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Commentary

Learning disabilities: The need for neuropsychological evaluation

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Abstract

A learning disability (LD) is a neurobiological disorder that presents as a serious difficulty with reading, arithmetic, and/or written expression that is unexpected, given the individual's intellectual ability. A learning disability is not an emotional disorder nor is it caused by an emotional disorder. If inadequately or improperly evaluated, a learning disability has the potential to impact an individual's functioning adversely and produce functional impairment in multiple life domains. When a learning disability is suspected, an evaluation of neuropsychological abilities is necessary to determine the source of the difficulty as well as the areas of neurocognitive strength that can serve as a foundation for compensatory strategies and treatment options.

Keywords: Learning disabilities; Neuropsychological assessment; Neuropsychological testing

1. What is a learning disability?

A learning disability is recognized by medical and mental health professionals as a neurobiological disorder of cognitive and/or language processing caused by atypical brain functioning. As a consequence of the brain dysfunction, the manner in which individuals with learning disabilities process and acquire information is different from the typical functioning expected for a child or adult who can learn without great difficulty. A learning disability may present academically in the areas of word decoding or identification, reading comprehension, calculation, mathematical reasoning, spelling, and/or written expression. Frequently, a learning disability is associated with atypical functioning in the area of spoken language, as well.

A learning disability that is demonstrated in an academic setting may have associated consequences in other contexts. For example, an individual's daily activities in the home may be affected because of the potential for poor memory, poor reasoning, or poor problem solving associated with the neurobiological problem. Additionally, social relationships and/or emotional functioning may be adversely affected because the individual's cognitive processing deficits cause him or her to make mistakes in thinking or behaving and/or to misunderstand the behavior of others (Rourke, 1995; Tsatsanis, Fuerst, & Rourke, 1997).

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Learning disabilities may co-exist with various conditions including attention-deficit/hyperactivity disorder (ADHD), behavioral disorders, sensory impairments, or other medical or neurological conditions, including sickle cell disease, diabetes, low birth weight, neonatal heart surgery, acute lymphoblastic leukemia, and hydrocephalus (Breslau, Chilcoat, Johnson, Andreski, & Lucia, 2000; Dalen, Bruaroy, Wentzel-Larsen, Nygaard, & Laegreid, 2006; Eiser & Tillman, 2001; Jameson, 2006; Shillingsford & Wernovsky, 2004; Wang, 2007). Although having a learning disability can cause the individual to become depressed or anxious because of poor performance and/or social difficulties, a learning disability is not an emotional disorder nor is it caused by an emotional disorder.

2. Sources of learning disabilities

There are many types of atypical brain functioning that can cause a learning disability. Not all of the variations have been identified and categorized. For example, dyslexia is a frequently occurring learning disability that affects reading and spelling. Research has shown that atypical brain functions involved in auditory-linguistic processing (e.g., phonological processing and rapid automatized naming) are found in many individuals with dyslexia (Shaywitz et al., 2002; Wolf, Bowers, & Biddle, 2000). Evidence exists that phonological processing and rapid automatized naming are core processes that predict reading skills (Kirby, Parrila, & Pfeiffer, 2003). However, some individuals with dyslexia have structural differences in their visual systems in the brain (Eden et al., 1996). The effects of visual-spatial deficits upon learning may extend to other skills. Dyscalculia is a learning disability that affects mathematical calculation and/or math problem solving. Investigations are underway to determine the various kinds of atypical brain functions that cause dyscalculia. The dyscalculia research that utilizes neuroimaging is not as extensive as the dyslexia research, but studies of neurocognitive processes clearly have documented specific types of brain dysfunction (Swanson & Beebe-Frankenberger, 2004; Wilson & Swanson, 2001). Some subtypes of dyscalculia are a consequence of the auditory-linguistic deficits that also cause dyslexia while other subtypes may be a product of visual-spatial dysfunction (Hecht, Torgesen, Wagner, & Rashotte, 2001).

3. Need for appropriate evaluation

The criteria for diagnosing a learning disability are changing, as educational policies change and research findings accumulate. However, the fact that a learning disability represents atypical brain functioning is not in dispute. Therefore, when an individual is struggling in school or in daily life and a learning disability is suspected, an evaluation of his or her neurocognitive abilities is necessary to determine which brain functions are not working as expected and which brain functions are working adequately and reliably. A neuropsychological evaluation can provide the breadth required to evaluate the specific functions that are often involved in learning disabilities, such as auditory-linguistic abilities, visual abilities, memory, processing speed, cognitive efficiency, and reasoning. Furthermore, a neuropsychological evaluation can assess functions that either enhance or detract from the individual's overall performance, such as attention or motor and sensory abilities. Broad assessment provided by a neuropsychological evaluation allows identification of strengths and weaknesses, which are both critical for determining areas of intervention. Measurement of response to intervention, the focus of current diagnostic approaches in the U.S., cannot replace a comprehensive neuropsychological evaluation (Posny, 2007).

Fundamental information about verbal and visual abilities can be obtained from a comprehensive test of intelligence (IQ) interpreted by a qualified professional. Public schools employ professionals who are qualified to administer and interpret IQ tests. However, many private schools and colleges do not employ professionals trained to administer and interpret IQ tests. Furthermore, it is quite unusual for a private school or college to employ a professional qualified to administer and interpret neuropsychological tests. With regard to professionals qualified to administer and interpret neuropsychological tests in the public schools, it is not safe to assume that such a person is employed at a given school. The situation must be investigated on a school-by-school or case-by-case basis. In the same manner that certain medical specialists must be sought outside the network of primary care providers for healthcare, professionals trained to conduct neuropsychological evaluations may need to be involved in the evaluation and care of children and adults for whom the school or college has no in-house expert.

Limited testing, consisting only of IQ testing and assessment of achievement levels, does not provide sufficient information about the child's or adult's brain functioning to enable the best standard of care and most relevant/targeted interventions to be provided. Neuropsychological evaluation for the purpose of examining and clarifying relevant

brain functions may be a medical necessity in the case of an individual with a learning disability. Neuropsychological evaluation is particularly critical if other medical conditions exist, but it is equally useful when no underlying medical condition is recognized. Prudent insurance providers are advised to determine if the necessary services can be provided by a qualified professional in the individual's school. When a qualified neuropsychologist is not available in the school, completion of the neuropsychological evaluation in a clinical setting is necessary.

A learning disability is a lifelong condition. The impact of the disability on the person's social, emotional, educational, and occupational functioning can be significant, depending upon life circumstances, interpersonal relationships, and individual strengths and weaknesses. The impact on society may be significant, as well. Children with learning disabilities perform more poorly in school and they are less likely to obtain a high school diploma. In adulthood, learning disabilities can have an adverse effect upon occupational functioning. Early identification of neuropsychological strengths and limitations can facilitate educational, vocational, and treatment planning. Appropriate evaluation should be provided in every case.

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