

A series of brief summaries of essential findings from recent scientific publications and presentations by the Center on the Developing Child at Harvard University.

**Research on the developing brain shows us that early childhood experiences build the foundation for a skilled workforce, a responsible community, and a thriving economy.** A new evidence base has identified a set of skills that are essential for school achievement, for the preparation and adaptability of our future workforce, and for avoiding a wide range of population health problems.

In the brain, the ability to hold onto and work with information, focus thinking, filter distractions, and switch gears is like an airport having a highly effective air traffic control system to manage the arrivals and departures of dozens of planes on multiple runways. Scientists refer to these capacities as executive function and self-regulation—a set of skills that relies on three types of brain function: working memory, mental flexibility, and self-control. Children aren’t born with these skills—they are born with the potential to develop them. The full range of abilities continues to grow and mature through the teen years and into early adulthood. To ensure that children develop these capacities, it’s helpful to understand how the quality of the interactions and experiences that our communities provide for them either strengthens or undermines these emerging skills.

**1 When children have had opportunities to develop executive function and self-regulation skills successfully, both individuals and society experience lifelong benefits.**

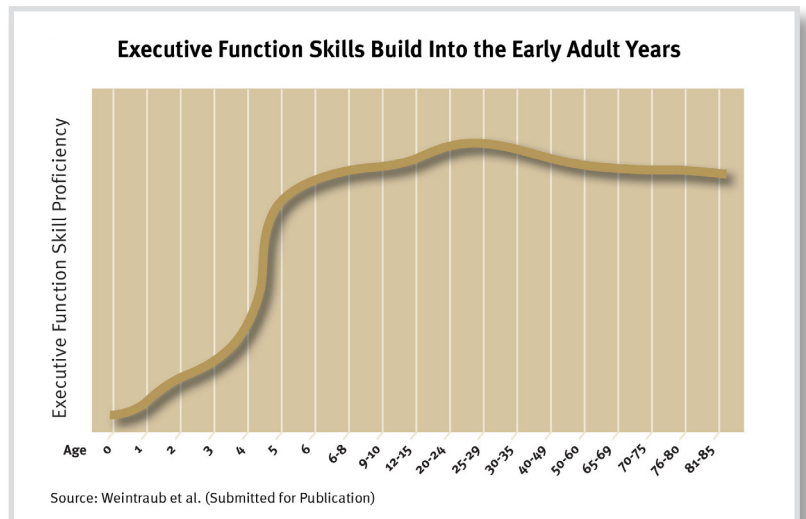
- **School Achievement**—Executive function skills help children remember and follow multi-step instructions, avoid distractions, control rash responses, adjust when rules change, persist at problem solving, and manage long-term assignments. For society, the outcome is a better-educated population capable of meeting the challenges of the 21st century.
- **Positive Behaviors**—Executive functions help children develop skills of teamwork, leadership, decision-making, working toward goals, critical thinking, adaptability, and being aware of our own emotions as well as those of others. For society, the outcome is more stable communities, reductions in crime, and greater social cohesion.
- **Good Health**—Executive function skills help people make more positive choices about nutrition and exercise; to resist pressure to take risks, try drugs, or

- have unprotected sex; and to be more conscious of safety for ourselves and our children. Having good executive function primes our biological systems and coping skills to respond well to stress. For society, the outcome is a healthier population, a more productive workforce, and reduced health care costs.
- **Successful Work**—Executive function skills increase our potential for economic success because we are better organized, able to solve problems that require planning, and prepared to adjust to changing circumstances. For society, the outcome is greater prosperity due to an innovative, competent, and flexible workforce.

**2 The critical factors in developing a strong foundation for these essential skills are children’s relationships, the activities they have opportunities to engage in, and the places in which they live, learn, and play.**

*Relationships*—Children develop in an environment of relationships. This starts in the home and extends to caregivers, teachers, medical and human services professionals, foster parents, and peers. Children are more likely to build effective executive function skills if the important adults in their lives are able to:

- **Support** their efforts;
- **Model** the skills;



Tests measuring different forms of executive function skills indicate that they begin to develop shortly after birth, with ages 3 to 5 a window of opportunity for dramatic growth in these skills. Development continues throughout adolescence and early adulthood.

- **Engage** in activities in which they practice the skills;
- **Provide** a consistent, reliable presence that young children can trust;
- **Guide** them from complete dependence on adults to gradual independence; and
- **Protect** them from chaos, violence, and chronic adversity, because toxic stress caused by these environments disrupts the brain circuits required for executive functioning and triggers impulsive, “act-now-think-later” behavior.

*Activities*—Building these abilities in young children requires communities and caregivers to provide and support experiences that promote emotional, social, cognitive, and physical development broadly, including a range of strategies that:

- **Reduce stress** in children’s lives, both by addressing its source and helping them learn how to cope with it in the company of competent, calming adults;
- **Foster social connection** and open-ended creative play, supported by adults;
- **Incorporate vigorous physical exercise** into daily activities, which has been shown to positively affect stress levels, social skills, and brain development;
- **Increase the complexity** of skills step-by-step by

finding each child’s “zone” of being challenged but not frustrated; and

- **Include repeated practice** of skills over time by setting up opportunities for children to learn in the presence of supportive mentors and peers.

*Places*—The home and other environments where children spend most of their time must:

- Feel (and be) **safe**;
- Provide space for **creativity, exploration, and exercise**;
- Be **economically and socially stable** in order to reduce the anxiety and stress that come with uncertainty or fear.

**3** If children do not get what they need from their relationships with adults and the conditions in their environments—or (worse) if those influences are sources of toxic stress— their skill development can be seriously delayed or impaired. That said, science shows that there are opportunities throughout development to provide children, adolescents, and the adults who care for them with the relationships, environments, and skill-building activities that will enhance their executive function capacities. It’s just easier, less costly, and more effective to get them right from the start.

## POLICY IMPLICATIONS

- **Efforts to support the development of these skills deserve much greater attention in the design of early care and education programs.** Policies that emphasize literacy instruction alone could increase their effectiveness by including attention to the development of executive function skills.
- **Teachers of young children would be better equipped to understand and address behavioral and learning challenges in their classrooms if they had professional training in the development of executive function skills.** Teachers are often the first to recognize serious problems with a child’s ability to control impulses, focus attention, stay organized, and follow instructions. The consequences of mislabeling these problems as “bad behavior” can lead to a highly disrupted classroom, preventable expulsions, or the inappropriate use of psychotropic medications.
- **For young children facing serious adversity, policies that combine attention to executive function and reducing the sources of toxic stress would improve the likelihood of success in school and later in life.** Adverse conditions such as abuse, neglect, community violence, and persistent poverty can disrupt brain architecture and place children at a disadvantage with regard to the development of their executive function skills. Lessons learned from interventions that have successfully fostered these skills hold considerable promise for incorporation into home visiting, parent education, and family support programs.
- **Adult caregivers need to have these skills in order to support their development in children.** Programs such as job-skills training that intentionally build executive function and self-regulation capacities in adult caregivers not only help them become more economically secure, but they also enhance their ability to model and support these skills in children.

For more information, see “Building the Brain’s ‘Air Traffic Control’ System: How Early Experiences Shape the Development of Executive Function” and the Working Paper series from the Center on the Developing Child at Harvard University. [www.developingchild.harvard.edu/resources/](http://www.developingchild.harvard.edu/resources/)

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