Research in Developmental Disabilities 51-52 (2016) 89–102

Contents lists available at ScienceDirect

Research in Developmental Disabilities

Vocabulary skills are well developed in university students with dyslexia: Evidence from multiple case studies

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ARTICLE INFO

Article history:
Received 21 July 2015
Received in revised form 6 November 2015
Accepted 8 January 2016
Available online 23 January 2016

Keywords:
University students with dyslexia
Vocabulary breadth
Vocabulary depth
Rasch model
Multiple-case studies

ABSTRACT

Most studies in adults with developmental dyslexia have focused on identifying the deficits responsible for their persistent reading difficulties, but little is known on how these readers manage the intensive exposure to written language required to obtain a university degree. The main objective of this study was to identify certain skills, and specifically vocabulary skills, that French university students with dyslexia have developed and that may contribute to their literacy skills. We tested 20 university students with dyslexia and 20 normal readers (matched on chronological age, gender, nonverbal IQ, and level of education) in reading, phonological, vocabulary breadth (number of known words), and vocabulary depth (accuracy and precision) tasks. In comparing vocabulary measures, we used both Rasch model and single case study methodologies. Results on reading and phonological tasks confirmed the persistence of deficits in written word recognition and phonological skills. However, using the Rasch model we found that the two groups performed at the same level in the vocabulary breadth task, whereas dyslexics systematically outperformed their chronological age controls in the vocabulary depth task. These results are supplemented by multiple case studies. The vocabulary skills of French university students with dyslexia are well developed. Possible interpretations of these results are discussed.

What does this paper add?

This study looked at strengths of university students with dyslexia, an innovative approach in comparison to the majority of studies, which describe only the deficits of these readers. We investigated whether the development of one oral language skill, namely vocabulary skill, is preserved in university students with dyslexia. We then examined vocabulary breadth and depth using both quantitative (using the Rasch model) and case study methodologies. The demonstration that vocabulary skills are potential compensatory reading skills in this population is its novel contribution.

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http://dx.doi.org/10.1016/j.ridd.2016.01.006
0891-4222/

1. Introduction

The majority of studies conducted with university students with dyslexia have attempted to identify the deficits responsible for their persistent reading difficulties, while only a few have looked at these readers' strengths (Leong, 1999; as well as Elbro & Arnbak, 1996, for adolescents with dyslexia). And yet such analyses could shed considerable light on the question of how these readers manage to read successfully. According to Gough and Tunmer's (1986) "simple" view of reading, reading comprehension skills depend on both written word recognition and oral comprehension. Research on these readers has shown persistent deficits in written word recognition (see the meta-analysis of Swanson & Hsieh, 2009) and in several forms of phonological processing that are involved in reading, such as phonological awareness, phonological short-term memory, and rapid access to phonological word representations. Neuroimaging studies have confirmed the presence of phonological deficits (for a review see Richlan, Kronbichler, & Wimmer, 2011) and results suggest that this cognitive deficit arises from congenital dysfunction in certain cortical areas involved in phonology and reading. Studies demonstrating the impairment of both written word recognition and phonological skills in university students with dyslexia have given no indication on how these adults manage the intensive exposure to written language required to obtain a university degree.

Importantly, it has often been argued that children with developmental dyslexia are able to compensate for their reading problems (Bruck, 1992; Snowling, 2000). The model of Bishop and Snowling (2004) is of particular interest: they propose that differences in the balance between phonological and nonphonological skills (e.g., semantics, reading comprehension, ability to use linguistic context…) may account for different profiles of reading and spelling impairments. For instance, dyslexia and specific language impairment (SLI) are represented on a two-dimensional space where individuals with dyslexia may present impaired phonological skills but unimpaired nonphonological skills, while those with SLI may present impairments on both language skills that affect learning to read. Furthermore, this model leaves open the possibility that readers who face difficulties can develop and use compensatory skills. According to the model, students with dyslexia may therefore rely more on their available unimpaired cognitive resources to offset their decoding difficulties. The main objective of the present study is to identify certain skills, and specifically vocabulary skills, that French university students with dyslexia have developed, and that may have contributed to the development of their literacy skills, thus allowing them to successfully pursue studies at the university level.

Some studies suggest that written word recognition and reading comprehension are weakly associated in adults with dyslexia. It has been shown that university students with dyslexia can attain a level of written comprehension comparable to normal adult readers of the same chronological age (Bruck, 1990; Lefly & Pennington, 1991; Miller-Shaul, 2005; Parrila, Georgiou, & Corkett, 2007), particularly when time constraints are removed (Lesaux, Pearson, & Siegel, 2006). Interestingly, Ransby and Swanson (2003) showed that the reading comprehension of these readers is mainly explained by oral comprehension, rather than written word recognition. A regression analysis showed that the reading comprehension performance of university students with dyslexia was mediated not only by phonological processing but also by several other key cognitive processes, such as oral comprehension and vocabulary skills. Crucially, using regression analyses in a sample of unimpaired children (in Grades 1 and 6), Ouellette and Beers (2010) showed that vocabulary predicted both decoding and reading comprehension in Grade 6 but not in Grade 1, with a stronger contribution to reading comprehension. In addition, using structural equation modeling in a large sample of skilled adult readers, Guo, Roehrig, and Williams (2011) showed that vocabulary knowledge was the most important factor in reading comprehension, and highlighted the relevance of measures of vocabulary in explaining individual differences in reading (Ouellette & Shaw, 2014). Taken together, these results suggest that oral vocabulary plays a greater role, and decoding a lesser role, in explaining the reading comprehension of more proficient readers. It is therefore important to consider variables other than written word recognition and phonological processing in order to understand how adults with dyslexia are able to use other skills to compensate for their deficits and attain a high level of reading comprehension.

Recently, the role of oral language skills in explaining reading performance has been increasingly emphasized. Vocabulary knowledge, a key component of oral language skills, is now considered an essential component of reading performance both in normally developing readers (Ouellette, 2006; Ouellette & Beers, 2010; Tunmer & Chapman, 2012) and in skilled adult readers (Guo et al., 2011). Evidence has been presented that preserved semantic skills may be used as a compensatory strategy in reading development in dyslexia (Elbro & Arnbak, 1996; Quémart & Casalis, 2015; Snowling, 2000). Snowling and colleagues, notably, have suggested that dyslexic readers may be able to compensate for decoding deficits to some extent by relying on semantics and/or contextual cues to support decoding processes (Bishop & Snowling, 2004), probably by using intact oral language skills to "bootstrap" impaired decoding process (Hulme & Snowling, 1992; Nation & Snowling, 1998). In adults, only a few studies have evaluated the semantic skills of university students with dyslexia by assessing vocabulary knowledge. Some have done so in order to characterize the verbal performance of individuals with dyslexia and their control group, while others have used vocabulary as a control variable to match control and dyslexic participants. It is not clear from these studies whether or not dyslexics in fact show a deficit in vocabulary skills. Two components of vocabulary skills can be distinguished (Ouellette & Beers, 2010; Ouellette & Shaw, 2014): vocabulary breadth and vocabulary depth. Breadth is the quantitative dimension of vocabulary: it consists in the number of words forms stored in the vocabulary system, and is typically assessed by tests such as the PPVT (Dunn & Dunn, 1981). Depth is the qualitative dimension of vocabulary: the extent of word meaning or semantic knowledge, as in the vocabulary subtest of the WAIS-3 (Wechsler, 1997) or the BNT (Kaplan, Goodglass, & Weintraub, 1983).