TRIUMPH CENTER
for child and adolescent counseling

# Executive Function Skills in Children and Adolescents

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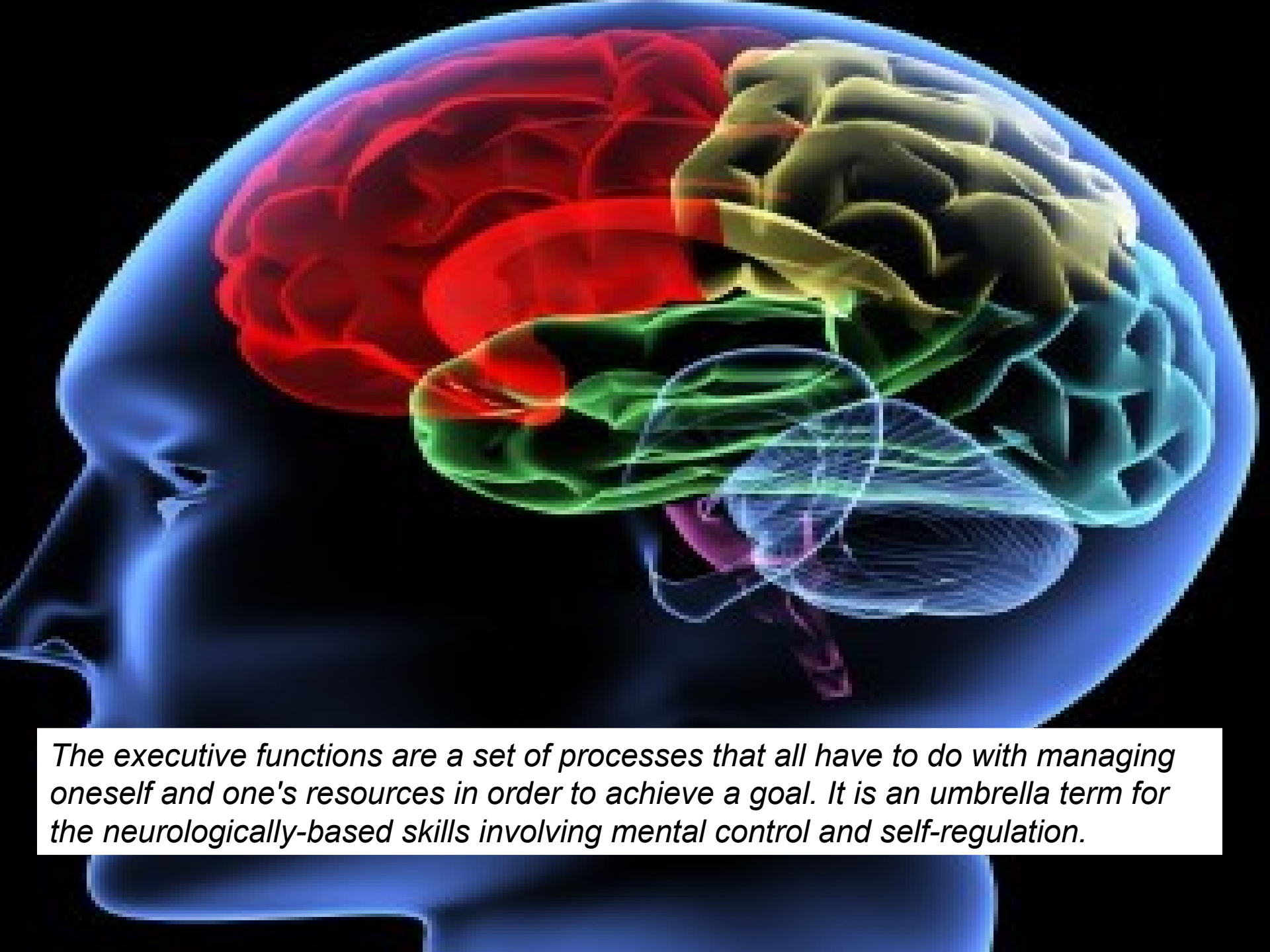


*The executive functions are a set of processes that all have to do with managing oneself and one's resources in order to achieve a goal. It is an umbrella term for the neurologically-based skills involving mental control and self-regulation.*

# Say the COLOR of the ink:

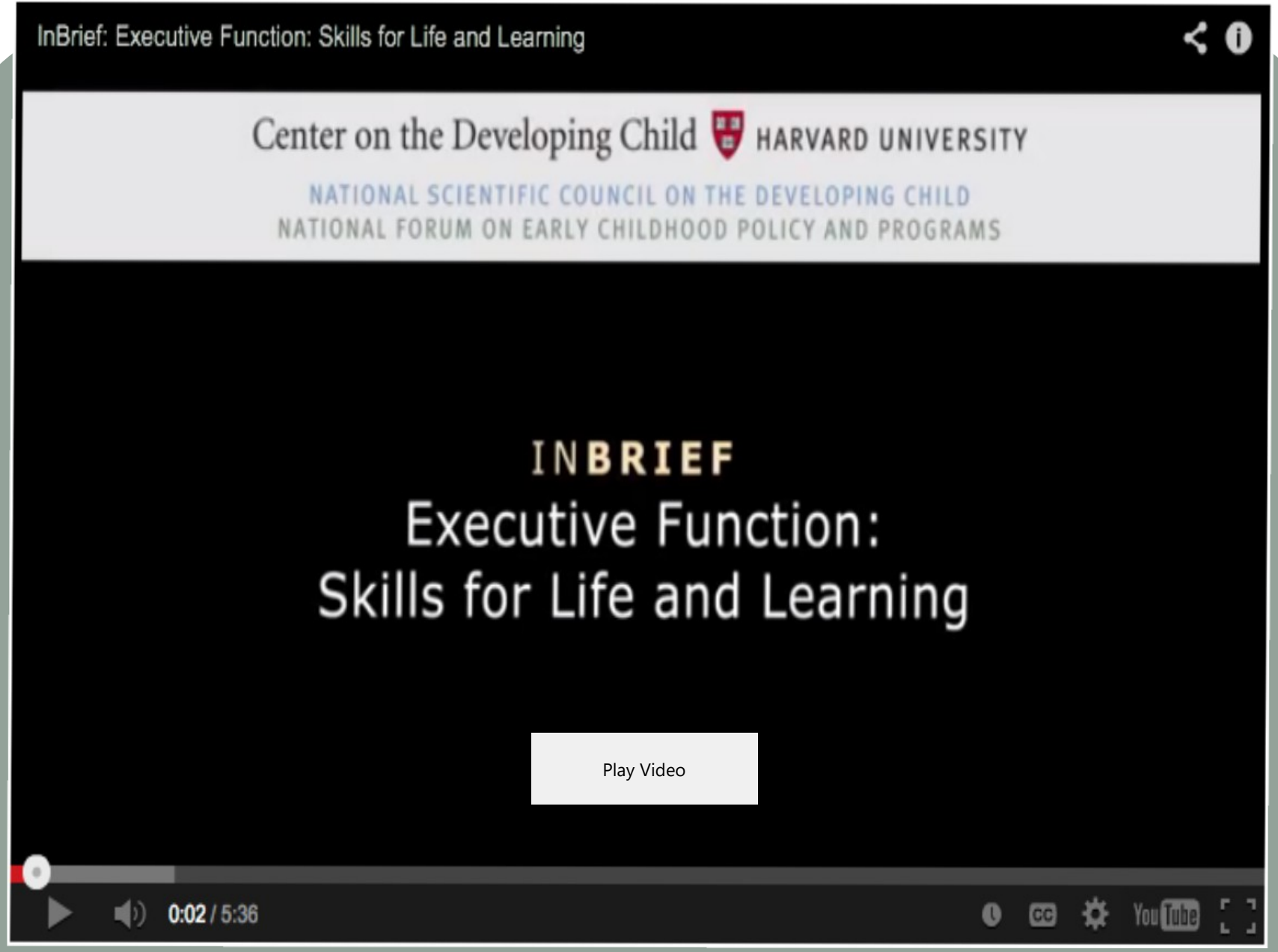
GREEN YELLOW RED BLUE BLACK

RED BLUE BLACK YELLOW GREEN

# Say the COLOR of the ink:

GREEN YELLOW RED BLUE BLACK

RED BLUE BLACK YELLOW GREEN




p://developingchild.harvard.edu/resources/inbrief-executive-function-skills-for-life-and-learni

# brain Circuits

# Executive function

Executive function includes the following skills:

- Inhibit (control impulses)
  - Curb inappropriate speech or behavior
- Shift
  - Switch focus/Transition
  - Adjust to changing rules
- Emotional Control
  - Modulate emotional responses (not too bi
- Initiate
  - Begin a task or activity
  - Generate ideas


"Yipee! Join the dots!"

# Executive Function

- Working memory

  Remember and follow a series of instructions

- Plan and organize

  Manage time and attention

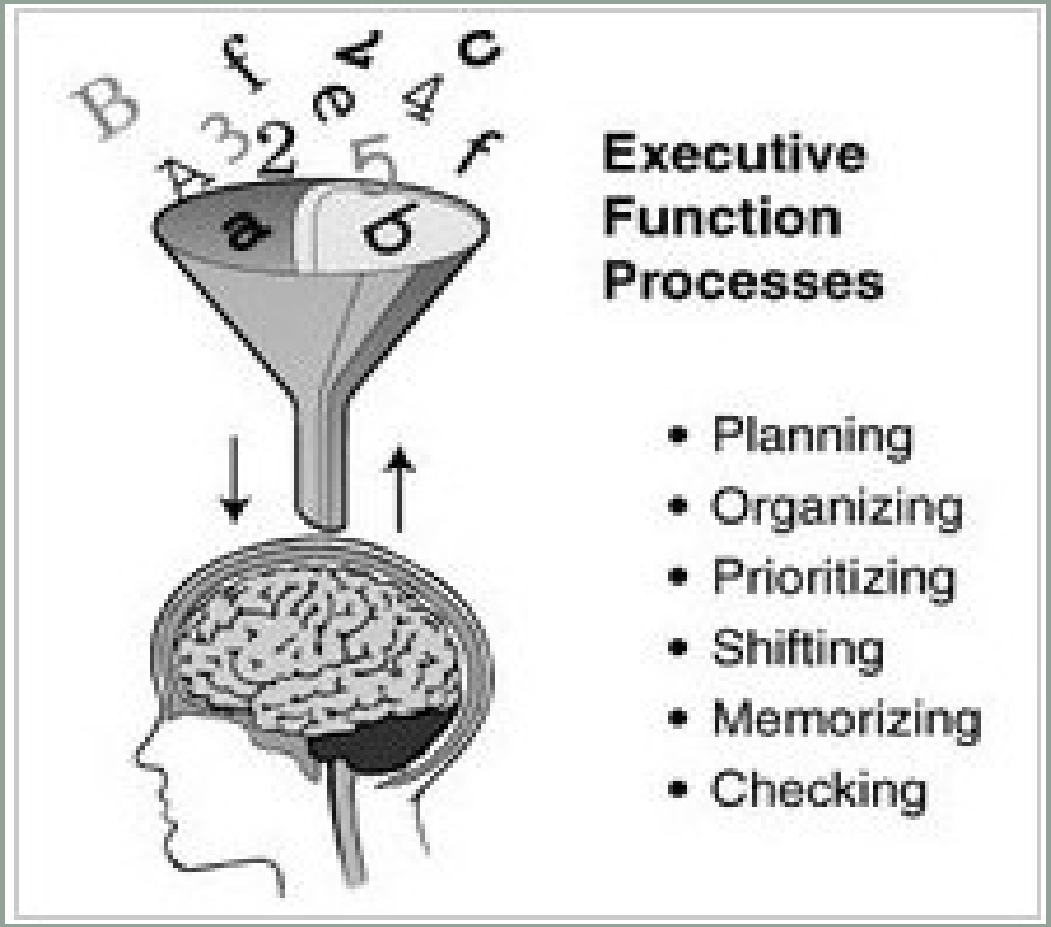
  Keep work area orderly (e.g., papers in folders by subject-area)

- Monitor

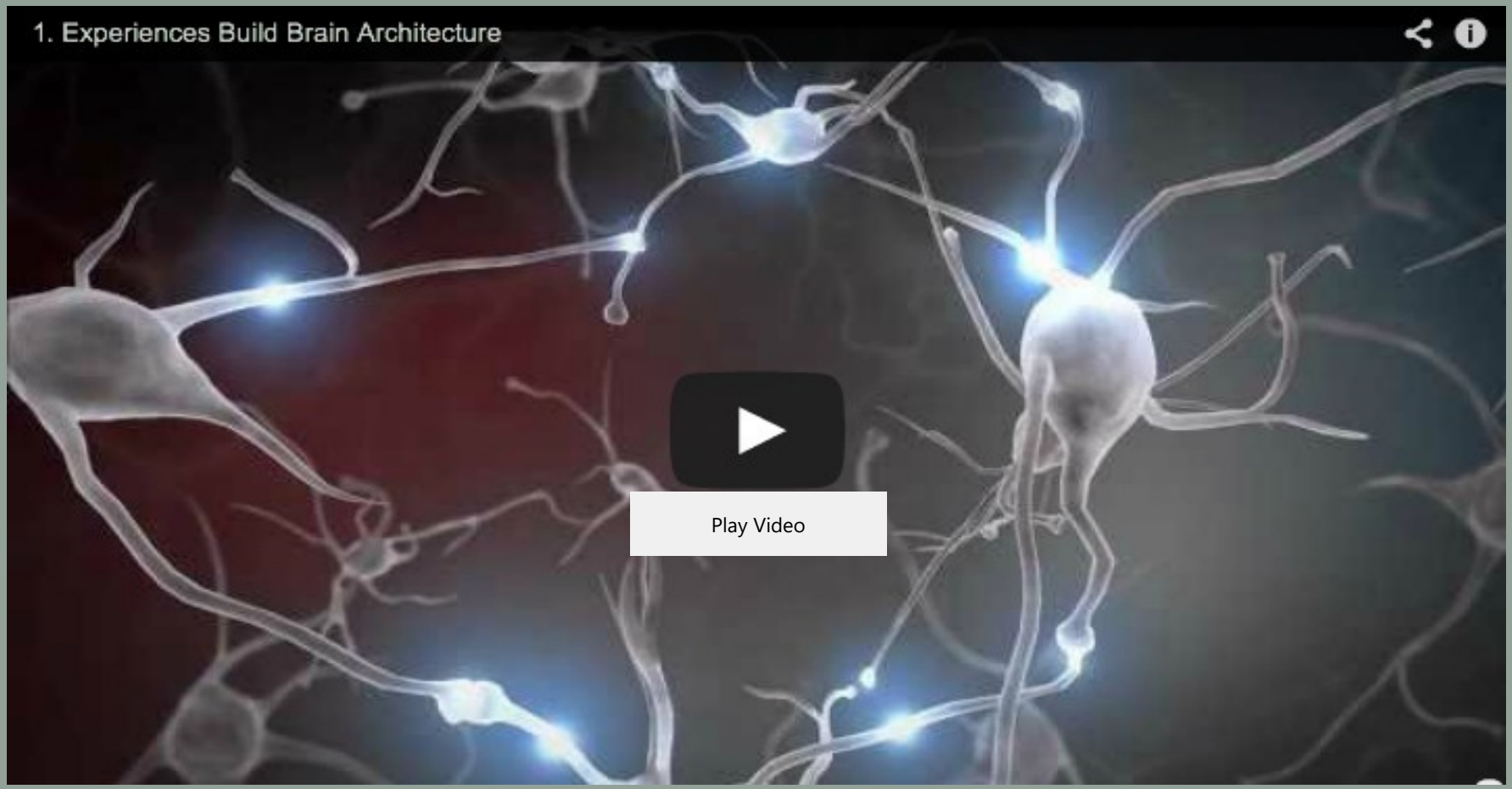
  Check work

  Keep track of impact of own behavior on others

# Executive function in the brain



# Experiences Build Brain Architecture

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# Warning Signs

Warning signs that a child may be having difficulty with executive function include trouble in:

- Planning projects
- Estimating how much time a task will take to complete
- Telling stories (verbally or in writing)
- Communicating details in an organized, sequential manner
- Memorizing information
- Retrieving information from memory
- Initiating activities or tasks
- Generating ideas independently
- Retaining information while doing something with it
- Controlling language, behavior, and emotion

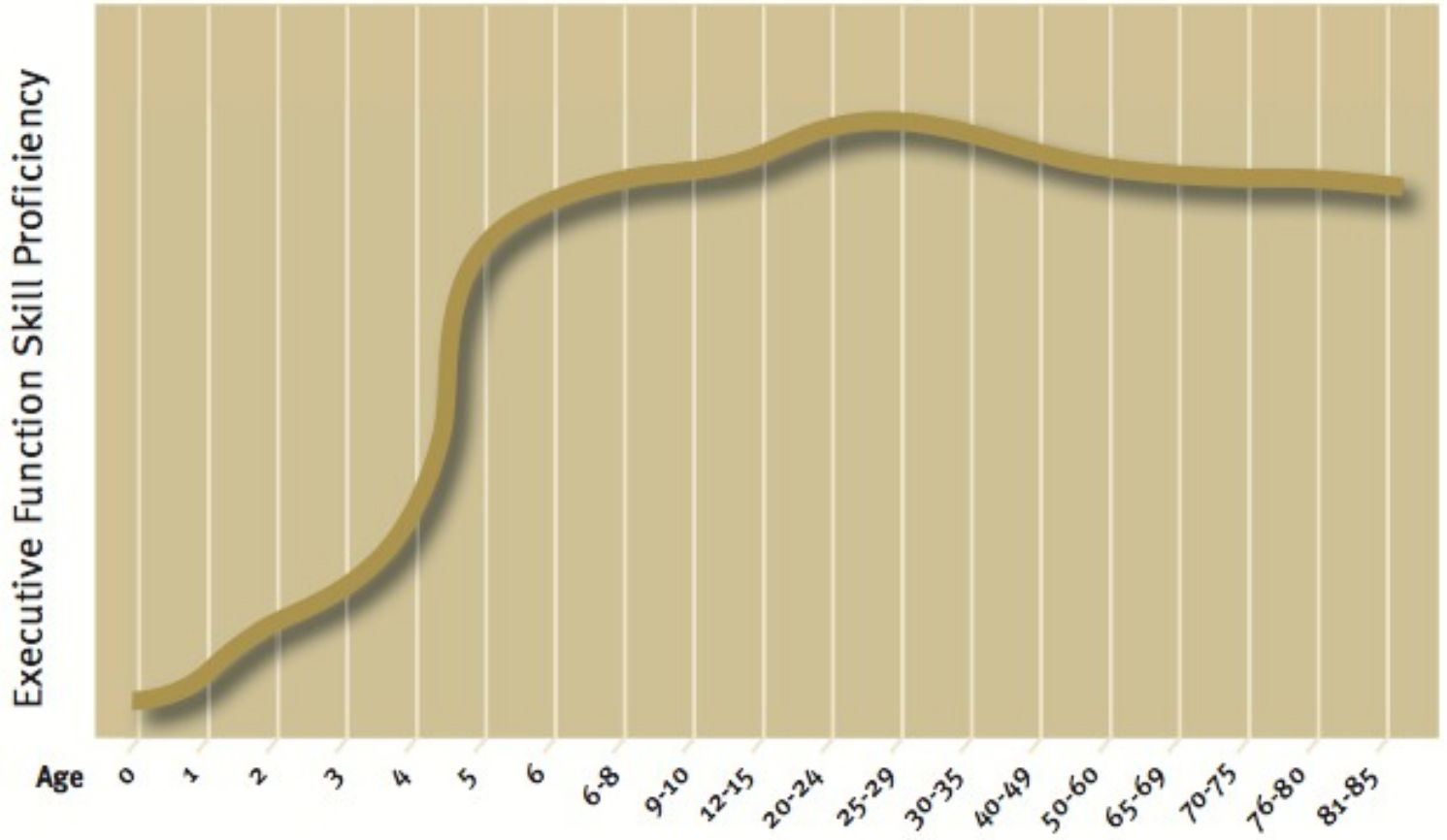
# Critical concept

"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."

-NATIONAL FORUM ON EARLY CHILDHOOD POLICY AND PROGRAMS

NATIONAL SCIENTIFIC COUNCIL ON THE DEVELOPING CHILD

# Executive Function Skills Build Throughout Childhood and Adolescence




A range of tests measuring different forms of executive function skills indicates that they begin to develop shortly after birth, with ages 3 to 5 providing a window of opportunity for dramatic growth in these skills. Growth continues throughout adolescence and early adulthood; proficiency begins to decline in later life.

Source: Weintraub et al. (In Press).[99]

# Critical Concept

As with all developmental milestones, there is a ‘normal level of variability’ in the attainment of executive functioning skills –not all ‘normal children’ develop the skills at the same time or pace.

## WORKING MEMORY

**ADULT** Can remember multiple tasks, rules, and strategies that may vary by situation

**5-16 YEARS** Develops ability to search varying locations, remember where something was found, then explore other locations (e.g., a game of Concentration or hiding a penny under one of three cups)

**4-5 YEARS** Comprehends that appearance does not always equal reality (e.g., when given a sponge that looks like a rock)

**3 YEARS** Can hold in mind two rules (e.g., red goes here, blue goes there) and act on the basis of the rules

**9-10 MONTHS** Can execute simple means-to-ends tasks and two-step plans; also able to integrate looking one place and acting (e.g., reaching) at another place

**7-9 MONTHS** Develops ability to remember that unseen objects are still there (toy hidden under a cloth); learns to put two actions together in a sequence (remove cloth, grasp toy)

## INHIBITORY CONTROL

**ADULT** Consistent self-control; situationally appropriate responses (e.g., resists saying something socially inappropriate, resists "tit for tat" response)

**10-18 YEARS** Continues to develop self-control, such as flexibly switching between a central focus (such as riding a bike or driving) and peripheral stimuli that may or may not need attention (road signs and pedestrians vs. billboards and passing houses)

**7 YEARS** Children perform at adult levels on learning to ignore irrelevant, peripheral stimuli (such as a dot on the side of a screen) and focus on the central stimulus (such as a picture in the middle of the screen)

**4-5 YEARS** Reductions in perseveration (persisting with following a rule even when knowing that the rule has changed). Can delay eating a treat; also can begin to hold an arbitrary rule in mind and follow it to produce a response that differs from their natural instinct (sort colored cards by shape rather than color)

**9-11 MONTHS** Able to inhibit reaching straight for a visible but inaccessible reward, such as a toy on the other side of a window, and instead delay a moment to recognize the barrier and detour around it

**8-10 MONTHS** Begins to maintain focus despite distractions during brief delays in a task

**6 MONTHS** Rudimentary response inhibition (able to not touch something instructed not to touch)

## COGNITIVE FLEXIBILITY

**ADULT** Able to revise actions and plans in response to changing circumstances

**13-18 YEARS** Continued improvement in accuracy when switching focus and adapting to changing rules

**10-12 YEARS** Successfully adapts to changing rules, even along multiple dimensions (okay to shout on playground, not okay in school, okay sometimes in theater rehearsal)

**2-5 YEARS** Succeeds at shifting actions according to changing rules (e.g., takes shoes off at home, leaves on at school, puts on boots for rain)

**9-11 MONTHS** Develops ability to seek alternate methods to retrieve objects beyond directly reaching for what's in view

Sources: Best & Miller (2010)[100]; Diamond (1991a, 1991b, 2002, 2006).[101,102,8,103]

# Adult-Child Relationships

"A young child's environment of relationships plays an important role in the development of executive capacities. Environments that foster executive functioning are characterized by adult-child relationships that guide children from complete dependence on adult support to gradual assumption of the "executive" role for themselves."

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# Developmental Tasks & Executive Function Skills

## Preschool

- Follow immediate one-step directions.
- Tidy bedroom or playroom with assistance.
- Perform simple chores and self-help tasks with reminders.
- Inhibit certain behaviors.

# Developmental Tasks & Executive Function Skills

## Grades K-2

- Follow 2 to 3-step directions.
- Tidy bedroom or playroom.
- Perform simple chores, self-help tasks that take less than 10-minutes to complete -- with reminders.
- Bring papers to and from school.
- Complete homework assignments (20 minutes).
- Decide how to spend money for small purchases.
- Inhibit (slightly broader and more subtle) range of behaviors.

# Developmental Tasks & Executive Function Skills

## Grades 3-5

- Run errands and follow directions.
- Keep track of belongings when away from home.
- Complete homework assignments (up to 1 hour).
- Plan simple school project. such as a book report.
- Keep track of changing daily schedule.
- Save money for desired objects over time; plan how to earn money.
- Inhibit/self-regulate on own.

# Developmental Tasks & Executive Function Skills

## Grades 6-8

- Babysit younger siblings or for pay
- Use system for organizing schoolwork; including assignment book, notebooks, etc. Follow complex school schedule involving changing teachers and classes during different periods.
- Plan and carry out long-term projects, including tasks to be accomplished and reasonable timeline to follow.
- Plan/schedule activities -- including after-school activities, homework, family responsibilities.
- Independent self-regulation and rule-governed behavior.

# Developmental Tasks & Executive Function Skills

## High School

- Manage schoolwork effectively on a day-to-day basis, including completing and handling assignments on time, studying for tests, creating and following timelines for long-term projects, making adjustments in effort and quality of work in response to feedback from teachers and others (e.g., grades on tests and papers).
- Establish and refine long-term goal and make plans for meeting that goal.
- Make good use of leisure time, including obtaining employment or pursuing recreational activities during the summer.
- Inhibit reckless and dangerous behaviors (e.g., use of illegal substances, sexual acting-out, shoplifting, vandalism).

# Critical concept

"For students with executive function weaknesses, their conceptual reasoning abilities may be stronger than their output and productivity. ... As these students enter middle and high school, their difficulties become more evident, due to the mismatch between their skills and the curriculum demands."

-Meltzer, 2010

# Strategies For Executive Function Development

A practical Approach

# Neuroplasticity

"The healthy development of executive function skills can be supported with specialized 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."

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# 3 Broad Strategies

## Modify the Environment

- Systems for organization
- Daily schedules and routines
- Checklists/"to-do" lists

## Teach Executive Function Skills

- Modeling
- Scaffolding
- Choices
- Reinforcement

## Change Brain Functioning

- Sleep
- Nutrition
- Exercise
- Neurofeedback

# MAKE IT FUN!!

Executive function skills provide critical supports for learning and development, and while we aren't born with these skills, we are born with the potential to develop them through interactions and practice.

- Card Games & Board Games
- Physical Activities & Games
- Movement & Song Games
- Quiet Games & Brain Teasers

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# Thank you! Questions?