

Chapter 2

Medical Conditions Associated with NLD

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ABSTRACT

The pattern of neuropsychological assets and deficits that characterize a nonverbal learning disability (NLD) is evident in a wide variety of neurological diseases and dysfunctions. Numerous studies that have focused on neuropsychology, development, and cognition have resulted in a hierarchy of disorders and disabilities. Research has found that hydrocephalus related to spina bifida, and other neurological conditions, predispose the individual affected to an NLD. This chapter is organized to reflect the extent to which certain biological conditions give rise to the features characteristic of NLD with a three-level hierarchy wherein level 1 disorders are the closest phenotypically to NLD. Discussion then moves to levels 2 and 3 where presentations of the syndrome are less obvious. Characteristic features of each disorder, relevant research findings, and the involvement of damaged, destroyed, or dysfunctional white matter in manifestation of the NLD syndrome are discussed.

INTRODUCTION

Research has found that certain conditions predetermine a nonverbal learning disability (NLD). In individuals with NLD, functional deficits usually coexist with fluent speech, which causes a misleading profile for educational, medical, and allied health professionals. The overarching goal of this chapter, written in accessible language to suit a range of audiences, is to describe the neurological conditions that predispose individuals to exhibit features of an NLD. Objectives are to inform educators, pediatricians, school psychologists, neuropsychologists, occupational therapists, psychiatrists, and government disability service providers about the behavioral characteristics that may accompany these disorders. It is anticipated that in the future, behavioral features of NLD presented by individuals in class and consultation rooms will lead to prompt identification, comprehensive assessment, and appropriate interventions.

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BACKGROUND

An NLD is a silent, serious, and complex developmental disability that persists into adulthood. It is believed to be caused by damage, disorder, or destruction of neuronal white matter in the brain's right hemisphere and may be seen in persons suffering from a wide range of neurological diseases such as hydrocephalus, spina bifida, and other types of brain injury (Semrud-Clikeman & Fine, 2011). Tsatsanis and Rourke (1995b) hypothesized that developmental disorders "fall along a continuum of neurodevelopmental disease," each disorder displaying different degrees of severity contingent upon a "proposed relationship to white matter dysfunction" (p. 476). Difficulties with right-hemisphere functions are believed to be at the core of an NLD (Collins & Rourke, 2003; Fletcher, Brookshire, Bohan, & Timothy, 1995; Harnadek & Rourke, 1994; Mapou, 2008; Roman, 1998; Rourke, 1995a; Rourke, 1989; Rourke, van der Vlugt, & Rourke, 2002; Thompson, 1997). Based on Goldberg and Costa's (1981) literature review, which concluded that the right cerebral hemisphere contains relatively more white matter than the left, Rourke (1995) viewed the cognitive and behavioral deficits that characterize NLD as being consistent with impaired integration of information within and between cerebral hemispheres.

The human brain has two cerebral hemispheres that govern behavior, thinking, emotions, and understandings. Rourke (1989) suggested the evidence is strongest for a disturbance in the right hemisphere because individuals with NLD experience great difficulty adapting to situations that demand integration of messages from the senses. This, along with visual memory and facial recognition for social competence, has been frequently linked to right-hemisphere functions (Liddell & Rasmussen, 2005). It is recognized that both hemispheres are suited for different types of processing and typically complement each other in functioning (Goldberg & Costa, 1981). Since 1987, Goldberg and Costa's (1981) theory, on which Rourke's explanation of NLD is based, has been extensively investigated and developed. Rourke (1995a) clearly delineated the right hemisphere's ability to deal with unusual demands for which an individual has no previously learned behavior in his or her "cognitive repertoire" from the left hemisphere's ability to handle routine, mechanical tasks once "assembled" by the right hemisphere (p. 482; Heilman & Van den Abell, 1980). By contrast, the left hemisphere efficiently handles well-practiced tasks such as rote-learned spelling and scripts. The following discussion focuses on Rourke's (1989) theorized cause of NLD based on the Goldberg and Costa (1981) investigations of human adults and the role of white matter damage in manifestation of the NLD syndrome. Explication of the white matter model will thus provide a foundation for subsequent description of the various disorders.

White Matter Model

From 1987 to 1988, Rourke developed the white matter model to account for the assets and deficits believed to characterize all children who display the NLD syndrome (Rourke, 1989, p. 18). Although neuroscientists are not in complete agreement about the cause of the syndrome, Rourke's (1995a) white matter, right hemisphere deficit hypothesis is commonly accepted as a way to understand the syndrome's development and presentation (Vacca, 2001, p. 27). Rourke (1989) described three key aspects of the white matter model:

1. The more dysfunctional or damaged the white matter is, the bigger the chance an NLD will be present.

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