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# The Science of Early Childhood Development: Closing the Gap Between What We know and What we Do

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## **The Importance of Viewing Child Well-Being in a Broad Context**

The healthy development of children provides a strong foundation for healthy and competent adulthood, responsible citizenship, economic productivity, strong communities, and a sustainable society.

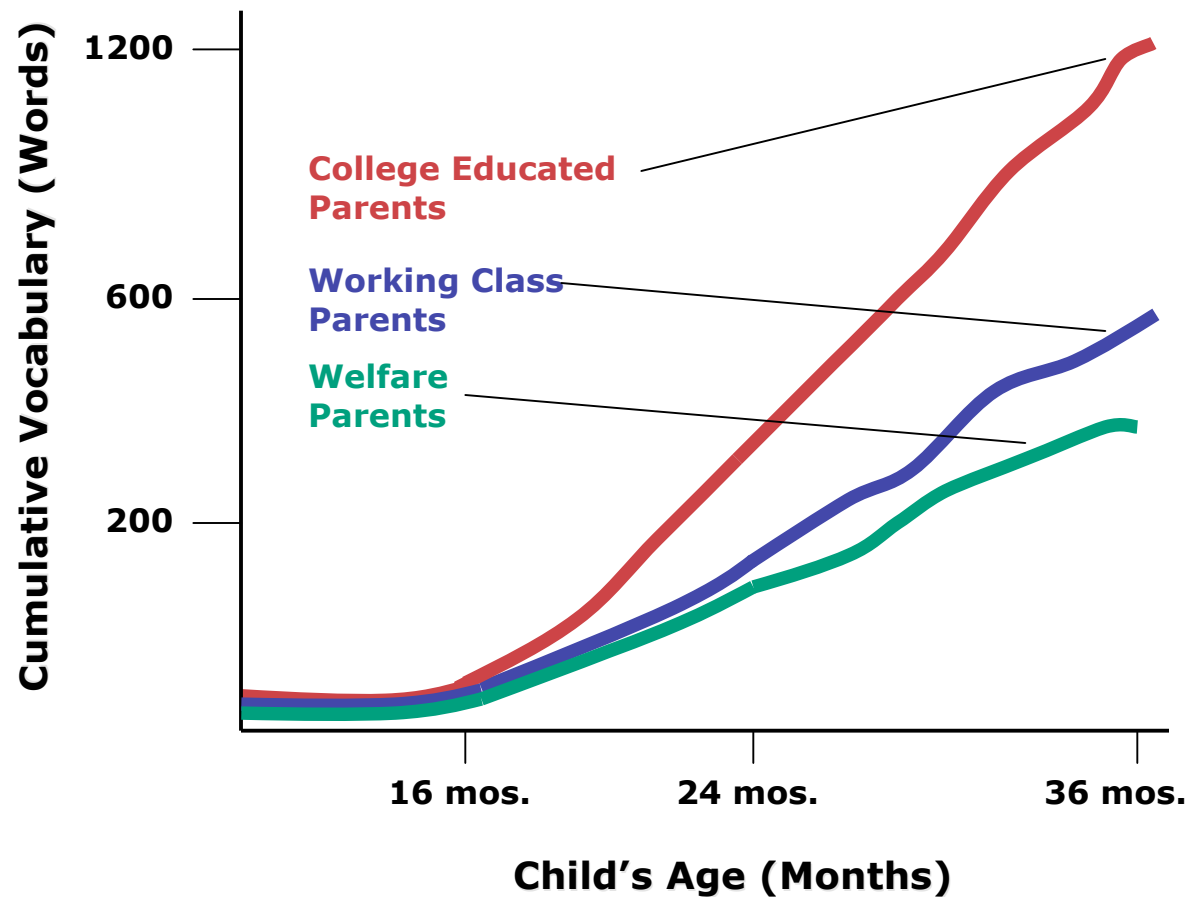


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# **Science Tells Us that Early Life Experiences Are Built Into Our Bodies**



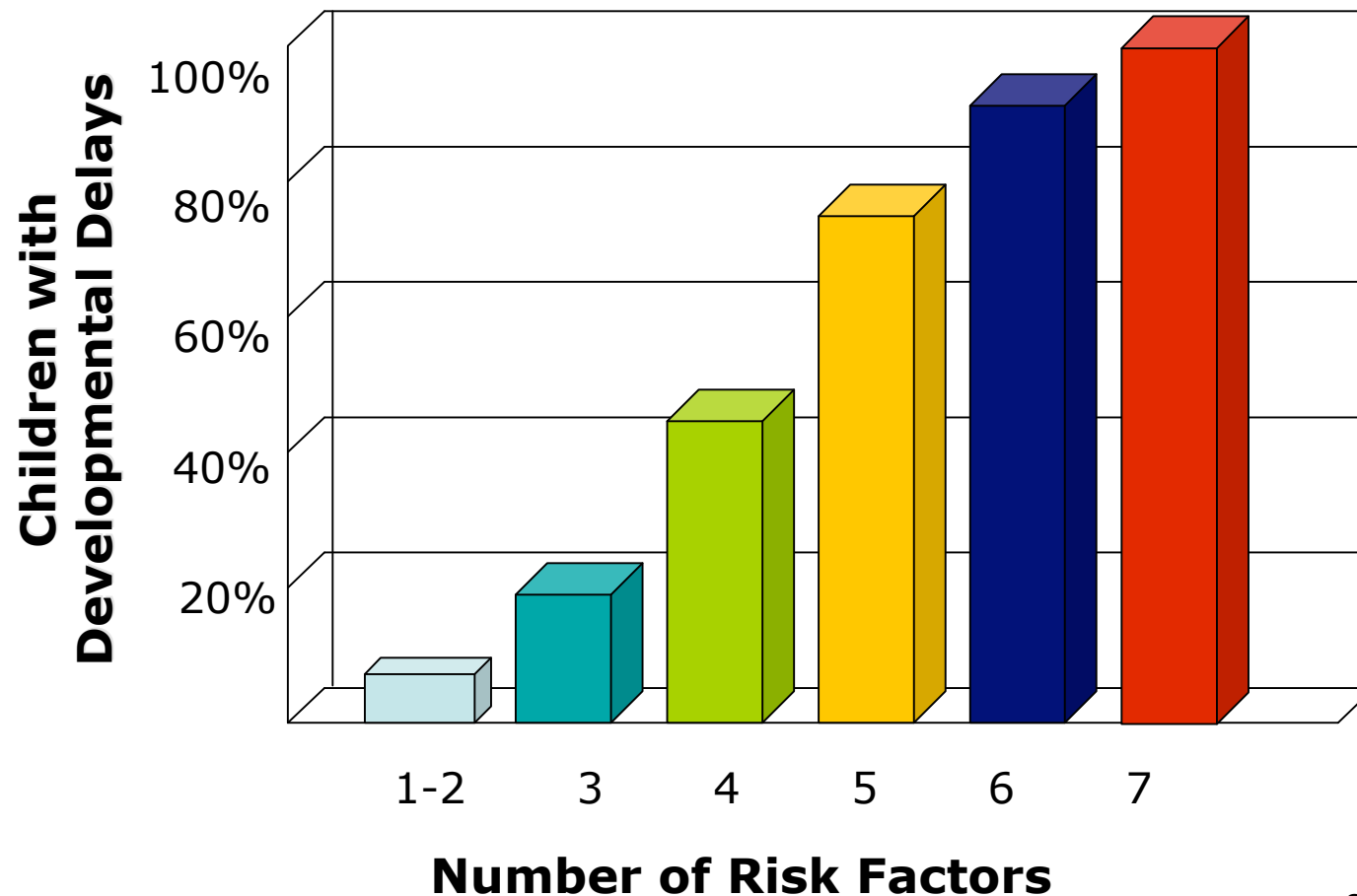
## Barriers to Educational Achievement Emerge at a Very Young Age



Source: Hart & Risley (1995)

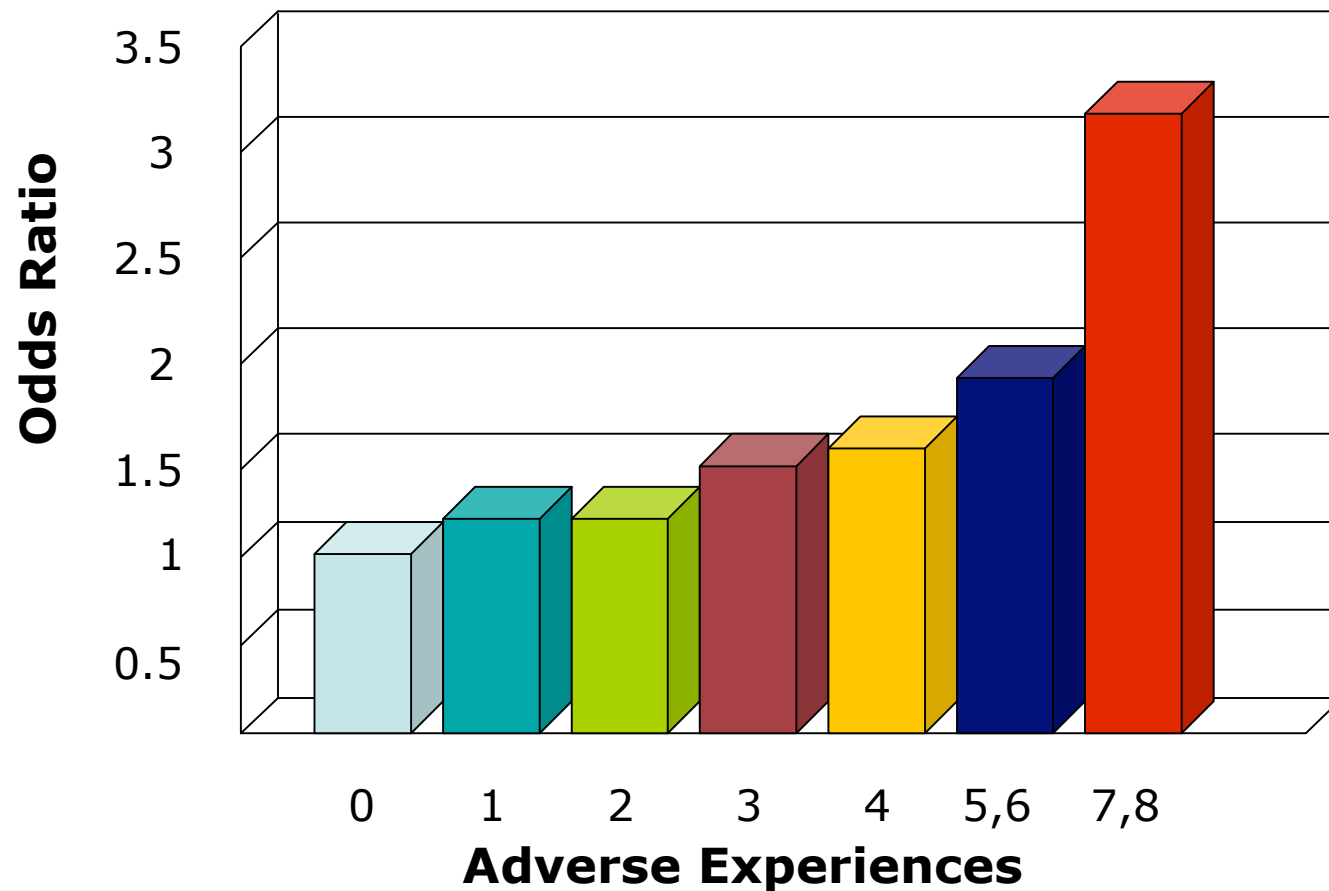


## Significant Adversity Impairs Development in the First Three Years





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



Source: Dong et al, (2004)



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# **Early Experiences Affect the Architecture of the Developing Brain**



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## Core Concepts of Development

Brains are built over time, from the prenatal period through adulthood.

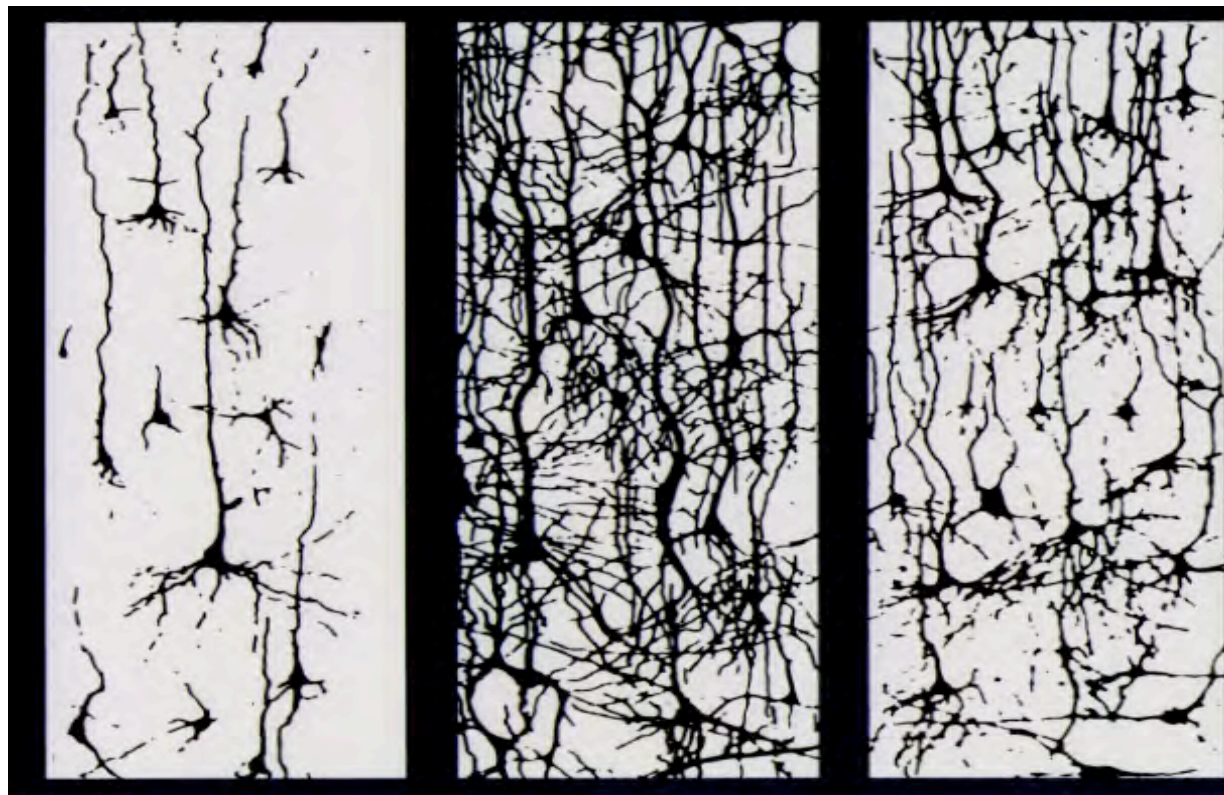
The interaction between genes and experience influences brain architecture.

The capacity for change decreases with age.



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# Experience Shapes Brain Architecture by Over-Production Followed by Pruning



**birth**

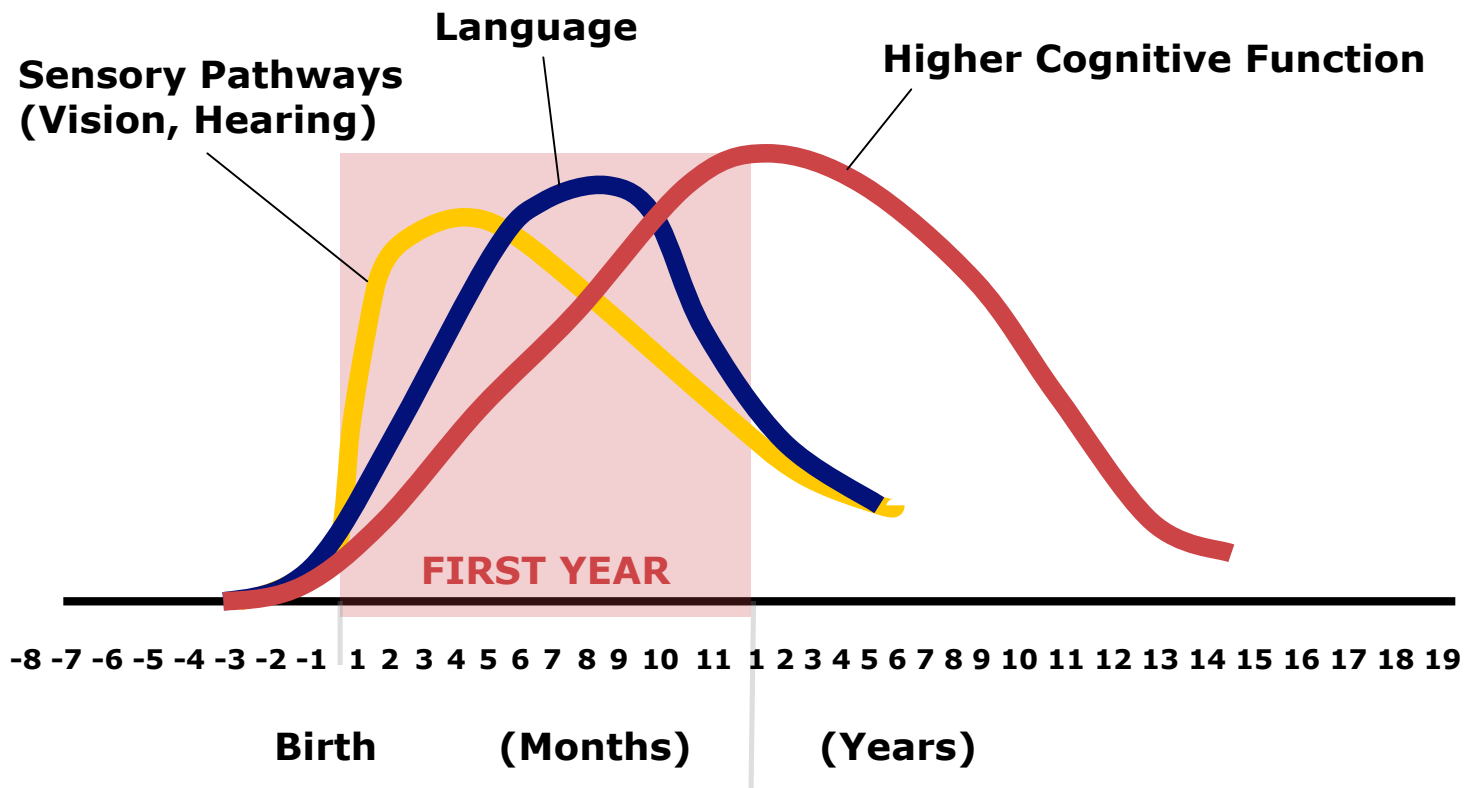
**6 years**

**14 years**



# Neural Circuits are Wired in a Bottom-Up Sequence

(700 synapses formed per second in the early years)

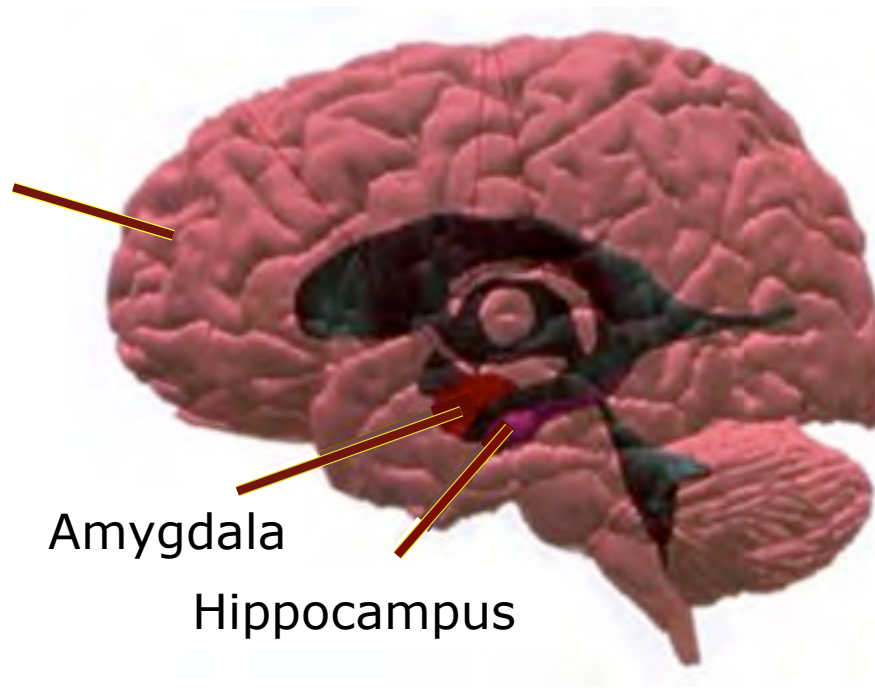




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# Cognitive, Emotional, and Social Capacities are Inextricably Intertwined Within the Architecture of the Brain

Prefrontal Cortex



Amygdala

Hippocampus



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## Brains and skills are shaped by the “serve and return” nature of human interaction





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## **Understanding the Long-term Impacts of Significant Adversity**

Research on the biology of stress illustrates how threat raises heart rate, blood pressure, and stress hormone levels, which can impair brain architecture, immune status, metabolic systems, and cardiovascular function.



## Three Levels of Stress

### **Positive**

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

### **Tolerable**

Serious, temporary stress responses,  
buffered by supportive relationships.

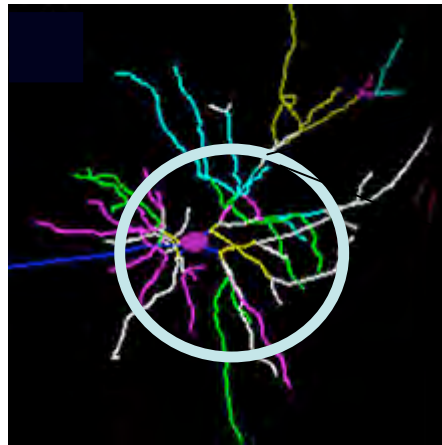
### **Toxic**

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



# Persistent Stress Changes Brain Architecture

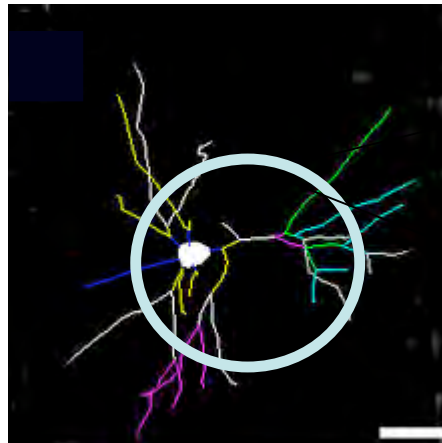
Normal



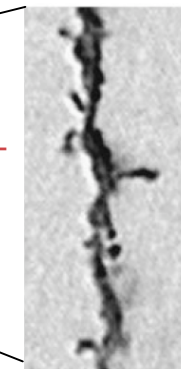
Typical neuron—  
many connections



Toxic  
stress



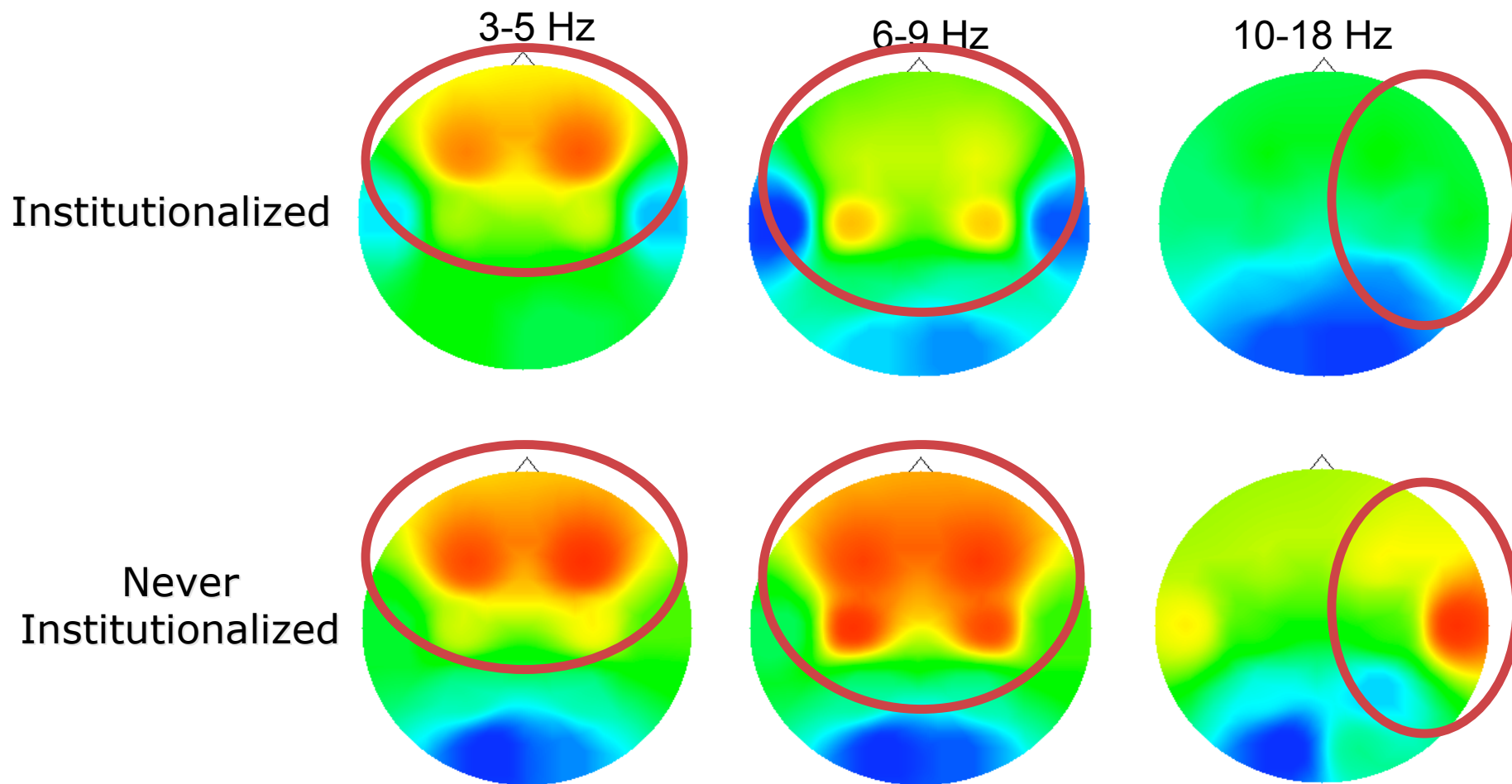
Damaged neuron—  
fewer connections



Prefrontal Cortex and  
Hippocampus



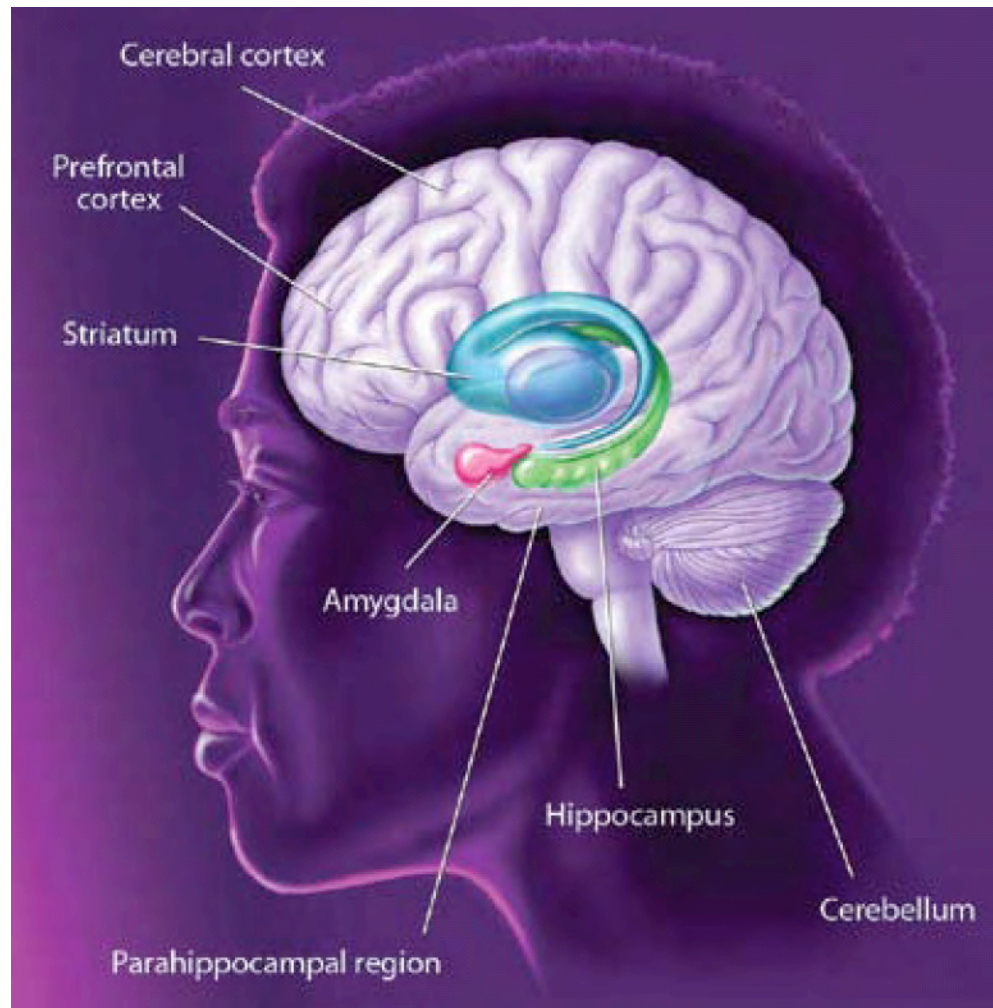
# Extreme Neglect Diminishes Brain Power





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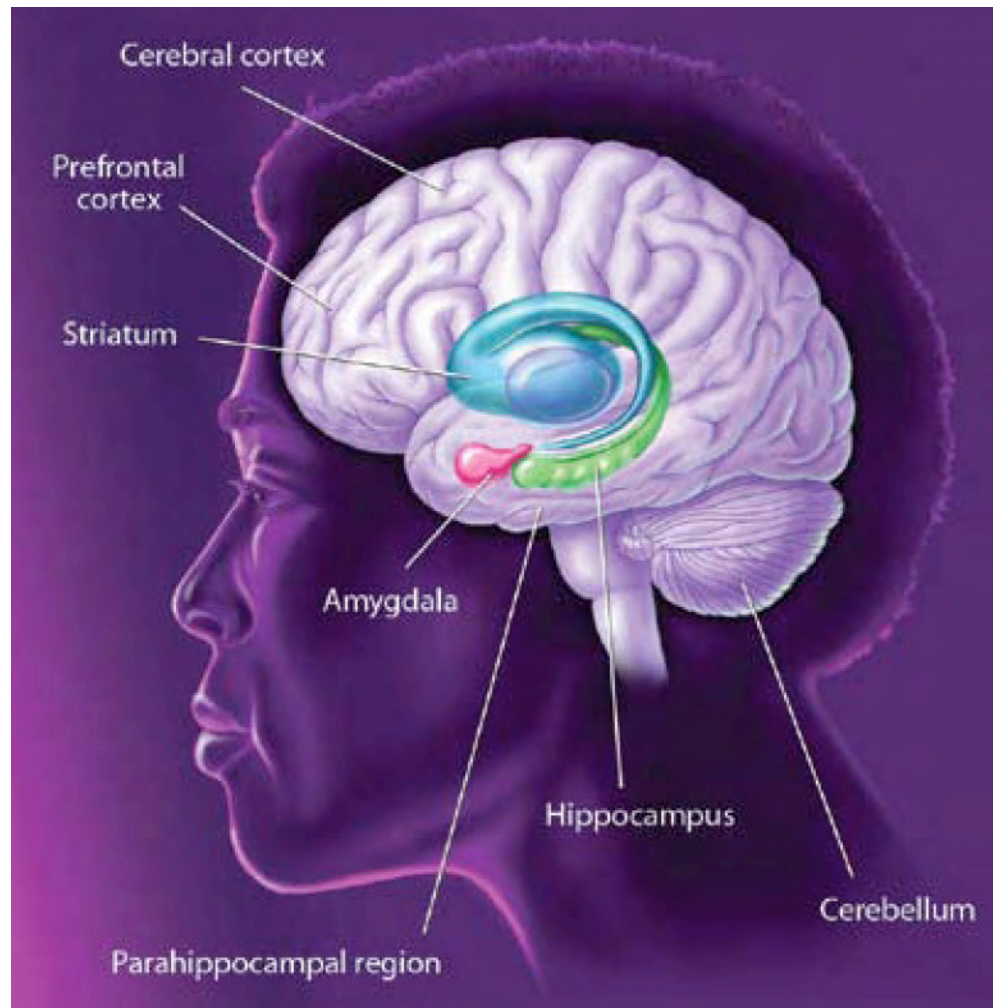
# The Brain Architecture of Anxiety and Fear





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# The Brain Architecture of Memory and Learning





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# Public Policies Can Make a Difference By Protecting the Environments in Which Children Develop





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## **Research Findings Can Guide Policies**

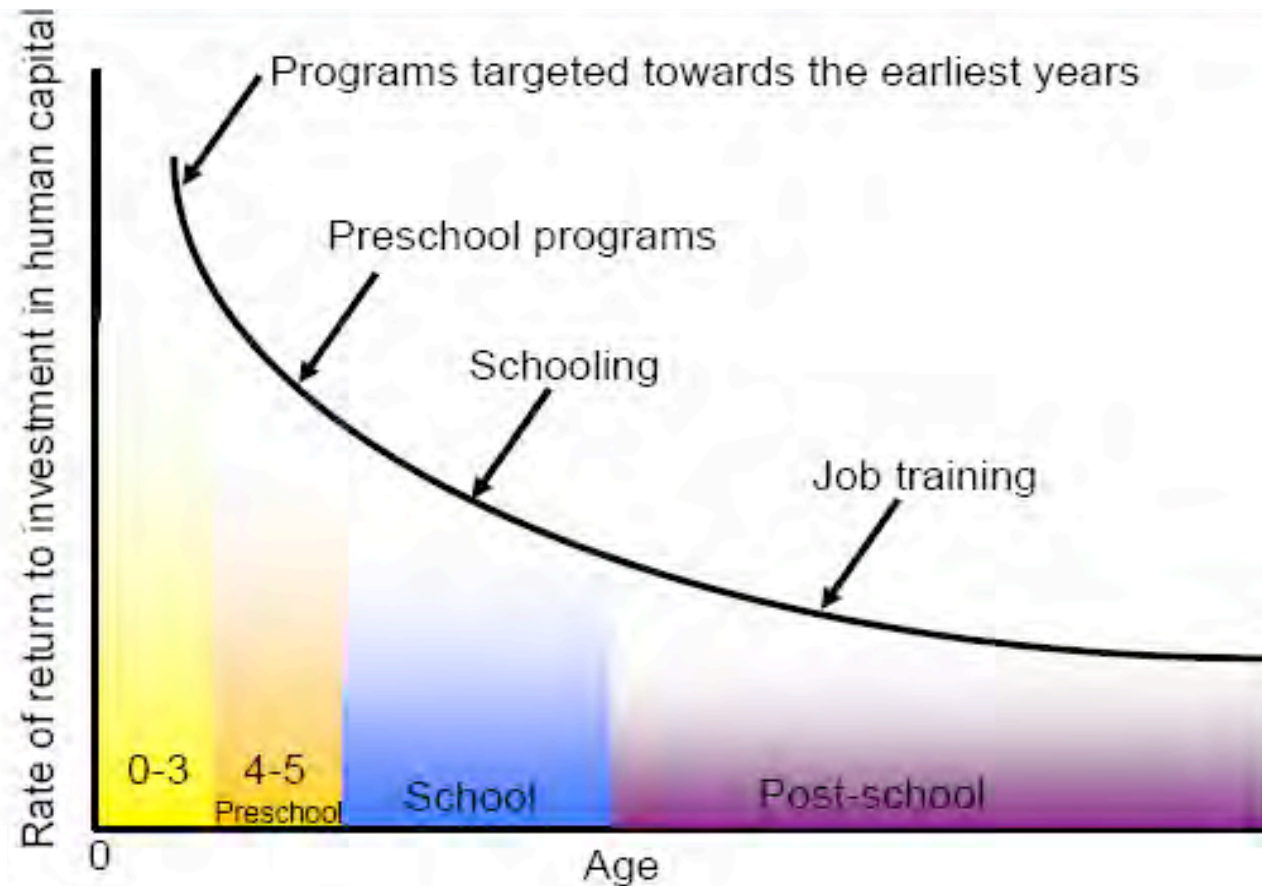
Supportive relationships and positive learning experiences begin at home but can also be provided through a range of services with well-documented effectiveness factors.

A balanced approach to emotional, social, cognitive, and language development will best prepare children for success in school, the workplace, and the community.

Highly specialized interventions are needed as early as possible for children experiencing tolerable or toxic stress.



## Preventive Intervention is More Efficient and Produces More Favorable Outcomes than Later Remediation





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## **Advancing an Effective Policy Agenda**

Build an appropriately skilled early childhood workforce whose expertise matches the needs of the children and families it serves.

Invest in “evidence-based” programs that are implemented well.

Leverage the power of bipartisan support and public-private partnerships, and view expanding opportunities for children as a moral responsibility and a wise social and economic investment.



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## **Creating the Future of Early Childhood Policy and Practice**

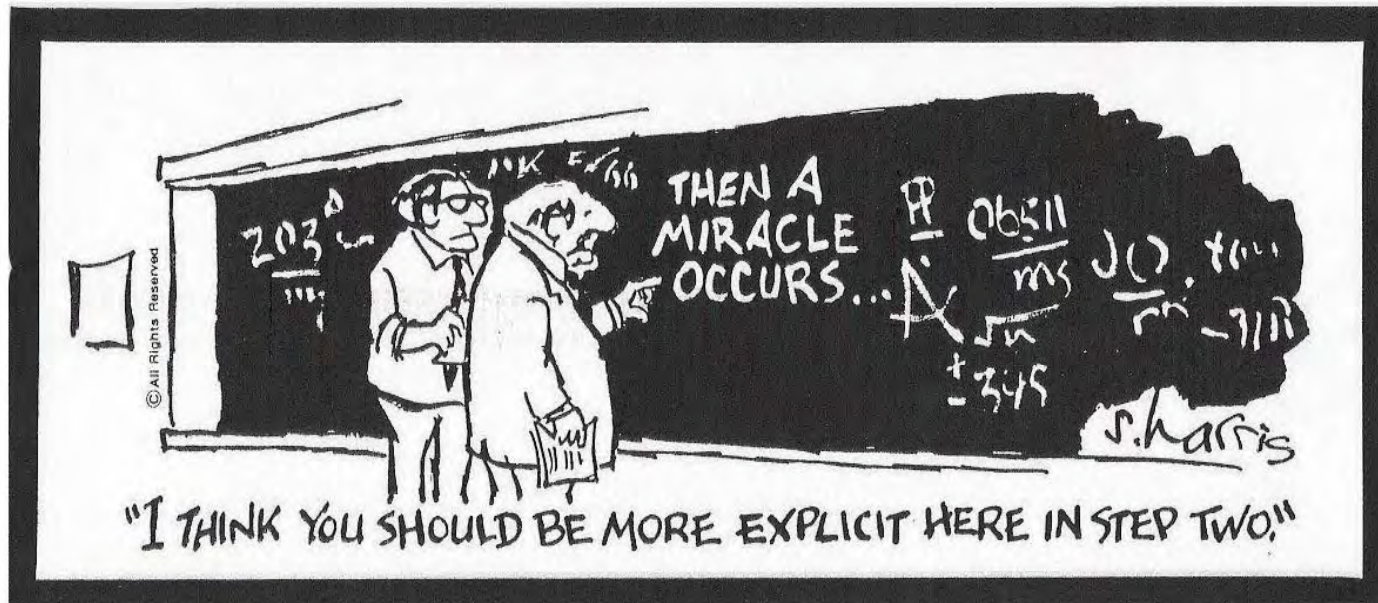
Promote a culture of innovation, integration, and continuous improvement in health services and early care and education.

Prevent and treat mental health problems in children and parents, as well as address the unmet needs of service providers.

Develop new strategies to enhance the economic security of families raising young children under conditions of poverty or financial hardship.

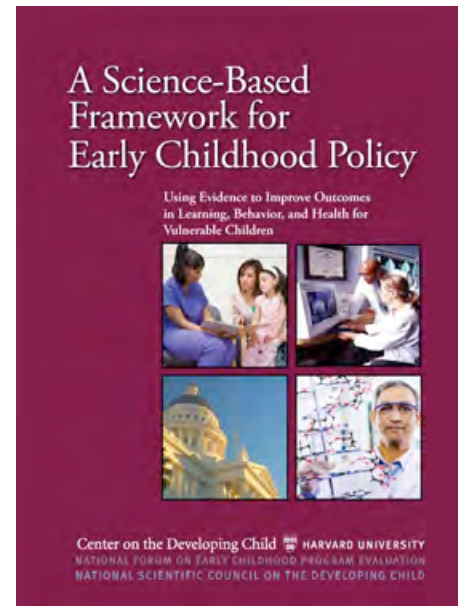
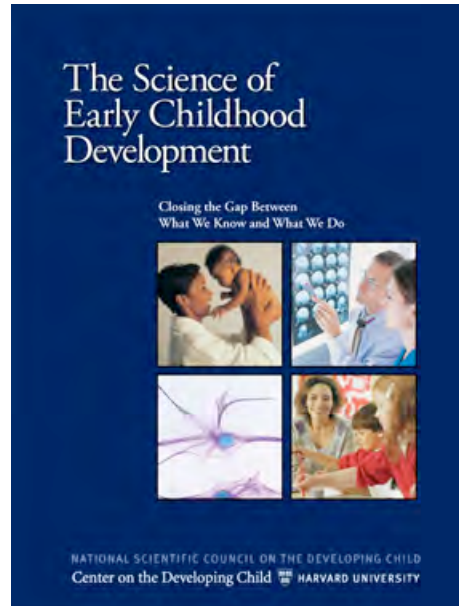


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