

**AN EXAMINATION OF DYSLEXIA RESEARCH AND INSTRUCTION,  
WITH POLICY IMPLICATIONS**

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Note: This manuscript has benefited from many colleagues' feedback. We offer them abundant thanks, but hesitate to name them so as not to imply endorsement since they have not seen the final iteration of the document.

## **An Examination of Dyslexia Research and Instruction, with Policy Implications**

Some children experience more difficulty than others becoming literate, often at great emotional, intellectual, social and economic cost to themselves, but also to those who love and care for them, and for society at large. The causes of those difficulties, and what to do about them, have been the source of much research and sometimes heated disagreement among researchers and educators – disagreements that, in one form or another, go back well over a century. The current focus of this attention, from the media, some researchers, parents and politicians, is on the construct dyslexia – a term used (mostly) to describe serious difficulty with the word reading aspect of the reading process.

Currently, there is a well-organized and active contingent of concerned parents and educators (and others) who argue that dyslexia is a frequent cause of reading difficulties, affecting approximately 20 percent of the population, and that there is a widely-accepted treatment for such difficulties: an instructional approach relying almost exclusively on intensive phonics instruction. Proponents argue that it is based on “settled science” which they refer to as “the science of reading” (SOR). The approach is based on a narrow view of science, and a restricted range of research, focused on word learning and, more recently, neurobiology, but paying little attention to aspects of literacy like comprehension and writing, or dimensions of classroom learning and teacher preparation.<sup>1</sup> Because the dyslexia and instructional arguments are inextricably linked, in this report, we explore both while adopting a more comprehensive perspective on relevant theory and research.

Despite differing views on the causes and potential solutions to reading difficulties, to date, at least 42 states and the U.S. federal government have passed laws invoking dyslexia,<sup>2</sup> laws that are largely aligned with the SOR perspective and that change the distribution of

resources and educational practices affecting not only students classified as dyslexic, but all students, their teachers and teacher education more generally. The media have also become involved in advocating the SOR perspective. In the four years between 2016 and 2020, there was a flurry of reports about dyslexia in respected outlets such as National Public Radio, the Public Broadcasting Service, CBS, *Time*, *Newsweek*, the *New York Times*, and *Education Week*, each asserting a narrative that dyslexia is a central cause of reading difficulty and that SOR-aligned instruction is necessary, not only for those classified as dyslexic, but for all students.

To promote engagement in the issues that face stakeholders (including educators, parents, and policymakers) in relation to dyslexia and related literacy instruction, we offer responses to 12 FAQs. Doing so will, of necessity, involve some repeated coverage of certain topics that are relevant for more than one question. Question numbers are for convenience of reference rather than a reflection of priorities.

**Q1: What is the definition of dyslexia?**

**A: There is much disagreement about how to define dyslexia. So much so, that some argue it is not a useful classification.**

There are many, often conflicting, definitions of dyslexia and none offers a clear foundation for determining who qualifies for the classification. Take, for example, the International Dyslexia Association's (IDA) definition:

Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary

consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.<sup>3</sup>

This definition asserts that dyslexia is recognizable by deficiencies in word recognition, spelling and decoding, but only if the deficiencies have a biological cause and are not related to limited cognitive (intellectual) ability. It also asserts that difficulty analyzing speech sounds (commonly referred to as phonological awareness) is a common, but not the only cause of dyslexia.

This definition is too vague to serve any practical purpose, which is compounded when the same organization offers a different definition that does not require biological causation and expands the scope of difficulties to “usually” include “difficulties with other language skills such as spelling, writing, and pronouncing words.”<sup>4</sup> It also introduces a new criterion, that dyslexics “respond slowly to the instruction being provided to their peers but not because of their IQ or lack of effort.” The IDA is not alone. Such discrepancies in definition are widespread. Elliott lists four distinct kinds of definition, each with different implications.<sup>5</sup> Definitions also frequently use hedging, such as “often,” “frequently,” or “typically.”

Why does this matter? First, there is no practical, nor consensually definitive, way to decide who is and is not dyslexic. For example, there is no way to directly detect presumed biological causes in individuals. Consequently, students whose difficulties are presumed to arise from non-biological conditions such as “environmental, cultural, or economic disadvantage,” or below average IQ (as specified in federal law) are excluded from the classification.<sup>6</sup> Indeed, between 1963 and 1973, the early years in which children were classified as “learning disabled in reading” (a term researchers often use interchangeably with dyslexia), 98.5 percent of students deemed to have such a disability were white, and most were middle class.<sup>7</sup>

Second, researchers who study word reading difficulties/dyslexia use different definitions

and criteria to identify the students they study. Some researchers choose a simple, arbitrary cut-off point such as below the 25<sup>th</sup> percentile, or the 7<sup>th</sup> percentile, on a wide variety of different tests, subtests or subtest clusters. Some researchers accept as dyslexic anyone who has been diagnosed by any authority. Some exclude from their studies children with lower IQs or with behavioral or other problems; others do not. Consequently, when researchers report their findings, they are often talking about very different groups of students whose only common factor is that, by some definition and some means, it has been determined that they are having difficulty learning to read. Basically, the majority of researchers studying reading difficulties simply select children who on some test are not reading well. Most do not even use the category dyslexic or even mention it in their published reports, a fact that has not inhibited others from referencing that research to draw conclusions about dyslexia.

Because of this variability in definition, estimates of the prevalence of dyslexia range from five to as much as twenty percent of the population.<sup>8</sup> This confusion has led some highly regarded researchers to propose not using the term at all. For example, Keith Stanovich observes, “No term has so impeded the scientific study of reading, as well as the public’s understanding of reading disability, as the term dyslexia. The retiring of the word is long overdue.”<sup>9</sup>

The bottom line is that there are many definitions of, and theories about, dyslexia and simply no agreed-upon definition that allows schools, clinicians, researchers, or anyone else, to decide who is dyslexic in any valid or reliable way. By contrast, it is simple enough to decide at kindergarten entry who *might* encounter difficulty learning to read using measures of actual literacy knowledge. Such a determination has immediate instructional implications.

**Q2: Is there a biological basis for some children’s difficulties becoming literate?**

**A: Probably.**

Like virtually every human characteristic, there are likely heritable influences on reading and language skills. The strength of such heritability is an active area of ongoing research but the issue, at this point, has virtually no instructional implications. There is, however, evidence that instruction impacts characteristics of a physical nature. For example, studies of people's brains, as they process print, show that patterns of activity in the brains of good readers are, on average, different from those of poor readers. However, these studies have not shown differences between poor readers in general and those classified as dyslexic because most neuroscience studies on dyslexics simply define them as children scoring below a certain point on a reading test. More significantly, with both children and adults, there is suggestive evidence that instruction in aspects of reading, and the resulting progress in reading development, can change the brain activity of poor readers to look more like that of good readers.<sup>10</sup> That is, while differences in brain anatomy and/or activity correlate to some degree with reading performance, brains are sufficiently plastic that the process of learning to read can, to some extent, reorganize (normalize) brain anatomy and activity. Beyond this, there are no instructional implications.

The bottom line is that individual biologically-based differences can make literacy learning more difficult. However, such differences do not *determine* whether children will readily become literate. Our brains remain somewhat plastic in responding to environmental factors, including reading instruction, into adulthood.

**Q3: Is there a difference between those classified as dyslexic and others who struggle with learning to read words?**

**A: No.**

From an instructional standpoint, there is no practical distinction between those classified as dyslexic and others at the low end of the normal distribution of word reading ability in the

early elementary grades.<sup>11</sup> This distribution of word reading ability is likely the result of complex combinations of normally distributed individual differences in, for example, phonological awareness, rapid naming, working memory, and many other biological, cognitive (including instructional) and situational factors.<sup>12</sup> Difficulties with phonological analysis are the most common factor associated with early reading problems, but no single factor or combination of factors, guarantees or fully explains literacy difficulties.

The bottom line is that there is currently no consistent basis - biological, cognitive, behavioral, or academic - for distinguishing those who might be identified as dyslexic from others experiencing difficulty learning to decode words. In the end, determining whether or not someone is dyslexic amounts to deciding where on the normal distribution to draw a line – and for some, determining how many lines to draw (whether for reading ability only or for intellectual ability as well). There is no agreement about where to draw the line(s) and there is no evidence that instructional response should be different for those above or below the line(s).

**Q4: Does dyslexia confer benefits such as greater intelligence, creativity, and the like?**

**A: No.**

Public narratives about dyslexia commonly claim that people classified as dyslexic have an array of special positive attributes such as intelligence or creativity – more so than those not so classified. There is virtually no scientific evidence for these claims. The narratives are based largely on high-profile actors, scientists, artists, or others claiming (or having claims made for them in posterity) to be dyslexic. This lack of evidence has not stopped those advancing such claims. For example, the IDA’s website at once recognizes that the evidence for such claims is “pretty weak,”<sup>13</sup> while using visual media to suggest that such claims have validity.<sup>14</sup>

Similarly, Yale University’s Center for Dyslexia and Creativity website includes no

research on creativity. The word “creativity” occurs only in the website title. Although not included in their explicit definition of dyslexia, the site claims, without evidence, that indicators of dyslexia among school children might include: “Eager embrace of new ideas”; “Surprising maturity”; “Enjoys solving puzzles”; “Talent for building models”; “Excellent thinking skills: conceptualization, reasoning, imagination, abstraction,” among many others. Similarly, the Connecticut State Department of Education’s working definition of dyslexia includes, “Typically, students with dyslexia have strengths and cognitive abilities in areas such as reasoning, critical thinking, concept formation, problem solving, vocabulary, listening comprehension, and social communication (e.g., conversation).”<sup>15</sup>

A higher incidence of such characteristics among individuals classified as dyslexic lacks any empirical basis. However, the claims do enhance the attractiveness of a diagnosis of dyslexia and the support and funding for researchers studying the dyslexia construct.

**Q5: Can difficulties often attributed to dyslexia be prevented?**

**A: Answers vary depending on one’s definition.**

There is strong evidence that *most* children whose initial assessments suggest they might have difficulty developing reading skills can be spared that experience through good first instruction and early intervention. Intervention in kindergarten and first grade is more effective than in later grades.<sup>16</sup> These conclusions are valid whether or not children are classified as dyslexic. A small percentage of children, 2-6 percent by some estimates, despite best efforts so far, continue to make slow progress.<sup>17</sup> The most under-researched area, and possibly the most important, is how to address the difficulties of students who do not benefit from intervention that has been successful with many of their peers. It is possible that this gap may, at least in part, be attributable to the belief that dyslexia is a permanent condition and to an assumption that we



already know *the* right way to approach instruction for such students.

**Q6: Is it useful to screen kindergarten and first-grade children for dyslexia?**

**A: It is definitely useful to screen to identify children who demonstrate limited early literacy skills – which does not imply screening for dyslexia.**

Early screening to identify and support students whose early literacy skills are limited, has been shown to be effective for reducing subsequent reading difficulties through early intervention.<sup>18</sup> Preventive screening in kindergarten can be simple and efficient. For example, a simple screening for alphabet knowledge at kindergarten entry (but not subsequently) allows for the identification of children who may need closer monitoring and perhaps intervention to prevent subsequent problems.<sup>19</sup> Assessments based on assumptions about dyslexia are more fraught. Current efforts at dyslexia screening are misleading about 50 percent of the time.<sup>20</sup> In addition, they often lead to less instructionally relevant screening practices. For example, based on the idea that there is a heritable component to literacy difficulties, some propose screening using family literacy histories collected on school entry.<sup>21</sup> But literacy difficulty can have a range of sources. For example, there are higher rates of difficulty in minority student families, difficulties that are more likely related to a history of schooling and impoverished conditions with fewer family opportunities to acquire the foundations of literacy, than to biologically-based family characteristics. There is little evidence that screening for dyslexia via family history indices would improve identification of those in need of instructional supports over simple measures of early literacy knowledge. Neither is there evidence such approaches would lead to better instruction. In fact, exactly the opposite effect might accrue as instructional personnel and families might be led to expect that long-term difficulties among those who are flagged as potentially dyslexic are inevitable.

**Q7: How do we help children most likely to be classified as dyslexic learn to read - those who demonstrate difficulties learning to read words?**

**A: While a good deal is known about this issue, there is currently considerable disagreement about the meaning and interpretations of available evidence.**

Reading is a complex process and comprehension is the central goal. To comprehend written texts, readers need to be able to devote most, if not all, of their attention to the meaning of the texts they read. To do so, among other things, readers need to be able to quickly and accurately identify most, if not all, of the words in the text. For readers who struggle with word identification (those most likely to be identified as dyslexic), limits in fast and accurate word identification can become a bottleneck that can create frustration and limited comprehension. The question for educators is how to help readers gain proficiency in word identification? This question has become a hot-button issue because of concerns about dyslexia and, once again, arguments about what science has to say about instruction for beginning and struggling learners.

Those who believe that dyslexia is a useful diagnostic category have historically supported the Orton-Gillingham (O-G) and derivative approaches to instruction for children classified as dyslexic and, of late, for all learners. This instruction, originating in the 1920s, traditionally teaches children, in a fixed sequence, letters and sounds and letter patterns, using what are referred to as multi-sensory techniques. Despite 90 years of use, there is little other than testimonial evidence that this approach has been successful. In the only comparative study of intervention approaches we could find, the O-G based approach was found to be no more effective than other types of intervention in improving reading comprehension among third and fifth grade struggling readers despite a year of instruction using the approach.<sup>22</sup> A study included in the National Reading Panel (NRP) report even demonstrated a substantial *negative* impact on

comprehension a year after students participated in an O-G-based intervention.<sup>23</sup> Nevertheless, enthusiasm for such approaches persists and the IDA, which advocates for O-G-based programs, now refers to them, for “marketing” purposes to help “sell what we do,” as “Structured Literacy”.<sup>24</sup> This advocacy has intersected, and merged, with perennial advocacy for explicit systematic phonics as the preferred and sometimes sole approach to instruction for all children.

Thus, despite decades of research on reading instruction for beginning and struggling readers, including several syntheses of research that have found no support for the effectiveness of heavy, near-exclusive, phonics-based approaches to reading instruction when compared to other instructional approaches that might be employed, these approaches are still widely advocated and employed.<sup>25</sup> Throughout, the NRP meta-analysis has been cited frequently to justify extreme versions of phonics instruction for those identified as dyslexic as well as others who struggle with reading, and sometimes all beginning readers. However, the NRP report *did not* support that conclusion. Instead, it asserted that, “various types of systematic phonics approaches are significantly more effective than non-phonics approaches in promoting substantial growth in reading,” though effects were in the moderate range.<sup>26</sup> The report did not argue for any particular phonics approach. Rather, it recognized that, given the individual differences in knowledge and skills in any classroom, phonics instruction would need to be flexible, and that teachers need to know how to adapt instruction to those individual differences. In addition, it asserted that, “systematic phonics instruction should be integrated with other reading instruction to create a balanced reading program. Phonics instruction is never a total reading program.”<sup>27</sup> Underscoring this point, the report noted, “Phonics should not become the dominant component in a reading program, neither in the amount of time devoted to it nor in the significance attached. ... By emphasizing all of the processes that contribute to growth in

reading, teachers will have the best chance of making every child a reader.”<sup>28</sup>

Subsequent meta-analyses and re-analyses of the studies included in the NRP report, using different techniques and correcting for various analytical weaknesses, have been even less supportive of the type of instruction advocated by SOR proponents.<sup>29</sup> In a recent summary of intervention for struggling literacy learners, Fletcher and colleagues concluded:<sup>30</sup>

At this point in the development of reading interventions, the issue is not whether to provide explicit phonics instruction; rather, the question is how to integrate phonics instruction with instruction on other components central to learning to read. Individuals who argue that the solution to reading difficulties is simply to introduce more phonics instruction in the classroom, without incorporating instruction in other critical reading skills (e.g., fluency, vocabulary, comprehension) are not attending to the NRP findings or the converging scientific evidence. This is true for programs that attempt to enhance the reading abilities of all students in the classroom, as well as programs that attempt to enhance reading in students with LDs.

Thus, the idea that there is a “settled science” that has determined the only approach to the teaching of reading, is simply wrong. There is no evidence that the highly scripted approaches often advocated in media stories are more effective than other approaches that explicitly teach learners about the alphabetic code. And, there is no evidence that such approaches impact the end goals of reading instruction – comprehension and knowledge development.

There is, however, considerable agreement among researchers with a broader perspective on scientific research in reading, that children, including those experiencing difficulty with reading, and potentially classified as dyslexic, benefit from explicit instruction designed to develop phonological sensitivity (the ability to analyze the sounds in spoken words), an

understanding of the alphabetic code (how print is related to the sounds in spoken words) and attention to orthographic structure (the predictable patterns of letters in printed words), and that these warrant serious instructional attention *in combination with instruction to develop comprehension, vocabulary, fluency, and a strong positive relationship with literacy*. These latter aspects do not simply arise spontaneously from improving children's decoding ability.

There is no question that, as children learn phonological and orthographic skills, they should be encouraged to bring all of those skills to bear on figuring out unfamiliar words. However, there are far too many words in printed English that cannot be fully decoded given initial, or even advanced, phonics skills. Indeed, many printed words are irregularly or ambiguously spelled and cannot be accurately decoded using phonics alone. The percentage of irregularly spelled words among the most common words in English, and thus the ones beginning readers are likely to encounter early, is particularly high (e.g., *of, the, come, gone, one, was, said*). Of course, many words are not fully decodable by beginning and struggling readers because, not only do they not yet have all of the requisite phonics skills and orthographic knowledge, but also because of differences in spoken dialects. For example, in the American South, there may be little difference between the pronunciation of *wheel* and *will* while in Maine it is hard to distinguish between *Carl* and *Kyle*.

When readers encounter a word that they are unable to fully decode, they must either stop reading, skip the word, get help, or turn to additional sources of information for assistance. For beginning readers who are reading books at their level, this additional information may include pictures and the sentence context which would be integrated with code-based information derived through the application of their existing knowledge of sound-spellings and other word parts.<sup>31</sup> For older struggling readers, illustrations may still be helpful, but it is primarily the

sentence context in which the word occurs and their advancing knowledge of word meanings, *in combination with* the decodable aspects of the word, that will help them to accurately and independently identify the word, and thus continue reading and, potentially, make the initially unknown word more recognizable upon subsequent encounters.<sup>32</sup> SOR proponents argue strongly against encouraging learners to use these additional types of information (see Question 8), a position which has the clear potential to limit learners' growth in sight vocabulary.

Further, there are important gaps in the research. For example, O-G-based approaches teach learners many details of the English writing system that most highly literate adults do not know. These details, such as the six syllable types, are believed to provide assistance in word solving. However, there is no evidence that such knowledge improves word solving in context – which is the setting in which the identities of most written words are learned. Indeed, there is reason to hypothesize that such details may impede word learning by turning readers' attention away from text meaning which contributes to word solving in important ways (see Question 8).

In addition, most research on dyslexia and approaches to phonics pay little or no attention to children's writing and the role of their motivation to write in their learning about the alphabetic and orthographic code. Existing evidence suggests that encouraging children to write, approximating spelling based on their analysis of speech, accompanied by feedback on the quality of their approximations, helps them to become better readers and spellers.<sup>33</sup>

**Q8: Are approaches that encourage children to use context information as an assist in figuring out words based on a disproven theory of reading?**

**A: No.**

Certain advocates of SOR instruction have asserted that encouraging the use of meaningful context to help identify words, arises from a theory that has been “disproven,” and

that the use of context strategies impedes the development of automatic word recognition. Each such claim we have examined, either offers no evidence, or simply refers to another researcher offering the same unsupported argument. The National Council on Teacher Quality (NCTQ), a forceful supporter of this perspective, has been asked four times over a period of months for its evidence base for this claim, so far without response.

In fact, the utility of using context to direct and check decoding attempts has long been recognized as critical in enabling learners to build sight vocabulary.<sup>34</sup> These approaches assume that many common words cannot be figured out solely through phonic analysis. Instead, they propose that children need multiple strategies to figure out words and to read effectively – using knowledge of the relationships between speech and print and letter patterns, *as well as* context information such as meaningfulness and grammar. The argument is twofold. First, multiple strategies offer the greater flexibility necessary with an orthography such as English in which many of the most common words are not fully decodable. Second, children can only self-correct and be independent in identifying unfamiliar words and in building their sight vocabularies when they use multiple strategies accessing different sources of information. Monitoring for meaning is presumed to be part of building independence in word-solving rather than something that is learned after word-solving has been mastered. If children are not monitoring for meaning, they will not be able to confirm that their decoding efforts are accurate.

Contrary to the “disproven theory” claims, the approach has strong theoretical and empirical support. For example, more than 20 years ago Share theorized, and demonstrated empirically, that, in order to build sight vocabulary, readers need to rely on phonological skills coupled with contextual information to enable them to resolve decoding ambiguities.<sup>35</sup> Further, having a *set for variability*<sup>36</sup> as articulated by Gibson and Levin, explains how readers can use

context to help settle on the correct identity of unfamiliar words - *if the first attempt at the pronunciation of a word doesn't result in a word that fits the context, try a different pronunciation for some of the letters, especially the vowels*. In addition, the effectiveness of teaching multiple strategies to children experiencing difficulty learning to read has been supported (albeit not explicitly tested) by intervention studies that have either examined the word solving guidance offered by more and less effective intervention teachers<sup>37</sup> or have directly manipulated the guidance provided to teachers with regard to how to support students' word solving efforts.<sup>38</sup> Furthermore, among first-grade students assigned to special instruction because of reading difficulties, those making the most progress by the end of the year used multiple strategies for identifying words, including contextual meaning and language structure, while their less successful peers used only phonics.<sup>39</sup>

Finally, the argument that scientific evidence disproves the use of strategies other than phonics, is based on analysis of competent readers, not analysis of the challenges facing beginning readers.<sup>40</sup> Proficient readers rarely encounter words they cannot identify, which is why they do not normally need context to identify them. However, when faced with difficulty, they will draw on context, when the word is in their listening/spoken vocabulary but not their sight vocabulary. Such instances are likely to involve words that have irregular spellings (e.g., *albeit*) and cannot be identified relying exclusively on the decoding elements typically taught.

**Q9: Is there one right way to teach a child experiencing difficulty learning to read?**

**A: No, but we can do much better than we currently do.**

Numerous studies show that identifying children who are behind in their reading development and intervening early can prevent lasting difficulty in *most* children and multiple approaches have been variously successful in this regard.<sup>41</sup> As noted previously, whatever the



approach, there always remains a small group for whom intervention efforts are not successful. In spite of the claims of some, no form of instruction has been invariably effective with these children. What this means and what to do about it, are important questions. For those who believe there is a distinct group of dyslexic poor readers, the explanations for failure to respond to intervention either invoke the severity of dyslexia or the lack of the type of instruction that SOR proponents advocate. If such instruction has already been provided, rather than examining the qualities of instructional interactions, the recommendation is often to simply double down on the previously unsuccessful strategy with sometimes unsatisfactory side-effects.<sup>42</sup> Requiring such instruction to be applied to all children, as some advocates do, risks creating problems across the spectrum of reading ability.<sup>43</sup>

There is another option. Rather than assuming a singular explanation for students' word reading difficulties (dyslexia) and the singular correctness of the type of instruction advocated by SOR proponents, we might instead assume that students' difficulties are explained individually by unique combinations of factors. Rather than assuming that the instruction is scientifically correct, and that the problem rests permanently within the student, a conclusion that leads to doubling down on the ineffective instruction, we might instead assume that the problem lies in the instruction not accommodating the student's unique complexities, and undertake a thorough analysis of instructional interactions.<sup>44</sup> Such research is virtually non-existent.

**Q10: What is the value of the term dyslexia?**

**A: It is unclear.**

The first assumed advantage of classifying someone as dyslexic, is that it will lead to optimal instruction specifically aimed at remediating their condition. As noted previously, there is no evidence that such definitive instruction exists, and there is at least some evidence that

some popular instructional interventions for students classified as dyslexic may do more harm than good.<sup>45</sup> Of course, in general, such outcomes are unlikely to be published. Although evidence shows that early identification of students who are at-risk for having difficulties learning to read is valuable if it leads to early intervention, early classification as dyslexic contributes nothing beyond that awareness. The second most articulated advantage is that the classification offers those with reading difficulties, and their parents, a tool for breaking the cultural link between reading difficulty and negative assumptions about intellect. Thus, a diagnosis of dyslexia is a vehicle for maintaining self-esteem, albeit at the expense of those whose reading difficulties are deemed “expected” due to other causes such as poverty or culture.

Although this latter argument is plausible, there is so far no reliable evidence that it is widely the case, or that it outweighs its potential downsides (including a sense the reading difficulties may be permanent). On the other hand, there is reason to believe that attributing students’ lack of success to fixed conditions such as dyslexia could undermine a growth mindset and motivation to overcome difficulties.<sup>46</sup> Furthermore, there is the risk that parents, teachers and others will have lowered expectations, a risk that is heightened when children are screened for dyslexia on or before entry to school. Screening for limited early literacy-related skills, rather than for dyslexia, *might* be less likely to impact such expectations. .

The idea that dyslexics are a separate class of individuals, distinct from those experiencing reading problems for other reasons such as intellect, culture, poverty, and/or limited opportunities to learn, coupled with the allusion that dyslexia indicates other exceptional skills, doubtless appeals to some as advantageous.<sup>47</sup> Less-often articulated arguments emphasize that the diagnosis increases access to more and different resources (e.g., extra time on exams, or assistive technologies) that are not available to those who are slow readers not classified as

dyslexic. If history is a guide, making such resources available to those classified as dyslexic but not to others with reading difficulties invites class- and race-related inequities.<sup>48</sup> Further, as Miciak and Fletcher point out, because “there is little evidence for the specificity of dyslexia interventions... the search for dyslexia-specific interventions potentially limits access to effective reading instruction for some children.”<sup>49</sup>

**Q11: Given the problems with the term dyslexia, and related claims about the need for instruction in word solving to focus exclusively on phonological and orthographic information, what fuels the thriving public narrative about them?**

**A: That’s complicated.**

Most people know someone who has difficulty with reading and related literacy skills, with all the associated troubles and anxieties. Bearing witness to their suffering makes us passionate about protecting them. Parents, researchers, school personnel, journalists and others bring that passion to their advocacy for resources for those who struggle to learn to read. Support groups have brought collective resources, passion and particular narratives to lobbying on their behalf. The International Dyslexia Association and Decoding Dyslexia, two such organizations, have been particularly effective at lobbying politicians to implement state laws they hope will best serve their cause and the learners about whom they are concerned. They have been effective in part because the dyslexia narrative has been embedded in the culture since the 1920s when the popular theory held that dyslexia was a visual problem. Although research rejected that theory in the late 1970s,<sup>50</sup> both the term and the theory had a strong foothold in the public imagination, a foothold that persists to this day. Stories that are repeated frequently, become an unquestioned part of cultural knowledge, and the internet and media have turned dyslexia into a cultural meme.

Second, the narrative includes the reasonable premise that a reading problem is not the

child's nor the parents' fault, and does not reflect a problem with intelligence or some other hypothetical characteristic like laziness. The narrative's appeal has been enhanced with unfounded claims that dyslexia may also entail an array of exceptional abilities. These claims are supported, not by research, but primarily by anecdotes about prominent, successful public figures, living and dead, who overcame reading difficulties presumed to be due to dyslexia. The experiences of those struggling to overcome reading difficulties, are certainly real. As evidence that dyslexics are more likely to be gifted in various ways, their value is questionable.

A third appealing part of the narrative is that there is a simple, and scientifically certain, solution to the problem. But as Petscher and colleagues point out, "the accrual of scientific knowledge related to reading is ever evolving, at times circuitous, and not without controversy," a sentiment echoed in Solari and colleagues' observation that, "the science on any human phenomenon or behavior is rarely settled."<sup>51</sup>

A fourth narrative element involves demonizing other instructional approaches by offering caricatures. Anything other than exclusive reliance on alphabetic decoding is demonized as not teaching phonics, but teaching children to "guess" at words, and thus unscientific and even educational malpractice. In fact, approaches that include alphabetic decoding as one of multiple instructional elements, have been shown to be successful with young readers experiencing difficulty.<sup>52</sup> Such dualisms are counterproductive. It is possible, even likely, that when teachers over-emphasize context strategies, some children will neglect expanding their phonics knowledge. It is equally possible, even likely, that when teachers neglect the use of context strategies, children will lose the sense that reading is about meaning construction, and not build the knowledge base and language skills on which comprehension depends.

Public dyslexia narratives often take the form of conversion narratives - stories with

sharp before and after contrasts featuring the (often emotional) recognition of dyslexia or of the significance of the near exclusive emphasis on phonics instruction. These narratives position public schools as either ignorant or heretical, and private providers of O-G based instruction as primary sources of knowledge and certification.<sup>53</sup>

In recent years, pronouncements about the presence and nature of dyslexia and the importance of SOR instruction have been delivered by practitioners of neuroscience or “brain science,” a field that very powerfully captures the public imagination. While yielding increasingly interesting data regarding reading processes, it remains a very large leap from neurological research to recommendations for instructional practice.<sup>54</sup>

Further, there is, in this process, no voice for families who have been failed by instructional approaches aligned with the SOR position. This is likely for at least two reasons. First, it is very difficult to speak up against large, organized, highly passionate lobbying groups and media presentations, particularly those whose stated mission is to protect vulnerable children. Second, diagnoses of dyslexia, with their promise of creativity or other gifts, are hard to give up, particularly when the slow progress in reading only confirms the diagnosis.

Fletcher and Grigorenko observe that “Unfortunately, science is generally not a primary basis for decision making in education; political trends, experience, anecdotes, and similar bases for evidence prevail.”<sup>55</sup> Such decisions are, however, frequently made in the name of science. The current state of research on dyslexia and related literacy instruction does not justify the bulk of the arguments about “settled science” relating to these matters. Indeed, there is strong support for a broader view of literacy-relevant science, and serious concern about the narrow view of the science popularized in the press.<sup>56</sup>

**Q12: Given the confusions and complexity surrounding dyslexia, how might we think about**

**and address children’s literacy learning difficulties?**

**A: A bit more humbly and with more recognition of what research actually offers, its breadth and its limitations.**

Some students have difficulty, sometimes extreme difficulty, with the word reading aspect of the reading process, and too often instruction does not meet those students’ needs. These difficulties absolutely need to be addressed instructionally and institutionally. That said, recent advocacy efforts have not been accurate or forthright about the current state of instructional research, its limitations, or its implications. Consequently, in the name of dyslexia, decisions are being made at school, district and state levels that affect the literacy instruction of all children. Doubtless, all parties involved have children’s best interests at heart. However, decisions are often made based on misrepresentations of the state of research promoted by media, commercial interests, and lobbying groups. Neither the nature nor the existence of dyslexia is settled science. Nor is the best approach to reading instruction for children experiencing difficulty learning to read, settled science. Educational and legislative decision-makers should be wary of claims to the contrary. Indeed, enthusiasm for the potentially curative benefits of the approach to instruction currently promoted by SOR proponents led to a grand, federally-funded experiment, the Reading First program, that failed to deliver any impact on reading comprehension (the most important target of reading instruction), despite a small but significant increase in word decoding skills. This despite the expenditure of billions of dollars in funding from the US Department of Education over six years.<sup>57</sup>

Teaching all children to read and write is no simple undertaking and instruction in word reading skills needs to be considered in the broader context of literacy development. Research suggests that teachers are the most important in-school factor in students’ learning.<sup>58</sup> It is what

teachers know and do, particularly in meeting the needs of individual students, rather than the programs or approaches they use, that are most influential in literacy outcomes. Children enter classrooms with very different knowledge, skills, biological attributes, and life experiences that influence their literacy development, and they encounter a range of difficulties in becoming literate. Consequently, teachers of young children need a deep understanding of early literacy development and teaching strategies in order to teach effectively. Some children will need more emphasis on decoding and related processes than others, some will need more support with language skills, or the conceptual knowledge and vocabulary upon which comprehension depends. Many, especially those who encounter difficulties, will need motivational support. It is not enough for teachers to know what children need to learn. They need to know how to create conditions such that children will develop that knowledge, and engage and persist with challenging activities, while maintaining a sense of meaningfulness, self-efficacy, and a positive relationship toward literate activities. Building such professional knowledge can reduce the number of children encountering difficulty.<sup>59</sup>

Unfortunately, teacher preparation programs typically have too few courses on literacy teaching and learning to enable future teachers to develop the needed expertise. But, adding courses onto teacher preparation programs increases the cost and timeline of preparing for a career that is generally underpaid. Adding literacy courses, on top of extensive other new priorities (anti-bullying, anti-racism, ADHD, SEL, etc.) without changing the cost and timeline, results in tradeoffs against learning how to teach science, social studies and math, teaching that contributes to the development of the knowledge and vocabulary necessary for enabling comprehension. That these costs and benefits have not been researched, has not impeded the implementation of state laws requiring a shift to screening and instructional procedures that are

aligned with the dyslexia and SOR perspective.<sup>60</sup> Too often, emergency and alternative certifications and limited professional development mean that teachers do not have the necessary professional knowledge to teach literacy effectively, especially for students who are highly dependent on school to promote their growth in literacy; students for whom limitations in background knowledge and language skills are at least as likely to limit reading comprehension as are weak phonics skills. These are serious problems to be solved that will affect the number of children encountering difficulty becoming literate in the broader sense of literacy that not only encompasses word reading accuracy but using written and spoken language for communication and knowledge development. Solutions to these problems are likely to reduce the number of children who some would have wished to classify as dyslexic as well as those who experience difficulties with the literacy development more broadly.

### **Policy Implications**

It should be clear that the nature of children's difficulties becoming literate and the best ways to teach are the focus of ongoing, not "settled" science. That said, currently, with respect to dyslexia, we can say:

1. Definitions of dyslexia vary widely, and none offers a clear foundation - biological, cognitive, behavioral, or academic - for determining whether an individual experiencing difficulty with developing word reading skill should be classified as dyslexic. (Questions 1 and 10).
2. Although there are likely heritable dimensions to reading and language difficulties, there is no way to translate them into implications for instructional practice. (Question 2).
3. Good first instruction and early intervention for children with a slow start in the word reading aspect of literacy, reduces the likelihood they will encounter serious difficulty. Thus, early screening with assessments that can inform instruction, is important.



Screening for dyslexia, particularly with instructionally irrelevant assessments, offers no additional advantage. (Questions 5 and 6).

4. Research supports instruction that purposely develops children’s ability to analyze speech sounds (phonological/phonemic awareness), and to relate those sounds to patterns of print (phonics and orthographics), *in combination with instruction to develop comprehension, vocabulary, fluency, and a strong positive and agentive relationship with literacy.*

(Questions 7, 8, 9 and 12).

5. Evidence does not justify the use of a heavy and near-exclusive focus on phonics instruction, either in regular classrooms, or for children experiencing difficulty learning to read (including those classified as dyslexic). (Questions 7, 8, 9 and 12).

6. Legislation (and district policies) aligned with the SOR perspectives on dyslexia will necessarily require tradeoffs in the allocation of resources for teacher development and among children having literacy learning difficulties. These tradeoffs have the potential to privilege students experiencing some types of literacy learning difficulties while limiting instructional resources for and attention available to students whose literacy difficulties are not due (exclusively) to word reading difficulties. (Questions 3 and 12).

These policy implications should not, in any way, serve to diminish concerns about the experiences of learners who encounter difficulty with the word reading process. Most learners who experience such difficulties can overcome those difficulties with early and appropriately targeted instruction and intervention that is not limited to an exclusive phonics focus. There is no evidence that their classification status is relevant in this regard.

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