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What do diagnostic test data tell us about differences in the profiles of children diagnosed with reading disability or language impairments?

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ABSTRACT

A detailed evaluation of a child's strengths and weaknesses allows for a valid and reliable diagnosis of reading disability for the selection of optimal intervention practices. Using archival data from a clinic that specialized in the diagnosis of reading disabilities, we compared the performance of 60 children diagnosed with specific reading disability (SRD) and 31 children with language impairments and reading disability (LIRD) on measures of cognitive reasoning, verbal ability, phonological manipulation, rapid serial naming, and phonological memory. While the SRD and LIRD groups did not differ in their phonological processing, children with LIRD performed significantly below their peers with SRD on thinking ability and verbal ability measures. Rapid naming skills served as current predictors of text reading fluency and verbal ability skills served as concurrent predictors of reading comprehension in both groups. These findings highlight the need for reading diagnosticians to conduct comprehensive evaluations using a range of cognitive and language processes to ensure the most accurate and specific diagnoses of children with reading disabilities.

Learning outcomes: Readers will be able to (a) describe general characteristics of reading disabilities, (b) differentiate features of two learning disabilities, specific reading disability and language impairments and reading disability, and (c) identify key clinical issues and approaches for identification, diagnosis, and intervention of these two diagnostic profiles.

1. Introduction

The term "learning disability" refers to a group of neurobiologically-based learning difficulties that represent a heterogeneous group of learners who have difficulties in academic domains (Fletcher, Lyon, Fuchs, & Barnes, 2006). Learning disabilities manifest in one or more of the following areas: (1) oral expression; (2) listening comprehension; (3) written expression; (4) basic reading skill; (5) reading comprehension; (6) mathematics calculation; and (7) mathematic reasoning (U.S. Office of Education, 1977). Currently 2.3 million students between 6 and 21 years of age in the USA are identified as having learning disabilities (U.S. Department of Education, 2011).

Specific reading disability (also known as developmental dyslexia) is the most common learning disability and is characterized by difficulty reading despite adequate intelligence and opportunity to learn (Snowling, 2000). Many studies

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have found that a large percentage of children diagnosed with specific reading disability have both reading *and* oral language deficits. For example, McArthur, Hogben, Edwards, Heath, & Mengler, 2000 reported in a series of three studies that approximately 55% of children who were diagnosed with specific reading disability exhibited impairments in both reading and oral language. Likewise, Tomblin, Zhang, Buckwalter, and Catts (2000) found that children diagnosed with language impairments were six times more likely to have a reading disability than children without a language impairment. These findings question the homogeneity in the reading disability group and emphasize the need for further studies using specific classification in the group (Bishop & Snowling, 2004; Snowling, 2000). Thus, in this study, we compared children who have disabilities only in reading (SRD; specific reading disability/dyslexia) and children who have both oral language and reading disabilities (LIRD; language impairment/reading disability).

1.1. Phonological skills of children with SRD and LIRD

A large body of evidence shows that phonological processing skills are closely related to reading impairments (Scarborough, 1998; Snowling, 2000; Vellutino, Fletcher, Snowling, & Scanlon, 2004). Phonological processing refers to the awareness and use of the sound structure of language (Wagner, Torgesen, & Rashotte, 1994). Three phonological processing skills have been associated with reading achievement: phonemic awareness, rapid serial naming, and phonological working memory (Wagner et al., 1997). Phonemic awareness is the most widely studied set of skills and represents the ability to manipulate sounds in words by blending, segmenting, and transposing phonemes in words. Evidence from studies of typical readers and children with reading disabilities supports the close relationship between phonemic awareness and reading skill (e.g., Share, 1995; Share, Jorm, Maclean, & Matthews, 1984; Tunmer & Nesdale, 1985). Rapid serial naming skill is the ability to quickly access the phonological forms of a closed set of familiar stimuli (e.g., letters and digits). Deficits in rapid serial naming are also very closely associated with reading disabilities (e.g., Cutting & Denckla, 2001; Denckla & Rudel, 1976; Powell, Stainthorp, Stuart, Garwood, & Quinlan, 2007). Lastly, phonological working memory is defined as the capacity to store and retrieve phonological information from temporary storage. Efficient phonological encoding enables readers to efficiently recall words, phrases, and sentences (e.g., Cohen-Mimran & Sapir, 2007; Swanson, Howard, & Saez, 2006).

Traditionally, the two learning disabilities (SRD and LIRD) have been studied separately (Fraser, Goswami, & Conti-Ramsden, 2010). Gradually, however, researchers began to address the overlap in phonological processing skills in these two disorders (Larkin & Snowling, 2008). For example, in a longitudinal study, Catts, Adlof, Hogan, and Weismer (2005) compared phonological processing skills in children with SRD and children with LIRD. The 527 children's phonological awareness and phonological memory skills were measured in second, fourth, and eighth grades. Children with SRD and children with LIRD did not differ on the phonological processing tasks in any of the grades tested. Similarly, Eisenmajer, Ross, and Pratt (2005) reported no significant differences in the performance of the 7–12 year old children with SRD and children with LIRD on tasks of phonological awareness. The similarly in phonological processing deficits across these two groups have led some researchers to conclude that specific reading disability is a language impairment. (Kamhi & Catts, 1989).

1.2. Non-phonological language skills and cognitive ability of children with SRD and LIRD

In a seminal paper on comparing children with SRD and those with LIRD, Bishop and Snowling (2004) argued cogently for examining nonphonological language skills when attempting to distinguish and differentiate the two groups. They suggested that while children with SRD and children with LIRD perform similarly on phonemic tasks such as segmenting and elision, they differ on nonphonological tasks that represent knowledge of words' meanings that tap into higher cognitive level of language. Fraser et al. (2010) compared the performance of 9- to 11-year-old children diagnosed with either SRD or LIRD on tasks of nonphonological language skills. Children with LIRD performed significantly poorer than those with SRD on most nonphonological language tasks including picture vocabulary, semantic fluency (word association), and semantic relations. These data support Bishop and Snowling's thesis that the groups may in fact differ on specific types of language measures - those that tap into higher level language processes.

Cognitive ability has long been considered to contribute to both spoken language (Bishop, 1994; Ullman & Pierpont, 2005) and reading impairments (Johnson, Humphrey, Mellard, Woods, & Swanson, 2010; Swanson & Alexander, 1997). For example, Montgomery, Magimairaj, and Finney (2010) reviewed literature regarding the cognitive abilities in children with language disabilities and reported language-impaired children often exhibit deficits in working memory, (e.g., Weismer, Plante, Jones, & Tomblin, 2005), attentional capacity (e.g., Archibald & Gathercole, 2006), and processing speed (e.g., Leonard et al., 2007) and many of these same deficits have been associated with children diagnosed with reading disability (Berninger, Raskind, Richards, Abbott, & Stock, 2008; McGrath et al., 2011). Hence, specific cognitive processes including reasoning, memory, and attention, have been found to be associated to reading and oral language.

1.3. The present study

Previous research comparing children with SRD and LIRD has shown that phonological processing skills, non-phonological language skills, and cognitive ability are involved in reading and language disabilities. However, the majority of the research has been limited to the assessment of only one or two of these skills. This study examined all variables together