Editorial

Advances in Developmental Dyslexia Research: Diversity, Specificity and Intervention

Avances en la investigación sobre la dislexia evolutiva: diversidad, especificidad e intervención

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The aim of this special issue is to offer a necessarily limited, but meaningful perspective on recent advances in research on developmental dyslexia. The papers presented combine great theoretical value with practical applications. The studies by Sprenger-Charolles and Pernet, Dufor and Démonet approach the diversity of dyslexia from different perspectives, whereas the paper presented by Serniclaes follows the opposite strategy. It presents allophonic perception as a deficit specific to dyslexia. Explaining the variability and specificity of dyslexia is a genuine challenge within current scientific research. Four other contributions complete this monograph, and are presented in a given order to fulfil certain didactic aims. The first two papers focus on diagnosis. Carrillo, Alegría, Miranda and Sánchez present part of a battery for evaluating dyslexia in Spanish, while Luque, Bordoy, Giménez, López-Zamora and Rosales support the diagnostic value of a set of tasks related to speech perception. The last two papers clearly offer new approaches to difficulties in learning to read and write in the context of intervention. Jiménez, Baker, Rodríguez, Crespo, Artiles and Afonso present a Response to Intervention (RTI) system applied within the State Education system in the Canary Islands. Gómez, Defior and Serrano describe in detail the basis and structure of an intervention program on reading fluency, which has rarely been addressed in the Spanish literature. We now describe these contributions in more detail.

Sprenger-Charolles takes a cross-linguistic approach to the different dyslexia profiles. Surface and phonological profiles, based on the double route model, are used to establish differences between languages with different levels of orthographic consistency (English, French, and Spanish). After a critical review of the methodology, the author emphasizes the advantage of the classic method over the regression method, due to the latter being less reliable. She also supports the usefulness of assessing accuracy as well as speed to identify the dyslexics’ reading deficit. Use of the classic method under the best methodological conditions, while taking accuracy and speed into account, shows there is a predominance of mixed profiles, followed by phonological and surface profiles, with few differences between languages. However, under less optimal conditions, dissociated profiles dominate and the ratio of phonological to surface profiles varies between languages. The author supports a phonological deficit, without clear-cut limits between subtypes, which is very stable across languages. This conclusion is very similar to that of Ziegler, Castel, Pech-Georgel, George, Alario and Perry (2008) who used a computer simulation, where individual profiles were simulated by adding noise to different skill components. As Ziegler et al. (2008) point out, the distinction between surface and phonological dyslexics is not related to clear-cut differences between deficient lexical processing versus deficient non-lexical process-
ing. These two processing deficits (lexical versus non-lexical) suggest different approaches to both profiles. However, a multifactorial approach is compatible with a primary simple deficit that will unfold into different deficits during development. However, are we returning to the uniqueness and invariance of specific reading disorders? Or do we lack a sufficiently reliable and powerful method to reveal clear-cut differences between phonotactics and linguistic contexts?

Multiplicity is the core of Pernet, Dufor and Démonet’s paper. Their basic idea is that we should be aware of a paradox between what is assumed to be a pure reading deficit, according to the definition of dyslexia, and the multiple deficits associated with this disorder. The following question arises: how could a pure reading deficit account for the fact that in relation to dyslexia three different types of deficits (phonological, visual-attentional, and learning-memory) have been demonstrated with a fairly high degree of success, each one subdivided into different categories (e.g. auditory and allophonic explanations for the phonological deficit)? The authors point out that phonological disorders, which are among the most common, are present only in 40% of the participants as reported in a meta-analysis of 10 recent papers. In answer to this question, the authors offer three suggestions: (1) relaxing the criteria used to define dyslexia to include associated deficits; (2) investigating every possible associated deficit; (3) identifying different phonotactics based on brain studies. We analyze these questions within a more general framework. It is worthwhile to support studies that include participants with specific difficulties and those with other deficits (e.g. deafness, attentional disorders, high-level autism, Williams Syndrome, etc.). Using this “broad-band” paradigm should not only shed light on differences within the clinical disorder itself (e.g. within dyslexia), but also on some features common to several disorders (e.g. among dyslexics and high-level autistics). It is worth noting that in the current state of the art the “broad-band” paradigm does not involve redefining the different clinical disorders. Should we be conducting systematic research on phonological, visual, and auditory deficits? Maybe, but we should think twice. The cost-benefit ratio involved in multifactorial research could be prohibitive if the criteria applied are not clearly associated with a well-defined hypothesis. Finally, brain studies often reveal more than behavioural studies (see Serniclaes’ paper) and could even prove useful for taxonomic purposes.

Serniclaes’ paper reviews allophonic theory. One of the challenges of current research is to determine the exact relationship between difficulties in learning to read and their hypothetical cause. It is widely accepted that phonological awareness tests identify the immediate cause of difficulties in learning to read. Nevertheless, no sooner was it declared that dyslexic deficits were caused by the poor representation, storing, and/or processing of phonemes than other hypotheses were suggested related to sound or phoneme perception (Tallal, 1980). The so-called rapid auditory processing hypothesis has not been demonstrated as being specific to dyslexia, neither has it been possible to determine the connection between an auditory deficit and learning to read (Ramus, 2003). Nor has the repeated confirmation of differences in categorical perception between control and dyslexic participants led to further progress (Serniclaes et al, 2004). This is the main advantage of the allophonic hypothesis: it offers a direct explanation that connects a deficit (allophonic perception) with difficulties in learning conversion rules. Allophonic perception would be the consequence of difficulties in the transition between universal phonetic boundaries and those of the mother tongue. If some of the universal categories remain active, this would directly affect the establishment of the sound-letter correspondences. In particular, some correspondences, which would normally be established between two sounds and two letters, would include three sounds and two letters (/b-p-p / to “b” and “p”). Thus, Serniclaes argues in favour of specific falsifiable predictions that in this new review provide a new formulation: whereas several deficits in perceptual accuracy are not specific to dyslexia, allophonic perception is specific to it. The real theoretical interest of deficits in categorical perception is not that dyslexics have weaker discrimination between categories, but that they have better discrimination within categories. The paper is rounded out with two contributions of interest. Firstly, the identification of the left premotor area as the key area where phonemes are discriminated from allophones. These studies have highlighted another relevant aspect: although allophonic perception is difficult to observe using behavioural measures, complementary recordings of brain activity clearly show the phenomenon. Finally, after reviewing the results of some intervention studies on phonemic perception, it is concluded that there is some evidence of its positive effect on alleviating dyslexia.

Carrillo, Alegría, Miranda and Sánchez present part of a larger study in development on designing a simple reliable tool to detect specific difficulties in reading and to diagnose developmental dyslexia. As they explain, the battery includes three basic tools to be applied sequentially. Firstly, a simple cost-effective detection task that can be administered to a group within 5 minutes. This task can identify up to 96% of students who will subsequently present delays in word identification mechanisms. To assess delays or deficits in these mechanisms, the DIS-ESP battery includes a selected set of tasks related to the phonological and orthographic mechanisms involved in word reading. These tasks have proved that once the reading experience becomes more relevant, most students with difficulties show a delay in both phonological and orthographic mechanisms. Up to 85% of students with difficulties at ages 9 and 11 shows a mixed delay profile. This prevalence of mixed profiles is interpreted by the authors following Share’s (1995) hypothesis: the consolidation of the phonological mechanism would enable learning and this would progressively strengthen the orthographic representation of words. Finally, the prevalence...
of the difficulties observed is close to that found by national and international studies, although it should be noted that not all cases lead to a diagnosis of dyslexia. A third set of tools is recommended to obtain a diagnosis of dyslexia: a set of phonological tasks—with no reading involved—that represent the different areas which have a proven association with the basic phonological deficit (Wagner and Torgersen, 1987).

The study by Luque, Bordoy, Giménez, López-Zamora and Rosales describes the development and assessment of a set of tasks related to speech perception and a set of measurements derived from them. The basic idea is to replicate some relevant findings from the specialized literature to investigate the usefulness of these measurements as a deviation criterion in relation to samples of control participants matched by age or reading level. They argue that independently of whether the deficits detected using these procedures are specific to dyslexia, these measurements have great diagnostic value. They could help to detect comorbidity between the specific language impairment and dyslexia and also to detect difficulties in perceptual accuracy or other perceptual weakness present in dyslexia and other disorders. Finally, they may even be able to detect those allophonic deficits which Serniclaes states are specific to dyslexia (this issue), although in the study presented this aspect is not explored. Thus, the authors conclude that these instruments could serve to find out the uneven levels between phonological skills and other cognitive abilities that remain intact in the case of dyslexics. Similarly, patterns of comorbidity would be of great relevance when studying specific language disorders and, in general, when studying the symptoms associated with individual dyslexic profiles.

RTI systems, which became widespread in the USA during the last decade, are the direct heirs of a more general idea: education practice should be based on scientific knowledge (evidence-based practice). Although this philosophy is widely accepted in the area of health, the experiment underway in the Canary Islands represents a genuine innovation within the Spanish education system. RTI systems are an institutional alternative to the early detection and adequate treatment of learning difficulties. These systems involve research institutions as well as the educative bodies including schools. A basic instrument in this collaborative framework is the system of continuous evaluation of performance at school. A tests set allows the early detection and continuous evaluation of a range of abilities directly related to the learning to read curriculum. Fortunately, the University of Oregon developed these instruments for Anglo-Saxon and Spanish-speaking students. Known by the acronym IDEL (Indicadores Dinámicos del Éxito en la Lectura. Good, Baker, Knutson and Watson, 2006), these instruments have facilitated collaboration and the adaptation of the procedures in the Canary Islands. Founded on high-quality professional training, the system makes it possible to take educational decisions based on dynamically compared objective information, and to adjust the intensity of treatments as well as the human and material resources. Finally, the authors present and discuss the standards specific to the Canary Islands. This exemplifies one of the features of RTI systems, that is, the possibility of comparing the performance of a student or school taking different criteria as a reference: national, regional, county or the classroom itself.

Gómez, Defior and Serrano’s paper on reading fluency is innovative at least in two ways. It inherits the drive to transfer scientific knowledge into educational practice. This aim came to fruition in the National Reading Panel (NRP, 2000). The NRP results highlighted five fundamental areas for intervention: phonemic awareness, the alphabetic principle, vocabulary, fluency, and reading comprehension. Although some published studies have already suggested ways to approach reading fluency in Spanish, their efficacy has not been empirically validated. There is a basic gap between scientifically guided programs and those whose efficacy has been scientifically tested. This paper only presents the basic structure of the program, although scientifically validated results could soon be available. In addition, the paper describes in detail the process of establishing the scientific guidelines that should be followed when developing an intervention program. This exemplifies one of the main steps involved in transferring scientific knowledge into educational practice. Apart from these methodological or formal aspects, the program integrates specific tasks ranging from sublexical units to work on the text itself, taking advantage of the advances mainly obtained from two techniques: accelerated reading and repeated reading methods. In summary, it is a model well worth emulating when designing scientifically based and tested instruments for intervention.

This issue has been published with the aim of not only promoting research on developmental dyslexia, but also with the special objective of transferring to educational agents part of the vast corpus of scientific knowledge that could be fully exploited during their evaluation, diagnosis or intervention practice on specific difficulties in learning to read. We hope to have contributed to these two very important aims.

References


