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## **The Science of Healthy Development: Closing the Gap Between What We Know and What We Do**

**JACK P. SHONKOFF, M.D.**

JULIUS B. RICHMOND FAMRI PROFESSOR OF CHILD HEALTH AND DEVELOPMENT  
DIRECTOR, CENTER ON THE DEVELOPING CHILD  
HARVARD UNIVERSITY

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## **The Importance of Viewing the Needs of Children in a Broad Context**

The healthy development of all children benefits all of society by providing a solid foundation for economic productivity, responsible citizenship, and strong communities.



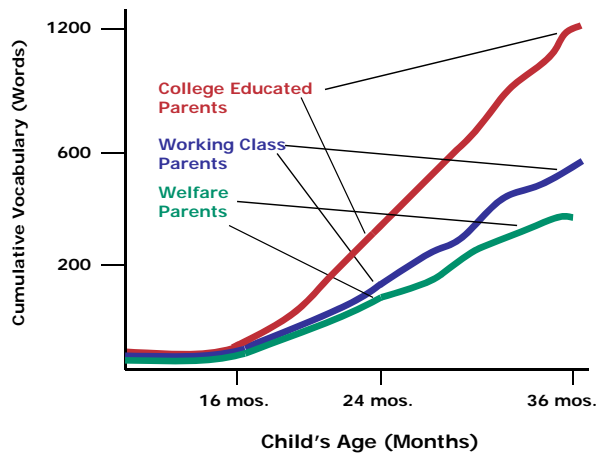
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## Science Tells Us that Early Life Experiences Are Built Into Our Bodies



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### Barriers to Social Mobility Emerge at a Very Young Age

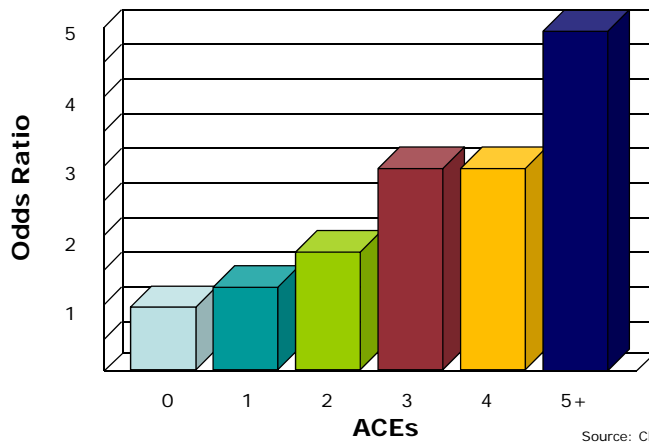


Source: Hart & Risley (1995)



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### Risk Factors for Adult Depression are Embedded in Adverse Childhood Experiences

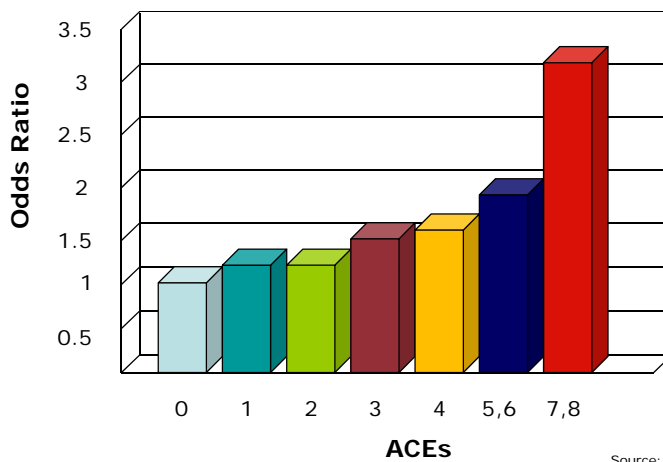


Source: Chapman et al, 2004



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

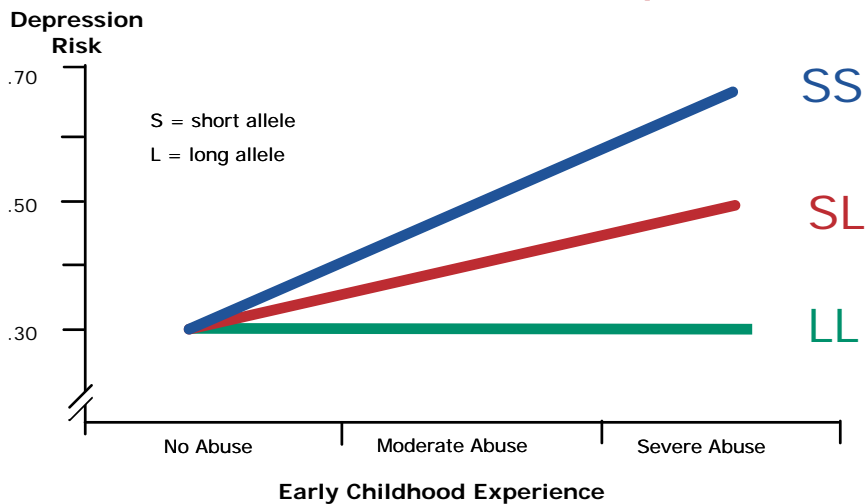


Source: Dong et al, 2004



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## Resilience is Related to the Interaction Between Genetics and Experience



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## Building an Integrated Science of Child Health, Learning, and Behavior

Blending the tools of the biological, behavioral, and social sciences to study the interactive influences of genetics and experience on the developing brain – and closing the gap between what we know and what we do to enhance the healthy development of children.



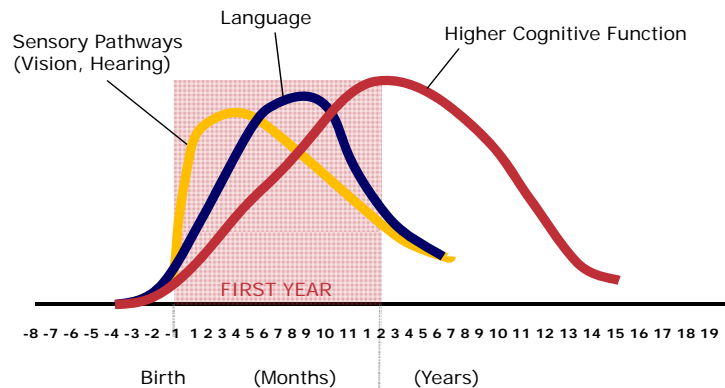
## Core Concepts of Development

Brains and skills are built over time, neural circuits are wired in a bottom-up sequence, and the capacity for change decreases with age.

The interaction of genes and experience shapes the architecture of the developing brain, and the active agent is the “serve and return” nature of children’s relationships with the important adults in their lives.



## Human Brain Development Synapse Formation Dependent on Early Experiences



Source: C. Nelson (2000)



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## **Early Childhood Adversity Can Influence a Range of Lifelong Outcomes**

Research on the biology of stress helps explain some of the underlying reasons for differences in learning, behavior, and physical and mental health.



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### **Positive Stress**

A necessary aspect of healthy development that occurs in the context of stable, supportive relationships.

Brief increases in heart rate and mild changes in stress hormone levels.

### **Tolerable Stress**

Stress responses that *could* disrupt brain architecture, but are buffered by supportive relationships.

Allows the brain an opportunity to recover from potentially damaging effects.



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## Toxic Stress

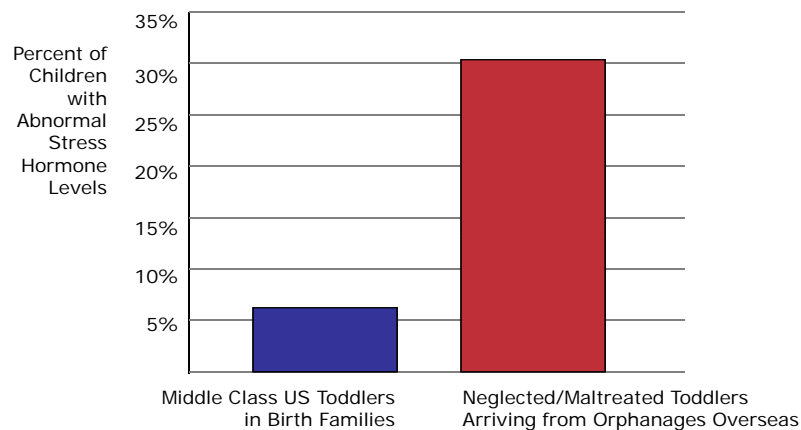
Strong, prolonged activation of the body's stress response systems in the absence of the buffering protection of adult support.

Can damage developing brain architecture and create a short fuse for the body's stress response systems, leading to lifelong problems in learning, behavior, and both physical and mental health.



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## Institutionalization and Neglect of Young Children Disrupts Their Body Chemistry



Source: Gunnar & Fisher (2006)



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## **Investigating the Biology of Disparities in Health and Education Outcomes**

Persistent elevations of cortisol, the development of the hippocampus, and the “achievement gap.”

Increased levels of cytokines and the pathogenesis of depression.

Chronic activation of the inflammatory response and the development of cardiovascular disease and diabetes.



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## **Implications for Policy and Practice**



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## There Are No Magic Bullets

Positive relationships and quality learning experiences can be promoted both at home and through a range of **evidence-based** parent education, family support, early care and education, and intervention services.

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

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



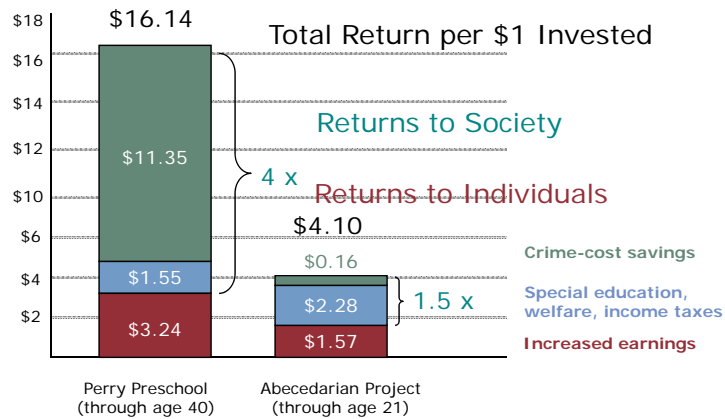
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## Maximizing Return on Investment

The basic principles of neuroscience and human capital formation indicate that later remediation will produce less favorable outcomes than preventive intervention.

Responsible investments focus on effective programs that are staffed appropriately, implemented well, improved continuously, and generate benefits that exceed or justify their costs.

### Cost/Benefit for Two Early Childhood Programs (Dollars returned for each dollar invested)



### Using the Science of Child Development As a New Lens for Public Health Policy

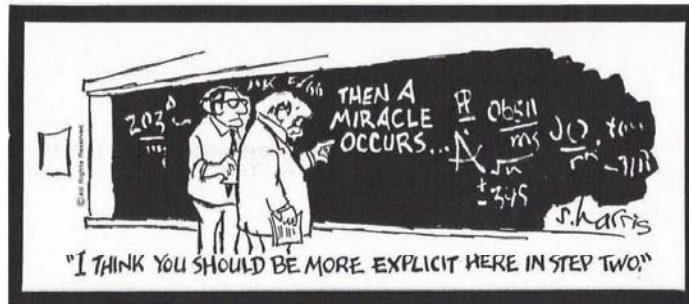
Greater focus on causal links between toxic stress in the early years and susceptibility to physical and mental health impairments in later adulthood.

Increased investment in a skilled early childhood workforce and evidence-based interventions to reduce significant adversity in early childhood.

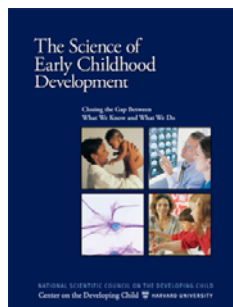
Leveraging an expanded science base to harness the power, resources, and sustainability of bipartisanship and public-private collaboration.



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