

“Executive Functioning” Explained

November 2009



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The term executive function describes a set of cognitive abilities that control and regulate other abilities and behaviours. Executive functions are necessary for goal-directed behaviour. They include the ability to initiate and stop actions, to monitor and change behaviour as needed, and to plan future behaviour when faced with novel tasks and situations. Executive functions allow us to anticipate outcomes and adapt to changing situations. The ability to form concepts and think abstractly is often considered a component of executive function.

As the name implies, executive functions are high-level abilities that influence more basic abilities like attention, memory and motor skills. For this reason, they can be difficult to assess directly. Many of the tests used to measure other abilities, particularly those that look at more complex aspects of these abilities, can be used to evaluate executive functions. For example, a person with executive function deficits may perform well on tests of basic attention, such as those that simply ask the individual to look at a computer screen and respond when a particular shape appears, but have trouble with tasks that require divided or alternating attention, such as giving a different response depending on the stimulus presented. Verbal fluency tests that ask people to say a number of words in a certain period of time can also reveal problems with executive function. One commonly used test asks individuals to name as many animals or as many words beginning with a particular letter as they can in one minute. A person with executive function deficits may find the animal naming task simple, but struggle to name words beginning with a particular letter, since this task requires people to organise concepts in a novel way. Executive functions also influence memory abilities by allowing people to employ strategies that can help them remember information.

Other tests are designed to assess cognitive function more directly. Such tests may present a fairly simple task but without instructions on how to complete it. Executive functions allow most people to figure out the task demanded through trial and error and change strategies as needed.

Executive functions are important for successful adaptation and performance in real-life situations. They allow people to initiate and complete tasks and to persevere in the face of challenges. Because the environment can be unpredictable, executive functions are vital to human ability to recognize the significance of unexpected situations and to make alternative plans quickly when unusual events arise and interfere with normal routines. In this way, executive function contributes to success in work and school and allows people to manage the stresses of daily life. Executive functions also enable people to inhibit inappropriate behaviours. People with poor executive functions often have problems interacting with other people since they may say or do things that are bizarre or offensive to others. Most people experience impulses to do or say things that could get them in trouble, such as making a sexually explicit comment to a stranger, commenting negatively on someone's appearance, or insulting an authority figure like an official or police officer; but most people have no trouble suppressing these urges. When executive functions are impaired, however, these urges may not be suppressed. Executive functions are thus an important component of the ability to fit in socially.

Executive function deficits are associated with a number of psychiatric and developmental disorders, including obsessive-compulsive disorder, Tourette's syndrome, depression, schizophrenia, attention-deficit/hyperactivity disorder, and autism. Executive function deficits also appear to play a role in antisocial behaviour. Chronic heavy users of drugs and alcohol show impairments on tests of executive function. Some of these deficits appear to result from heavy substance use, but there is also evidence suggesting that problems with executive functions may contribute to the development of substance use disorders.

Because executive functions govern so many lower-level abilities, there is some controversy about their physiological basis. Nevertheless, most people who study these abilities agree that the frontal lobes of the brain play a major role in executive function. The frontal lobes are the large portions of the brain cortex that lie near the front of the brain. The cortex is the site in the brain where lower level processes like sensation and perception are processed and integrated into thoughts, memories and abilities, and actions are planned and initiated. People with frontal lobe injuries have difficulty with the higher level processing that underlies executive functions. Because of its complexity, the frontal cortex develops more slowly than other parts of the brain, and not surprisingly, many executive functions do not fully develop until adolescence.

There are many effective strategies one can use when faced with the challenge of problems with executive function. Here are some methods to try:

General Strategies

- Take step-by-step approaches to work; rely on visual organisational aids.
- Use tools like time organisers, computers or watches with alarms.
- Prepare visual schedules and review them several times a day.
- Ask for written directions with oral instructions whenever possible.
- Plan and structure transition times and shifts in activities.

Managing Time

- Create checklists and "to do" lists, estimating how long tasks will take.
- Break long assignments into chunks and assign time frames for completing each chunk.
- Use visual calendars to keep track of long term assignments, due dates, chores, and activities.
- Use management software such as the Franklin Day Planner, Palm Pilot, or Lotus Organizer.
- Be sure to write the due date on top of each assignment.

Managing Space and Materials

- Organize work space.
- Minimize clutter.
- Consider having separate work areas with complete sets of supplies for different activities.
- Schedule a weekly time to clean and organise the work space.

Managing Work

- Make a checklist for getting through assignments. For example, a student's checklist could include such items as: get out pencil and paper; put name on paper; put due date on paper; read directions; etc.
- Meet with a teacher or supervisor on a regular basis to review work; troubleshoot problems.

Remember

The brain continues to mature and develop connections well into adulthood, and a person's executive function abilities are shaped by both physical changes in the brain and by life experiences, in the classroom and in the world at large. Early attention to developing efficient skills in this area can be very helpful, and as a rule, direct instruction, frequent reassurance and explicit feedback are strongly recommended.

Some executive functions also appear to decline in old age, and some executive function deficits may be useful in early detection of mild dementia.

Alzheimer's Disease gradually deteriorates executive functioning, making it increasingly difficult to carry out daily tasks and live independently. Because it's hard to assess during a medical visit, health professionals usually have to rely on reports from the caregiver and the person with Alzheimer's to evaluate executive functioning.