

Measuring and Developing Executive Functions

Executive Functions

Executive Functions are a class of cognitive skills that constitute the directive capacities of our minds. There are three core executive functions – Working Memory, Inhibitory Control and Cognitive Flexibility.

Skill	What it is	Academic Example	Social/Emotional Example
Working Memory	The ability to hold information in our mind while we think about it.	Holding multiple aspects of a problem in mind and keeping track of where we are in a multi-step solution.	Holding someone else's point of view in mind, comparing and contrasting it to other points of view, considering alternative ways to respond.
Inhibitory Control	The ability to suppress a thought or idea, to refrain from doing something we otherwise would.	Not leaping to the first possible solution but questioning assumptions and considering other alternatives.	Not blowing out the candles on someone else's birthday cake. Not blurting out "That's stupid," when you disagree. Also, deferring gratification (longer term).
Cognitive Flexibility	The ability to change our mindset when the rules of the world around us change.	When our original approach to a problem doesn't work, finding other approaches. Looking at problems from different points of view and being able to change direction on the basis of new information.	Looking at personal experiences from different points of view and being able to change direction on the basis of new information.

Measuring Executive Functions and other Cognitive Skills

The Mindprint Cognitive Assessment is a scientifically valid, nationally normed cognitive assessment. It has ten subtests, three of which measure specific executive functions: Attention (including Inhibitory Control in this test), Working Memory, and Flexible Thinking (Cognitive Flexibility). The other tests assess processing speed and various reasoning and memory skills. The assessment is administered on a computer (Chromebook, PC or Mac) and takes about an hour. It can be administered to a group of students at the same time.

The Mindprint dashboard makes it easy to identify strengths and weaknesses for an individual student. Below is an example, where you can see that four of these students scored in the Support Range (bottom 16% of the population) in Attention or Flexible Thinking, and the other two students scored at the Low End of the Expected Range on one of more of the tests of Executive Functions.

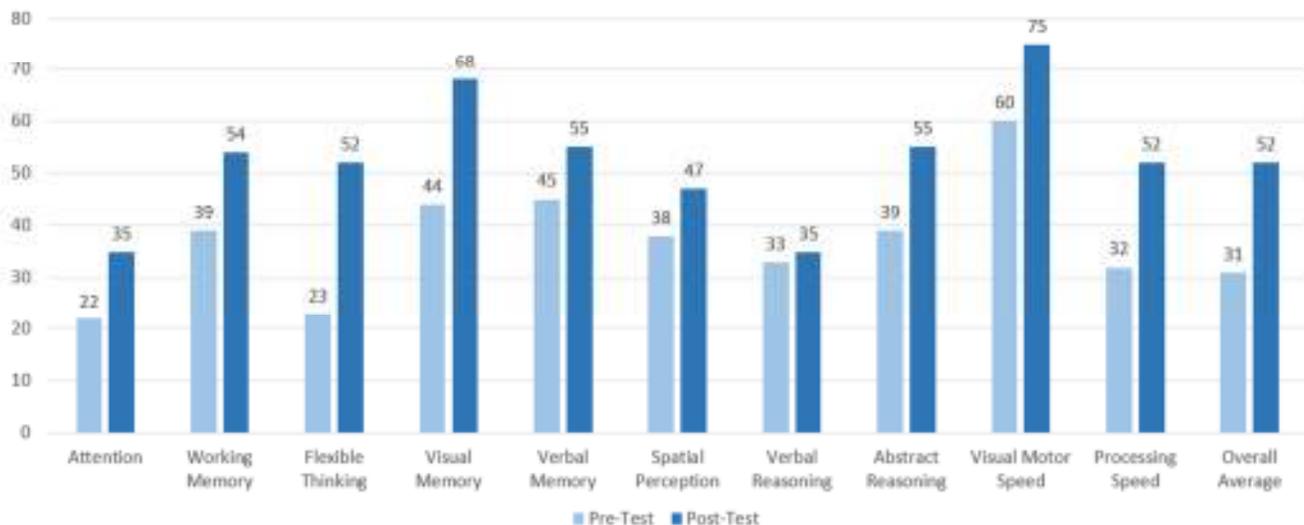


Developing Executive Functions and Other Cognitive Skills

BrainWare SAFARI is a cognitive training program delivered online that develops 41 cognitive skills, including Executive Functions, in a comprehensive and integrated way. It is based on multidisciplinary clinical therapy procedures developed and refined over 40+ years, which are incorporated with the best practices of video-game technology. BrainWare SAFARI works on a PC or a Mac and requires an Internet connection while it is being used. Recommended usage for significant cognitive growth as seen in research studies is 3 to 5 times per week, 30 to 45 minutes, over 12 to 14 weeks.

BrainWare SAFARI has been demonstrated to significantly improve executive functions and other cognitive skills in over 30 studies, including peer-reviewed published research, and field studies in schools. The chart below shows the results from a study of 47 students who were tested before and after using BrainWare SAFARI.

Average Percentile Rankings Before and After Using BrainWare SAFARI



Following use of BrainWare SAFARI, these students' average score on the cognitive tests improved by 21 percentile points, with significant growth on all three Executive Functions tests as well as reasoning, memory, and processing speed.

In the context of a Multi-Tiered System of Supports or other student support initiatives, the Mindprint cognitive assessment helps teachers and other school staff determine the root causes for struggling or under-performing students, by pinpointing the non-instructional (i.e., cognitive) reasons for a student's difficulties. This enables truly individualized support with an intervention targeted at developing executive functions, and strategies based on actionable data, rather than guesswork. This enables teachers and administrators to unpack the learning process and be more strategic in the application of resources.

Mindprint Technical Requirements:

Computer (PC, Mac, Chromebook), with mouse and speakers/headset, Google Chrome or Mozilla Firefox Internet Browser, Adobe Flash Player Plug-In, Browser set to allow access to cookies.

BrainWare Technical Requirements:

PC: Windows® 98 or higher, Pentium III or higher, 600 MHz or faster. **Mac:** OSX required. 600 MHz G3 or faster. A Mac Compatibility Pack is available for computers with OS 10.7 and higher. **All:** 200 MB available hard disk space. Internet connection. Computer speakers. External mouse and headset recommended.