



Expert's Forum

A Primer on Pediatric Neuropsychology

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The Duke Gifted Letter asks Paul Beljan about pediatric neuropsychology, how it differs from school and educational psychology, and how and when families can benefit from a practitioner's expertise.

DGL: *What is pediatric neuropsychology?*

Beljan: The American Board of Pediatric Neuropsychology (ABPdN) defines pediatric neuropsychology as a specialty within the field of psychology and related health-care sciences. The emphasis in pediatric neuropsychology is the study and understanding of brain-behavior relationships specifically in children with known or suspected brain injury.

A pediatric neuropsychologist uses special tools and assessment devices to test children and to determine their strengths and weaknesses across the domains of executive functioning and attention, learning and memory, language, sensory and motor abilities, and visual and spatial abilities. Although the definition specifically cites children with known or suspected brain injury, the reasons to obtain the services of a pediatric neuropsychologist go well beyond brain injury.

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Understanding the brain-behavior relationship is a key to understanding all human beings. For children, however, brain behavior is not evaluated in isolation from their environment and family unit. In other words, pediatric neuropsychology looks at the whole child in relation to cognitive functioning and the impact of nature and nurture on their development. This is commonly known as the biopsychosocial model. A pediatric neuropsychologist has advanced clinical training to understand the dynamic developmental changes of a child's brain and how behavior quickly evolves during the child's rapid periods of development. The child is not seen as a static entity. These dynamic changes and the knowledge of appropriate developmental phases helps pediatric neuropsychologists identify what is considered a deficit versus normal behavior and development.

DGL: *How does a pediatric neuropsychological assessment differ from school psychology or a psycho-educational assessment?*

Beljan: Pediatric neuropsychology is drastically different than educational psychology. Whereas the pediatric neuropsychologist looks at the origin of learning skills and motivation in the brain, the educational psychologist focuses on assessment outcomes and behavior. In my experience, most educational psychologists function as school psychologists, who are most commonly known for administering psycho-educational evaluations.

A psycho-educational evaluation generally is a determination of the child's intellectual and achievement abilities. For years Public Law 94-142 (originally known as the Education of All Handicapped Children Act) mandated that psychoeducational testing be used to determine which children receive services for learning disorders and how that would take place in the least restrictive environment. The law also heralded the advent of what became known as the discrepancy model. A child can meet the discrepancy model in either

of two ways:

- a. The child's intellectual score is 1.5 standard deviations (approximately 22 points) above their achievement test scores.
- b. The child is functioning two grade levels below grade placement based on achievement test scores.

Unfortunately, Public Law 94-142 handcuffed school psychologists from rendering an accurate clinical diagnosis of learning disorders. The discrepancy model is not a clinical diagnosis of learning disorders. It became a means of 'drawing a line in the sand' and determining that children on one side of the line received special education services, while children on the other side of the line did not. Many children who have learning disorders such as phonological dyslexia or dyscalculia never met criteria for the discrepancy model rule and were denied services. Public Law 94-142 was re-authorized in 2004 with the advent of No Child Left Behind legislation (and renumbered PL 108-446). Now known as the Individuals with Disabilities Education Act (IDEA), it eliminated the requirement to use the discrepancy/achievement model; however, many states still use the original laws' guidelines to identify students with learning disabilities to determine which students receive services.

A pediatric neuropsychologist determines the presence of a learning disorder based on its neuroanatomical and neuropsychological antecedents without considering the discrepancy model. For example, reading is a language-based ability and does not conform to the discrepancy model rule or the normal bell curve. Therefore, to determine whether or not a child has a learning disorder for reading without testing that child's language abilities is problematic and can be considered unethical given that the correct science is widely available.

The outcome of using the discrepancy model to determine who receives specialized educational services or accommodations can be devastating to an individual's educational, career, and interpersonal future. For example, during an assessment with a gifted teen, "John" was upset because he obtained only a 75th percentile score on his PSAT. John was distraught because he earned top grades, studied hard and wanted to attend an Ivy League college. He knew his score had been lowered by his need to keep re-reading the passages during the Comprehension portion of the test so did not have the time to answer all of the questions about the passage.

Neuropsychological test results revealed John had an IQ of 138 and basic reading and spelling scores at the 130s. On a reading comprehension task, however, John obtained scores at the ninth percentile. He was able to answer some multiple-choice questions about comprehension, but he could not relate comprehension information on his own. On tests of phonological processing and language expression, it was discovered that John had a phonological processing deficit and expressive language disorder.

John suffered from phonological dyslexia. His early childhood articulation deficit, his language usage, and a family history of dyslexia were all red flags for the disorder. Diagnostic interviewing revealed that John spent far more time studying word recognition and spelling than same-age peers. He also spent an inordinate amount of time working on papers and other projects for school. His mother, a dedicated parent, developed a streamlined study method that helped John encode and consolidate information. Pediatric neuropsychological testing revealed that John was simply reading words on a page without comprehension. He was only recognizing words. Furthermore, a qualitative study of his test results revealed phonological errors when John spelled unfamiliar words—the examiner could not tell what John was trying to spell.

John obtained achievement scores consistent with his IQ and, therefore, never met criteria for the discrepancy model rule. Previous testing by school psychologists never determined the presence of phonological dyslexia. The results of our evaluation took place when John was a junior in high school. John received intervention for dyslexia as well as untimed SAT testing accommodation. He significantly improved his phonological processing, earned his highest grades ever as a senior, and obtained superior scores on the SAT. John was accepted to Yale by the time he graduated from high school.

John's example exemplifies another key difference between a pediatric neuropsychological assessment and

a psychoeducational assessment. A pediatric neuropsychological assessment takes more time and is more expensive than a psychoeducational assessment; however, it is this up front investment in a child that saves an enormous amount of childhood emotional pain and suffering and time and money spent on remediation. Children who endure years of academic struggle do so at the cost of self-esteem and motivation, often resulting in behavior problems that can distract educators from the real problem. An initial investment in a comprehensive pediatric neuropsychological assessment yields an accurate diagnosis and guides appropriate intervention. The cost savings in time, appropriate resources, and the child's self esteem is immeasurable.

DGL: *In what instances should parents seek the expertise of a pediatric neuropsychologist?*

Beljan: While assessment is the primary domain of pediatric neuropsychologists, we also are heavily involved in developing and directing interventions to help remedy or improve the various deficiencies and conditions we discover. Although, brain injury and seizure disorders historically are the cornerstone of pediatric neuropsychology, the applications of pediatric neuropsychology holds far reaching applications as the field becomes more sophisticated.

Some reasons to obtain a pediatric neuropsychological assessment include a detailed determination of attention deficit-hyperactivity disorder (ADHD) and executive function deficit, language disorders, movement and sensory disorders, memory disorders, and learning disorders. The services of pediatric neuropsychologists are frequently sought in cases of developmental delay and autism spectrum disorder. A commonly unknown but wide-spread application of pediatric neuropsychology is the assessment of infants. Infants suffer from many neuropsychological issues secondary to prematurity, birth injury, and other syndromes that effect cognition and development. Finally, the fastest growing area of pediatric neuropsychology is the identification and management of sports-related concussion, which has reached epidemic status in the United States, yet remains one of the most unidentified neuropsychological conditions of childhood.

Pediatric neuropsychology is a wonderful profession as it enlightens parents about their children in a way that no other profession can. When parents learn that the origin of their child's negative behavior is due a brain-based disorder, the parent-child relationship and family dynamics immediately and positively shift. The outcomes are happy children with high self-esteem, positive relationships, and unlimited futures.

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