



# Center on the Developing Child HARVARD UNIVERSITY

NATIONAL SCIENTIFIC COUNCIL ON THE DEVELOPING CHILD | NATIONAL FORUM ON EARLY CHILDHOOD PROGRAM EVALUATION

## What Science Can Bring to the Development of Effective Early Childhood Policies

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Achieving American prosperity will require both short- and long-term actions. While stimulating the economy may be the most immediate need, sustainable economic growth is just as dependent on our ability to: (1) reduce global warming by expanding alternative energy sources, and (2) build a skilled, adaptable workforce by recognizing that brain architecture gets shaped in early childhood in ways that either promote or undermine a lifetime of learning and health. Both challenges require a convergence of science, innovation, and pragmatism. It was no coincidence that these two issues were selected for the opening session of the February 2007 Democratic Issues Retreat organized by Nancy Pelosi and Rahm Emanuel, where I had the honor to speak on the early childhood roots of human capital development. It is also clear that President-elect Barack Obama understands that the path to a skilled workforce begins in the early years of life.

My colleagues and I have worked closely on this issue with Senator Edward Kennedy over many years, helped plan Speaker Pelosi's National Summit on America's Children in May 2007, and have partnered with the National Governors Association Center for Best Practices (NGA) and the National Conference of State Legislatures (NCSL) to generate bipartisan support for early childhood investments in states as diverse as Nebraska, Kansas, Washington, Connecticut, and South Carolina. Funded by the Buffet Early Childhood Fund, John D. and Catherine T. MacArthur Foundation, Pierre and Pamela Omidyar Fund, Birth-To-Five Policy Alliance and others, our objective is to mobilize scientific expertise and practical experience to inform policies that enhance early childhood and early brain development.

**We believe that sound policy is guided by credible science.** We are eager to work with the Obama Administration and Congress, in conjunction with our continuing state-level efforts with NGA, NCSL, and the business community, to bring rigorous science to bear on the formulation of policies to ensure that properly supported child development can become the foundation for community development and economic prosperity, as capable children become the bedrock of a productive and secure society. In this memo, we offer a concise summary of the scientific principles driving these assertions, the policy opportunities and challenges we envision, and the innovative direction that science can help our nation to pursue.

**Dramatic new discoveries at the intersection of neuroscience, molecular biology, genomics, and the behavioral and social sciences can now explain how healthy development happens, how it is derailed, and what we as a society can do to keep it on track.** We know, for example, that the interaction of early experience and genetics builds a foundation for all subsequent learning, behavior, and health. While families and communities clearly play the central role in providing the positive relationships and experiences that all children need, we are equally convinced that the influence of government in promoting healthy environments for children can be significant and have life-long impacts. To this end, science has a lot to say about



how a child's environment of relationships –within family, community, and society – can be strengthened to produce better outcomes that benefit all of society.

To achieve this goal, responsible management of our nation's resources requires that we close the gap between what we know and what we do *right now*, while we simultaneously develop new strategies to improve opportunities for all children, especially for those who are unable to excel because of significant adversity that is built into the environments in which they live.

### What Science Can Contribute to Public and Policy Discussions

The basic science of early childhood and early brain development is grounded in the following core concepts that are universally accepted by the scientific community:

- The **architecture of the brain** is constructed through an ongoing process that begins before birth and continues into adulthood. As it emerges, the quality of that architecture establishes either a sturdy or a fragile foundation for all of the capabilities and behavior that follow.
- **Skill begets skill** as brains are built in a hierarchical fashion, from the bottom up, and increasingly complex circuits and skills build on simpler circuits and skills over time.
- The **interaction of genes and experience** literally shapes the circuitry of the developing brain. As in tennis and volleyball, the child serves up an invitation to engage and the environment is either responsive or unresponsive to the child's needs. This “serve and return” process is fundamental to the wiring of the brain, especially in the early childhood years.
- **Cognitive, emotional, and social capacities are inextricably intertwined**, and learning, behavior, and both physical and mental health are highly interrelated over the life course. Stated simply, you can't do one without affecting the others.
- Although manageable levels of stress are normative and growth-promoting, **toxic stress (e.g., from repeated abuse or chronic neglect) in the early years damages the architecture of the developing brain** and leads to problems in learning and behavior, as well as increased susceptibility to physical and mental illness. Just as with other environmental hazards, we must control toxic stress by improving the conditions that cause it.
- Brain plasticity and the ability to change behavior decrease over time and getting it right early is less costly, to society and to individuals, than trying to fix it later. Thus, **we can pay now or pay more later** for society's inability to meet this challenge.
- We have the capacity to measure **effectiveness factors that make the difference between programs that work and those that don't work** to support children's healthy development. Identifying those factors (what works best for whom) and learning how to bring them to scale should be a major priority for ongoing evaluation research.

### How Science Can Shape More Effective Policies

The creative integration of rapidly growing scientific knowledge, from the basic biology of brain development to the applied sciences of early intervention and program evaluation, offers an unprecedented opportunity to craft more effective, evidence-based policy in four areas:



- (1) Our country would be wise to view investment in high quality early care and education programs, with proactive enrollment of children from disadvantaged families, as an effective and cost-effective way to **enhance academic achievement** during the school-age years and **promote greater economic productivity** throughout adulthood.
- (2) To make sure that adequate investments are directed to areas of greatest need, we should **target specialized interventions as early as possible, at or before birth**, to improve life outcomes for children whose learning capacity and health are compromised by toxic stress.
- (3) Significant impacts can be realized from greater availability of **prevention and treatment services for young children with serious emotional or behavioral problems**, as well as for caregivers whose own depression adversely affects a child's environment of relationships.
- (4) To reduce debilitating burdens on families that can derail development, policies should be enacted that **enhance economic security and guarantee access to health care** to assure that children's well-being can be monitored, concerns about health or development can be identified early, and effective intervention can be provided when needed.

### **Lessons Learned from Across the Sciences to Strengthen Early Childhood Development**

**The quality of the investment will determine the rate of return.** Programs that feature evidence-based effectiveness factors, beginning with qualified staff, produce positive outcomes. Programs with inadequately trained personnel, excessive child-adult ratios, and diminished or developmentally inappropriate learning opportunities are unlikely to have significant effects, particularly for the most disadvantaged children. The strongest data on impacts come from a few model programs, all of which demonstrate that high quality interventions can make a difference for children at risk for problems. The dilemma facing policymakers is the ongoing debate about the relative effectiveness of available programs that vary markedly in the skills of their staff and quality of their implementation. Overcoming that variability is our most critical and immediate challenge. Continuing to invest in programs that lack sufficient quality is unproductive.

**The most effective programs unquestionably make a difference, but we have to do better.** Increases in graduation rates and lifetime earnings, as well as decreases in welfare dependence and incarceration, all yield large social and financial benefits, but residual problems still remain. For example, 40-year follow-up data from the most frequently cited program, the Perry Preschool Project, reveal increased rates of high school graduation (from 45% to 66%) and lower rates of arrest for violent crime (from 48% to 32%) that represent impressive impacts. But no one could look at these findings and conclude that our work is done. Focusing the best minds in the nation on how to improve outcomes from our investments in human capital development may not be rocket science, but it is comparably challenging and no less pressing for our national security than it was to put a man on the moon.

### **Building a Science-Based Future for More Effective Early Childhood Policy**

The lessons of the past are straightforward – **effective interventions can make a big difference in the lives of disadvantaged young children**. The challenge for the future is also clear – after four decades of program development and advances in neurobiology, **science stands ready to**



**guide the creation of a new era in early childhood policy that builds on current best practices and provides incentives to develop innovative interventions that get a “bigger bang for the buck” for our most vulnerable, young children.** Neuroscience tells us that the later we wait to invest in those children who are at greatest risk, the more difficult it becomes to achieve positive outcomes. Program evaluation data tell us that, although we know how to improve the life trajectories of children who face the burdens of poverty and social disadvantage, we have much more work to do if our aim is to *fully* eliminate disparities based on adverse life circumstances. And early childhood program staff report that they are often overwhelmed by the emotional and behavioral problems of the children they serve. The following are two areas in which science can help move our public investments to a higher level of impact.

**(1) The first task is to apply the biology of adversity and the science of early intervention to shape more effective policies and programs focused on children whose opportunities are undermined by toxic stress, beginning at birth or even prenatally.** To cite one example, the time is ripe to rethink the way we address child maltreatment by building on the last reauthorizations of federal legislation governing the child welfare (CAPTA) and early intervention (IDEA) systems that laid the groundwork for greater coordination between the two. My colleagues and I have had productive discussions with leaders at the Centers for Disease Control and Prevention about reframing child abuse and neglect as a public health issue, rather than a social services concern, to underscore the extent to which early maltreatment gets built into the body and leads not only to impairments in learning but also to higher rates of diabetes, heart disease, hypertension, and many other adult diseases that drive escalating health care costs.

**(2) The second task is to apply new knowledge from the growing science of early learning to enhance the impacts of early care and education programs for all children, from infancy to school entry.** Essential to this challenge is the need to think beyond the important emphasis on language stimulation and early literacy, and to also focus on other domains of development that are essential for success in school, at work, and in the community. These include the early emergence of executive functions such as working memory, attention, and self regulation, all of which contribute to the ability to focus, plan, use information creatively, and work productively with others. Moreover, because cognitive, language, emotional, and social capabilities are highly interrelated (both in skill development and in their underlying brain architecture), failure to acknowledge that “you can’t do one without the others” undermines the full promise of what evidence-based investments in early care and education can achieve.

**Innovation, pragmatism, and science** are all required if we are to meet the pressing challenges of our time – to remake the economy, protect the environment, develop alternative energy sources, enhance national security, and **build human capital for a 21<sup>st</sup> century world.** Scientists have much to offer the latter task. We stand ready to work with private- and public-sector leaders across the political spectrum to help create the future of early childhood policy through the continuous generation and application of a rapidly growing knowledge base to enhance the life prospects of our nation’s youngest children.

The challenges are formidable and the competition for resources is intense. Some undoubtedly will argue that we can’t afford increased funding for early childhood programs at this time of severe budget constraint. **Science explains why this is an investment we can’t afford to delay.**