



Executive Functioning

It is not uncommon for children who have undergone radiation and/or chemotherapy treatment for cancer to experience various short-term and late cognitive effects. A common effect of treatment is problems with *executive functioning*. But what exactly is executive functioning?

Executive functioning refers to higher-level cognitive skills that guide complex behavior, much like an executive manages and organizes a company.

Executive functioning skills include:

- Organization
- Planning
- Sequencing instructions
- Time
- Working memory
- Attention
- Starting Task
- Making transitions
- Regulating behavior
- Regulating emotional expression

Organizational skills are critical to just about every task we undertake whether it be doing simple math problems or listening to a lecture in college. For young children, organizational skills allow them to sequence information so that they follow directions with many components ("Open your notebook, take out a pencil, and turn to page 50"). Difficulty with organizational skills may also manifest in problems with managing time and space. For example, an individual with executive functioning problems may underestimate the time it takes to complete a certain task and can therefore fall behind. At home, the child might inaccurately estimate how long it takes to get ready in the morning before school.

Another common executive functioning difficulty involves **working memory**. Working memory involves an active or "online" memory which is crucial for storing and manipulating units of information that are going to be used in complex tasks. For example, when mentally multiplying two-digit numbers like 37×19 , we may first compute and store the partial product $7 \times 9 = 63$, later use this partial product in further computations, and subsequently drop it when it is no longer needed. Difficulties with sustained attention and perseverance can also play a role in memory problems. In school, a student might have trouble completing a math word problem that involves integrating multiple pieces of information. They might also have trouble following along with a demonstration of a math problem on the board. Individuals with these difficulties may have trouble learning new information or tasks or take longer to learn them.

Sometimes individuals may have difficulty with **self-regulation**, which can present itself in a number of behaviors. The individual may have difficulty with impulse control, or the ability to delay or avoid engaging in a behavior. At school, this might be talking out of turn in class,

or answering a question before thinking through the answer. In other, there may be difficulty responding appropriately to a situation, or changing behavior to match changing activities or social groups. Regarding peer relationships, these difficulties may be seen in terms of aggressive responses to minimal stress, rather than an expected response. In other instances, emotional responses, such as displaying compassion, may be different than what we expect. These can lead to problems with social interaction.

Starting a new task can also be difficult without precise instruction, guidance, or time to facilitate the process. A teacher or parent may need to provide the child with verbal instructions or visual cues. Individuals with executive functioning problems may have difficulty in making transitions between tasks and adjusting to a new setting or activity. For example, the student may be frustrated and disoriented between classes or activities at school, or even making the transition between homework time, playtime, and dinner at home. Minimizing these transitions by supports for consistent and predictable routines can be helpful for a child. The use of graphic organizers, picture schedules, and the combination of verbal, visual, and physical cues are useful strategies.

