

## **Chapter 4- Understanding and Assessing Executive Functioning**

**Chapter 4 of *Integrating Neuropsychological and Psychological Evaluations: Assessing and Helping the Whole Child* provides an in depth description of Executive Functions and the various subdomains associated with this construct. Executive Functions are a set of cognitive skills utilized during the development and attainment of goal directed behavior. In addition, Chapter 4 discusses commonly used assessment tools for this functional domain.**

**The following vignette describes a young girl struggling with executive functions. It highlights her behavior over the course of two days of a neuropsychological evaluation.**

*Melinda presented as an appropriately dressed and groomed seven year old girl who greeted me from her mother's lap with considerable exuberance. She provided good eye contact and separated easily to proceed to my office. She was immediately distracted by the toys on the shelves and found it difficult to settle into a chair to begin testing. She needed to be coaxed by encouraging her to bring a toy over to the table that would "help" her with the testing. She managed to perch on the chair for brief periods and was constantly distracted by the traffic outside or the toys. She was in fairly constant motion and demonstrated an extremely short attention span, frequently interrupting testing to impulsively examine another toy and attempt to engage me in some shared experience with "lookit" while proffering the toy. Over the course of each day of the two days of testing, she managed to scatter all of the toys from the shelves over the floor of my office. While she was extremely disorganized, we did engage in play with the toys and she attempted to categorize some of them. For example, she selected all of the horses (her favorite) and separated them from other domesticated animals which were further separated from the "wild" animals. Her time with each toy was quite limited, however, excepting her interest in a doctor's kit which held her attention the longest. She most enjoyed playing that she was injured, placing a bandage on her leg and limping at the end of one session as she toured the grounds with myself and her father.*

*Testing was completed under these conditions and she was most successfully engaged when I could utilize some interest of hers or fit the testing into some aspect of her own play schema or agenda. Nevertheless, her agendas were quite fluid, seemingly triggered by whatever stimulus caught her attention. She had significant difficulty both sustaining and switching cognitive set and required constant cueing, redirection, encouragement and a significantly heightened affect to keep her engaged. She also required frequent breaks and the promise of some rewards to sustain any effort. When faced with a challenge that she felt she could not meet, her tendency was to want to escape, requesting that we play or just leaving her chair and going to the door of the office. Although she could not articulate her distress, she was able to acknowledge that the materials were "too hard" when asked. Her mood was extremely variable throughout and she was highly reactive, often jumping from her seat or bolting from her standing position at the table when frustrated.*

**Executive Functions are crucial to the development and achievement of goals. The relationship between Executive Functions and generalized intelligence is evident, but it is also clear that they are two different constructs. The following vignette highlights the relationship between these functional domains, while providing an example of how they differ. This example also displays the impact of an individual's emotional status on their ability to engage in goal directed behavior.**

### **Executive Functions and Intelligence**

*Scott presented as a casually dressed twelve year old boy who was oriented to time and place but who appeared very tired. He somewhat reluctantly greeted me and immediately began arguing with his father, insisting that he did not want to participate in the evaluation. He escalated quickly and it took some considerable time and effort on both his father's and my part to calm him and have him agree to at least attempt to engage in the testing. Despite his very apparent misgivings, Scott agreed to accompany me to my office and try. Once there, Scott agreed to sit at the table. He demonstrated an upper trunk hypotonia and made fleeting eye contact. He was clearly displeased and agitated and complained of feeling very tired. Despite this, he willingly engaged with the materials as we began testing and did appear to make his best effort. However, it quickly became clear that he had considerable difficulty tolerating any frustration he experienced as any particular task on the WISC-IV became more challenging.*

*Towards the end of the fourth subtest, after making good effort on all the preceding material, he had reached his limit and refused to go on saying "I can't think" while holding his head as if he were in pain. We then discussed the various impediments to his continuing, including his belief that he was being singled out by his parents for something he did not need, that none of his peers did evaluations, that he didn't need help, that it was his parents who should be evaluated, etc. No amount of reasoning and explanation of how the information could be used to make his home and school experience better was sufficient to change his mind. We then made our way to the waiting room to explain the situation to his father. Scott and his father then spent the following twenty or so minutes there and Scott emerged saying that he was ready to continue. His demeanor was altered and he explained that he and his father had signed a contract with the understanding that if Scott completed the evaluation in a timely fashion, his video game privileges would be reinstated.*

*We continued with the testing under these conditions and Scott made his best effort but, nevertheless, still had considerable difficulty sustaining his effort and attention. He had an extraordinarily difficult time tolerating any frustration, became anxious about his performance whenever he was challenged, would inquire if he had answered a question correctly and appeared very disappointed if he perceived that he had not and would refuse to take a guess at an answer if he thought he might get it wrong. He also tended to make disparaging comments about his skills, such as "I'm not very good at drawing." Thus, throughout, he demonstrated a perfectionistic approach to the materials.*

*For the most part, when Scott was calm, his affect remained quite flat. However, he would rapidly become agitated, complain that he could not think and appeared desperate with the prospect that he had to do more. Thus, he demonstrated a frequent and rapid cycling of mood that appeared to be triggered by any challenge that resulted in frustration. His level of despair and agitation was most evident on tasks that required that he shift cognitive set, that is, change gears to consider a question from another perspective. He found these tasks to be quite effortful and they consistently caused him to express his discomfort somatically. It was helpful to preview materials with him, explaining how long each would take and how many parts to each test would be involved and how many different tasks would be given over any particular time period. It also helped him to take frequent breaks, to be reassured that he was doing well and to be given cues to take deep breaths and calm himself before continuing. Thus, the provision of clear structure, scaffolding and emotional support assisted his efforts. Overall, despite Scott's rapid cycling of mood, perfectionistic approach and considerable difficulty sustaining his effort and attention and tolerating any frustration, he did appear to make his best effort when engaged with the materials. Results from the WISC-IV indicated that his verbal abilities were in the Superior range while his perceptual organizational abilities were in the High Average range. His working memory tested at the low end of the High Average range and his processing speed scored in the Average range. He likely would have done better in each domain if he had been able to sustain his effort when frustrated and had been willing to take a reasonable guess with material he was uncertain about. Nevertheless, results reflected his current functional capacity.*

**The following vignette provides an example of one subset of Executive Functions, fluency. The example describes how difficulties with fluency may impact a child's ability to function within a social group in a classroom setting.**

## **Fluency**

*It was a new school year, and a small group of pre-adolescent children were playing a get to know you game. They were each given a piece of paper and asked to write as many of their favorite desserts as possible, then share with the group. Caleb LOVED dessert. His lunchbox often contained up to three desserts each day, along with healthy foods, which he would happily consume. The children were given several minutes to write down their sweet treat preferences then asked to share. Most of the children rattled off a long list of pastries, candy and cake. At Caleb's turn, he read, "Chocolate, eclairs and chocolate chip cookies." Only three items, despite his reputed and accurate love of dessert. When asked why he only listed three items, he responded, "It was all I could think of."*

**The ability to regulate emotional and behavioral responses to both internal and external events is another subset of Executive Functions. This ability develops as a child ages, first relying on external support, such as parents or teachers, and gradually occurs more independently. The following vignette relates the story of a boy who struggles with emotional and behavioral regulation**

**while completing a Neuropsychological Evaluation. The vignette also illustrates the use of various interventions attempted to help the child regulate himself in order to complete the required activities.**

## **Behavioral and Emotional Regulation**

*Richard presented as an appropriately groomed eight year old boy who was comfortably dressed in loose clothing. He greeted me from his mother's lap with good eye contact and immediately launched into a story about cats, turkeys and chiropractors without providing any context. When queried, he explained that the story related to his stuffed animals, some of which he had left in the car outside. After some further discussion, he was able to separate easily from his mother and proceed to my office, continuing his monologue on the way. As he did so, his story became increasingly rambling and tangential and veered into content related to bombs and destruction. His affect also heightened as his story became more disorganized and he tended to perseverate on the idea of fixing backs or fixing things that were broken as he explored the toys in the room.*

*With clear redirection, Richard was able to transition to testing and made some initial effort to engage with the materials. He could not sustain this effort for long, however, and again returned to his stories. Furthermore, while he initially attempted to sit in the chair at the table, he soon was kneeling on the chair, standing by the table, walking around the room or, at times, reaching over and laying his upper trunk on the table while kneeling on the chair. In this manner, he was in fairly constant motion but was able to respond to clear limits and redirection to come back to the chair and attempt designated tasks. It soon became clear, however, that his activity level became even more elevated and he tended to retreat into the fantasy of his stories whenever he became challenged by the materials. If I attempted to coerce him or become firm in insisting that he continue with a task, he would become more tangential, distracting or eventually oppositional and insulting, at one point calling me "Mr. Stupid". He was also not interested in a system that would earn him points for a reward. It quickly became clear that neither of these approaches would be useful and that appealing to his imagination and sense of humor was much more productive. For example, when I proposed that I walk on the ceiling if he completed a task, he took me up on the offer and mounted an increased effort. When I followed through, he asked if I would help him walk on the ceiling if he completed some tests and again managed to put forth extra effort. Consequently, using humor combined with a plan in the form of a schedule to work and take frequent breaks enabled him to manage periods of testing. In this manner, he was much more interested in engaging in relational activities as a means to motivate him. At one point, for example, he commented "I like play mode best with you". He also enquired about myself, as to whether or not I had children and in this way, demonstrated some reciprocity. Engaging him in play or discussions of this sort tended to establish the relationship and provided some leverage to get him to attempt tasks he felt were too difficult or challenged his vulnerabilities.*

*The breaks that we took included opportunities to play with the stuffed animals, play board games or get snacks. Each of these activities, and particularly the chance to ingest crunchy foods, also served to reset his sensory threshold and support his return to the work. His sensory sensitivity was evident throughout and particularly so when I offered him gum to chew while working. He eagerly accepted some peppermint gum but, after a few chews, made a disgusted expression and anxiously asked to throw it out, saying it was “too strong.” His tendency to become overwhelmed was not contained to being challenged by difficult materials or sensory experiences, however, but also appeared when he became flooded by affect related to play. For example, during one of our breaks, we made a building out of Legos that he described as the building we were in. He designated specific areas that corresponded to rooms that he had been in. At one point, however, he became frustrated by an aspect of the design he was attempting and destroyed the entire structure. He also tended to become distracted and dysregulated by some of the wind-up toys in the office, a response characteristic of a much younger child.*

*Overall, Richard made as much effort as he could manage. He also was observed to use a variety of strategies in an attempt to organize his responding. Throughout, despite his struggles with his distractibility, impulsivity and anxiety, he was able to comply with directions for many of the tasks and was very charming in many ways. Nevertheless, his struggles with emotional and behavioral modulation and sustaining effort and focus very likely compromised his performance on a number of tasks. Thus, while the results from this evaluation were felt to accurately reflect his current functional abilities, they may have underestimated his potential.*

**As an individual engages with a task, it is useful for the individual to reflect on the progress and make adaptations in response. The following vignette provides an example of how this subset of Executive Functions, Use of Feedback/Self-Monitoring, may impact behavior while completing academic work independently.**

### **Use of Feedback/Self Monitoring**

*Marvin was a bright boy, with amazing powers of self-reflection and insight, especially for a 9 year old. He had this pocket of strength, but also had several learning disabilities which impacted his ability to access the curriculum. During both reading and math, he enjoyed some time to complete workbooks which were below his grade level, without a teacher hovering near. He would glance at the clock, which he could not read, and say, “I’m starting now, how long do I have?” His head would drop in concentration over the pages and he would fly through the brief questions. After five or ten minutes, the teacher would let him know time was up, the group was transitioning. He would proudly count the number of pages he had completed feeling a sense of accomplishment. As the teacher checked the work, it became evident that up to 40% of the answers were incorrect. Marvin was so consumed with finishing as many pages as possible, he hadn’t considered that he had done the work incorrectly.*

**In order to complete an undertaking, an individual must be able to pay attention to the task at hand. This subset of Executive Functions impacts many of the functional domains assessed during a complete Neuropsychological Evaluation. The following vignette provides a brief example of the impact of attentional difficulties in a classroom setting.**

### **Attention**

*Abigail was a charismatic and bright nine year old girl. She enjoyed playing, drawing and above all, horses. Academics however, were a challenge for many reason, but partly due to high distractibility. If an adult came to the classroom door, she would impulsively leap out of her seat to greet them. If part of a conversation or word reminded her of her passion for horses, she would shout out, "horsey!" grinning. It might take a minute or two to redirect Abigail back to the work at hand. During instruction, she often sat on a physioball to help her manage her motor output. At times, her impulsive behavior appeared to be a diversion tactic to avoid overwhelming work. At other times, it was clear she was at the mercies of her impulses, requiring significant support to feel successful.*