

## EXECUTIVE DYSFUNCTION

# How to Sharpen Executive Functions: Activities to Hone Brain Skills

Executive functioning skills range from working memory to cognitive flexibility to inhibitory control, and beyond. They power our daily functioning, future planning, and mental/physical health. Here, learn how to improve core EFs through recommended activities, exercises, and games.

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Executive functions (EFs) refer to a family of mental processes that allow us to reason and think before acting, meet new challenges head-on and with flexibility, and stay focused and concentrate, and more. So essential are executive functions to our well-being that they have been described as the mental toolkit for success.<sup>1</sup> Often, EFs can be more predictive of academic and career success than either socioeconomic status or IQ.<sup>2</sup>

To improve any executive function, practice is critical. EFs need to be continually challenged — not just used — to see improvements. (That goes for both children and adults.) However, EF training and practice alone will not achieve the best results. EFs blossom most when we lessen things that impair them (like stress or sadness) and enhance the things that support them (like joy or feelings of belonging).

## Executive Functioning Skills: Overview and Activities

There are three core EFs.

### 1. Inhibitory Control

#### Inhibitory Control at the Level of Behavior

Inhibitory control of behavior is self-control or response inhibition – resisting temptations, thinking before speaking or acting, and curbing impulsivity. Discipline and perseverance – staying on task despite setbacks or boredom and delaying gratification — require inhibitory control.

Many children, especially those with ADHD or other conditions that impact executive functioning, may have insufficient inhibitory control and thus struggle to curb a behavior they know is wrong or unhelpful. Parents and others may incorrectly assume that this indicates “bad” behavior or a discipline problem when it simply indicates immature inhibitory control.

Inhibitory control of behavior (self-control) improves with activities like the following.

#### Activities That Improve Inhibitory Control of Behavior

- Games like **Simon Says** (great for all ages).
- **Dramatic play acting** (to practice inhibiting acting out of character).

- **Playing music with others** (to practice waiting until it's your turn to play).
- **Performing a comedic routine** (to practice trying not to laugh at your own jokes).
- **“Buddy reading,”** where children pair up and take turns being the reader or listener. The listener receives a simple line drawing of an ear to help the child remember to listen and not speak. (This activity is part of the Tools of the Mind curriculum).

*[Get This Free Download: A Guide to Building Foundational Executive Functions]*

## Inhibitory Control at the Level of Attention

Inhibitory control of attention is focused or selective attention. It's the ability to resist distractions so you can focus, concentrate, and pay attention, and to sustain that focus even when the material is boring (sustained attention).

## Activities That Improve Inhibitory Control of Attention

- Perhaps the quintessential activity for challenging inhibitory control of attention (selective attention) is **singing in a round**.
- **Listening to stories** read aloud should improve sustained attention as it requires listeners to work to keep their attention focused without visual aids, such as pictures on the page or puppets acting it out. We found that listening to storytelling improves sustained auditory attention more than does listening to story-reading where the illustrations are shared after each page is read.
- Activities that challenge **balance as well as focused attention and concentration**:
  - **Walking on a log**.
  - **Walking on a line**. Similar to walking on a log, this activity is as challenging for young children as walking on a log or balance beam is for adolescents and adults. To increase the challenge, children can try to do this while balancing with something on their heads or racing with an egg in a spoon.
  - **Walking with a bell** and trying not to have it make a sound can be a fun activity for a group of people of all ages. (It is also great for calming down.)
- Activities that challenge **fine and gross motor skills as well as focused attention and concentration** (It's a general principle that motor development and cognitive development are fundamentally intertwined.<sup>3</sup>):
  - **Household and kitchen chores** such as pouring a liquid, spooning beans or peas, carrying a tray full of filled glasses, peeling a vegetable, threading a needle, sewing, etc.
  - Other ideas: **beading, juggling, etc.**

*[Read: Executive Dysfunction, Explained!]*

## 2. Working Memory

Working memory is the ability to hold information in the mind and to work or play with it. Just holding information in the mind without manipulating it is short-term memory; not working memory. Working memory enables us to:

- Mentally play with ideas and relate one idea to another
- Reflect on the past or consider the future
- Remember multi-step instructions and execute them in the proper order
- Remember a question you want to ask as you listen to the ongoing conversation
- Make sense of anything that unfolds over time, as this requires holding in mind what happened earlier and relating that to what's happening now

## Activities That Improve Working Memory

- **Perform mental math**, like calculating discounts or totals while shopping or calculating scores during a bowling match.
- Play a **storytelling memory game** in a group, where one person starts the story, the next person repeats what was said and adds to the story, and so on.
- **Hearing stories** may improve working memory, as it requires the listener's working memory to remember all the story's details and relate that to new information as the story unfolds without the help of visual aids. Storytelling has been found to improve vocabulary and recall in children more than does story-reading,<sup>4</sup> which is important because vocabulary assessed at age 3 strongly predicts reading comprehension at 9–10 years of age.<sup>5</sup>
- Similarly, performing **spoken-word or slam poetry** should help working memory and attention.

## A Note on Computerized Cognitive Training

CogMed® is the computerized method for training working memory with the most and the strongest evidence. But even CogMed® shows little or no transfer to any skill not practiced while doing CogMed® (even quite similar skills)<sup>6</sup> and benefits are no longer evident two years later.<sup>7</sup>

## 3. Cognitive Flexibility

Cognitive flexibility includes the abilities to:

- See an issue or situation from different perspectives
- Think about something in a whole new way (“thinking outside the box”)
- Take advantage of a sudden opportunity
- Find a way to succeed despite unexpected problems or barriers
- Admit you were wrong after you receive new information
- Seamlessly adjust to change or the unexpected

## Activities That Improve Cognitive Flexibility

- **Engage in improvisational activities**, like theater, jazz, and dance, which are unsurpassed for encouraging and nurturing creativity and adjusting on the fly.
- **Play think-outside-the-box games.** Come up with creative, unusual uses for everyday objects. You can eat at a table, for example, but you can also hide under it, use it as a percussion instrument, or cut it up for firewood – the list is endless.
- **Find commonalities** between everyday items and make a game of it. Example: How is a carrot like a cucumber? (Shape.) Like an orange? (Color.) Like a potato? (Both grow underground.)
- Teachers and parents: **Invite children to help you solve a real problem** that you are genuinely unsure how to solve. They'll love the challenge and will feel great pride in helping an adult.

## Examples of Activities That Improve All Executive Functions

- The arts (music, dance, theater, etc.)
- Sports, especially open-skill sports like soccer or basketball
- Traditional martial arts, which emphasize self-control, discipline, and character development. One study showed that children who practice taekwondo saw greater gains in all dimensions of EFs studied compared to children who took standard physical education classes.<sup>8</sup> Our huge systematic review of all

methods tried for improving executive functions found that mindful movement activities (like martial arts, qigong, and tai chi) show the very best results for improving EFs of all the different methods tried.<sup>9</sup>

- Wilderness survival
- Woodworking
- Cooking
- Caring for an animal or animals
- For younger children, social pretend play

Each of these activities requires planning, cognitive flexibility, perseverance, and creative problem-solving — indeed, all the EFs.

Note: Parents and teachers must draw very explicit analogies between these activities and academic subjects if they want to see skills transfer, as it is not always obvious to children that a skill used in one context applies to another.

## Executive Functions: The Roles of Stress and Self-Esteem

State of mind impacts executive functioning skills more than most people realize. The best methods to improve EFs encourage participants to:

- believe in themselves and their ability to improve your EFs,
- relax (reduce the stress in their life or how stressed they feel about it), and
- increase the joy in their lives.

## Stress and Executive Functions

Executive functions depend on prefrontal cortex (PFC), a part of the brain responsible for orchestrating thoughts and actions to align with internal goals.

When we are stressed, we can't think clearly or exercise good self-control. One reason for that is that even mild stress floods PFC (but not the rest of the brain) with dopamine, essentially taking PFC offline. Stress also disrupts functional communication between PFC and other neural regions,<sup>10</sup> such as the amygdala. The amygdala sends out alarm signals when it detects danger, real or perceived. It is PFC that calms down the amygdala when there is really no danger, or when the danger has passed. But when communication between PFC and the amygdala gets disrupted, PFC's "calm down" signal to the amygdala doesn't get through.<sup>11</sup> So the amygdala keeps firing and the person remains in a stressed, hyper-vigilant state.

Many of us were taught that people perform better on challenging cognitive tasks when they feel a bit on edge or are under a bit of pressure. The truth is that stress, even extremely mild stress, impairs the executive functions of most people.<sup>12</sup>

## Strategies and Ideas to Reduce Stress

- **Stable routines, predictability, consistency, and clarity about what is and is not permitted** all reduce stress.
- **Treat mistakes as a natural consequence of learning and stretching one's abilities.** A growth mindset instills confidence and teaches us to view failed attempts as learning opportunities.
- **Self-compassion** teaches us that we don't have to be perfect.

- **Ask for help.** The western emphasis on self-reliance is wrong and destructive for our mental and physical health. Everyone needs help now and again.
- Exercise in almost any form acts as a stress reliever,<sup>13 14</sup> as does being in nature.<sup>15 16</sup>
- **Movement-based mindfulness** (like tai chi, and taekwondo)<sup>17 18 19</sup> shows the best results for improving EFs over other methods, according to our comprehensive review.<sup>9</sup>
- Pets improve mood and reduce stress. Studies show that the presence of a dog in the classroom (whether in preschool, grade school, or university) or in the workplace reduces stress and improves attention and performance.<sup>20 21 22</sup>

## For Children

- **Communicate loud and clear that you believe in that child and expect him or her to succeed.** If we expect a child to succeed, that child often will, and if we expect a child to not do well, unfortunately the child often won't. (Pygmalion effect.<sup>23</sup>) Children often internalize our expectations of them, and their own expectations for themselves can become self-fulfilling prophecies.<sup>24</sup> What if we told children with ADHD, for example, that a particular test has been designed to be ADHD-friendly, and on this particular test, those with ADHD score as well or better than those without ADHD? Or, what if we told children that ADHD is an advantage for x, y, and z reasons and we know they'll succeed in life?
- **Assign responsibilities** to make children feel important and show that you believe in them.
- **Emphasize that everyone makes mistakes** and that errors are part of learning and improving.
- **Focus on strengths.**
- **Give do-able challenges.** Pride, self-confidence, and joy come from succeeding at something difficult. Sports and other activities allow children to have the experience of repeatedly conquering challenges through effort and practice. It is critical important that the challenges be do-able, however.
- **Be patient.** Feeling rushed can contribute to stress. Give children time and space to figure out how to solve problems on their own.
- Overall, **support your child's emotional, social, spiritual, and physical well-being.** All of these parts are fundamentally interrelated and affect one another.<sup>25</sup>

## How to Improve Executive Functions: Next Steps

- **Free Download:** Common Executive Function Challenges — and Solutions
- **Self-Test:** Could You Have an Executive Function Deficit?
- **Read:** It's Easy to Hover Over a Child with Executive Function Deficits. Don't.

*The content of this article corresponds, in part, to the ADDitude ADHD Experts webinar titled, "Optimizing Executive Functions in Children and Adults with ADHD" [Video Replay & Podcast #383] by Adele Diamond, PhD, FRSC, FAPA, FAPS, FSEP, which was broadcast live on December 14, 2021.*

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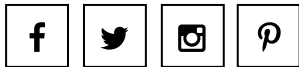
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