

WHAT ARE THE EXECUTIVE FUNCTIONS?

Executive Dysfunction is an often-overlooked source of the difficulties students have initiating, completing, and turning in their homework and class work.

Now that I have your attention, let's take a closer look at what the executive functions are and how dysfunction might be impairing your student.

The foundations for learning are attention, memory, and executive function. While most teachers would immediately have some sense of what "attention" and "memory" mean, many were probably never received any training about executive functions. And yet without these functions, so many aspects of our functioning would be impossible or significantly impaired.

Executive functions (EF) are central processes that are most intimately involved in giving organization and order to our actions and behavior. They have been compared to the "maestro" who conducts the orchestra. But what are these processes? The whole topic is very controversial, but there seems to be a consensus that executive functions involve (at the very least):

- planning for the future and strategic thinking
- the ability to inhibit or delay responding
- initiating behavior, and
- shifting between activities flexibly

If we break down the skills or functions into subfunctions, we might say that executive functions tap into the following abilities or skills:

- Goal
- Plan
- Sequence
- Prioritize
- Organize
- Initiate
- Inhibit
- Pace
- Shift
- Self-monitor
- Emotional control
- Completing

We will consider these skills in more detail later in this article, but for now, it should also be noted that in considering executive functions, we will also be talking about "working memory," which is not purely an executive function but overlaps executive functions, attention, and memory. Also, although "emotional control" is included in this list, it is not a purely executive function.

Because there is no uniform agreement on what the executive functions are, there has been no agreement on how to assess them. If we talk about particular subfunctions, however, it is possible to

answer the question.

Executive functions are generally assessed via neuropsychological tests and assessments. For any one function or subfunction, there may be a variety of tasks or tests that tap into components. If you suspect that your student has executive dysfunction (EDF), the appropriate referral would be to a board-certified neuropsychologist. Neuropsychologists are psychologists who specialize in the relationship between brain and behavior.² Although some of the tests school psychologists administer as part of any psychoeducational assessment do tap into some of the executive functions, in my opinion, a typical psychoeducational evaluation is not adequate or sufficient if you suspect the student has EDF.

FUNCTIONS AND SIGNS OF DYSFUNCTION

Let us take a closer look at each of the functions we identified earlier, and consider what dysfunction might look like. In looking at this chart, keep in mind that there are only a few examples of what dysfunction might look like.

Function	Description	Possible Signs or Symptoms of Dysfunction
Goal	Identify goal or set goal.	Acts as if "future-blind" (Barkley, 2002), i.e. not working towards the future.
Plan	Develop steps towards goal, identify materials needed, set completion date.	<ul style="list-style-type: none"> - May start project without necessary materials - May not leave enough time to complete - May not make plans for the weekend with peers
Sequence	Arrange (and enact) steps in proper order spatially or temporally.	<ul style="list-style-type: none"> - May skip steps in multi-step task - May have difficulty relating story chronologically - May "jump the gun" socially
Prioritize	Establish ranking of needs or tasks.	<ul style="list-style-type: none"> - May waste time doing small project and fail to do big project - May have difficulty identifying what material to record in note-taking
Organize	Obtain and maintain necessary materials and aids to completing sequence and achieving goal.	<ul style="list-style-type: none"> - May lose important papers or possessions - May fail to turn in completed work - May create unrealistic schedule
Initiate	Begin or start task.	Difficulty getting started on tasks may appear as oppositional behavior
Inhibit	Stop oneself from responding to distractors. Delay gratification in service of more important, long-term	<ul style="list-style-type: none"> - May appear distractible and/or impulsive - May pick smaller, immediate reward over larger, delayed reward

	goal.	
Pace	Establish and adjust work or production rate so that goal is met by specified completion time or date.	May run out of time
Shift	Move from one task to another smoothly and quickly. Respond to feedback by adjusting plan or steps.	May have difficulty making transitions and/or coping with unforeseen events
Self-Monitor	Assessing one's performance and progress towards goal.	<ul style="list-style-type: none"> - Doesn't check to insure that each step is completed - Doesn't monitor pace to determine if goal will be met on time, - Doesn't check work before submitting it
Emotional Control	Regulating and modulating responses to situations.	May exhibit inappropriate or over-reactive response to situations
Complete	Reaching the self-set or other-set goal.	May start tasks but not finish them

In other articles in this section of the web site, you can find helpful tips and strategies for addressing some of the deficits identified in the chart above.

As noted earlier, the foundations of learning are: (1) attention, (2) memory, and (3) executive functions. Where memory, executive function, and attention overlap, you have "working memory" -- the process of holding new visual or auditory information in mind as you retrieve older knowledge or procedures to apply to the new material. For example, you may have already learned the procedure for solving a two-digit multiplication problem. When I tell you the numbers to multiply, you need to hold them in your mind while you retrieve the procedural memory and apply the steps, keeping track of your calculations as you do this. Or if I ask you a question, you keep the question in mind as you mentally search through all your "memory files or folders" to pull out the information you are looking for.

But what if your memory's "filing system" is a disorganized mess? You'd know that the information was "in there," but it would take you longer to find it and you might not always find it in time. Additionally, the capacity of working memory is thought to be relatively fixed: you can only retain so much information at any one time. If a thought that is irrelevant to what you are working on suddenly intrudes on your thoughts, it may 'bump' important information from your working memory.

On a day-to-day level, perhaps one of the most frustrating things parents encounter is what appears to be their child's lack of time sense. It took me a while, but eventually I learned that asking my son if he would "take out the garbage in 5 minutes" was as effective as saying, "Justin, sometime before the end of your life, would you take out the garbage?" How could he not realize that more than 5 minutes had gone by? That 30 minutes had gone by..... 40.... 50.... Was he forgetting or distracted by what he was doing, or was he unable to estimate time accurately? Even if I offered him a huge reward for doing something on time, he might miss the deadline, so I knew this wasn't just motivational.

Most of us probably know a child or an adult who waits until the last minute to start a huge project. They may tell us that they work better under pressure (if they tell you that, tell them that the research doesn't support them on that point), but when people consistently have problems starting big projects or leave everything until the night before, we should be curious about what's going on and whether there's some EDF involved. And in addition to considering whether there are learning disabilities, executive dysfunction in initiating or planning problems, one thing we will also need to consider is whether there is an impaired sense of time.

Russell Barkley and other researchers have been looking at time issues in children with ADHD. So far, although most studies are finding evidence for different kinds of time impairment, we do not have enough data to draw any clear inferences about the nature of the impairment. Thus, your student may be able to accurately estimate how long an activity will take, but another student may underestimate how long something will take and eventually run out of time, while yet another student will be overestimating time intervals and nagging you (e.g., the child who says, "Mrs. Smith, you said we'd go in 10 minutes and it's already been 15," when in fact, only 4 minutes have gone by.)

STUDENTS WITH EXECUTIVE DYSFUNCTION

If students have deficits in ability to plan, initiate, sequence, sustain, and pace work, what is likely to happen to them in school?

Think of an academic activity such as writing a big report -- a common source of frustration for many students. The student who has Executive Dysfunction will have difficulty picking a topic, planning the project, sequencing the material for the paper, breaking the project down into manageable units with intermediate deadlines, getting started, and completing the activity. And because these students frequently underestimate how long something will take, they'll generally leave the project until the night before it's due.

Now consider another academic activity: conducting a laboratory experiment. In the laboratory, the student has a list of supplies that are needed to run the lab and a set of instructions. If the student begins the lab before lining up all the supplies, she may find herself having to run to get something at a time when timing was critical. If she cannot follow sequential steps, she may skip a step and ruin the lab.

How many of us have watched a disorganized or child and assumed that they were just lazy or that if they really and truly wanted to, they would be more organized? How many of us

have wanted to pull our hair out over the child who never brings home their assignments and materials despite supervision from the teacher, who never starts the homework without a knockdown-dragout fight, and who when they do finally do their homework, seem to lose it before it gets handed in to the teacher?

How many of us watched these children suffer day after day and never thought to get a neuropsychological assessment of their executive functions? Maybe we shook our heads and just "knew" that the school's proposed behavior modification or incentive plan wasn't going to work, but we couldn't put our finger on why it wouldn't work, other than to say, "It's not a motivational problem -- he really can't seem to organize himself"?

NOW WHAT?

What happens when we recognize that someone has serious problems with organization and that the source of the problem isn't laziness or lack of motivation?

In the author's experiences with schools, I have often observed that the 504 Plan or IEP makes all kinds of provisions for the teachers and parents to somehow compensate for the student's problem: the teacher is to record the assignments or check off that the student has recorded and packed them; the parent is to initial a notebook showing what came home and what got done, etc. The parents and the teachers, who are already more organized than the child, just engage in more organizing behavior without ever really teaching the child how to organize himself or constructively engaging him in solving his problem. Seldom do I see an IEP where there are specific goals and objectives listed that address teaching the child the organizational skills that he will need to function independently.

Unless you are willing to be following that child around when he's 30, you'd better start figuring out a way to teach him how to organize himself and meet his responsibilities.

There are two ways to view this problem. One is to say that the child needs our support, and that by supporting the child by providing the back-up copies, etc., we are reducing the child's vulnerability and doing A Good Thing. And maybe, along the way, the child will begin to do what he sees us doing and will develop the organizational skills. But if the child is feeling vulnerable and our taking care of all the organizational problems reduces that vulnerability, why will the child risk "blowing that" by attempting to organize himself? Even a child who is motivated to organize himself is likely to assess the situation and recognize that the adults are going to do a much better and more consistent job than he could ever do, so why even try?

Now consider another approach -- one in which we work with the child as their consultant or supporter to help them organize themselves. We let the child recognize and appreciate where their problems are and ask how we can be of help to them, assuming the best -- that they want to be responsible and organized. Often, the ideas or strategies that they come up with may be better than anything we could come up with and since they are now vested in the strategy, they are more likely to comply with it.

So we determine if they're motivated to organize themselves and offer our support. Within

that context, there are a number of tricks or strategies that can be used. Hopefully, they will be used within in a context in which we are trying to support the child's efforts to organize themselves. We do so recognizing that there will be many 'failures' along the way, and that if we want the child to succeed, we have to make it emotionally safe for them to try and even to fail. We need to reduce their vulnerability and we do by reducing our own. As parents, teachers, or treating professionals, we are not responsible for doing the child's work. We are not responsible for 'nagging' them to do their work. If they tell us that they would find it helpful to have a reminder at a particular time so that they can start their work, we can provide that reminder. But we probably should stop at the point when our efforts are not experienced as support and become 'nagging' or confrontation -- particularly if they have mood lability or are otherwise prone to explosive outbursts.

One final note: students with EDF may benefit from computers or electronic organizers that incorporate calendars with repeating functions. How much better to teach someone that although he may not remember things easily, he can teach himself to rely on a computer as a memory prosthesis. We can teach most children and adults to program their own reminders on computers. Alarms can be set (by them) so that they stay in control of taking responsibility. Such devices become lifelong tools that enable independent functioning and can rightfully be considered assistive technology and/or a reasonable accommodation.

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