

FROM THE EDITORS

Understandings and Misunderstandings About Dyslexia: Introduction to the Special Issue

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ABSTRACT

The purpose of this special issue was to provide a forum for contemporary research and thoughtful discourse about dyslexia. Scholars from several disciplines contributed articles that advance our understanding of dyslexia with regard to early identification, genetic and neural bases, assessment, instruction and intervention and educators' perspectives. In this article, we introduce the special issue, discuss current evidence and highlight persistent misunderstandings associated with dyslexia.

Over the past decade, and certainly within the last 5 years, there has been considerable momentum around passing legislation aimed at identifying and improving outcomes for individuals with dyslexia world-wide (Mather et al., 2020). In the United States, more than 42 states now have dyslexia-specific laws or policies in place and most of the remaining states have dyslexia-related laws in development. These laws vary in their scope but often include the following: (a) requirements related to early screening for youngsters with or at-risk for dyslexia, (b) prescribing requirements within teacher preparation programs for future teachers related to knowledge and skills for teaching individuals with dyslexia, (c) describing schools' obligations to provide evidence-based interventions for students with dyslexia, or (d) guidelines for professional development for current teachers related to dyslexia.

The surge of attention toward dyslexia is not the result of recent discoveries or new evidence from the reading research community. Rather, it has been driven primarily by an extraordinary grassroots movement of parent advocacy organizations, led by caregivers who seek effective instructional supports, rights and protections for their children who they perceive were not adequately recognized or taught. For example, Gabriel (2019) analyzed written testimony submitted to the Connecticut state legislature regarding dyslexia legislation. Many of the parents and students who testified described unsuccessful experiences with the reading instruction provided in their local schools and stated that it was not until they sought out reading instructional support, either through private tutoring or private schools, that they reported having successful reading outcomes.

Despite the legislative momentum around dyslexia, the notion of "dyslexia" may still be considered both a misunderstood and ill-defined construct. Like many other health impairments that occur along a continuum (e.g., anxiety, depression, autism, obesity),

determining the specific criteria and cut-point for the diagnosis of dyslexia is challenging. Although estimates of the prevalence of dyslexia have ranged from high as 20% (Shaywitz, 2003), most studies indicate prevalence rates below 10% (Rutter et al., 2004; Yang et al., 2022). A lack of universally accepted cut-points and identification methods for dyslexia has raised issues about how to justify diagnosis and treatment. We argue that these definitional and diagnostic issues prevail in education and medicine and are not justification for the position that the construct of dyslexia does not exist, but rather that the population of individuals with dyslexia will vary based on how the criteria for diagnosis are applied. We appreciate the position that the label “dyslexia” may not be reliably defined or categorically differentiated from subgroups of poor readers referred to as “reading disabled” or “significant reading difficulties” (Elliott, 2020; Elliott & Grigorenko, 2014). We do not quibble with this view and recognize that the term “dyslexia” has typically been reserved for a medical diagnosis of intractable reading difficulties. However, many terms in medicine, education, and clinical psychology have adjusted over time. The critical feature from our perspective is not the label, but the clear criteria for identification and the utilization of appropriate practices to prevent or remediate the difficulty.

Dyslexia (i.e., word-level reading disability) is the most commonly identified specific learning disability and can be conceptualized as significant and persistent difficulties reading and spelling words. These difficulties are considered “unexpected” because they occur despite receiving reading instruction that is effective for most children and are not explained by other factors known to cause difficulties in learning to read, such as disabilities with vision or hearing, or lack of familiarity with the language of the text. Contemporary perspectives view dyslexia as the result of an interplay among genetic, neuropsychological, and environmental factors and maintain that instruction plays critical preventative and remedial roles (e.g., Catts & Petscher, 2022; Fletcher et al., 2019). We, as well as others (e.g., Catts & Hogan, 2021; Elliott, 2020; Fletcher et al., 2019; Miciak & Fletcher, 2020; Vaughn et al., 2023), believe that dyslexia is best identified through an approach that considers students’ responsiveness to generally effective instruction and intervention.

Dyslexia is recognized around the world and is represented across written languages (Grigorenko, 2001; Mather et al., 2020). Despite the widespread use of the term, the lack of agreement on how to best identify and support students with dyslexia has influenced how legislators, educational stakeholders, and caregivers conceptualize screening, assessment and intervention for students with significant difficulties in reading—and help explain

some of the misconceptions that are currently part of state policies and implemented in schools.

Overview of the Special Issue

The purpose of this special issue was to provide a forum for contemporary research and thoughtful discourse about dyslexia, how it is assessed, and what elements of instruction are most effective. We considered scholars from across the world and the many disciplines that contribute to an understanding of significant word-reading difficulties.

The result, we believe, is a set of articles that advance our understanding of dyslexia in multiple ways. The first area pertains to identification and assessment-related issues. Wagner and Lonigan, in a series of studies, investigated methods of early identification of expected versus unexpected reading difficulties with children as early as preschool. Church and colleagues reviewed the state of the science in neural and genetic research, and how the current evidence underscores the importance of early intervention and a structured, explicit approach to reading instruction. Examining genetic transmission more specifically, Khanolainen and colleagues compared parents’ self-reports of their own history of reading difficulties and direct skill assessments of their reading skills in predicting their children’s reading difficulties in samples in which there was risk for familial transmission of dyslexia, and samples that were not preselected.

Assessment plays a critical role in supporting students with dyslexia, and papers in this special issue examined the assessment of reading skills with clear implications for intervention. With kindergarten students, Kim and Petscher investigated the extent to which spelling and vocabulary assessment, in addition to word reading, improved the identification of risk for reading difficulties measured in grade 2. Steacy and colleagues used dominance analysis to advance research on “set for variability”—the ability to flexibly adjust pronunciations of partially or inaccurately decoded words—by examining the degree to which it explains unique variance in word reading above other well-established predictors, such as phonological awareness.

There remains a need to further establish and refine our knowledge of best practices in instruction and intervention, and this special issue includes a set of systematic research reviews that summarized current knowledge of effective instruction and intervention approaches for students with or at risk for dyslexia. Dyslexia support begins in general education, and from this lens, Shanahan reviewed research on core instruction (i.e., tier 1) for students with dyslexia and other reading difficulties, which included a review of 32 meta analyses. In a meta-analysis of 53 studies representing 6053 students, Hall and colleagues investigated the overall effects of supplemental interventions for students with or at-risk for dyslexia, and the elements of interventions associated with stronger outcomes. Al Otaiba

and colleagues also synthesized research on interventions for students with reading difficulties by synthesizing the findings of 14 meta-analyses and systematic literature reviews on interventions for elementary students with reading difficulties and disabilities. Conclusions of these systematic reviews point to the importance of explicit code-focused instruction across levels of instructional intensity, which may be delivered in whole-class, small-group, or 1:1 configurations. Just as important as the conclusions these reviews offer on what works, all three identified areas that subsequent studies should address in determining what elements of interventions are most effective, what conditions moderate these effects, and the student skill profiles for which certain interventions are most effective.

Finally, any discussion about dyslexia would be remiss without considering the voices of educators. In this issue, Dymock and Nicholson surveyed teachers and school leaders in New Zealand, which revealed important insight on educators' support for students with dyslexia, but also gaps in their preparation and resources provided by their schools.

A Continued Need for Evidence-Based Perspectives and Recommendations

Although the advocacy and legislation surrounding dyslexia are based on valid concerns and good intentions, the movement is not without some unintended consequences and potential pitfalls. Misunderstandings regarding what dyslexia represents lead to confusion and disagreement about its underlying causes, how to assess and identify it, and how to intervene. For example, mandating that schools conduct dyslexia-specific screening and implement dyslexia-specific intervention on top of existing screening and intervention practices, which often serve the same purpose and are already implemented in many elementary schools, has the potential to further fragment services in under-resourced schools that already struggle to implement effective instruction and intervention. Persistent myths and misunderstandings held by policymakers also risks mandating certain instructional approaches with inadequate evidence of superiority over other types of programs, or requiring that intervention be delivered by staff with a special dyslexia-specific credential. Therefore, in addition to the comprehensive findings provided by the studies in this issue, we offer a brief description of current understandings and persistent misunderstandings surrounding dyslexia.

1. **Screening risk for dyslexia can often be readily integrated into existing reading screening approaches.** Many of the approaches that are currently in place at the state and district level for screening and identifying students with or at risk for significant reading problems are also useful for screening and identifying students with dyslexia.

For example, The Primary Reading Inventory has been in use since the late 1990s and is based on extensive research and sophisticated analyses for identifying students in kindergarten and first grade who are at risk for dyslexia (Foorman et al., 1998). Measures of phonological awareness (Wagner & Lonigan, this issue) and alphabetic knowledge (i.e., letter names and sounds) administered in kindergarten are often the most indicative of risk for dyslexia (Schatschneider & Torgesen, 2004), and have long been part of tools such as the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and others (see the *Academic Screening Tools Chart* maintained by the National Center on Intensive Intervention: intensiveintervention.org). Additional research will likely reveal how screening accuracy can be improved (e.g., Catts & Petscher, 2022), such as consideration of parents' history of reading difficulties (Khanolainen et al., this issue). However, layering additional measures or procedures onto already psychometrically sound screening approaches is unnecessarily burdensome for already thinly-stretched school resources.

2. **Intervene early.** Although students with dyslexia can make gains at any age (Hall et al., this issue; Lovett et al., 2012), early grade levels provide the best opportunities to make gains more quickly than when students are older (Wanzek & Vaughn, 2007). Lovett et al. (2017), for example, demonstrated that students with significant reading difficulties demonstrated stronger outcomes when provided intervention in first or second grade compared with third grade. Early screening and intervention provide opportunities for targeting reading needs and reducing the likelihood of long-term reading difficulties. *Formal* identification of dyslexia in kindergarten and first grade is problematic because dyslexia is defined by difficulties with word reading, a skill that cannot be reasonably expected for most students until the middle of first grade at the earliest. However, risk factors for word-level reading difficulties can be identified as early as kindergarten entry (e.g., Bishop & League, 2006; O'Connor & Jenkins, 1999), and an instruction model focused on identifying *risk* for dyslexia allows students to be provided with supplemental, preventative interventions when they have the greatest likelihood for success (Catts & Hogan, 2021; Catts & Petscher, 2022).
3. **Dyslexia has a familial and genetic association.** There is a higher rate of dyslexia in families with a familial history of dyslexia—as high as 45% in most studies (Kearns et al., 2019). As with most disorders that have a hereditary influence, dyslexia stems

from a complex interplay of genetic and environmental factors (Catts & Petscher, 2022; Fletcher et al., 2019; Olson et al., 2017; Peterson & Pennington, 2015). Oral language, phonological processing, and rapid automatized naming, processes thought to underlie the core word-reading deficits in dyslexia, have evidence of genetic transmission (Grigorenko, 2001; Petrill et al., 2006; Snowling & Melby-Lervåg, 2016). As Khanolainen and colleagues (this issue) investigated, identifying parent histories of reading difficulties may offer opportunities for early identification of risk for dyslexia. However, the language and literacy supports available in one's home environment and at school has considerable power to mitigate underlying genetic factors (Catts & Petscher, 2022). Considering reading development more generally, a child's early language and literacy exposure and experiences in the home between birth and age 5 play a significant role in subsequent reading achievement. For example, based on their review, Snowling and Melby-Lervåg (2016) noted that aspects of the child's environment can serve as protective factors that mitigate risk for children with underlying phonological processing difficulties. We reiterate that familial risk is complex, and can vary on an individual basis—for some children, dyslexia occurs despite a very strong home language and literacy environment. There is never one cause of dyslexia.

4. **Multisensory instruction is not the only approach to teaching students with dyslexia.** Multisensory instruction is most often associated with the Orton-Gillingham approach to intervention (OG; Gillingham & Stillman, 1960, 1997), which routinely involves teaching using the engagement of students' visual, auditory, tactile, and kinesthetic responses. There are several elements to the OG approach, including explicit and systematic phonics instruction; however, the multisensory emphasis is a feature that distinguishes it from other programs. OG has historically been viewed as a preferred intervention for dyslexia, as it has been commonly recommended by advocates, appeared prominently in case law, and is used in many specialized schools for dyslexia (Bhat et al., 2000; Rose & Zirkel, 2007). However, systematic reviews have indicated no statistically significant advantage of multisensory instruction compared with other approaches or that it is necessary for intervention for dyslexia (Ritchey & Goetze, 2006; Stevens et al., 2021). In their meta-analysis in this special issue, Hall and colleagues observed that programs categorized as multisensory were not more

effective than other programs. We recognize that some multisensory programs, as well as other intensive interventions, have been beneficial to some students with dyslexia. There are many systematic approaches to improving reading outcomes for students with dyslexia, but the most common characteristic of effective programs is the use of explicit instruction in phonics (Al Otaiba et al., this issue; Shanahan, this issue). Research also indicates benefits for integrating spelling instruction within reading instruction (Graham & Santangelo, 2014). The benefits of spelling instruction are likely due to the interdependent relationship and common foundation of spelling and word reading (Ehri, 2000).

5. **Students with dyslexia need much more than opportunities to read books to resolve their reading problem.** All students benefit from increased opportunities to read a variety of text levels and types. A lack of opportunities to practice reading for a student with underlying reading difficulties can lead to widening achievement gaps with typically-achieving readers. However, dyslexia is not originally *caused* by a lack of exposure to reading or lack of practice with it, and additional reading practice on its own is an inadequate approach to improving their reading outcomes. Combined with explicit code-focused instruction, many opportunities to read words and text are necessary for reading development, and students with reading difficulties often need more exposure to words to learn them compared with typically developing readers (Share, 2008).
6. **Dyslexia is not caused by impairments in vision or visual processing.** Although correlational evidence has observed that dyslexia is associated with reduced visual processing and perception, other studies indicate that visual processing deficits are likely the result of less exposure to and experience reading that is common in dyslexia, rather than a cause of it (e.g., Olulade et al., 2013). The notion that dyslexia is caused by visual processing problems is the basis for several other misunderstandings about dyslexia and instruction:
 - a. **Students with dyslexia are not identified because they see letters and words backward or text that are mixed up.** One of the oldest and most persistent myths regarding individuals with dyslexia is that they see and write letters and words backward, upside down, or mixed up. Many young children reverse letters and make decoding and spelling errors when beginning reading and writing, and with instructional practice and feedback, this issue is remedied.

- b. **Vision therapy is not an effective approach for students with dyslexia.** The faulty idea that dyslexia is a result of a vision disorder led to recommendations that dyslexia could be remediated through vision therapy or training. Many vision training approaches exist and have not been associated with improvements in reading for individuals with dyslexia, and are not endorsed or recommended by groups such as the American Academy of Pediatrics, American Academy of Ophthalmology, and American Association for Pediatric Ophthalmology (Lueder et al., 2009).
- c. **Colored lenses or overlays are not associated with improved reading for students with dyslexia.** Although the use of colored lenses and overlays continues to be recommended by some professionals, there is no evidence to support their effectiveness in improving reading skills (e.g., Hyatt et al., 2009; Ritchie et al., 2011).
- d. **Special dyslexia-specific fonts do not improve reading skills.** Creators of special fonts such as “Dyslexie” or “OpenDyslexic” claim that text written in these fonts is more comfortable to read and improves reading accuracy and fluency for individuals with dyslexia. However, several studies have observed that reading text written in dyslexia-specific fonts affords no benefits compared with text written in traditional fonts, such as Arial or Times New Roman (Galliussi et al., 2020; Kuster et al., 2018; Wery & Diliberto, 2017). Furthermore, Kuster et al. (2018) found that individuals with dyslexia actually preferred reading text in traditional fonts compared with Dyslexie. The idea that a dyslexia-specific font improves reading is based on the same problematic notion that dyslexia is a visual-processing problem, which is also the basis for vision therapies and colored overlays.
7. **“Brain training” does not improve reading outcomes for students with dyslexia.** Some approaches to improving reading skills claim that they can “retrain” the brain to result in improved learning outcomes. Examples include “educational kinesiology,” marketed as Brain Gym® (Dennison, 2006; Dennison & Dennison, 1994), which was developed from earlier methods such as neurological and psychomotor “restructuring” (Doman, 1968). However, there is no evidence that these therapies benefit individuals’ reading skills (Hyatt, 2007). Other examples include therapies that claim to be able to reverse dyslexia by “rewiring” the brain (Books, 2013). Developers of computer-based working memory training programs have also claimed that improving working memory leads to improved reading skills for individuals with reading difficulties; however, studies have not found evidence to support the benefits of working memory training on reading or other academic skills (Maehler et al., 2019; Melby-Lervåg et al., 2016).
8. **Many educators need knowledge about how to provide evidence-based screening, assessment, instruction, and interventions for students with dyslexia.** Research has documented that many educators need greater knowledge and skills for better identifying and teaching students with dyslexia and other reading problems (Bos et al., 2001; Cunningham et al., 2004; Spear-Swerling & Brucker, 2004). Students in teacher preparation programs have been observed to have a similar degree of knowledge about dyslexia as students in architecture (White et al., 2020), and many teachers perceive that they lack the confidence to teach students who are identified with dyslexia (Dymock & Nicholson, this issue; Worthy et al., 2018).
9. **Dyslexia, like many conditions, operates on a continuum in which the severity can be represented as mild to severe.** Dyslexia does not look precisely the same for all learners and the range of reading difficulties as a result of dyslexia also varies. There is no biological marker, single test, or test score that reliably identifies dyslexia.
10. **Many students with dyslexia display difficulties with spelling and handwriting.** Students with dyslexia often have difficulties not only with reading words but also spelling and writing words. However, difficulties spelling and writing words do not necessarily mean a student has dysgraphia, a condition that involves significant difficulties in writing (McBride & Rui En Cheah, 2021). Reading and spelling words share a foundation of common skills, which is why reading and spelling difficulties co-occur so often. Effective instructional approaches target word reading, spelling, and writing.
11. **“Certified language therapists” or other specially credentialed teachers are not the only individuals capable of providing effective reading interventions for students with dyslexia.** At present, there are no laws in the United States that require dyslexia-specific credentials or certifications to provide intervention to students with dyslexia. With access to evidence-based practices and programs, educators with all levels of training are prepared to meet the needs of students with dyslexia. For example, a meta-analysis by Jones et al. (2021) observed that paraprofessionals can provide reading interventions that result in meaningful improvements for students with reading difficulties.

12. **Classroom teachers can do much to remedy dyslexia.** Classroom teachers may be the most important and valuable resource for students with dyslexia (see Shanahan, this issue). Classroom teachers are often their primary reading teachers as well as the educators who have the most influence on their self-worth. Classroom teachers can be a tremendous source of social-emotional and educational support for students with dyslexia. Armed with the knowledge and skills of effective reading instruction, classroom teachers can alter the learning and life trajectories of students with dyslexia.

In closing, we initially launched this special issue on dyslexia for *Reading Research Quarterly* with editors Drs. Amanda Goodwin and Robert Jimenez, and acknowledge their support for this important topic. Our intent is that these papers enhance the practical knowledge and scientific discourse of assessment and intervention for students with dyslexia, prompt new research questions, and reaffirm a commitment to evidence-based practices. Many misunderstandings around dyslexia have interfered with educators successfully identifying and providing support to students with dyslexia and their families. This special issue of *Reading Research Quarterly* aims to take steps to remedy these misunderstandings.

Conflict of Interest

The authors have no known conflicts of interest to disclose.

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