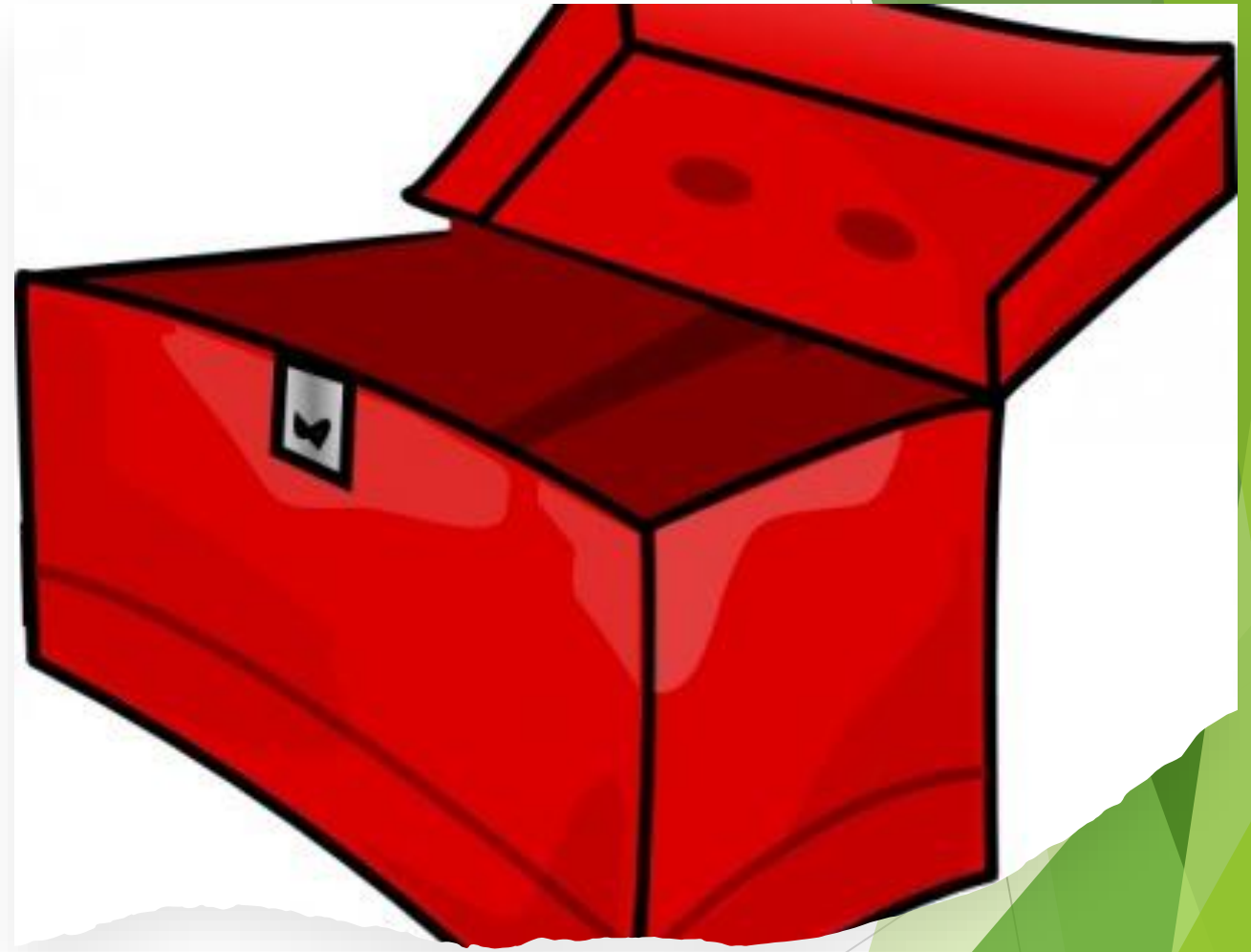


# A Toolbox to Understand Executive Function



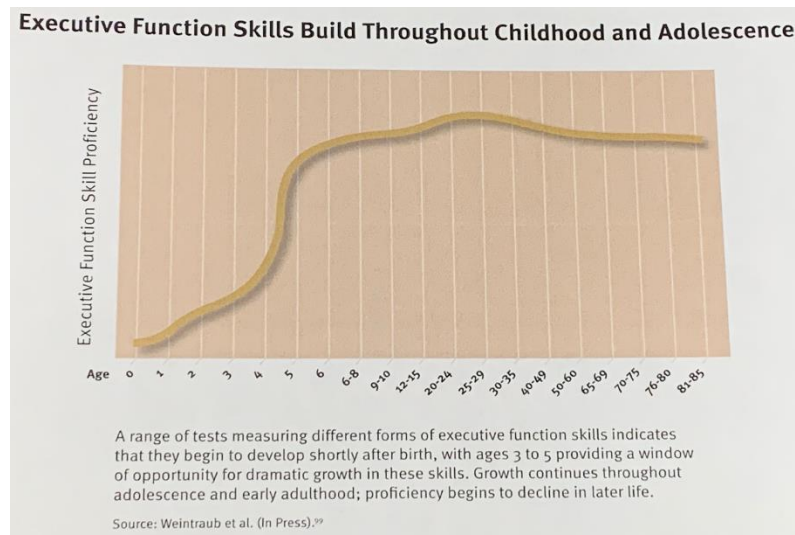
# Executive Function in Children

What is Executive Function?

The phrase “executive function” refers to a set of skills. These skills underlie the capacity to plan ahead and meet goals, display self-control, follow multiple-step directions even when interrupted, and stay focused despite distractions, among others.

Executive function skills help our brains prioritize tasks, filter distractions, and control impulses.

These skills take time and continual practice to develop!



# From the Center on the Developing Child - Harvard University

- ▶ Executive function and self-regulation skills are like an air traffic control system in the brain—they help us manage information, make decisions, and plan ahead. We need these skills at every stage of life, and while no one is born with them, we are all born with the potential to develop them.



# Building Blocks from Developing Brain Regions

- ▶ The building blocks of children's capacities to retain and use new information, focus attention, control impulses, and make plans are acquired during early childhood, but the full range of executive function skills continues to develop into the adolescent years.
- ▶ Scientists are making major strides in identifying the key brain regions on whose development the healthy emergence of these executive function skills depends. These include circuits and systems that primarily involve the prefrontal cortex, but also include the anterior cingulate, parietal cortex, and hippocampus. The gradual acquisition of executive function skills corresponds closely to the extended development of these prefrontal brain regions from infancy through late adolescence.

# The Basis for Learning to Read, Write and Do Math

- ▶ Scientists who study executive function skills refer to them as the biological foundation for school readiness. They argue that strong working memory, cognitive self-control, and attentional skills provide the basis upon which children's abilities to learn to read, write, and do math can be built. In practice, these skills support the process (i.e., the how) of learning—focusing, remembering, planning—that enables children to effectively and efficiently master the content (i.e., the what) of learning—reading, writing, computation. They enable children to acquire knowledge and to participate in the school experience as actively engaged and competent learners

# The Basis for Both Learning and Social Interaction

- ▶ Children's executive function skills provide the link between early school achievement and social, emotional, and moral development. Executive function skills are considered to be a common denominator for both learning and social interaction. Young children who have problems staying focused and resisting urges to respond impulsively—two core executive function skills—not only have trouble in school but also have trouble following directions generally and are at elevated risk of displaying aggressive and confrontational behavior with adults and other children.

# What Happens Early in Life Has large Consequences!

- ▶ Adverse environments resulting from neglect, abuse, and/or exposure to violence can impair the development of executive function skills as a result of the disruptive effects of toxic stress on the developing architecture of the brain. Chaotic (and thus, from the child's standpoint, unpredictable) environments can also lead to poor self-regulatory behaviors and impulse control.
- ▶ Children who experience adversity at an early age are more likely to exhibit deficits in executive functioning, suggesting that these capacities are vulnerable to disruption early in the developmental process

# Children Can Develop These Skills!

- ▶ The healthy development of executive function skills can be supported with practice and training. The same neuroplasticity that leaves executive functioning skills vulnerable to genetic and environmental disruption also presents the possibility of actively promoting the successful development of these skills.





How do we  
do that?

# Building Children's Executive Function Skills

## - 3 to 5 year olds

### Imaginary Play

- **Play plans can be a good way to organize play.** Children decide who they are going to be and what they are going to do before they start playing, and then draw their plan on paper. Planning means that children think first and then act, thus practicing inhibitory control. Planning play in a group also encourages children to plan together, hold these plans in mind, and apply them during the activity. It encourages social problem solving, as well as oral language

### Story Telling

- **Encourage children to tell you stories,** and write them down to read with the child. Children can also make pictures and create their own books. Revisiting the story, either by reviewing pictures or words, supports more intentional organization and greater elaboration.

# Building Children's Executive Function Skills

## - 5 to 7 year olds

### Card Games and Board Games

- **Games that require players to remember** are great at exercising working memory. At the simplest level, there are games such as Concentration, in which children uncover cards and have to remember the location of matches. At a more complicated level are games that require tracking types of playing cards as well as remembering their locations, including Go Fish, Old Maid, Happy Families, and I Doubt It.

### Physical Games/Activities

- **Games that require attention** and quick responses help children practice attention and inhibition. They include freeze dance (musical statues); musical chairs; Red Light, Green Light; or Duck, Duck, Goose for younger children. Others require selective responses and test inhibition, such as the Magic Word Game, in which children wait for a “magic word” to start an action.

# Building Children's Executive Function Skills

## - 7 to 12 year olds

### Brain Teasers

- Crossword puzzles are available for all skill levels and draw on manipulation of letters and words in working memory as well as cognitive flexibility.
- Sudoku provides a similar challenge but works with numbers and equations rather than letters and words.
- Classic spatial puzzles like Rubik's Cube require children to be mentally flexible and consider spatial information in devising potential solutions.

### Physical Games/Activities

- Various jump rope games also become popular among children of this age. Children can become very skilled at jump rope, double Dutch, Chinese jump rope, and other such challenges. Developing skill in these games requires focused practice, as well as the attention control and working memory to recall the words of the chant while attending to the motions