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# Different Perspectives on the Interface of Dyslexia and Language: Introduction to the Special LLD Issue on Dyslexia and Language

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Current psycholinguistic studies of language development beyond early childhood reflect important changes in morphosyntax, lexicon, and discourse (Berman, 2004; Nippold, 2007; Ravid, 2004, 2006). These developments in school-age language knowledge go hand in hand with increased command of metalinguistic abilities and access to higher order, nonliteral language (Karmiloff-Smith, 1986; Nippold & Taylor, 2002; Tolchinsky, 2004), which foster explicit thought about language and enables academic discourse. Such advanced linguistic could not have been achieved without the platform of reading and writing (Berman & Ravid, 2008). The written mode of expression is certainly the hallmark of linguistic literacy, occupying a privileged cognitive position for maturely literate individuals. It involves both reading—gaining information from written texts (Perfetti, 2007)—and writing, drawing on cognitive resources such as memory, executive functions, and top-down processing (Steinberg, 2005).

The current special issue focuses on language and literacy abilities in children, adolescents, and adults with reading disorders and developmental dyslexia, for whom the advantages of advanced language resources may not be as readily accessible as for normally reading individuals. The rich tapestry of languages, orthographies, and age groups woven in the special issue constructs an up-to-date picture of the crucial linkage between reading and spelling disability and impaired linguistic knowledge. The issue includes six articles on a Germanic language (English), two Romance languages (French and Portuguese), the Greek language (its own branch of the Indo-European languages), and Hebrew, a Semitic language, examining three different orthographies—Latin, Greek, and Hebrew scripts. From a participant's perspective, the special issue articles trace learning and processing of written and spoken language in a wide variety of age groups, starting with preschoolers, across of the school years, and ending with university students. The populations investigated in the special issue articles all suffer from reading and spelling disabilities, often with additional problems of oral language impairment. We were thus able to examine the issue of dyslexia and language in an ecologically valid way and from a variety of perspectives.

Developmental dyslexia (DD) is defined as a specific functional failure to acquire the age-appropriate reading skills in otherwise normally developing children (Curtin, Manis, & Siedenberg, 2001). One well-known factor that impedes normal reading acquisition in people with dyslexia is phonological. People with dyslexia typically exhibit persisting difficulties in phonological decoding (Høien & Lundberg, 2000; Stanovich, 1990), manifested in poor performance in nonword repetition (e.g., Snowling, 1981) and nonword reading (e.g., Rack, Snowling, & Olson, 1992). Many studies on the impact of poorly specified phonological representations in individuals with DD focused on English (Hulme & Snowling, 1992; Snowling, 2001; Swan & Goswami, 1997). At the same time, cross-linguistic studies on DD suggest the importance of differences among orthographic systems as mediating the impact of phonological deficits (Defior, Martos, & Cary, 2002; Seymour, Aro, Erskine, & the COST Action Group, 2003). According to these studies, consistency in the letter-sound relationship facilitates reading skill acquisition (Plaut, McClelland, Siedenberg, & Patterson, 1996) so that reading development among children with dyslexia might reflect differences in the orthographic complexity of the writing system and indicators of dyslexia may vary according to the type of orthography (Ziegler & Goswami, 2005). In languages with a more transparent orthography, such as Spanish or German, dyslexia seems to involve less severe deficits than among readers of more opaque orthographies such as English (Serrano & Defior, 2008). Similar results were found in studies of Italian (Paulesu et al., 2001; Tressoldi, Stella, & Faggella, 2001), Dutch (de Jong & van der Leij, 2003), French (Sprenger-Charolles, Cole, Kipffer-Piquard, Pinton, & Billard, 2009), Greek (Constantinidou & Stainthorp, 2009), Portuguese (Sucena, Castro, & Seymour, 2009), and Hebrew

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(Schiff, in press). However, these studies also suggest that across different languages, individuals with dyslexia suffer from slow phonological recoding speed in ways that do not differ significantly across orthographies.

Against this background, the article by Beattie and Manis (“Rise Time Perception in Children With Reading and Additional Nonphonological Language Difficulties”) investigates a particular facet of segmental phonology in English, namely, rise time, referring to the rate of change of amplitude at the vowel onset, linked to the creation of accurate lexical representations. According to Beattie and Manis’s review, children with dyslexia do less well than same-age peers on measures of rise time perception, indicating a developmental delay regarding prosodic sensitivity related to reading disability. Similar problems have been found in individuals with language impairment. Their current article studied rise time sensitivity in children and adolescents with dyslexia compared with chronological age-matched, typically developing peers and children with a specific reading deficit. Results showed that rise time perception was impaired in participants with reading difficulties and/or with language impairment in comparison to the typically developing, normally reading children. In-depth analyses and group heterogeneity indicated that an insensitivity to rise time may be a marker of reading impairment, but it may not play a causal role in the development of reading difficulties. This study about a novel aspect of phonological awareness points the way toward further studies investigating in what ways a rise time deficit could lead to both reading and language difficulties.

Phonology is not the only factor distinguishing the abilities of individuals with dyslexia from that of people with normal reading abilities. Lexical knowledge and grammatical abilities seem to be challenged in children and adolescents with dyslexia (Ben-Dror, Bentin, & Frost, 1995; Snowling, Gallagher, & Frith, 2003)—suggesting an underlying linguistic impairment. Morphology and syntax show impairment in individuals with DD (Hauerwas & Walker, 2003; Nippold, 2002; Rispens, McBride-Chang, & Reitsma, 2008), with adverse impact on lexical development (Nagy, Berninger, & Abbott, 2006; Schiff & Raveh, 2006, 2011; Schiff & Ravid, 2007; Schiff, Schwartz, & Nagar, 2011). The literature review in the Beattie and Manis article as well as their results suggest possible shared problems between reading disability and oral language impairment. This is the topic of three of the articles in this special issue: the articles by Casalis, Leuwers, and Hilton (“Syntactic Comprehension in Reading and Listening: A Study With French Children With Dyslexia”); by Schiff and Ravid (“Morphological Processing in Hebrew-Speaking Students With Reading Disabilities”); and by Robertson, Joanisse, Desroches, and Terry (“Past-Tense Morphology Deficits in Children With Dyslexia”). Casalis et al. discuss the centrality of syntax in

demands on working memory resources (notoriously poor in poor readers’ working memory capacity for language) and the special status of inflectional suffixation in the syntactic comprehension of spoken and written French. Their article examines different hypotheses relating to people with dyslexia’s deficits in syntactic processing based on the comprehension of center-embedded relative clauses. They find a syntactic deficit in French children with dyslexia compared to their chronological age peers in both reading and listening comprehension, with a discrepancy between the written and spoken modalities. According to the authors, this suggests that poor syntactic comprehension by people with dyslexia is due to an overload of working memory during sentence processing.

More evidence regarding poor grammatical abilities in individuals with dyslexia is provided by the Schiff and Ravid article, which highlights morphological production of noun and adjective plural inflection in adult speakers of Hebrew with dyslexia in comparison with normally reading peers and younger, reading-matched controls (sixth graders). The study found that university students with dyslexia tended to be slower and less accurate regarding both noun pluralization and adjective agreement marking, with more pronounced differences in the challenging domains of irregular suffixes and nouns with a stem change. Moreover, the adults with dyslexia did significantly worse than the sixth graders on accuracy of adjective agreement and required stem changes to nouns. The authors conclude that in Hebrew, a language requiring many pairings of morphophonologically related forms, individuals with dyslexia achieve less coherent and less stable lexical representations than even their much younger reading peers.

A third study by Robertson et al. combines the assessment of phonological and morphological difficulties in dyslexic children compared with children with oral language impairment. The article was based on the growing evidence that children with dyslexia also have difficulty with grammatical morphology and tested whether past-tense processing difficulties in dyslexia resemble those in children with language impairments (LI). Indeed, children with dyslexia showed similar deficits as the children with LI at forming the past-tenses of regular and irregular verbs, although unlike the LI group they did not show deficits for nonword verbs. The authors tentatively conclude both disorders might involve similar—but not identical—morphosyntactic deficits.

Taken together, the three articles on morphological and syntactic problems in children and adults with dyslexia in widely differing languages strongly suggest a link between linguistic deficiencies and dyslexia that should be taken up in further studies.

The final two articles of the special issue highlight a third domain of relevance to deficits in children with dyslexia, that

of spelling. Recent studies show that learning to spell relies to a great extent on linguistic knowledge—though not to the same extent in every language and every orthography (Ravid, 2012). Research relates diminished morphological abilities to the spelling of derived words in individuals with dyslexia (Deacon, Parrila, & Kirby, 2006; Tsesmeli & Seymour, 2006). For example, Bourassa and Treiman (2008) found that older children with dyslexia performed similarly on morphological analysis of complex stems in spelling as younger, typically developing children. Research on children with poor reading performance shows less efficient use of morphological cues, though they do not deviate from normal spelling patterns (Cassar & Treiman, 2004). A similar difficulty in using morphological information for spelling is shared by older children with dyslexia and younger controls of the same spelling level (Bourassa, Treiman, & Kessler, 2006). In production tasks, children with reading and spelling deficits produced fewer and less accurate morphologically complex words in their spontaneous writing, were more likely to omit inflections, and were less sensitive to the internal phonological and morphological structure of words in writing (Carlisle, 1996; Egan & Pring, 2004).

In the current special issue, the article by Tsesmeli and Koutselaki (“Spelling Performance and Semantic Understanding of Compound Words by Greek Students With Learning Disabilities”) investigates the spelling and comprehension of compound Greek words in primary school students with and without spelling disabilities. Findings indicate that poor spellers not only had significantly lower scores on spelling compounds, they also performed less well on comprehending abstract words than did their typically developing classmates. The authors conclude that spelling-disabled children are deprived in spelling compounds and in understanding of their complex internal structure, thus relating lowered spelling ability with morphological disability.

Adding the final note to this assembly of literacy studies on the relationship between dyslexia and language is the article by Kessler, Pollo, Treiman, and Cardoso-Martins (“Frequency Analyses of Prephonological Spellings as Predictors of Success in Conventional Spelling”), which explores how Portuguese-speaking Brazilian children’s prephonological writing foretells differential learning outcomes in primary school. Prephonological spellings have been shown to use letters and letter combinations with relative frequencies that approximate the frequencies with which such letters and combinations appear in children’s books. The current article shows that even before children learn the idea that letters in their spellings should represent sounds, they learn the statistical properties of text in their environment. According to the authors, adept statistical learning may account for skills required for later spelling performance and could help identify preschoolers who are potentially at risk of low spelling performance in primary school. This final contribution to the special issue anchors it

not only in models of language and literacy disorders but also embeds it in a general framework of gaining control of a knowledge system that relies on mining patterns and generalizations from a vast amount of seemingly unrelated spoken and written language data.

According to Slobin (2003), “human beings spend a large portion of their time in linguistic behavior of one sort or another—that is, we are creatures that are almost constantly involved in preparing, producing, and interpreting verbal messages” (p. 157). We hope that this special issue has made some contribution to the understanding of dyslexia as a linguistic disorder and paved the way to innovative assessment and treatment methods tailored for the needs of individuals speaking, reading, and writing different languages and facing different challenges.

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