

Introduction

Executive functions are those cognitive and metacognitive skills that, collectively, allow for planning timely, self-directed behavior. Developing these “executive” skills is no small feat. For at least the first two decades of life, the prefrontal cortex of the human brain weaves fascinatingly complex networks, linking itself with virtually all other aspects of the brain. The end result is a matrix of self-regulation that defies easy explanation. The outcome, however, is simple: control over our decisions, actions, and responses. Executive functions might be nature’s most fascinating gift. They allow us to set and achieve attainable goals, minimize unintentional errors, shift strategies when needed, and solve unforeseen problems.

The developmental process of acquiring mature executive functions is not only a protracted one, it is also entwined with the progression of other, nonexecutive skills. Take language, for example. Words help us articulate the nature of a problem and talk our way through various options. The ability to take others’ perspective, or Theory of Mind, is also conjoined with our executive system. How we relate to others and incorporate their needs or expectations influences our own decision-making skills. An additional confounding aspect is the environmental element—what kind of structural organization and predictability does a child have? Is the child’s executive system able to operate at its best within those circumstances? And how does each variable impact the staggered development of up to nine different executive skills?

An additional complication is that the exact nature of a child’s executive dysfunction is difficult to pinpoint. While it may be obvious to many that a child is failing miserably at solving age-appropriate problems or managing reasonable responsibilities, it’s another task altogether to determine the profile of the problem. Assessment of executive functions is not done with a quick screening tool or a 20-minute test. Children with executive dysfunction often present with multiple diagnostic labels, and charts so thick you wonder where, and how, to start. The astute diagnostician must untangle the influences of communication and learning disorders, underlying neurological problems, and concomitant mental health diagnoses, all the while keeping an eye on the goal of identifying the EF profile. It’s a diagnostic double whammy, further complicated by the ever-present lack of time and resources. And, as any good therapist knows, you don’t start therapy without knowing what you’re working on, and why.

Just over a decade ago, when we wrote the first edition of *Development of Executive Functions*, the topic of executive functions was fairly new to professionals outside the realm of neurorehabilitation. Our main goals at the time were to explain the nature of executive functions, give the reader a review of assessment tools available, and offer some beginning groundwork for how to identify and treat the problem from a developmental perspective. Those goals are still relevant today.

However, building professionals’ awareness for executive functions isn’t really the main goal anymore. Now the task is to better prepare ourselves, as speech–language pathologists, to accurately diagnose and treat the problem. It is not enough to toss around the term and mention that a child has “poor problem solving.” Nor is it acceptable to take the position that “we don’t treat this problem,” when clearly the American Speech-Language-Hearing Association acknowledges the diagnosis and treatment of executive functions as part of our Scope of Practice (ASHA, 2016).

Parents of children with executive dysfunction want and deserve more specific answers to questions, such as, *Am I doing too much for my child? What kinds of skills should we practice? How do I teach my child to plan? Should I expect less of my child, or is that giving up? Is this just his ADHD? Does my child need some language help, too? Should the school provide accommodations, and, if so, what kind?* Speech–language pathologists who can provide astute, well-informed recommendations for

executive dysfunction, which are rooted in the most current evidence available, are valuable assets to these families and to our educational system.

To accomplish these goals, those of us treating children with executive dysfunction need to fine-tune our diagnostic and treatment skills. While it is commonplace for training programs in communication disorders to offer coursework in cognitive-communication disorders, we have no such mandate for coursework specifically geared towards executive functions. Speech-language pathologists (SLPs) learn on the job, or perhaps are exposed to certain aspects of executive functions embedded into other courses.

The authors of this book have found themselves in a rather enviable position this past decade. As the chair of and faculty member in the same department, we have had the good fortune to build a graduate course in executive functions into our special-topics curriculum. We have had the even better fortune to be able to offer this course on a semiregular basis, thus providing graduate education on executive functions to hundreds of newly minted SLPs over the years. And when we think of the professionals we have reached through continuing education presentations, we feel fortunate to have contributed to education in the area of executive functions.

We hope to advance this training-focused agenda with the second edition of *The Source® Development of Executive Functions*. Our goals are to provide the reader with the tools to identify and describe executive dysfunction (EDF), contextualize executive deficits in light of other diagnoses, and select treatment options based on the evidence currently available. Our insights as clinicians weigh in heavily, of course, as we both work as practicing SLPs in addition to our academic and administrative roles. Specifically, we hope this edition helps the reader to:

- Refine assessment skills when diagnosing executive dysfunction
 - Devise functional, ecologically valid diagnostic tasks that are time efficient while providing reliable information
 - Make defensible decisions about the use of various commercially available EF tests
 - Clarify the relationship between executive dysfunction and other, primary disorders
- Recognize how language is used for self-talk and self-regulation
- Understand the role of reasoning in planning and prediction
- Select appropriate intervention methods based on the child's EF profile
 - Educate parents, colleagues, and other professionals about EFs
 - Scaffold EF success through environmental strategies
 - Implement awareness-building therapy to promote self-monitoring
 - Develop and teach effective compensatory strategies
 - Devise therapy and direct teaching to foster the development of EF skills

The Complexity of the Problem

If we're being honest, it's fair to say that managing executive dysfunction is a complex and time-consuming job. The relentless need for prompts and reminders can be exhausting for parents. Teachers certainly have plenty of challenges managing the needs of multiple learners all in one classroom. SLPs are under pressure to address the needs of a large caseload whose goals range from apraxia and AAC to feeding and reading. Foundational language and speech skills need to be addressed. Teachers face pressure to help entire classrooms meet academic benchmarks and performance targets. And then they get a question about EDFs—can you do something about this, too?

The goal of this text is to clarify and streamline what is often a complex, overwhelming situation. Sometimes it's helpful to drill down into the magnitude of a problem before packing it all back up into a streamlined, simplified parcel.

The role of executive functions is often described using the analogy of an orchestra. With an optimal blend of talented, well-trained musicians and a dynamic, attentive, multitasking conductor, the result can be sublime. Each instrumental section is composed of musicians who have mastered the art of playing their instruments and reading complex musical notation. The discrete skill of producing harmonious notes from the musical instrument has been acquired as a prerequisite to being a member of the orchestra. Reading a musical score is another discrete skill that each musician must have acquired to a certain level of competence to qualify for inclusion in the orchestra. As a member of an orchestra, a musician must integrate a series of discrete isolated skills into a functional whole. Competent musicians in an orchestra are skilled at listening to others around them, taking direction from the conductor, and merging technical requirements with artistic expression.

The conductor must simultaneously divide his or her attention among the many instruments and parts to perform the near-magic of organizing possible chaos into aesthetic beauty. The task is demanding, necessitating a sustained focus with attention to detail. Each performance requires the conductor to constantly monitor and revise the timing and blending of each individual musician's and section's contribution. A conductor is skilled at processing multiple channels of incoming information. She must integrate previous experience with each new piece the orchestra attempts so that she can identify and rectify any gaps or problems. The conductor needs to recognize strengths and weaknesses within the orchestra as a whole, and compensate to achieve a satisfactory result.

Well-trained musicians, led by a highly skilled conductor, can build a repertoire of musical styles and complexities. An orchestra can become very adept at performing certain types or genres of music. Additionally, they can improvise, creating new variations on a theme when necessary. Performances can be impromptu or planned, but the result is fluid and coordinated. For the audience, the cumulative experience is satisfying and harmonious.

In the event that some musicians in the orchestra are unprepared for the demands required to achieve a well-integrated performance, the result is likely to be less successful. Imagine poorly played violas, cellos, flutes, violins, tympani, French horns, trombones, and trumpets sounding off simultaneously in different keys and rhythms. No matter how gifted the conductor might be, the end result will not meet the anticipated expectations. Despite some skilled performances, the functional outcome will be in deficit.

A similar scenario could result if the conductor, rather than the musicians, is lacking in skill. Without the leadership of a competent orchestra conductor, the coordination and awareness of timing, balance, and integration of parts to achieve a satisfying whole are absent. If the orchestra is lacking order and organized direction, each section can freely play whatever they choose. The woodwinds might be engaged in the mellow smoothness of a laid-back jazz piece, while the strings are competing for the audience with a fiercely fast rendition of a classical overture. The percussion section doesn't know whom to follow. The horn section is also confused, and not sure whether to play, be silent, wait, or simply leave. To further add to the chaos, the conductor continues waving her baton, oblivious to the surrounding confusion. If the conductor persists with the same ineffective attempts to coordinate and integrate the various instrumental sections, frustration and behavior problems are likely to erupt.

It is important for the conductor to pay attention to feedback from the audience and musicians in the orchestra, and learn from her mistakes. Preparing the orchestra for its next performance

requires a careful analysis of exactly where and why the breakdown occurred. Do the musicians need work on their discrete primary skills? Are the prerequisites to a successful performance in place? Does the conductor require help in discriminating the productive versus nonproductive aspects of the orchestra's performance? Perhaps someone should provide an objective opinion or critique to point out to the conductor what is obvious to the audience. Or perhaps some assistance is required to effectively organize the primary ability of the musicians with the integration capacity of the conductor, to organize the multiple talents into a single, eloquent, focused entity that moves smoothly from one musical action to the next.

This, then, is our executive function system: an orchestration-performing, multifaceted system with the capacity to help us regulate behavior, adapt as necessary, and achieve goals.

Jill and Gail