

Executive Function Fact Sheet

By: National Center for Learning Disabilities (NCLD) (2005)

What is Executive Function?

"Executive Function" is a term used to describe a set of mental processes that helps us connect past experience with present action. We use executive function when we perform such activities as planning, organizing, strategizing and paying attention to and remembering details.

People with executive function problems have difficulty with planning, organizing and managing time and space. They also show weakness with "working memory" (or "seeing in your mind's eye"), which is an important tool in guiding one's actions.

As with other manifestations of LD, disorders in executive function can run in families. Problems can be seen at any age but tend to be increasingly apparent as children move through the early elementary grades; the demands of completing schoolwork independently can often trigger signs that there are difficulties in this area.

How does Executive Function affect learning?

In school, at home or in the workplace, we're called on all day, every day, to self-regulate behavior. Normally, features of executive function are seen in our ability to:

- make plans
- keep track of time
- keep track of more than one thing at once
- meaningfully include past knowledge in discussions
- engage in group dynamics
- evaluate ideas
- reflect on our work
- change our minds and make mid-course and corrections while thinking, reading and writing
- finish work on time
- ask for help
- wait to speak until we're called on
- seek more information when we need it.

These skills allow us to finish our work on time, ask for help when needed, wait to speak until we're called on and seek more information.

Problems with executive function may be manifested when a person:

- has difficulty planning a project
- has trouble comprehending how much time a project will take to complete

- struggles to tell a story (verbally or in writing); has trouble communicating details in an organized, sequential manner
- has difficulty with the mental strategies involved in memorization and retrieving information from memory
- has trouble initiating activities or tasks, or generating ideas independently
- has difficulty retaining information while doing something with it; e.g., remembering a phone number while dialing.

How are problems with Executive Function identified?

There is no single test or even battery of tests that identifies all of the different features of executive function. Educators, psychologists, speech-language pathologists and others have used measures including the Wisconsin Card Sorting Test (Berg, 1948), the Category Test (Reitan, 1979), the Trail Making Test (Reitan, 1979), and the Progressive Figures and Color Form Tests (Reitan & Wolfson, 1985) to name a few.

Careful observation and trial-teaching are invaluable in identifying, and better understanding, weaknesses in this area.

What are some strategies to help?

There are many effective strategies one can use in 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 organizational aids.
- Use tools like time organizers, 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 organize 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.

The bottom line

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.

Life Without Executive Functioning

By: Joyce Cooper-Kahn and Laurie Dietzel (2008), excerpts from their book

The Basics

- The executive functions all serve a "command and control" function; they can be viewed as the "conductor" of all cognitive skills.
- Executive functions help you manage life tasks of all types. For example, executive functions let you organize a trip, a research project, or a paper for school.
- Often, when we think of problems with executive functioning, we think of disorganization. However, organization is only one of these important skills.

The term "executive functioning" has become a common buzzword in schools and psychology offices. This is more than just a passing fad. In fact, neuropsychologists have been studying these skills for many years. We believe that the focus on executive functioning represents a significant advancement in our understanding of children (and adults!) and their unique profile of strengths and weaknesses.

A Formal Definition of Executive Functioning

Now (drum roll please), here is a formal definition of executive functioning:

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.

What mental control skills are covered under this umbrella? Different researchers and practitioners have their own favorite lists, although the overall concept is basically the same. We use the list proposed by Drs. Gerard A. Gioia, Peter K. Isquith, Steven C. Guy, and Lauren Kenworthy. These psychologists developed their understanding of executive functions through sound research and created a rating scale that helps parents, teachers, and professionals understand a particular child and think more specifically about how to help.

Before looking at the list of specific characteristics encompassed by the broad category of executive functions, we'd like to provide an example that makes the concepts more concrete.

Understanding Executive Functions by Looking at Life without Them

Thinking about what life is like for someone with weak executive functioning gives us a better understanding of the way these core skills affect our ability to manage life tasks. In the interest of making the concepts immediately relevant and meaningful, our example focuses on an adult, since we assume that most people reading this book are adults, too. Throughout the rest of the book we've included mostly examples of executive functioning in younger people.

The Road Trip without a Map

We'd like to tell you a story about our friend, Robin, who lives life without the benefit of strong executive functioning. Robin is a composite of many individuals we have known, and she struggles with weaknesses in executive skills, despite her well-intentioned efforts to reform herself.

One day in May, Robin gets a phone call from her Aunt Sue in Merryville, Missouri. Aunt Sue is planning a family reunion in July, and she wants to know if Robin and her family can come. All of the extended family will be there. The little town will be overrun with relatives and it is going to be a great corralling of the family from all across the United States. Robin is excited at the prospect and eagerly says, "Of course we'll be there! We wouldn't miss it!"

Aunt Sue gives Robin all the particulars, including the dates of the reunion and places to stay. Robin rummages around in the kitchen junk drawer for a pencil while her aunt talks, but she never does find one with a point on it. She promises to herself to find a pencil and write down all the details just as soon as she gets off the phone. But by the time she hangs up, she can't remember the specifics. She makes a mental note to call back soon to get the dates.

That evening, Robin excitedly tells her husband and two children about the reunion. Her husband asks when it will take place. "Sometime in July. I don't remember exactly." He says, "Well, please find out this week because I have to request vacation time at work." Their fifteen-year-old son exclaims, "Hey, I thought July was when I was supposed to go to Band Camp!"

"Didn't you remember?" Robin's daughter practically shouts, "I'm going to Ocean City with Julie and her family sometime in July." Robin blows up at them all, yelling, "Why are you all being so negative? This is supposed to be fun!"

About once a week, Robin's husband reminds her to get the information about the reunion. She promises to do so. (And she really means to get around to it!) Finally, in June, Robin's husband gets very annoyed and says, "Do it now! I'm going to stay right here in the kitchen until you call!" Robin makes the call and gets the dates as well as the other particulars. Her husband harrumphs around the house the rest of the evening because now he has only three weeks left before the requested time-off. Luck is on their side, though, because he manages to arrange the vacation around work, and the reunion dates do not conflict with the kids' activities.

Over the next three weeks, thoughts about the trip float through Robin's head from time to time. She thinks about how the kids will need to have things to do in the car since it's a long trip. She thinks about taking food and snacks for the ride. She thinks about getting her work at the office cleared up in advance so she can be free of commitments for the vacation. She thinks, "I really should take care of that stuff."

A few days before it is time to leave for the two-day drive to Missouri, she starts piling stuff into the van, including clothes and other supplies. (You can only imagine what the inside of this van looks like!)

Finally, it's time to pile the people into the van, too. On the way out of the house, one of the kids asks, "Who will be taking care of the cats while we're gone?" Robin moans, "Oh no! I forgot about that. We can't just leave them here to die and there's no one to take care of them! Now we can't go. What will we tell Aunt Sue?" Her husband takes over, and starts calling around the neighborhood until he finds a teenager who can do the pet sitting. The crisis passes. The cats will be fine.

So, they're off. Robin's husband drives the first shift. He pulls out of the neighborhood, gets onto the main highway, and then asks, "So, what's the game plan? What's the route?" Robin answers, "Missouri is west, so I know we have to go west." He looks at Robin incredulously and says, "You don't know any more details than *that*? Well, get out the map. We can't just head west with no more information than that!" And, of course, Robin says, "What map? I don't have a map." Robin's husband sighs and shakes his head. "Oh no! Another road trip without a map! Why didn't you tell me you were having trouble getting it all organized? I could have helped." Robin replied, "I didn't have any trouble. Everything is fine. We're in the car, aren't we? We'll get there. What are you so upset about?"

Do you think Robin had made reservations for where to stay along the way? Do you think she had planned out how much cash they would need for the trip or made it to the bank ahead of time? These and many other details, of course, had escaped planning.

A List of Executive Functions

With this example as a base, let's turn back to the question of what specific abilities are covered under the umbrella term of executive functioning. Below is the list of executive functions from Dr. Gioia and his colleagues. We've included a specific illustration of each executive function from our case study of Robin in parentheses after each definition.

1. **Inhibition** - The ability to stop one's own behavior at the appropriate time, including stopping actions and thoughts. The flip side of inhibition is impulsivity; if you have weak ability to stop yourself from acting on your impulses, then you are "impulsive." (When Aunt Sue called, it would have made sense to tell her, "Let me check the calendar first. It sounds great, but I just need to look at everybody's schedules before I commit the whole family.")
2. **Shift** - The ability to move freely from one situation to another and to think flexibly in order to respond appropriately to the situation. (When the question emerged regarding who would watch the cats, Robin was stymied. Her husband, on the other hand, began generating possible solutions and was able to solve the problem relatively easily.)
3. **Emotional Control** - The ability to modulate emotional responses by bringing rational thought to bear on feelings. (The example here is Robin's anger when confronted with her own impulsive behavior in committing the family before checking out the dates: "Why are you all being so negative?")
4. **Initiation** - The ability to begin a task or activity and to independently generate ideas, responses, or problem-solving strategies. (Robin thought about calling to check on the date of the reunion, but she just didn't get around to it until her husband initiated the process.)
5. **Working memory** - The capacity to hold information in mind for the purpose of completing a task. (Robin could not keep the dates of the reunion in her head long enough to put them on the calendar after her initial phone call from Aunt Sue.)
6. **Planning/Organization** - The ability to manage current and future-oriented task demands. (In this case, Robin lacked the ability to systematically think about what the family would need to be ready for the trip and to get to the intended place at the intended time with their needs cared for along the way.)
7. **Organization of Materials** - The ability to impose order on work, play, and storage spaces. (It was Robin's job to organize the things needed for the trip. However, she just piled things into the car rather than systematically making checklists and organizing things so important items would be easily accessible, so the space would be used efficiently, and so that people and "stuff" would be orderly and comfortable in the car.)
8. **Self-Monitoring** - The ability to monitor one's own performance and to measure it against some standard of what is needed or expected. (Despite the fact that they're off to Missouri without knowing how to get there, with almost no planning for what will happen along the way, and without a map, Robin does not understand why her husband is so upset.)

The executive functions are a diverse, but related and overlapping, set of skills. In order to understand a person, it is important to look at which executive skills are problematic for her and to what degree.