

Chapter 6 - Understanding and Assessing Sensory Motor Functioning

Chapter 4 of *Integrating Neuropsychological and Psychological Evaluations: Assessing and Helping the Whole Child* provides an in depth description of sensory motor functioning. Various commonly used assessment tools are also discussed.

The following vignette describes various neurological conditions that impact a teenage boys perceptual organizational abilities and executive functions, while his verbal skills are a relative strength. Furthermore, the vignette describes his emotional experience as he attempts to manage his vulnerabilities while he moves through adolescence.

Mark was a sixteen year old boy whose history was significant for a pre- or perinatal right hemisphere neurological insult that resulted in a left sided spastic hemiplegia (a neuromuscular spasticity on one side of the body) of the extremities. He also had a significant right visual field deficit due to persistent hyperplastic primary vitreous (PHPV) of the right eye. He had surgeries that partially improved his vision. Mark began receiving early intervention services at two years. He made progress in public school but in eighth grade he became significantly depressed and behaviorally dysregulated. He completed his freshman year in high school with the support of a one to one aide and a significant number of classroom, computer and testing accommodations.

Upon Neuropsychological testing, Mark presented as a related young adolescent who was engaging and quite charming. He found much of the material, particularly visually based and fluency related tasks, to be quite challenging. He used verbal strategies to support his performance in these areas. On the WISC-IV, Mark's verbal abilities fell at the high end of the Average range while his perceptual organizational abilities fell in the Borderline range with a Scaled Score of 4 on Block Design. His working memory was at the low end of the Average range while his processing speed was in the Extremely Low range. He scored below the tenth percentile on the Copy, Immediate Recall and Delayed Recall portions of the Rey-Osterrieth Complex Figure test and below the first percentile on the Beery-Buktenica Developmental Test of Visual-Motor Integration. His left-sided fine and gross motor disability as well as underlying neurological vulnerabilities consistent with a nonverbal learning disability, both attributable to a right hemisphere neural insult, contributed to a level of stress that challenged his adaptive capacities. Furthermore, additional neurological vulnerabilities, including deficits in executive functioning and attention that may or may not have been related to early trauma, as well as his impaired visual abilities, further complicated his behavioral and emotional profile. Combined, these factors made it difficult for him to regulate his affect and contributed to a depression and compromised level of motivation.

While Mark mounted a brave effort to overcome many of the limitations his condition imposed on him, there was evidence to suggest that his primary defense was to avoid self-focusing. Despite this, he remained preoccupied with his bodily functioning

and compared himself unfavorably with his peers and, at times, felt that he was helpless to control the circumstances in his life. This underlying sense of futility contributed to his negativity and anger and, combined with his difficulty regulating his affect and impulsivity, likely exacerbated by adolescence, resulted in angry outbursts symptomatic of an underlying depression. In addition, his nonverbal learning disability as well as his concern about his bodily functioning, made it difficult for him to consistently relate to peers. Consequently, he felt more comfortable relating to adults and did so in the context of community service in which relationships were more structured and less intimate and he felt that he was contributing to a greater good.

Visuoconstruction, achievement and emotional development

In this vignette, a young boy struggles to filter details while copying increasingly complicated images. Although he employs several strategies for managing this difficulty, he is unable to filter his emotional response to the work, making completion of the task difficult.

Peter was an eight year old boy who had a Verbal Comprehension Index of 140 and a Perceptual Reasoning Index of 119 on the WISC-IV. While his Matrix Reasoning Scaled Score was 15, his Block Design Score was 11. On the latter, he took a logical, sequential and step-wise approach. He was frequently drawn to the more salient features of the designs and often used them to organize his construction. He could also be distracted by salient features, having difficulty filtering them out when working on another separate part. At such times, he would cover up the distracting detail with his hand in an attempt to focus on the part with which he was dealing. He benefited from the structure and models provided and relied to a significant degree on boundary lines in the models. He had difficulty transitioning from a four block to nine block grid and, on both, at times lost configural set, failing to retain a four or nine block square template when distracted by salient details. When provided with less information of this nature, he had more difficulty and proceeded in more of a trial and error fashion and struggled with the visuo-constructive element. Although he used a good strategy of talking himself through this task, he had difficulty sustaining his effort and appeared discouraged when faced with the increased challenge. He attempted to compensate for his perceived failure by contending that he could easily do the most difficult design if he wanted, but didn't care to, merely describing how he would do it, though his description was, unknown to him, inaccurate. In this manner, Peter demonstrated significant difficulty with the integration of part to whole relationships on this task.

Graphomotor Skills

Graphomotor skills are a subset of fine motor skills. This skill set includes the ability to copy designs, write numbers and words. The following vignette provides an example of how difficulty with graphomotor skills may impact a student's ability to access curriculum in a classroom setting and the extent of emotional frustration that can be experienced.

Nelson was a bright 10-year-old boy with a wealth of background knowledge and excellent verbal skills. Despite his aptitude he was reluctant to participate in academic activities, particularly those that involved writing or drawing. At the beginning of the school year, during math and reading, Nelson would sit on the floor, roll around and cry. Eventually, he could be coaxed to the table, but refused to touch the materials. Teachers began scribing for Nelson, and his reactions diminished. He would still grumble, glower and snap, but he would sit at the table and pay attention. This transitioned into sitting peacefully. When the teachers gave him the opportunity to write, he tried, but it was very slow and laborious. Nelson used a special pencil that helped his grasp. Tracing and copying almost appeared painful. While his frustration was more tolerable, it was clear, the avoidance and tantrums were related to his difficulty generating output. He could think quickly and clearly, but his hands could not keep up. The process of helping Nelson move from the floor to the table, to full participation took over 4 months and even then, he was unable to independently complete assignments and required significant support to manage his emotions and graphomotor disability.

Gross Motor Skills

This brief vignette provides an example of the impact difficulties with gross motor skills has on children on the playground and in the school environment.

Two nine year old boys chased around the playground. One, bounding gazelle-like, quick, fast and sure. The other awkward, precarious and slow. His gait was uneven, his body posture slightly twisted and his feet barely left the ground. He grinned, happy to play. When it was his turn to be "it," after several minutes of chasing his agile friend, his face crumpled. He complained, "I can't keep up! I'll never get him!" The disparity between the two didn't stop with just speed, but overall, one was well coordinated and comfortable within his body. The other, constantly felt awkward. Tasks like hanging up coats or moving between chairs always took longer. He persevered a few moments longer, and before an emotional breakdown occurred, a teacher intervened, suggesting they were both overheated and perhaps swinging would help them calm down. The boys retreated to the swing set together.