As Seidenberg presents (this issue), the rigorous scientific research conducted during the last several decades has strong implications for the content and methods of teaching children to read. The benefits of systematic, explicit instruction about the language and orthographic units in writing systems have been established. When educators have this knowledge, students learn more readily and rapidly with fewer falling behind. Yet, with few exceptions, the findings and implications have been largely resisted and deflected both by mainstream higher education and by the leading reading/literacy organization, The International Literacy Association (ILA). This resistance has been the case despite the ongoing, unacceptable incidence of reading difficulties documented for U.S. students across socio-economic levels (National Assessment of Educational Progress [NAEP], 2019).

At the core of this problem is a long-running disagreement about how reading should be taught: originally framed as teaching by a focus on phonics or a focus on meaning (a.k.a. the reading wars; Chall, 1967; Adams, 1990). In the 1980s and 1990s, the meaning approach dominated in the form of Whole Language and, later, by a variation termed Balanced Literacy. These approaches, which still have a strong influence on teacher preparation and teaching practices, brought benefits of good literature to classrooms and appreciation of differences in students’ cultural backgrounds. However, paired with this philosophy is a belief that learning to read is natural and, if natural, does not need to be directly taught. Yet, if learning to read were natural, it would be a universal human attainment, as are walking and talking, when in fact a large percentage of people on earth remain illiterate. The reality is that a long time passed in human history before writing systems were created by insightful persons matching arbitrary symbols with units in spoken language—in the case of the alphabet with meaningless phonemes (Liberman & Liberman, 1990). In the current era, brain research has documented the need for a child learning to read to establish new neural networks to handle reading, linking regions of the brain that evolved for other purposes and sometimes modifying their functions (e.g., Dehaene, 2009; Pugh et al., 2010).

Unfortunately, most in education continue to base reading instruction practices on a faulty assumption that learning to read is natural and does not require explicit instruction. A related problem is the adoption since the 1980s of something known as the three-cueing system (i.e., teaching children to use “cues,” i.e., semantic, syntactic, or graphophonics, to figure out words in text). However, as Adams critiqued in 1998, the approach evolved to emphasize comprehension and to diminish attention to phonics. Further, teachers Adams interviewed believed that students have knowledge about semantics, syntax, and phonics and just need a nudge, when in reality many students have insufficient knowledge and require explicit instruction (Seidenberg, 2017).

The differences in opinion about how to teach reading persist despite developments in research that underscore the importance of teaching a rich, multi-layered set of language and literacy skills, integrated from the start, that are a far cry from the phonics workbooks or “phonics first and only” approaches feared in mainstream education. Instead, evidence-aligned approaches consist of engaging and informed methods of teaching children to...
Evidence-aligned approaches consist of engaging and informed methods of teaching children to read that inspire and empower educators when they are given the chance to learn such methods.

With the publication of the Report of the National Reading Panel (NRP, 2000) in which the merits of teaching phonological awareness and phonics were documented in a review of the research literature (along with fluency, vocabulary, and comprehension), advocates of the meaning approach protested. For example, in his 2003 book, *Unspeakable Acts, Unnatural Practices* (referring to phonics), Smith decried the hazards of phonics, stating that it “is not a system that helps anyone learn to read and it can only confuse and interfere with anyone learning to read” (p. 32). He asserted that “phoneme awareness is a spurious concept” (p. 26). In 2013, Allington failed to understand that decoding is a critical skill that enables beginning readers to sound out words and students in later grades to successfully read the thousands of words they encounter for the first time in print. He stated, “children can be taught to pronounce nonsense words, but this should not be confused with teaching them something useful as developing readers” (p. 521).

Variations in these views remain dominant in the ILA and in schools of education, contributing to strategies that marginalize and minimize systematic and explicit instruction in phoneme awareness, phonics, and other layers of the language and writing systems.

**Strategies to Minimize the Use of Scientifically-Based Methods of Instruction**

1. **Tokenism.** Tokenism is the practice of making only a small or symbolic effort. This is a common strategy used to sidestep more extensive use of scientifically-based reading instruction. After the publication of the NRP report, the pressure on the education field to recognize the importance of phoneme awareness and phonics instruction for reading acquisition was fairly acute. Shortly afterward, the International Reading Association (IRA; now ILA) took a stance supporting phonics within the context of a whole-language program. In practice, however, this has played out as a little bit of phonics without the systematic and explicit instruction needed.

   A strategy related to tokenism has been to stress the lack of significant differences in the NRP report between different types of phonics instruction, that is, between programs that provided instruction at the level of the phoneme and those that used larger chunks of sound in word families. Educators were encouraged to minimize the focus on phonemes in their lessons, focusing instead on word families (e.g., Cunningham, 2007). It is important to note that research since the NRP report has shown that the comparability of phonics lessons offering phoneme or word family instruction is evident only for low-level skills such as letter knowledge. Instead, strong benefits for phoneme-level units are found for more advanced skills such as decoding words not seen before in print (see Brady, 2011). Operating without the more current knowledge and avoiding a focus at the phoneme-level of words, authors and publishers produce nonsystematic programs that only have a small dose of phonics, claiming to be using research-based best practices.

Operating without the more current knowledge and avoiding a focus at the phoneme-level of words, authors and publishers produce nonsystematic programs that only have a small dose of phonics, claiming to be using research-based best practices.

Tokenism is present in the Common Core State Standards (CCSS) as well. As described by Moats (2012), “The widely used Common Core Curriculum Maps, for example, offer holistic, theme-oriented lessons organized around the reading of high quality texts, not around the systematic instruction of reading and writing skill (p. 17).” The only attention to Reading Foundations is at the back of the standards document as an incidental topic, not coordinated with the theme-based lessons, leaving teachers with no guidance as to how to integrate the foundational components of reading instruction. Scru-
tiny of the CCSS Reading Foundations section reveals that this section has serious gaps in the language and orthography concepts included, and deficiencies in the content that is included (Brady, 2012).

In short, the token acknowledgement of phonics and claims that effective phoneme awareness and phonics instruction have been incorporated into meaning-based programs veil an underlying resistance to key elements of language and writing systems. This obfuscation is inevitably misleading to policy makers, administrators, and parents seeking to provide the best resources for schools and students.

2. The higher education roadblock. The prevailing views in schools of education in the United States and elsewhere are compatible with current manifestations of meaning-based instruction. The ILA serves as the major credentialing organization for higher education programs, setting “Standards for the Preparation of Literacy Professionals.” The standards outline nonspecific expectations that fail to detail what future teachers need to master in order to be able to assess and teach reading, spelling and writing well. For example, Standard 1: Foundational Knowledge, states:

Candidates demonstrate knowledge of the major theoretical, conceptual, historical, and evidence-based components of reading (e.g., concepts of print, phonological awareness, phonics, word recognition, fluency, vocabulary, comprehension) development throughout the grades and its relationship with other aspects of literacy. (ILA, 2017)

The general listing of reading components, without elaboration, do not make clear what scope and depth is required in each area, nor is this detailed elsewhere, leaving wide room for interpretation that often results in inadequate coverage.

In 2006, Walsh, Glaser, and Wilcox, working for the National Council on Teacher Quality (NCTQ), reviewed the content of 233 required reading courses for future teachers offered at a randomly-selected sample of 72 education programs in the U.S. The results showed that only 15% provided students with minimal exposure to the science of reading. This organization reports that the percentage has increased to approximately 37%, but, in a recent review of state testing for licensure in elementary and special education, found that only eleven states mandate assessment of that knowledge (NCTQ, 2018). A similar situation is taking place in Australia (see Jennifer Buckingham’s article in this issue). Yet surely future elementary teachers responsible for teaching children how to read and special educators serving students with reading disabilities should be able to demonstrate that they have the knowledge and skills derived from the science of reading.

Positive attributes that come through in other portions of the ILA Standards are genuine concern about respect for diversity and delivery of equity in education to all students. In addition, ILA underscores the value of teacher choice and decision-making with regard to instructional materials and assessments. However, as noted, the knowledge base required to meet these goals effectively is not detailed; the standards are largely devoid of sufficient content. This contrasts dramatically with the Knowledge and Practice Standards for Teachers of Reading, produced by the International Dyslexia Association (IDA). The IDA standards clearly articulate the extent of preparation that should be given to educators who will be teaching students to read, write, and comprehend text.

The consequence of the higher education roadblock to the science of reading is an ongoing flow of newly credentialed teachers who have not acquired critical knowledge and skills for teaching reading.

3. Co-opting the terminology and making false claims. Two organizations, IDA and Decoding Dyslexia (DD), advocate in-depth knowledge and skills for all teachers of reading. They emphasize the merits of systematic and explicit instruction in reading, illustrated by a number of programs initially developed to teach students with dyslexia (e.g., Slingerland, Project Read), but that are highly effective with all learners. More recently, an umbrella term, Structured Lit-
In light of the headway that IDA and DD have made promoting the value of Structured Literacy, ILA recently revised earlier statements to now advocate for systematic and explicit instruction in phonics. A 2019 ILA Literacy Leadership Brief titled *Meeting the Challenges of Early Literacy Phonics Instruction*, provides a summary of explicit and systematic phonics. If this Leadership Brief signals genuine movement toward accepting the importance of phonics instruction, and not mere co-opting of terms, that would be most welcome. Movement will be evident if the preparation standards also shift to reflect greater attention to the knowledge and practices educators need in order to effectively teach reading.

The risk of co-opting terminology is raised in an article by Gabriel (2018) in which she noted the inroads made by IDA and DD in dyslexia advocacy. Gabriel summarized that state dyslexia laws have established exploratory committees, adopted the 2003 IDA definition of dyslexia, mandated assessment and intervention, or prescribed various combinations of assessment and intervention and/or teacher training. Central to these laws is frequent use of the terms “explicit, systematic methods of reading instruction” and “structured literacy.” Expressing concerns about a growing dyslexia industry, Gabriel suggested that these dyslexia terms be incorporated into other kinds of reading programs:

“Reading Recovery and other programs will need to build a case for inclusion as viable for dyslexia-specific policies. All invisible pedagogies with a track record of success outside of programs most closely associated with Structured Literacy will require some explanation and demonstration in order to show how they fit in the current policy climate.” (p. 32)

This suggestion would be innocent enough if the programs referred to do in fact meet the criteria for structured literacy programs. It is quite alarming when they do not. Reading Recovery, for example, has none of the critical properties of Structured Literacy methods; claiming that it does would only add to the difficulty of obtaining effective instruction for struggling readers. Recommending that educators of other non-systematic and non-explicit methods engage in making false statements would complicate matters further, adding to the risk that provision of effective instruction and remediation would not occur.

In a subsequent article, Gabriel (2019) argues that the discourse and rhetoric used in dyslexia policy-making “drives a privatization agenda in which public schools become mandated consumers for a growing dyslexia industry” (p. 1). This is an example of a false claim made to discredit demands for change. Thus, Gabriel endeavors to undermine DD’s efforts to have the needs of students with reading difficulties met by claiming that DD has dangerous implications for “the privatization of public schools and teacher education” (p. 29). Certainly, there is money to be made by targeting a need and a market. But, this must be acknowledged as being true of *all* approaches that gain traction (e.g., materials by Fountas & Pinnell and Calkins from Heineman Press). In reality, at the core of the proposed DD legislation is the motive to better prepare educators and to improve reading instruction, not to promote entrepreneurial goals to sell materials and programs, nor to fund private schools that specialize in direct and explicit methods of instruction. Whether privatization is advanced indirectly will depend on whether the tokenism, higher education roadblocks, co-opting of terminology, and dissemination of false narratives come to an end.

### Science Denial: Not Unusual in the Process of Accepting Scientific Gains

Across history there have been endless cases of resistance by scientists to important scientific discoveries, as well as by nonscientists, because of economic, technological, religious, or other reasons. Barber (1961) notes some of the factors across the centuries that have contributed to rejection of scientific advances; these also apply to the present situation in education:

- Objections to the area of professional specialization of the researcher(s)
- Resistance by other scientific organizations and publications, as well as by opposing “schools” of thought
- New concepts that are questioned as valid
- The professional standing of the resisters who may be the current leaders in their field
- Deeply held philosophical, religious, or ideological conceptions that are closely interwoven with existing scientific theories or beliefs

One of the most compelling examples of rejection of scientific gains involved Ignaz Semmelweis (Carter & Carter, 2005), an obstetrician who pinpointed a major cause of puerperal fever, also known as childbirth fever, once a com-
mon illness and cause of death for women. In 1847, Semmelweis set about studying its occurrence in his hospital in Vienna. He documented that mothers whose babies were delivered by doctors had a much higher death rate (13-18%) than did mothers whose babies were delivered by midwives in the same hospital (2%). Carefully eliminating a number of potential factors, Semmelweis found the death of mothers was associated with their babies having been delivered by doctors who had just come from the morgue where they had been conducting autopsies. Although bacteria and viruses had not yet been discovered, Semmelweis deduced that the doctors were somehow transmitting disease to the women. He instituted a hand-washing regimen, insisting that all doctors wash their hands thoroughly after working in the morgue. The death rate plummeted to that of the deliveries by midwives, but the doctors were displeased and insulted that they, the best educated, were being told that they were the purveyors of death. Not long after, Semmelweis lost his hospital position, working subsequently in two other facilities where he again instituted hand-washing procedures and reduced the death rates. Yet, the medical community remained hostile to his recommendation about how to reduce the occurrence of childbirth fever and ridiculed him for it.

Although there are mixed accounts of the end of his life, in 1865 three doctors signed a document stating that Semmelweis had dementia. Signing of a document with this claim would result in institutionalization for the rest of a doctor’s life. Other accounts imply that Semmelweis had a psychological breakdown, perhaps from the acute frustration of not being able to advance a simple procedure that would save the lives of many women; he is reported to have become increasingly agitated about the matter. One view proposes that by declaring him mentally incompetent, the medical community silenced this annoying threat to doctors’ reputations. Whatever the basis, he was taken to an institution and was beaten so badly while being admitted that three weeks later he died as a result of his injuries at age 47. Yet, Semmelweis has been heralded in subsequent eras up to the present as a pioneer in antiseptic procedures and for fostering an understanding of the spread of disease.

While the Semmelweis story is a moving example of resistance to new findings, it also is a cautionary tale that rejecting scientific advanc-
es can have weighty consequences. At present in the U.S., roughly half of the nation’s children are not attaining proficient reading levels, an unnecessary circumstance that inevitably influences their educational success, employment opportunities, self-esteem, and more, with national effects as well.

At the same time, in discussing the acceptance of scientific results, it is necessary to acknowledge that throughout history there also have been theories that did not hold up or that were countered by a different body of research (e.g., phrenology, Einstein’s early theory of a static universe). To be on firmer ground, theories have to meet the criteria of testing hypotheses, using a variety of methods to do so, and obtaining a substantial body of convergent evidence. And, in education as in other applied fields, it is necessary to have independent evaluation of commercial products (Barshay, 2019). The science of reading has met these criteria and is well beyond a tipping point for accepting the implications for instruction.

In terms of the present lack of widespread acceptance of reading science by educational leaders, one can only hope that open-mindedness—essential to the advance and acceptance of science—will prevail, aided by change agents who will facilitate the transition. Moving forward will require that the faulty beliefs that learning to read is natural and that explicit and systematic instruction is detrimental must be let go, along with the use of the three-cueing system. At the same time, there will need to be informed combinations of the productive elements of current educational practices and the implications of reading science. Two areas for collaboration are the benefit of wide reading experience and the importance of building vocabulary and background knowledge, examples of numerous points of agreement shared by all who teach reading. Likewise, good teaching techniques, fostering discovery and interest, of course are key: any subject can be taught with dull methods or with engaging, effective ones, neither overdoing what is already known, nor launching the student into tasks the student is not ready to undertake.

Seeking Solutions
The roadblock in higher education must be removed, with accompanying changes in the ILA Standards for teacher preparation or adoption of other standards that adequately reflect the science of reading. In the context of academic freedom, higher education departments have had a stronghold on the content of courses and on whom they hire. Suggestions that the science of reading should be incorporated in teacher preparation programs (e.g., in the NRP) have not resulted in future teachers learning the robust language and literacy content needed.

It is in no way the fault of educators that they are not prepared to deliver evidence-aligned reading instruction. These dedicated, intelligent, caring professionals earnestly want to launch successful readers, but often have not been given sufficient knowledge and skills to do so.

This is not really surprising. Professors who are committed advocates of meaning-based methods of reading instruction, and who never learned the concepts and methods implicated by the science are unlikely to embrace this goal enthusiastically. The consequence may be superficial discussion of phoneme awareness and phonics in a lecture or two (i.e., tokenism), or less. If instead, schools of education hired faculty who either have terminal degrees related to the science of reading or certification in an IDA or International Multisensory Structured Language Education Council (IMSLEC) approved structured language program, these individuals could properly teach the foundations and methods courses that are necessary. In turn, preservice teachers (i.e., future classroom teachers, reading specialists, and special educators) receiving this preparation would be more likely to learn and use those methods when teaching children to read. To be clear, it is in no way the fault of educators that they are not prepared to deliver evidence-aligned reading instruction. These dedicated, intelligent, caring professionals earnestly want to launch successful readers, but often have not been given sufficient knowledge and skills to do so. Paying for and earning a degree should result in acquiring knowledge and practices informed by the science of reading.

Another positive step would be for departments of speech and language to establish literacy tracks for speech-language pathologists (SLPs) who want to work in schools. SLPs have solid training in language structures and rules of use, as well as in differentiating instruction to meet the individual needs of children. Thus,
adding the science of reading and relevant methods would be a straightforward step for these specialists. In turn, they could help meet the needs of students struggling in literacy and/or language in the schools, and could help support teachers in learning effective methods of teaching reading.

A third possibility is for universities and colleges presently lacking a Department of Education to establish new departments that would, with guidance from reading researchers and experts in scientifically-based reading methods, create cutting-edge programs for elementary teachers, reading specialists and special educators that are strongly aligned with the science of reading. Such programs could provide helpful models of best practices in preparing teachers to teach reading.

Further, the teacher credentialing exams should be reviewed by experts in the science of reading to ensure that the test items accurately reflect the science and are sufficiently rigorous. Strong state reading assessment policies for educators are necessary for preparing professionals who know how to teach reading.

Finally, these suggestions point to the important role for state departments of education to implement these actions and strengthen university programs. They also could sponsor relevant professional development opportunities for higher education faculty, school administrators, and current educators.

In closing, it is long overdue for the resistance and avoidance from the field of education to cease and for the science of reading to inform practices in schools. All students should be taught to read proficiently—an attainable accomplishment if methods stemming from the science of reading were taught well in teacher preparation programs and became the norm in schools.

References


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