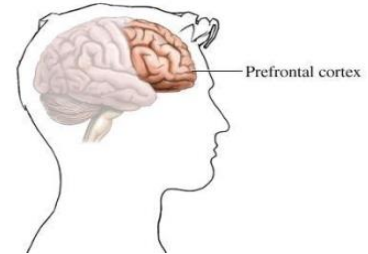


SCREEN-TIME IMPACT ON EXECUTIVE FUNCTION

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1. The **prefrontal cortex** of the brain is the seat of Executive Function.
It is the “control center” of the brain.



2. **Executive Function is:**
“a collection of prefrontal skills underlying GOAL-DIRECTED BEHAVIOR, including

- ATTENTION
- WORKING MEMORY
- INHIBITORY CONTROL
- PROBLEM SOLVING
- SELF-REGULATION
- DELAY OF GRATIFICATION.”¹

3. Imagine the impact on a person’s life if these qualities are underdeveloped.
(i.e. school, relationships, work)
4. Research indicates a correlation between hours of screen time during the developmental years and pre-frontal cortex underdevelopment.²

“...the majority of parents [believe] that screen-based activities are good educational tools. The findings of the current review do not support this belief. ...the vast majority of evidence suggests that screen time has either no effect or a detrimental effect on cognitive development during early childhood.”³

1. Angeline Lillard and Jennifer Petersen, “The Immediate Impact of Different Types of Television on Young Children’s Executive Function,” *Pediatrics*, Vol. 128 (2011): 644-649.
2. Tom Hummer, “Media Violence Effects on Brain Development: What Neuroimaging Has Revealed and What Lies Ahead,” *American Behavioral Scientist* 59, no.14 (2015): 1790-1806.
3. Valerie Carson et al., “Systematic Review of Sedentary Behavior and Cognitive Development in Early Childhood,” *Preventive Medicine*, 78 (2015): 115-122.

See also:

Pagani LS, Fitzpatrick C, Barnett TA, Dubow E. “Prospective Associations Between Early Childhood Television Exposure and Academic, Psychosocial, and Physical Well-being by Middle Childhood,” *Arch Pediatr Adolesc Med.* 164(5):425–431. doi:10.1001/archpediatrics.2010.50

**“...every additional hour of television exposure at 29 months corresponded to 7% and 6% unit decreases in classroom engagement... and math achievement, respectively”
at age 10.**

Victoria L. Dunckley, “Gray Matters: Too Much Screen Time Damages the Brain.”

<https://www.psychologytoday.com/us/blog/mental-wealth/201402/gray-matters-too-much-screen-time-damages-the-brain>

Further research of interest:

Bus, Adriana, Takacs, Zsafia, and Kegel, Cornelia. "Affordances and Limitations of Electronic Storybooks for Young Children's Emergent Literacy." *Developmental Review* 35 (2015) 79-97.

Huber et al. "The Effects of Screen Media Content on Young Children's Executive Functioning." *Journal of Experimental Child Psychology* 170 (2018) 72-85.

Suchert, Vivien et al. "Relationship Between Attention-Deficit/Hyperactivity Disorder and Sedentary Behavior in Adolescence: A Cross-Sectional Study." *ADHD* 9 (2017) 213-218.

Takeuchi, Hikaru, Yasuyuki Taki, Hiroshi Hashizume, Kohei Asano, Michiko Asano, Yuko Sassa, Susumu Yokota, Yuka Kotozaki, Rui Nouchi, and Ryuta Kawashima. "The Impact of Television Viewing on Brain Structures: Cross-Sectional and Longitudinal Analyses." *Cerebral Cortex* 25, no. 5 (2013): 1188-1197. doi:10.1093/cercor/bht315.

How the dopamine reward system is manipulated by media producers:

<http://sitn.hms.harvard.edu/flash/2018/dopamine-smartphones-battle-time/>

"What Screen Addictions and Drug Addictions Have in Common:"

<https://www.pbs.org/wgbh/nova/article/screen-time-addiction/>

"Studies suggest that all of these changes can cause long-term damage to the brain's ability to create new connections. Brain plasticity—the ability to build new networks and learn new things—may not be an infinite resource. Some research suggests that when glutamate builds too many networks related to drugs, it limits the networks involved in other types of learning. And the earlier addiction happens, the worse it tends to be."

Recommended reading:

Reset Your Child's Brain, Victoria Dunckley, 2015.

Written by a child psychiatrist, this is a detailed, step-by-step guide for bringing screen sanity back to your kids and home. A must read for parents!

The Shallows: What the Internet is Doing to Your Brain, Nicholas Carr, 2010.

An excellent analysis of reading real books versus screen presentations. Highly recommended for educators.

The Hacking of the American Mind: The Science Behind the Corporate Takeover of Our Bodies and Brains, Robert Lustig, MD, 2017.

The Age of Surveillance Capitalism, Shoshana Zuboff, 2019.

Zuboff is a former professor at the Harvard School of Business, and describes in historical detail the development of today's big media business model and strategies for attaching us to electronic devices which monitor our lives, and big media's trafficking in the increasingly intimate personal profiles on each individual developed without our knowledge or permission.

A success story: "Schools Pushed for Tech in Every Classroom. Now Parents Are Pushing Back." *Wall Street Journal*, Sept. 3, 2019. How parents in Montgomery County, MD took back their public school classrooms from too much screen time, and got improved academic performance to show for it.