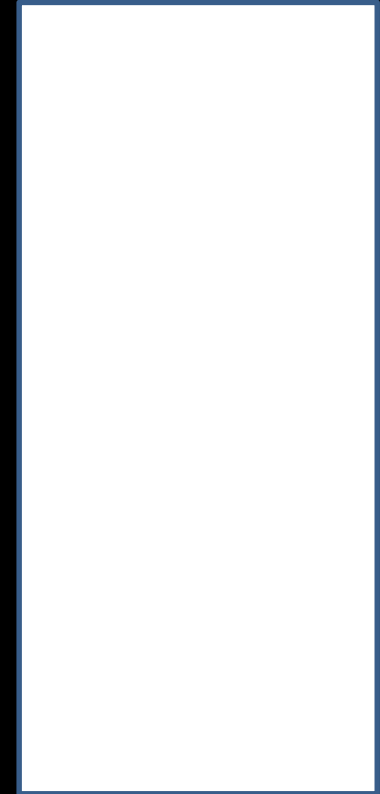
Birth



6 years old



14 years old



Politician

Serve and Return Interactions Shape Brain Architecture



- When an infant or young child babbles, gestures, or cries i.e. the “serve”
- and an adult responds appropriately with eye contact, words, or a hug, i.e., the “return”
- neural connections are built and strengthened in the child’s brain that support the development of communication and social skills.

Serve and Return Interactions Shape Brain Architecture

5 steps



https://developingchild.harvard.edu/resources/how-to-5-steps-for-brain-building-serve-and-return/?utm_source=newsletter&utm_medium=email&utm_campaign=may_2019

- Notice the “serve” & share the child’s focus of attention
- Return the serve by supporting and encouraging
- Give it a name
- Take turns ... and wait. Keep the interaction going back and forth
- Practice endings and beginnings

5 Rs of Early Childhood Education

ROUTINES – help children know what to expect of us - what is expected of them

READING together - daily

RHYMING, playing and cuddling

REWARDS for everyday successes –

PRAISE is a powerful reward

RELATIONSHIPS, reciprocal and nurturing –
foundation of healthy child development



Safe, Stable, Nurturing Relationships

Safety: The extent to which an individual is free from fear and secure from physical or psychological harm within their environment.

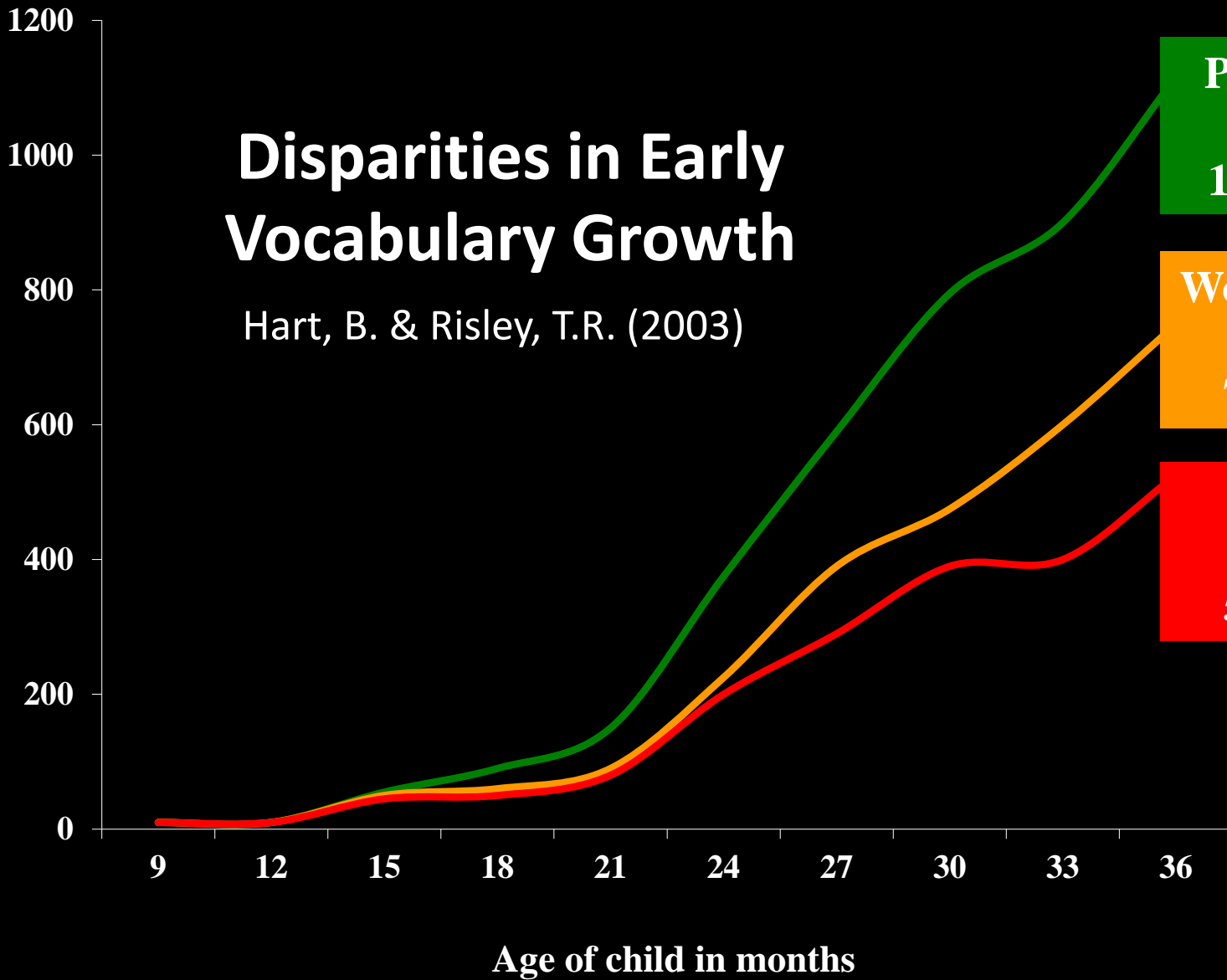
Stability: The degree of predictability and consistency in one's relationships and social, emotional, and physical environments

Nurturing: The extent to which children have access to individuals who are able to sensitively and consistently respond to and meet their needs

Disparities in Early Vocabulary Growth

Hart, B. & Risley, T.R. (2003)

Vocabulary Size



Professional Families
1,116 words

Working Class Families
749 words

Poverty Families
525 words

The Early Catastrophe: The 30 Million Word Gap by Age 3

Beyond the 30M Word Gap

- Children with more conversational turns with adults
 - Exhibited greater left inferior frontal (Broca's area) activation on functional MRI during story listening
 - First evidence directly relating children's language environments with neural language processing
- Conversational experience impacts neural language processing over and above SES or the quantity of words

Early Childhood Stimulation Benefits Adult Competence and Reduces Violent Behavior

How experience influences life course –

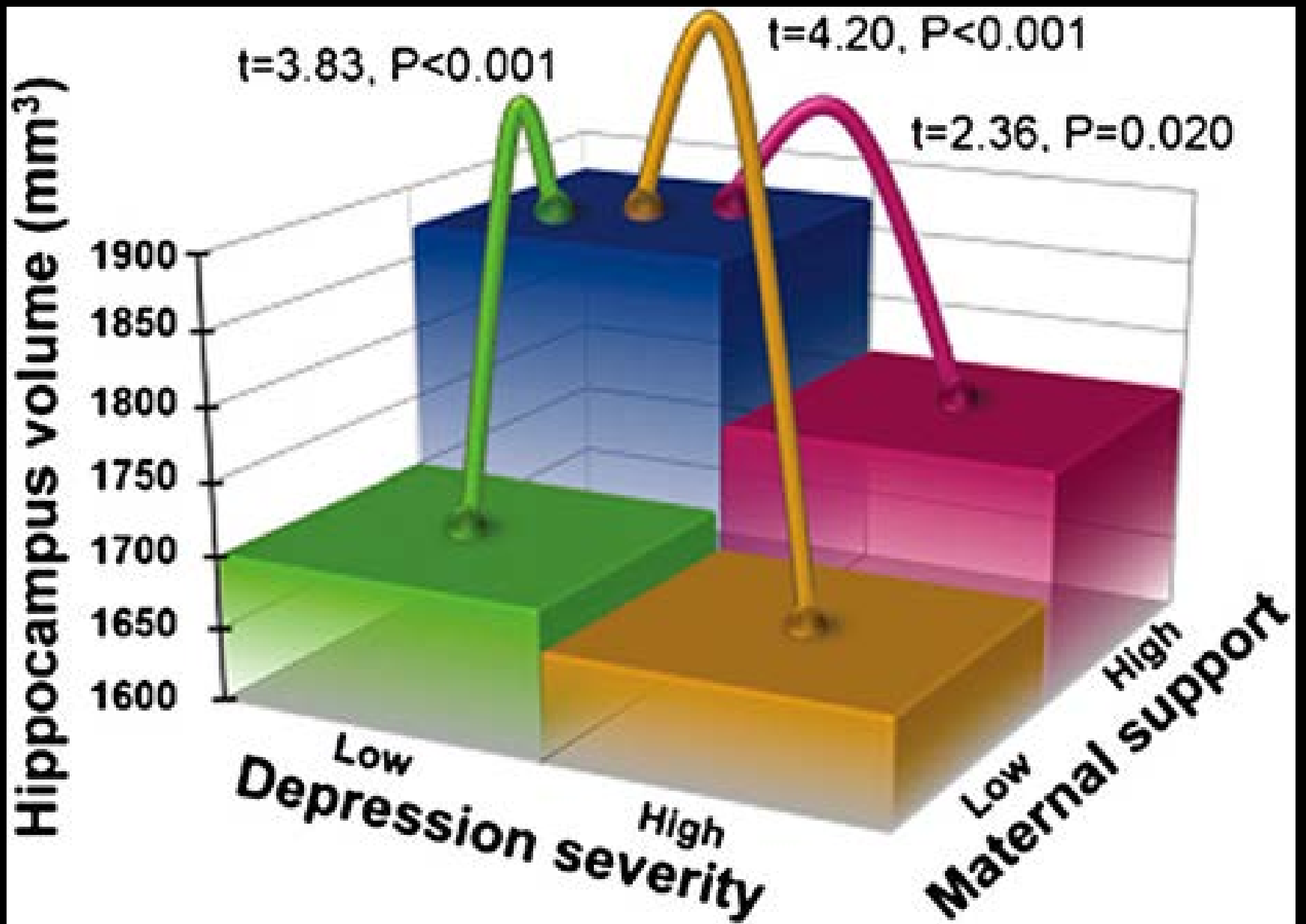
SP Walker et al, *Pediatrics*, 127 (95) 849-865, 2011

129 Jamaican growth retarded children 9-24 mo

2 yr trial of nutritional support (1 kg milk-based formula/wk) and/or psychosocial stimulation (weekly sessions to improve mother/child interaction thru praise, play, chatting & discouraging physical punishment)

At 22 yo (& before) => no benefit of nutritional supplement

Early stimulation groups => 36% and 33% less likely to be involved in fights or violent behavior, had higher IQs (6.3, CI 2.2-10.4) and educational attainment, and less depression



Early Childhood Interventions

Proven Results, Future Promise



 RAND
Labor and Population

Lynn A. Karoly
M. Rebecca Kilburn
Jill S. Cannon

Rand Study Key Findings of Early Intervention Programs

Early Childhood Interventions Proven Results, Future Promise; Lynn A. Karoly M. Rebecca Kilburn, Jill S. Cannon. Prepared for Labor and Population, 2005

http://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG341.pdf

Rand Study

Types of Intervention Programs

- a. Parent education and family supports through home visiting or services provided in other settings
- b. Early childhood education, typically in a center-based setting, for one or two years prior to school access
- c. Combines the two approaches

Rand Study

Key Findings of Early Intervention Programs

1. Are high quality early intervention programs effective?
2. What are the attributes of high quality programs?
3. What is the return on investment (ROI)?

Early Childhood Interventions Proven Results, Future Promise; Lynn A. Karoly M. Rebecca Kilburn, Jill S. Cannon. Prepared for Labor and Population, 2005

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Home Visiting or Parent Education

DARE to be You

Developmentally Supportive Care: Newborn Individualized Developmental Care and Assessment Program*

HIPPY (Home Instruction Program for Preschool Youngsters) USA

Incredible Years

Nurse-Family Partnership Program

Parents as Teachers*

Project CARE (Carolina Approach to Responsive Education)—without early childhood education

Reach Out and Read*

Home Visiting or Parent Education Combined with Early Childhood Education

Carolina Abecedarian Project

Chicago Child-Parent Centers

Early Head Start*

Early Training Project

Head Start

High/Scope Perry Preschool Project

Houston Parent-Child Development Center

Infant Health and Development Program

Project CARE—with early childhood education

Syracuse Family Development Research Program

Rand Study

Key Findings of Early Intervention Programs

**Studies going back 30 years
have shown that intervention
in the first 3 years
can improve outcomes**

Early Childhood Interventions Proven Results, Future Promise; Lynn A. Karoly M. Rebecca Kilburn, Jill S. Cannon. Prepared for Labor and Population, 2005

http://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG341.pdf

Rand Study

Key Findings of Early Intervention Programs

- **academic achievement**
- **behavior**
- **educational progression and attainment**
- **delinquency and crime**
- **labor market success**

Early Childhood Interventions Proven Results, Future Promise; Lynn A. Karoly M. Rebecca Kilburn, Jill S. Cannon. Prepared for Labor and Population, 2005

http://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG341.pdf

Rand Study

Key Findings of Early Intervention Programs

- Interventions with more favorable results
 - Better-trained caregivers
 - Smaller child-to-staff ratios
 - Parental involvement

Early Childhood Interventions Proven Results, Future Promise; Lynn A. Karoly M. Rebecca Kilburn, Jill S. Cannon. Prepared for Labor and Population, 2005

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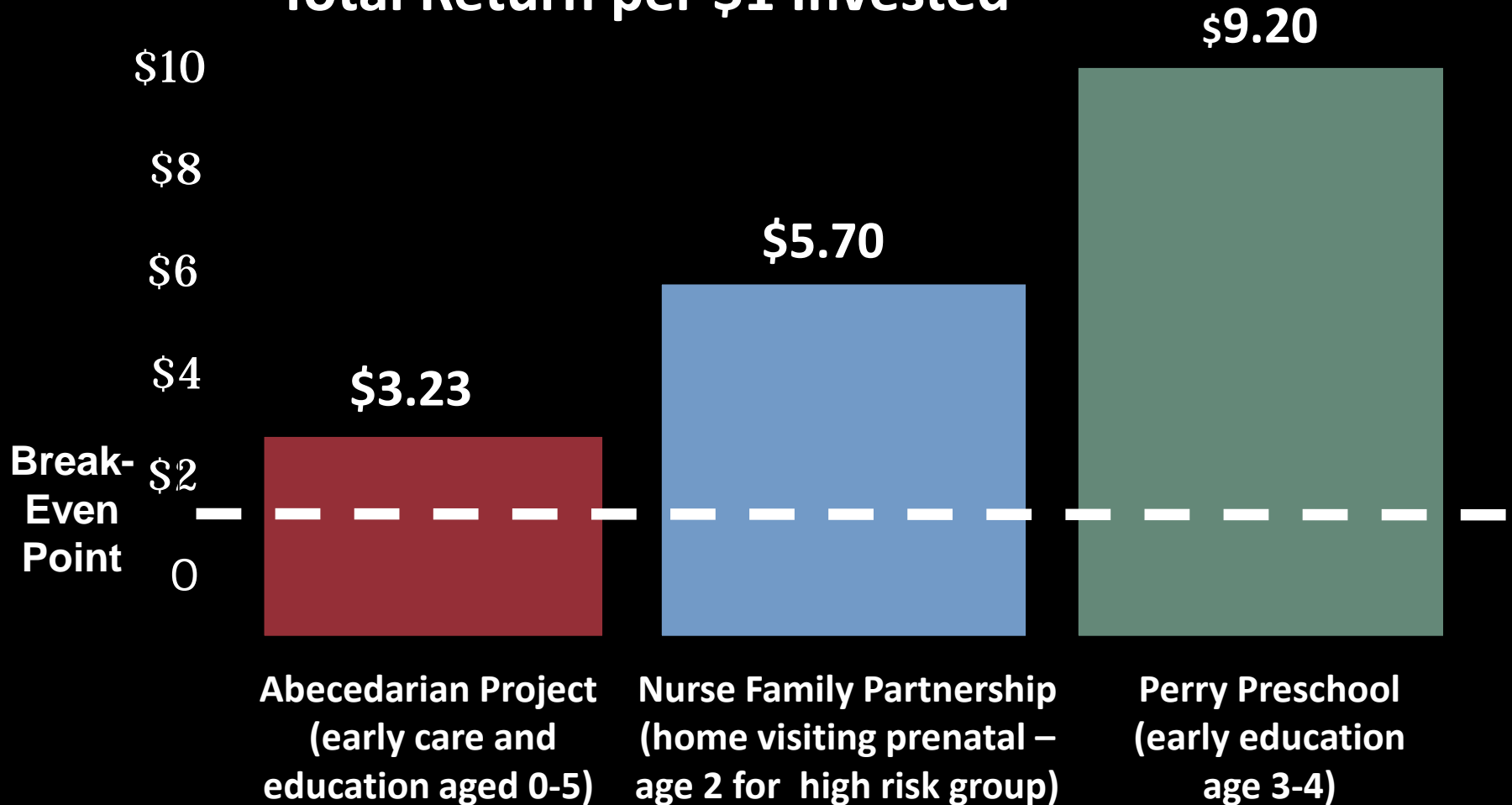
Key Findings of Early Intervention Programs

Well-designed early childhood interventions have been found to generate a return to society ranging from \$1.80 to \$17.07 for each dollar spent on the program

Early Childhood Interventions Proven Results, Future Promise; Lynn A. Karoly M. Rebecca Kilburn, Jill S. Cannon. Prepared for Labor and Population, 2005
http://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG341.pdf

ROI for Proven Early Childhood Strategies

Total Return per \$1 Invested



Summary

- Early experiences shape the architecture of the brain
- Development of the brain incorporates experience, whether positive or negative
- Brain architecture establishes a sturdy or weak foundation for learning & behavior with life long consequences

Closing Thoughts

Early childhood development
affects all of us!

- 75% of 18 year olds cannot get a job as a private in the US army

Ready, Willing and Unable to Serve A report by Mission Readiness, Military Leaders for Kids www/cdn.missionreadiness.org

- 75% of 18 year olds cannot get a job as a private in the US army
 - Lack of diploma
 - Health (obesity, asthma)
 - Criminal record
 - Drug / alcohol

Ready, Willing and Unable to Serve A report by Mission Readiness, Military Leaders for Kids www/cdn.missionreadiness.org

Benefits of Early Intervention Programs

Academic achievement
Behavior
Educational attainment
Delinquency and crime
Labor market success

Cannot Get a Job as a Private in Army

Lack of diploma
Health (obesity, asthma)
Criminal record
Drug / alcohol

Federal Reserve Chair Janet Yellen

- ...four sources of economic opportunity in America-- think of them as "building blocks" for the gains in income and wealth that most Americans hope are within reach of those who strive for them

-

Janet Yellen, Chair, Board of Governors, Federal Reserve System of the United States. "[Perspectives on Inequality and Opportunity from the Survey of Consumer Finances](#)." Federal Reserve Bank of Boston, October 17, 2014

Federal Reserve Chair Janet Yellen

- ...four sources of economic opportunity in America-- think of them as "building blocks" for the gains in income and wealth that most Americans hope are within reach of those who strive for them
- The first [is] widely recognized as important source of opportunity: *resources available to children in their most formative years....* One of the most consequential examples is early childhood education
- **Janet Yellen**, Chair, Board of Governors, Federal Reserve System of the United States. "[Perspectives on Inequality and Opportunity from the Survey of Consumer Finances](#)." Federal Reserve Bank of Boston, October 17, 2014

ROI: RATE OF RETURN TO INVESTMENT

Prenatal

Early childhood

Preschool

K-12 education

**Economic impact of investing
in early childhood learning.**

— James Heckman, www.heckmanequation.org

Job training

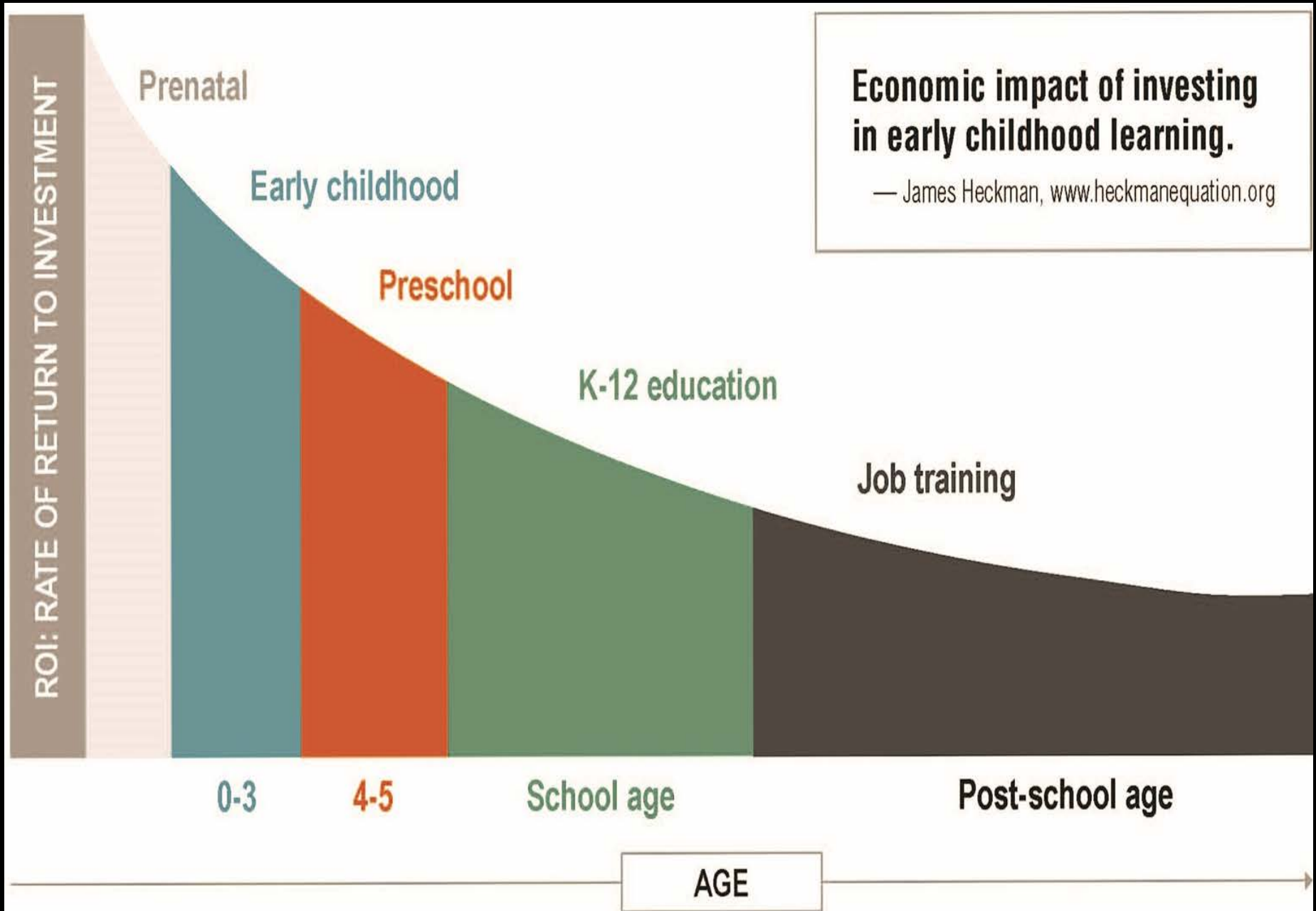
0-3

4-5

School age

Post-school age

AGE



ROI: RATE OF RETURN TO INVESTMENT

Programs targeted at earliest months and years

Preschool programs

K-12 education

Job training

0-3

4-5

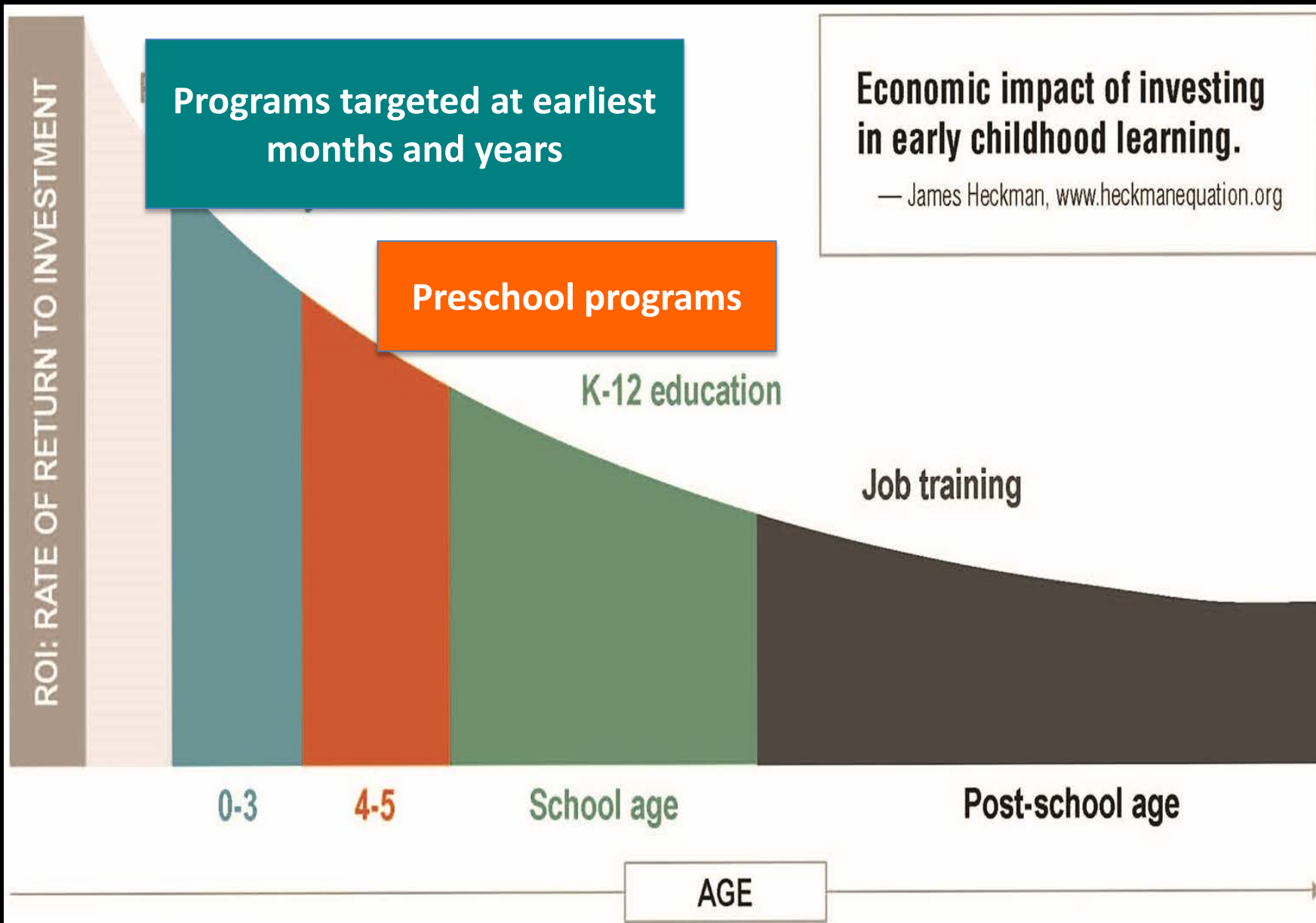
School age

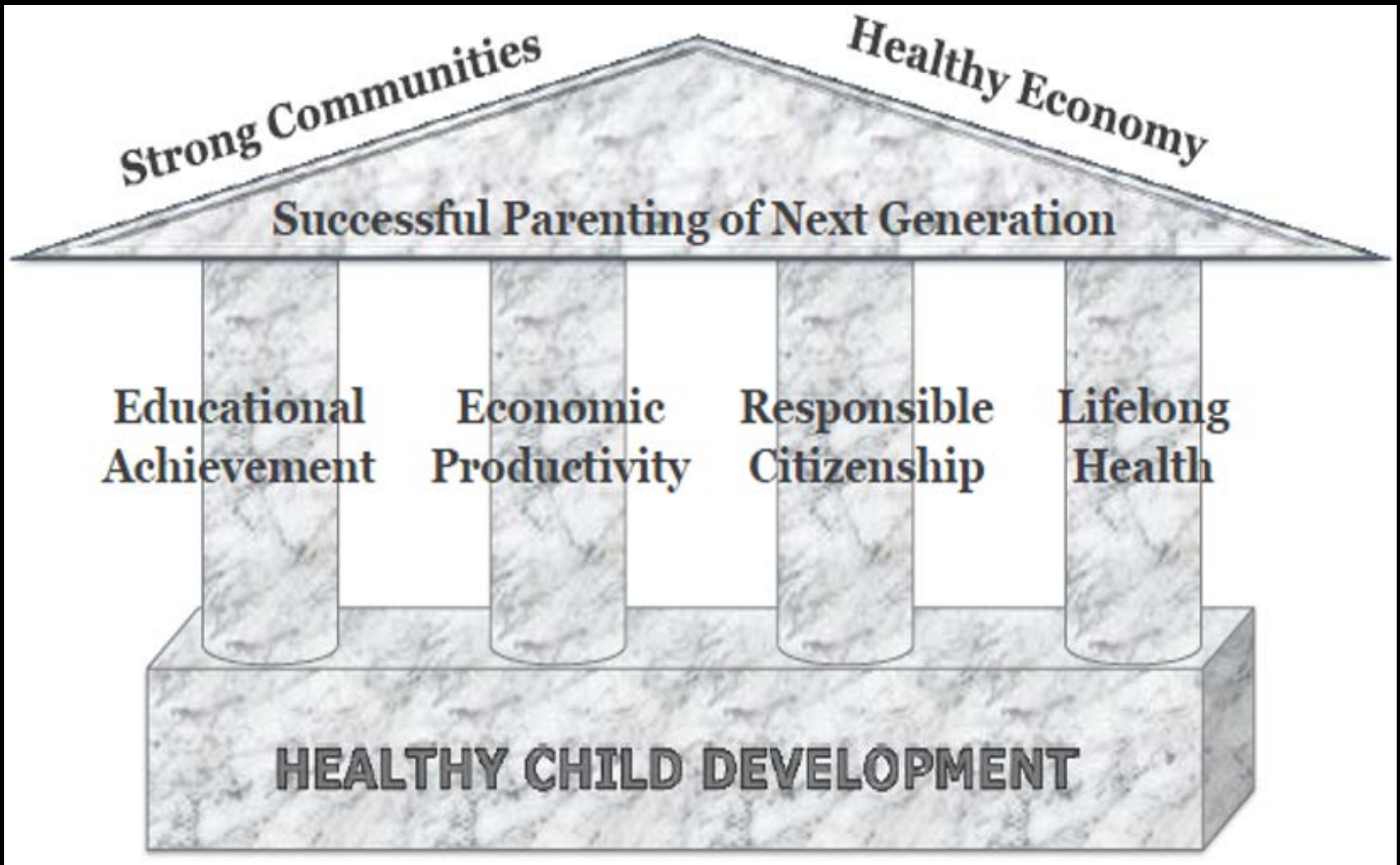
Post-school age

AGE

Economic impact of investing in early childhood learning.

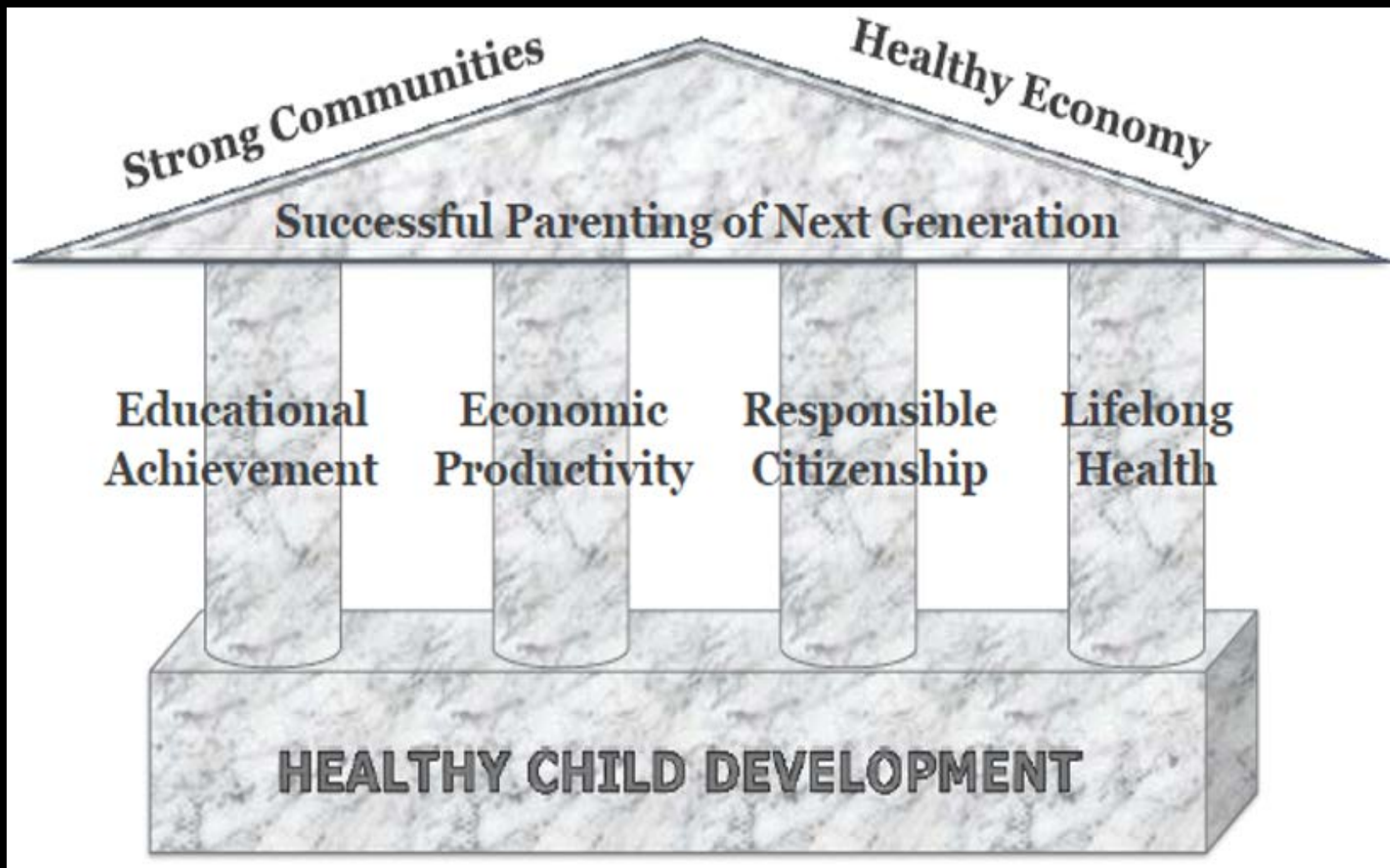
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http://www.readynation.org/uploads/db_files/Early%20Brain%20Research%20Presentation%20-%20Center-ReadyNation%20Econ%20slide%20FOR%20WEB53.pdf

Children 100% of Our Future



http://www.readynation.org/uploads/db_files/Early%20Brain%20Research%20Presentation%20-%20Center-ReadyNation%20Econ%20slide%20FOR%20WEB53.pdf

**Safe, Stable, Nurturing Families:
*Early Brain Development
aka Neurobiology***

Thank you!!

Nancy Swigonski, MD, MPH, MBA, FAAP
Professor, Department of Pediatrics and
Fairbanks School of Public Health
Indiana University School of Medicine





Serve and Return

- <http://www.youtube.com/watch?v=apzXGEbZht0>
- https://www.aap.org/en-us/Documents/ttb_bring_out_best.pdf

Anticipatory Guidance

Children are doing the best they can. Pediatricians can help by providing practical strategies for caregivers to address the behaviors and challenges of the traumatized child.

Trauma-Specific Anticipatory Guidance

WHAT YOU WILL SEE	WHY IT OCCURS	HOW FAMILY CAN RESPOND
<p>Traumatized children will respond to anything they think is a threat more quickly and more forcefully than other children.</p> <p>Traumatized children are more likely to misread facial and non-verbal cues and think there is a threat where none is intended.</p>	<p>Areas of the brain responsible for recognizing and responding to threat are turned on. This is called hypertrophied.</p> <p>Brain does not recognize that this new situation does not contain the same threats.</p>	<p>Do not take these behaviors personally.</p> <p>Helping the child understand your facial expression or the tone of your voice will help lessen the chance of the child's behavior escalating in situations that otherwise do not seem threatening.</p>
<p>Traumatized children need to be redirected or behavior may start to escalate.</p>	<p>Responding with aggression will trigger the child's brain back into threat mode.</p> <p>Logic centers shut down, fight, flight, or hide response takes over.</p>	<p>Avoid yelling and aggression.</p> <p>Lower the tone and intensity of your voice.</p> <p>Come down to the child's eye level, gently take hold the child's hand, and use simple, direct words. Give directions without using strong emotions.</p>
<p>Children don't always know how to say what they are feeling. It can be hard for them to find words. Often they are not told that how they feel is okay.</p>	<p>Emotion and language centers are not well connected. Memory centers to hold words are blocked.</p>	<p>Tell the child it is okay to feel the way she feels and to show emotion.</p> <p>Give the child words to label her emotions.</p>
<p>Traumatized children do not have</p>	<p>Children have had to constantly be watchful</p>	<p>Develop breathing techniques, relaxation skills, or exercises that</p>

Children are doing the best they can. Pediatricians can help by providing practical strategies for caregivers to address the behaviors and challenges of the traumatized child.

Trauma-Specific Anticipatory Guidance		
WHAT YOU WILL SEE	WHY IT OCCURS	HOW FAMILY CAN RESPOND
<p>Traumatized children will respond to anything they think is a threat more quickly and more forcefully than other children.</p> <p>Traumatized children are more likely to misread facial and non-verbal cues and think there is a threat where none is intended.</p>	<p>Areas of the brain responsible for recognizing and responding to threat are turned on. This is called hypertrophied.</p> <p>Brain does not recognize that this new situation does not contain the same threats.</p>	<p>Do not take these behaviors personally.</p> <p>Helping the child understand your facial expression or the tone of your voice will help lessen the chance of the child's behavior escalating in situations that otherwise do not seem threatening.</p>
<p>Traumatized children need to be redirected or behavior may start to escalate.</p>	<p>Responding with aggression will trigger the child's brain back into threat mode.</p> <p>Logic centers shut down, fight, flight, or hide response takes over.</p>	<p>Avoid yelling and aggression.</p> <p>Lower the tone and intensity of your voice.</p> <p>Come down to the child's eye level, gently take hold the child's hand, and use simple, direct words. Give directions without using strong emotions.</p>
<p>Children don't always know how to say what they are feeling. It can be hard for them to find words. Often they are not told that how they feel is okay.</p>	<p>Emotion and language centers are not well connected. Memory centers to hold words are blocked.</p>	<p>Tell the child it is okay to feel the way she feels and to show emotion.</p> <p>Give the child words to label her emotions.</p>
<p>Traumatized children do not have the skills for self-regulation or for calming down once upset.</p>	<p>Children have had to constantly be watchful for danger. Parts of the brain that keep us alert stay turned on, but the parts of their brains used for self-regulation and calming have not grown with the child.</p>	<p>Develop breathing techniques, relaxation skills, or exercises that the child can do when getting upset. Praise the child for expressing feelings or calming down.</p> <p>Guide the child at first, then just remind the child to use his skills when you start to see the child getting upset.</p>
<p>Traumatized children will challenge the caretaker, often in ways that threaten placement.</p>	<p>Children come with negative beliefs and expectations about themselves (worthless, powerless) and about the caregiver (unreliable, rejecting).</p> <p>Children often reenact or recreate old relationships with new people. They do this to get the same reactions in caretakers that they experienced with other adults because these lead to familiar reactions.</p> <p>These patterns helped the child survive in the past, prove negative beliefs, help the child vent frustration, and give the child some sense of control.</p>	<p>Give messages that say the child is safe, wanted, capable, and worthwhile and that you as the caretaker are available, reliable, and responsive.</p> <p>Praise even neutral behavior.</p> <p>Be aware of your own emotional responses to the child's behavior.</p> <p>Correct when necessary in a calm unemotional tone.</p> <p>Repeat, repeat, repeat.</p> <p>Do not take these behaviors personally.</p>

- **Suggestions for Helping Children Who Have Experienced Trauma**
- **Not all strategies work for all children.** While a calming pat on the back may work well when Alex is feeling upset, this may have the opposite effect on Chiara and cause her to retreat further into herself. Find strengths even in children with the most challenging behaviors, and remind them often of what they are doing well (Wolpov et al. 2009). Here are some ways to help children who have experienced trauma.
- **Create and maintain consistent daily routines for the classroom.** Stability helps children understand that the world can be a safe place (NCTSN 2008). They feel empowered when they know the order of events and how they will be carried out. For example, placing a visual calendar on a wall or creating a book with images outlining the daily schedule for the library center can help children like Alex and Chiara feel more in control of their experiences.
- **Tell children when something out of the ordinary is going to occur.** The smallest unexpected event—such as a loud noise or a visit from an outsider—can be a reminder of trauma and trigger children’s stress responses; therefore, it is important to try to mitigate the fear and uncertainty that often come with unexpected changes (van der Kolk 2005).
- For example, during a study of trees Alex’s teachers invite a park ranger to talk to the children. Three days before the park ranger’s visit, the teachers hold a class meeting to discuss the upcoming visit and answer the children’s questions about the ranger. The teachers let the children express their feelings and concerns about a stranger coming into the classroom. By the time the ranger arrives, the children have agreed on how they will introduce themselves to their guest and some of the questions they will ask. This helps Alex feel less fearful of the new person and allows him to grapple with some of his fears outside of the trauma scenario.
- **Offer children developmentally appropriate choices.** Traumatic events often involve loss of control. Empowering children to have ownership of their behaviors and interests by giving them choices about things like where they want to sit at lunch or which songs to sing at circle time can help build healthy self-esteem (NCTSN 2008).
- **Anticipate difficult periods and transitions during the school day and offer extra support during these times.** Many different situations can remind children of their traumas, but your support can help to alleviate their responses. Because Alex finds himself alone in the house when he wakes up some mornings, he may feel anxious during naptime and have trouble falling asleep. Rather than resting, he might watch the teacher to make sure she stays in the room. To support him, the teacher sits by Alex while he falls asleep and reminds him that she will not leave him alone (Perry & Szalavitz 2006).
- **Use techniques to support children’s self-regulation.** Introducing breathing and other centering activities, such as mindfulness, helps children self-regulate (Perry & Szalavitz 2006). Starting off each day with a special breathing ritual gives them the strategy they need to pay attention and to modify their breaths when they are stressed.
- **Understand that children make sense of their experiences by reenacting them in play or through interactions with peers or adults.** Alex’s teacher rings the bell to initiate cleanup time. Alex asks if he can get out the clay. The teacher says it is not an appropriate time and points to the bell as she explains that it is time to clean up and get ready to go home for the day. Alex becomes visibly upset and yells “I hate you!” before running into the corner and banging his head against the wall.
- Teachers can help children like Alex to manage their feelings during such experiences by remaining composed and offering empathy and support. Rather than becoming the angry adult Alex expects, the teacher calmly initiates healthy and reparative interactions. She validates Alex’s feelings and communicates that she understands that Alex is upset. She also explains to Alex that she needs to keep his body safe and slowly moves her body between Alex and the wall so that he can no longer bang his head (NCTSN 2008). With the teacher’s support, Alex is able to calm down. Before joining his peers for cleanup, Alex makes a plan with the teacher to bring the clay out the next day.
- **Be nurturing and affectionate but also sensitive to children’s individual triggers.** Chiara’s history of sexual abuse causes her to feel anxious and confused when her teachers hug her. Being physically close to young children can reassure them, but with Chiara, a good rule of thumb is to be physically affectionate only when she seeks it. The teacher asks Chiara whether she wants to be hugged, and if she does, the teacher holds and hugs her (Perry & Szalavitz 2006).
- **Use positive guidance to help all children.** Strive to create supportive interventions to guide children to appropriate activities. For example, when Alex rips up his classmate Juan’s artwork, the teacher helps him understand that his actions upset Juan, and she encourages Alex to help repair Juan’s artwork. This enables Alex to connect his actions to his peer’s feelings while creating the expectation that he repair the physical damage he causes (Fox & Hemmeter 2009)

<https://www.naeyc.org/resources/pubs/yc/may2015/trauma-sensitive-classrooms>

Family Stress, Cortisol & Brain Development

- Early Social-Emotional Functioning and Public Health: The Relationship Between Kindergarten Social Competence and Future Wellness
 - Jones, et.al. American Journal of Public Health July 16, 2015
 - Followed children for 13-19 years
 - Social-emotional skills in kindergarten were associated with key young adult outcomes – education, employment, criminal activity, substance use and mental health

Family Stress, Cortisol & Brain Development

- Tracing Differential Pathways of Risk: Associations Among Family Adversity, Cortisol and Cognitive Functioning in Childhood
 - Suor, et. al., Child Deveopment 2015
 - 201 low income children followed for 3 years
 - Family instability and emotional maternal unavailability predicted abnormal cortisol levels and lower child cognitive function at age 4

○ Low reactivity

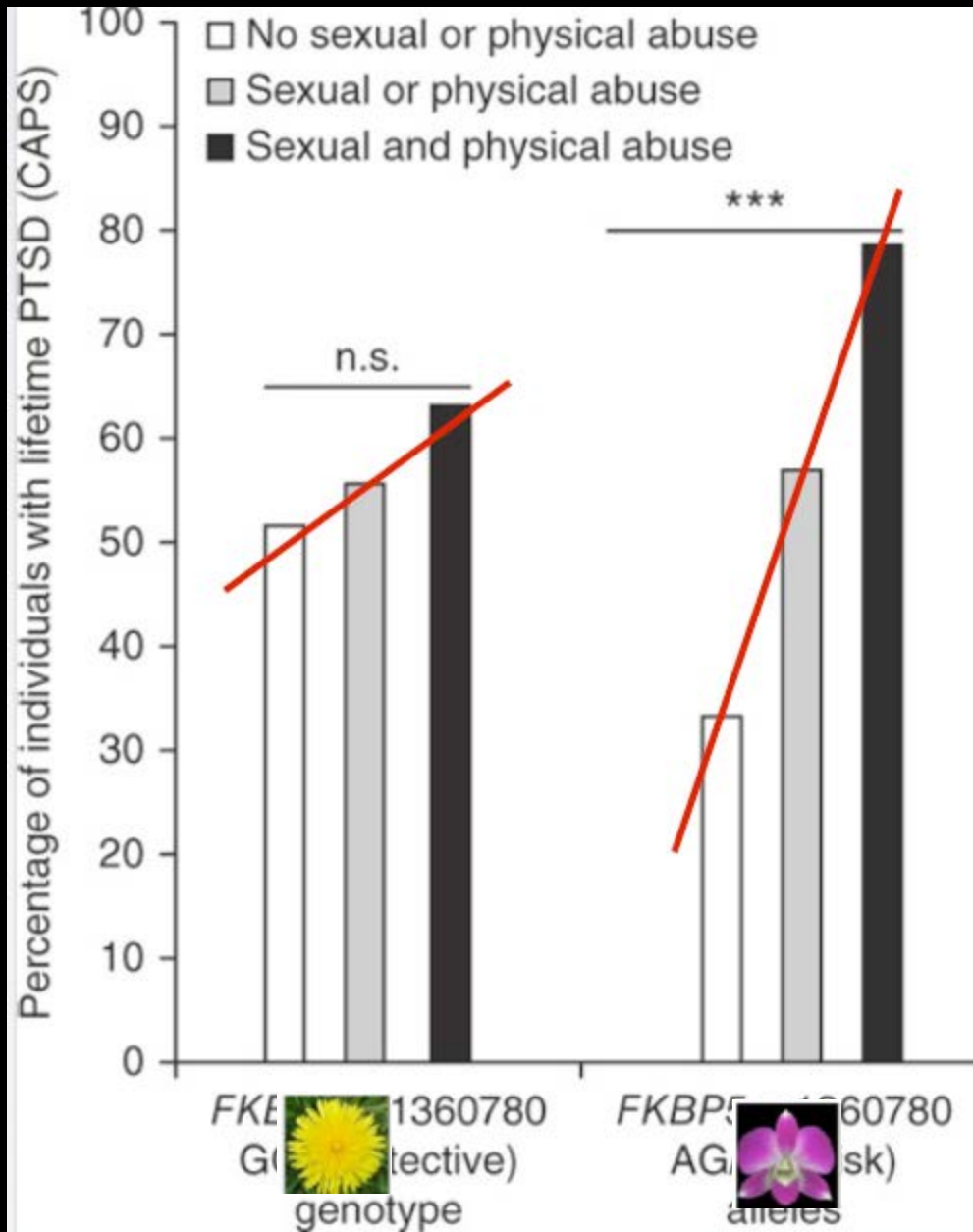
○ High reactivity



Supportive

Stressful

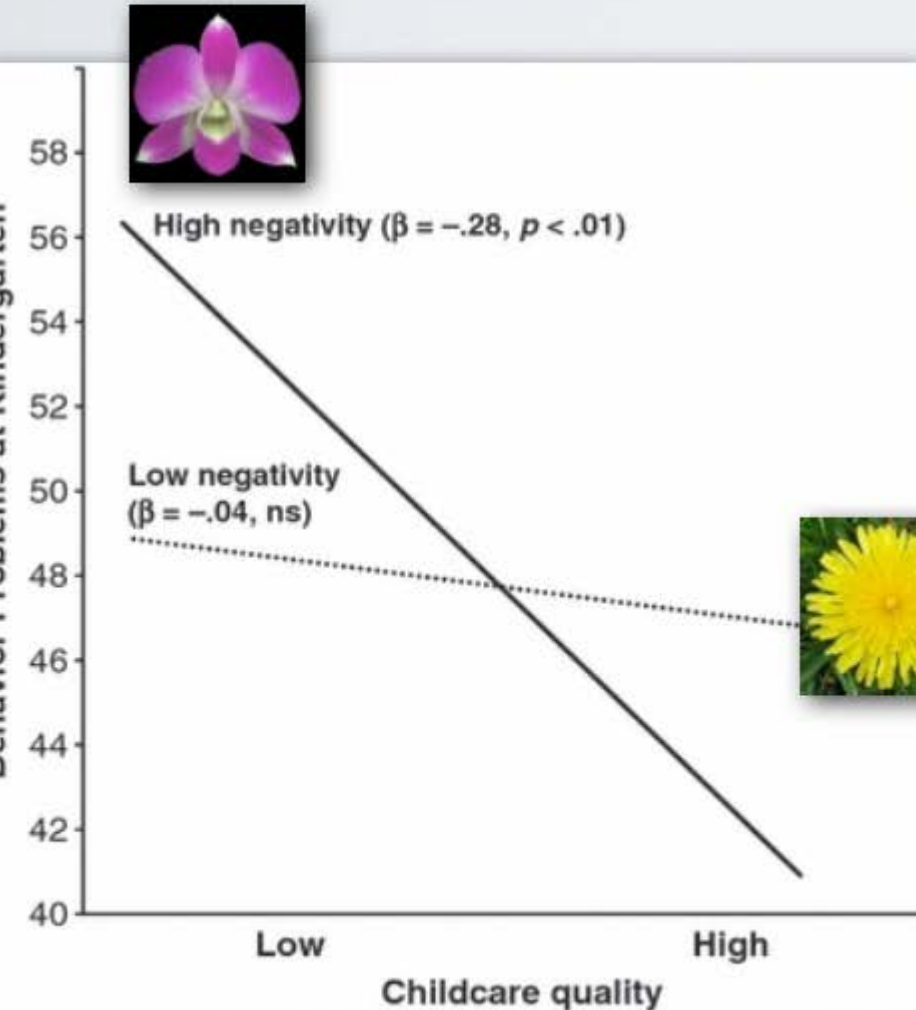
Social context



Differential susceptibility to rearing experience

the case of childcare

(Pluess, Belsky (2009) J Child Psychol Psychiatr)



- Children with high temperamental negativity had either the lowest or highest teacher-reported behavior problems, contingent upon childcare quality
- Child with low negativity relatively unaffected by childcare quality

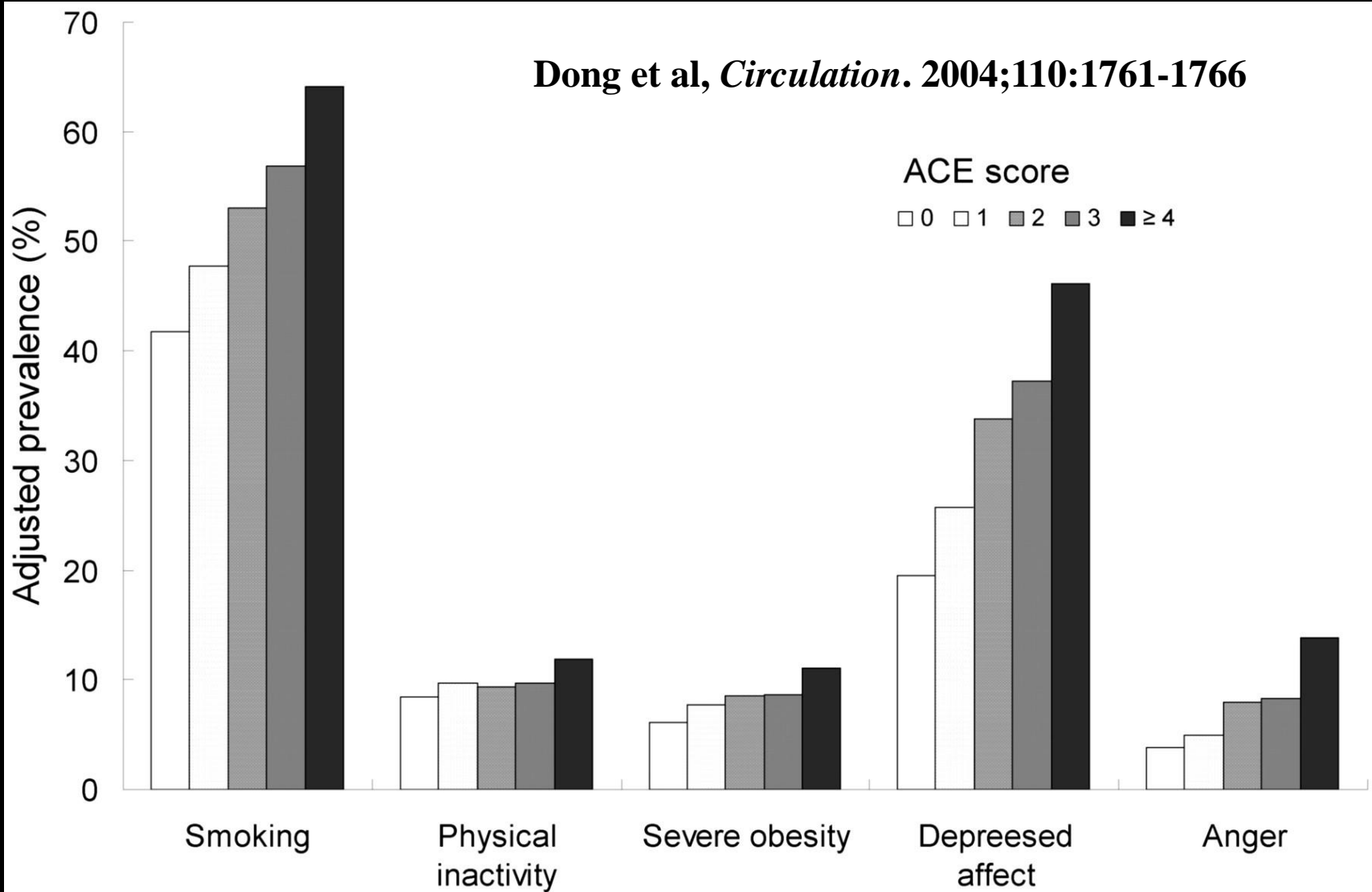
- federal Child Abuse Prevention and Treatment Act (CAPTA), as amended by the Keeping Children and Families Safe Act, defines child abuse and neglect as “at a minimum, any recent act or failure to act on the part of a parent or caretaker, which results in death, serious physical or emotional harm, sexual abuse or exploitation, or an act or failure to act which presents an imminent risk of serious harm.”

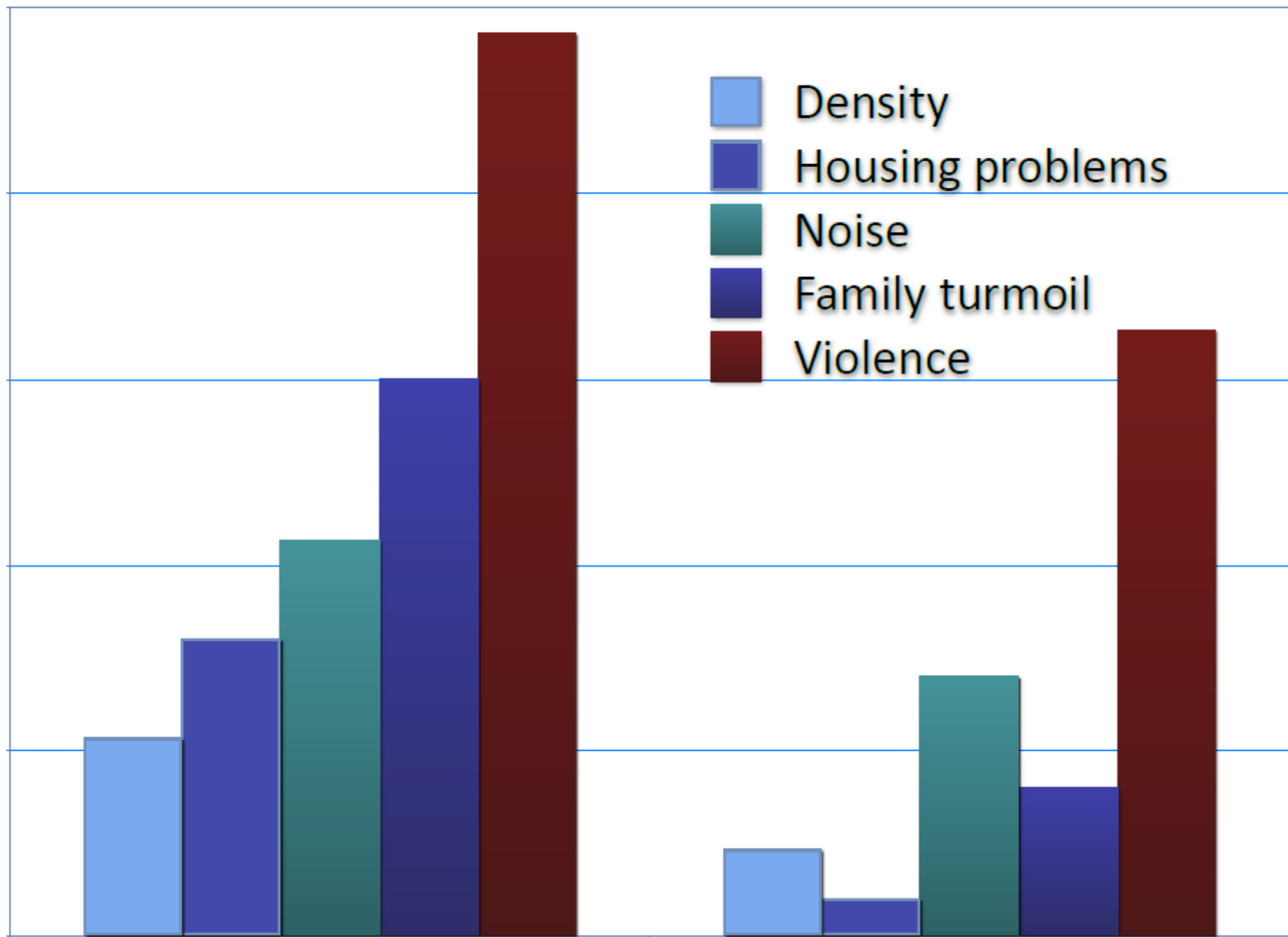
National Scientific Council on the Developing Child. (2012). *The Science of Neglect: The Persistent Absence of Responsive Care Disrupts the Developing Brain: Working Paper 12*. <http://www.developingchild.harvard.edu>

- To researchers, neglect—also sometimes referred to as deprivation—refers to the absence of sufficient attention, responsiveness, and protection that are appropriate to the age and needs of a child.
- understanding the fundamental connection between early deprivation and subsequent impairment lies in the realization that healthy development can be threatened not only by bad things that may happen to children (e.g., as a result of physical or sexual abuse), but also by the *absence* of sufficient amounts of essential experiences that are required for their positive well-being

National Scientific Council on the Developing Child. (2012). *The Science of Neglect: The Persistent Absence of Responsive Care Disrupts the Developing Brain: Working Paper 12*. <http://www.developingchild.harvard.edu>

Dong et al, *Circulation*. 2004;110:1761-1766





Neurodevelopmental Biology and Epigenetic Intersection

Early life experiences trigger
epigenetic modifications that alter
neuroendocrine levels,
brain structure and brain function

Neurodevelopmental Biology and Epigenetic Intersection

Neurodevelopmental Biology and Epigenetic Intersection

Early life experiences trigger
epigenetic modifications that alter
brain structure and function

~~Nature vs Nurture~~





Nature *and* Nurture Complex Intersection

	OCCASIONAL INATTENTION	CHRONIC UNDER-STIMULATION	SEVERE NEGLECT IN A FAMILY CONTEXT
Features	Intermittent, diminished attention in an otherwise responsive environment	Ongoing, diminished level of child-focused responsiveness and developmental enrichment	Significant, ongoing absence of serve and return interaction, often associated with failure to provide for basic needs
Effects	Can be growth-promoting under caring conditions	Often leads to developmental delays and may be caused by a variety of factors	Wide range of adverse impacts, from significant developmental impairments to immediate threat to health or survival
Action	No intervention needed	Interventions that address the needs of caregivers combined with access to high-quality early care and education for children can be effective	Intervention to assure caregiver responsiveness and address the developmental needs of the child required as soon as possible

National Scientific Council on the Developing Child. (2012). *The Science of Neglect: The Persistent Absence of Responsive Care Disrupts the Developing Brain: Working Paper 12*. <http://www.developingchild.harvard.edu>

2018 ELAC Dashboard Allen County Profile

Better ▲ Worse ▼
(Compared to State)

<p>YOUNG CHILDREN AND FAMILIES</p> 	<p>Young Children Ages 0-5</p> <p>2016 31,809</p> <p>Indiana 506,761</p>	<p>Young Children Living in Poverty</p> <p>2015 27%</p> <p>▼</p> <p>Indiana 25%</p>	<p>Percent of Income a Single Parent in Poverty Pays for High-Quality Care</p> <p>2017 46%</p> <p>▲</p> <p>Indiana 54%</p>	<p>Children Living in Households Where All Parents Work</p> <p>2015 62%</p> <p>Indiana 65%</p>
<p>HIGH-QUALITY EARLY CHILDHOOD CARE AND EDUCATION</p> 	<p>Children Enrolled in Known Programs</p> <p>2017 9,700</p> <p>Indiana 133,270</p>	<p>Children Enrolled in High-Quality Programs</p> <p>2017 4,040</p> <p>Indiana 49,300</p>	<p>High-Quality Enrollment in Known Programs</p> <p>2017 42%</p> <p>▲</p> <p>Indiana 37%</p>	<p>High-Quality Enrollment Available for Children With All Parents Working</p> <p>2017 20%</p> <p>▲</p> <p>Indiana 15%</p>
<p>EARLY CHILDHOOD CARE AND EDUCATION WORKFORCE</p> 	<p>Early Childhood Care and Education Workforce</p> <p>2017 2,105</p> <p>Indiana 30,762</p>	<p>T.E.A.C.H. Scholarships Awarded</p> <p>2017 116</p> <p>Indiana 1,526</p>	<p>Annual Median Salary for Preschool Teachers</p> <p>2016 \$26,987</p> <p>▲</p> <p>Indiana \$23,370</p>	<p>Projected Early Childhood Care and Education Workforce Deficit</p> <p>2016 429</p> <p>Indiana 8,195</p>
<p>KINDERGARTEN READINESS</p> 	<p>Children Enrolled in Kindergarten</p> <p>2017 77.1%</p> <p>▼</p> <p>Indiana 90.7%</p>	<p>Children Retained in Kindergarten</p> <p>2017 2.8%</p> <p>▲</p> <p>Indiana 4.4%</p>	<p>Cost of Retention</p> <p>2017 \$734,744</p> <p>Indiana \$22,672,339</p>	<p>Children Ready for School</p> <p>2017 ?</p>

Allen County

How many children need care because all parents are working?

Children Who Need Care

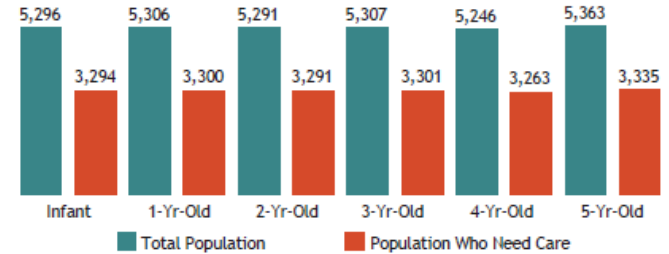


<http://www.elacindiana.org/data/>

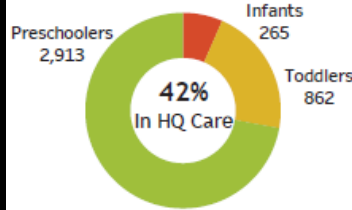


2018 ELAC Dashboard Allen County Profile

HOW MANY YOUNG CHILDREN LIVE IN THE COUNTY AND NEED CARE?
19,783 Young Children Need Care



HOW MANY CHILDREN ARE ENROLLED IN HIGH-QUALITY PROGRAMS BY AGE?

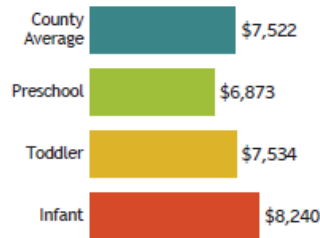


HOW MANY PROGRAMS ARE AVAILABLE?

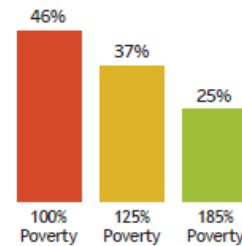
	Child Care Centers	School-Based	Registered Ministries	Family Child Care
Known	48	40	46	209
On PTQ	28	22	12	137
High-Quality	27	19	3	65

WHAT IS THE COST OF HIGH-QUALITY PROGRAMS BY AGE GROUP?

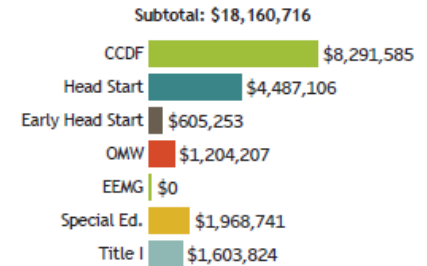
(State Average: \$8,818)



HOW MUCH OF THEIR INCOME DOES A SINGLE PARENT WITH ONE CHILD PAY FOR HIGH-QUALITY CARE?

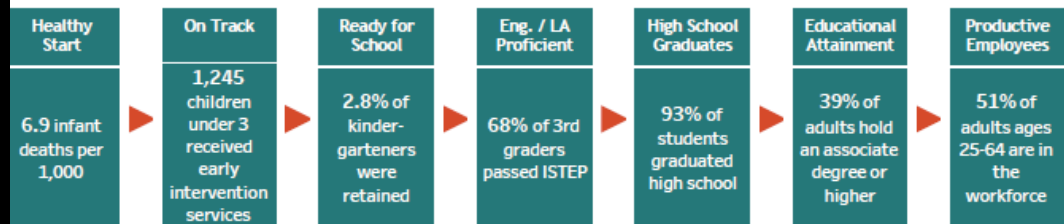


HOW MUCH PUBLIC ASSISTANCE IS AVAILABLE TO SUPPORT FAMILIES?



\$65,832,544 is needed to fund high-quality care for young children living under 100% of FPL.

HOW IS EARLY LEARNING LINKED TO LATER SUCCESS?



- Youth who have experienced traumatic events may reenact past patterns when they feel unsafe or encounter a trigger. Depending on whether the child has a “fight,” “flight,” or “freeze” response, the child may appear to be throwing a tantrum, willfully not listening, or defying you. However, responses to triggers are best thought of as reflexes—they are not deliberate or planned. When children’s bodies and brains are overwhelmed by a traumatic memory, they are not able to consider the consequences of their behavior or its effect on others.

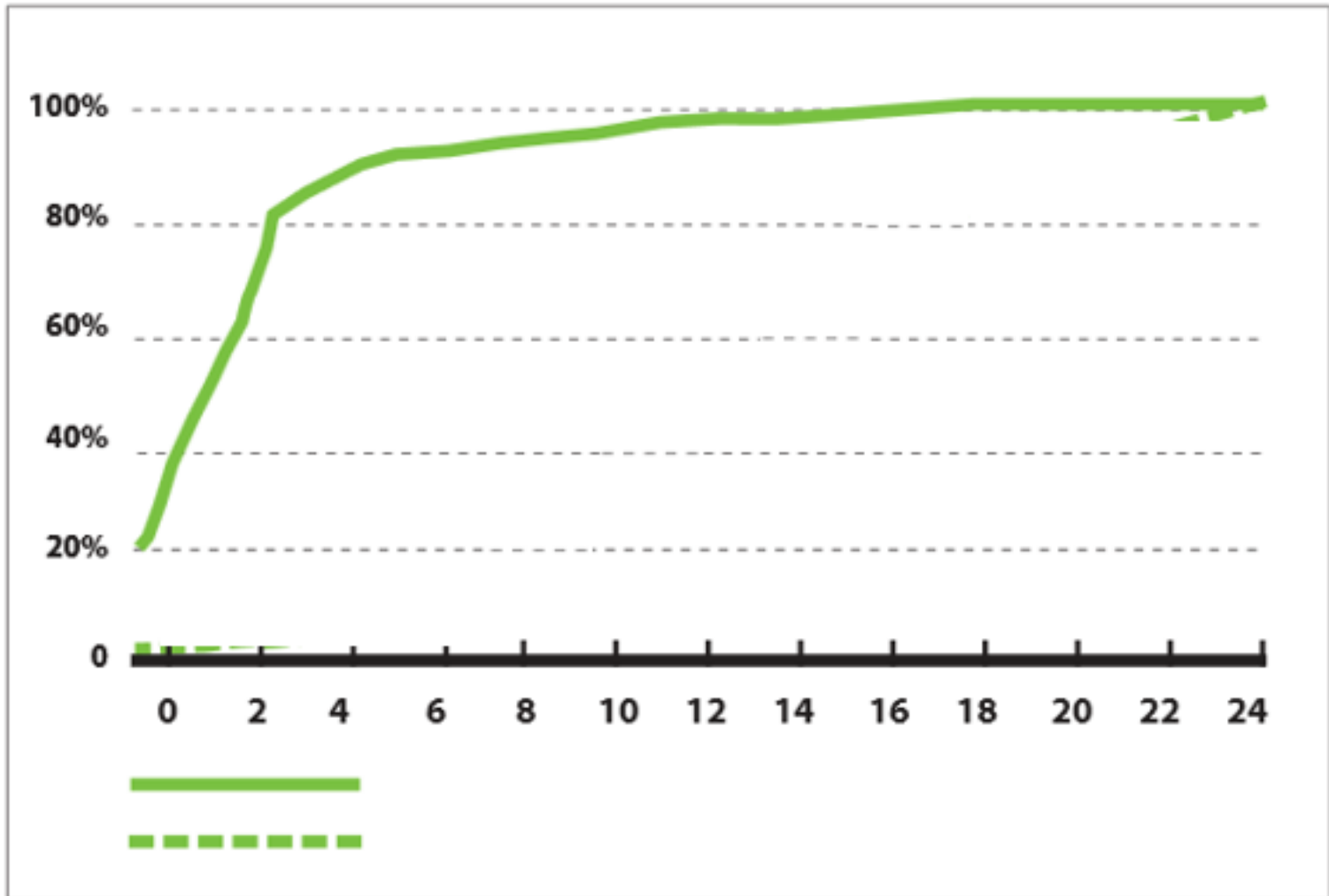
Child Welfare Information Gateway. (2014). *Parenting a child who has experienced trauma*. Washington, DC: U.S. Department of Health and Human Services, Children’s Bureau.

- **Identify trauma triggers.** Something you are doing or saying, or something harmless in your home, may be triggering your child without either of you realizing it. It is important to watch for patterns of behavior and reactions that do not seem to “fit” the situation. What distracts your child, makes him or her anxious, or results in a tantrum or outburst? Help your child avoid situations that trigger traumatic memories, at least until more healing has occurred.
- **Be emotionally and physically available.** Some traumatized children act in ways that keep adults at attention, comfort, and encouragement in ways your child will accept. Younger children may want extra hugs or cuddling; for older youth, this might just mean spending time together as a family. Follow their lead and be patient if children seem needy.
- **Respond, don't react.** Your reactions may trigger a child or youth who is already feeling overwhelmed. (Some children are even uncomfortable being looked at directly for too long.) When your child is upset, do what you can to keep calm: Lower your voice, acknowledge your child's feelings, and be reassuring and honest.
- **Avoid physical punishment.** This may make an abused child's stress or feeling of panic even worse. Parents need to set reasonable and consistent limits and expectations and use praise for desirable behaviors.

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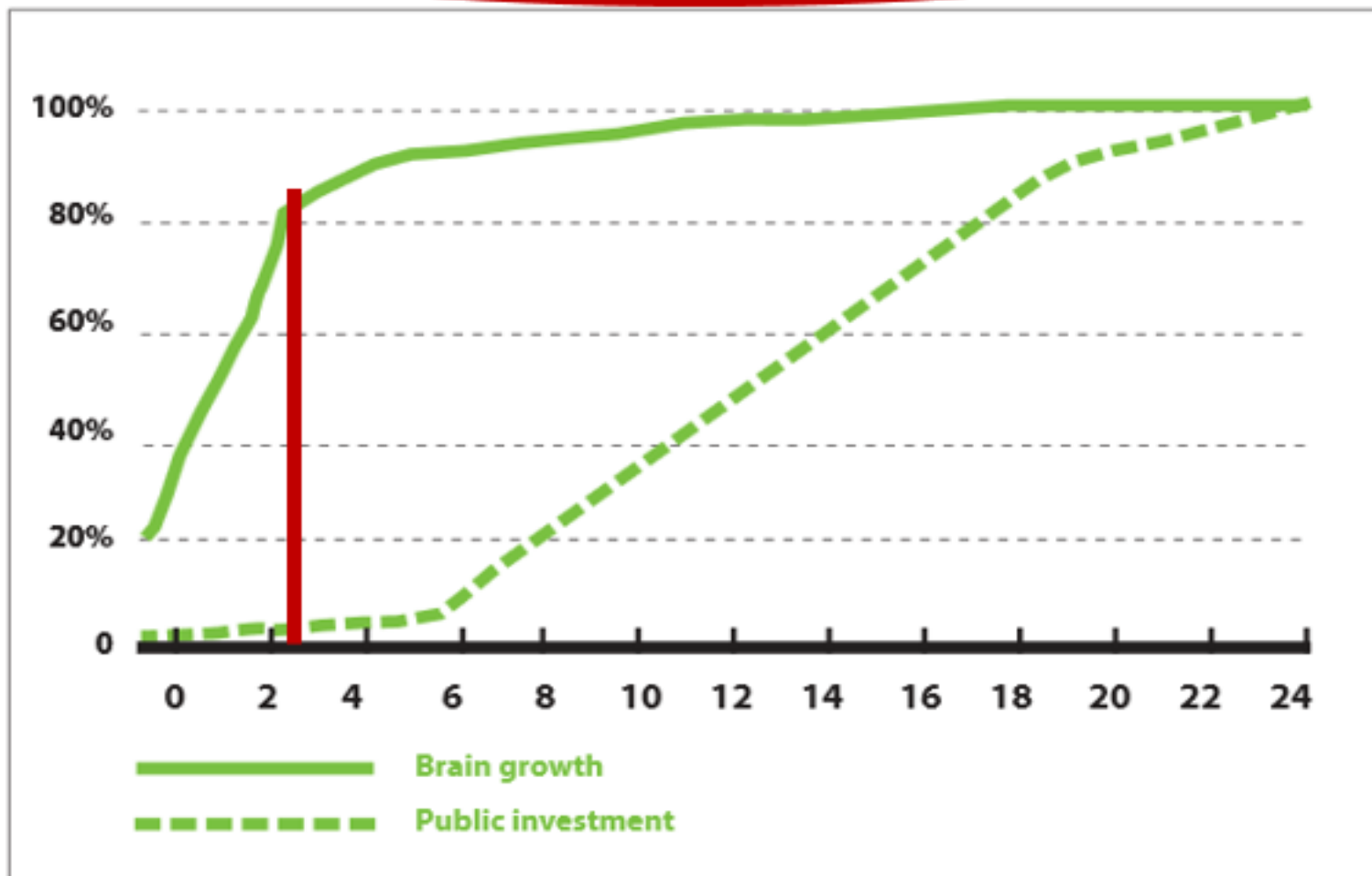
- **Don't take behavior personally.** Allow the child to feel his or her feelings without judgment. Help him or her find words and other acceptable ways of expressing feelings, and offer praise when these are used.
- **Listen.** Don't avoid difficult topics or uncomfortable conversations. (But don't force children to talk before they are ready.) Let children know that it's normal to have many feelings after a traumatic experience. Take their reactions seriously, correct any misinformation about the traumatic event, and reassure them that what happened was not their fault.
- **Help your child learn to relax.** Encourage your child to practice slow breathing, listen to calming music, or say positive things ("I am safe now.").
- **Be consistent and predictable.** Develop a regular routine for meals, play time, and bedtime. Prepare your child in advance for changes or new experiences.
- **Be patient.** Everyone heals differently from trauma, and trust does not develop overnight. Respecting each child's own course of recovery is important.

- **Allow some control.** Reasonable, age-appropriate choices encourage a child or youth's sense of having control of his or her own life.
- **Encourage self-esteem.** Positive experiences can help children recover from trauma and increase resilience.



Source: Early Learning Left Out, Voices for America's Children and the Child and Family Policy Center, 2004.

Brain Growth and Public Investment



Source: *Early Learning Left Out*, Voices for America's Children and the Child and Family Policy Center, 2004.