

# What Research Tells Us About Reading Instruction

**Rebecca Treiman**

Department of Psychological and Brain Sciences, Washington University in St. Louis

Psychological Science in the  
 Public Interest  
 2018, Vol. 19(1) 1–4  
 © The Author(s) 2018  
 Reprints and permissions:  
[sagepub.com/journalsPermissions.nav](http://sagepub.com/journalsPermissions.nav)  
 DOI: 10.1177/1529100618772272  
[www.psychologicalscience.org/PSPI](http://www.psychologicalscience.org/PSPI)



Parents, educators, reading researchers, and policy makers all agree that children must learn to read to participate fully in a modern society. They agree, moreover, that much of this learning will take place in school. Beyond this, agreement breaks down. There have been many debates about how children should learn to read; those between proponents of phonics instruction and proponents of whole-language instruction have sometimes been so heated that they have been called the “reading wars.” What can psychological science tell us about the issues? This is the question that Castles, Rastle, and Nation (2018) set out to answer in their article. They provide a wide-ranging review of how reading develops, from beginners to experts, and consider the implications of the research for how reading should be taught.

## The Difficulty of Reading and the Importance of Phonics Instruction

Reading is, in the words of Gough and Hillinger (1980), an unnatural act. This is in contrast to listening and speaking, which are natural. Language is as old as our species, and we are built to acquire it. Exposure and experience are required, of course, but babies come into the world with the tools they need. Well before infants can understand any words, for example, they find speech interesting to listen to and prefer it to other kinds of sounds (Shultz & Vouloumanos, 2010). The idea of symbolizing a language by making marks on a durable surface is rather new in historical terms, having arisen in a few cultures five or six thousand years ago and spreading to others. Evolution did not equip us to read and write in the same way that it equipped us to listen and speak. Children who do not know how to read, for example, are not drawn to look at writing in the same way that babies who cannot understand spoken words are drawn to listen to speech (Evans & Saint-Aubin, 2005). These considerations suggest that written language is learned rather differently than spoken language.

For many children, what is hard about learning to read is understanding that the marks on the page represent units of their language and figuring out the code by which they do so. This is the unnatural part of reading. It is particularly unnatural when the marks represent individual speech sounds, as in alphabetic writing systems. Adults who know how to read and write an alphabet find it obvious that spoken words are composed of sounds. We can easily judge that *bean* begins with the same sound as *bat* and that *went* includes the same “n” unit that *name* does. But these things are not obvious to preliterate children, illiterate adults, or adults who are literate in a nonalphabetic writing system (Liberman, Shankweiler, Fischer, & Carter, 1974; Morais, Cary, Alegria, & Bettelson, 1979; Read, Zhang, Nie, & Ding, 1986). Individual speech sounds, what linguists call *phonemes*, are abstract units. The *n* in *went*, for example, is not exactly the same in its pronunciation or acoustic form as the *n* of *name*. Humans spoke for many thousands of years before a few of them had the idea that one could symbolize abstract units of language with visible marks. It is not realistic to expect 5- or 6-year-old children to discover on their own a technology that took their ancestors so long to invent.

These considerations suggest that children need to be taught explicitly about how their writing system works and how it maps to the language they already know. A large body of research supports this point, and Castles et al. provide an accessible discussion of this research. This is an important service, because the value of teaching children how their writing system works is not always appreciated by educators, parents, and policy makers.

One reason that the importance of phonics instruction is not more widely appreciated is the common

### Corresponding Author:

Rebecca Treiman, Department of Psychological and Brain Sciences,  
 Washington University in St. Louis, Campus Box 1125, St. Louis, MO  
 63130  
 E-mail: [rtreiman@wustl.edu](mailto:rtreiman@wustl.edu)

belief that the best way to ensure that children will become good readers is to read to them frequently, starting from infancy. This idea, which is held by many parents and teachers, is both true and false. It is true in the sense that reading to children exposes them to spoken language—often more language than they would hear in the same amount of time and often more complex language. Spoken-language skills are important both in their own right and because they provide a foundation for reading, and the language skills that children develop by being read to pay off later in the form of improved reading comprehension. Reading to children also serves to interest them in books and what can be learned from them. This can pay off in increased motivation for reading. But the idea that reading to children is the best way to ensure that they will read well themselves is false in the sense that children do not usually learn very much about how their writing system works from being read to. When adults read to children who cannot yet read on their own, the children pay attention to the language they are hearing and the pictures in the book. They do not pay much attention to the writing. In one representative study, mentioned earlier, preschool children spent about 20 times longer looking at the pictures in a storybook that was being read to them than looking at the words in the text (Evans & Saint-Aubin, 2005). Thus, it is not realistic to expect children to learn very much about how their writing system works from being exposed to print while being read to. Uncritical acceptance of the idea that reading to children is what counts in making them good readers has contributed to failures to recognize the value of direct teaching.

Another reason that the importance of teaching children about their writing system is not always appreciated is that an alternative idea—that children learn best by discovering things on their own—is so attractive to so many. Discovery learning fits with Piaget's view of the child as forming and testing hypotheses about how the world works and, more generally, with the idea that learners actively construct knowledge. The best way for children to learn to read, according to such a *constructivist* view, is to expose them to print and allow them to discover its patterns and its links to language. However, research shows that pure discovery learning does not work very well in a variety of domains (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011; Mayer, 2004). Whether the subject is math, science, or reading, teachers must provide direct instruction, guidance, and feedback. They cannot rely on students to come up with the right generalizations and procedures on their own. The statement that students benefit from direct instruction and feedback does not mean, of course, that learning is impossible if these things are not provided. Research on statistical learning has amply shown that

people can and do learn through exposure, even when they are not trying to learn and even when the patterns in the material to which they are exposed are not explicitly pointed out (Aslin, 2017). But when a body of knowledge is complex, and when we are not evolutionarily prepared to learn it, as is the case for reading and writing, learning from exposure can be slow and prone to error.

### Improving Phonics Instruction

Phonics instruction is an attempt to provide the guidance and teaching that children need to learn how an alphabetic writing system works. As Castles and colleagues discuss, extensive research has shown that systematic phonics instruction as currently practiced leads to better word-level skills than does whole-language instruction. But is phonics instruction ideal as currently practiced? Advocates of phonics instruction have been somewhat reluctant to discuss this point because such discussions might be seen as weakening their position. But, just as psychological science has provided evidence for the value of phonics instruction, it can provide suggestions about how such instruction can be improved.

Phonics instruction teaches that the spellings of words encode the phonemes within them by virtue of systematic links between letters or groups of letters and phonemes. This is indeed a critical feature of alphabetic writing systems. However, as Castles et al. note, phonics instruction does not teach children very much about certain other aspects of writing. One important characteristic of English (and some other alphabetic writing systems, such as French) is that there are links between letters or groups of letters and *morphemes* (units of meaning). For example, *jumped* is composed of the root morpheme {jump} and the past-tense morpheme {-ed}. The word *hunted* is similarly composed of a root morpheme and the past-tense morpheme. The past-tense morpheme has a different phonemic form in the two words: /t/ in *jumped* and /ɪd/ in *hunted*. But the morpheme is spelled alike in the two words. Children need to learn that the spellings of morphemes often remain the same across words even when their pronunciations change. With its focus on links between writing and language at the level of phonemes, phonics instruction is not very helpful here (Bowers & Bowers, 2017).

Another aspect of writing that is not covered by current phonics instruction is that writing is a system of its own. There are restrictions on which letters can occur in which parts of words, for example, some of which are not motivated by anything in the spoken language. Consider the fact that *love*, *give*, and *have* all end with *e*. This is unexpected given that the words are pronounced with short vowels. Phonics instruction

teaches that an *e* at the end of a one-syllable word signifies a long vowel, but *love*, *give*, and *have* do not contain long vowels. The *e* is there for *graphotactic* reasons—having to do with the kinds of letter sequences that can occur in the writing system—rather than phonological reasons. English words rarely end with a single *v*, and the final *e* protects a word from such an ending. Teaching children about this graphotactic pattern could help them understand why the phonics rule about long and short vowels that works for other words, such as *bat* and *bate*, does not work for words with *v*. Another example of an English graphotactic pattern is that double consonants do not usually occur after a sequence of more than one vowel letter. Thus, *veell* does not look as if it could be a word of English, whereas *vell* does.

Rather than talking about the value of phonics instruction, Castles et al. suggest that we might talk about the value of teaching children how their writing system works. For alphabetic writing systems, this includes the body of information that is currently taught in phonics instruction and some other information as well, the specifics of which depend on the language and the script under consideration. For nonalphabetic writing systems, the kind of information that children need to learn is different, but the need to learn about the workings of the writing system is the same.

When teaching children about the workings of their writing system, it may be beneficial to place more emphasis on spelling and writing than many current phonics programs do. Phonics instruction typically focuses on correspondences from letters to sounds and use of the taught correspondences to pronounce written words. More emphasis on links from sounds to letters and on spelling orally presented words could be helpful, in part because spelling is an important skill in itself and in part because knowing the exact spellings of words helps people to read them (Ouellette, Martin-Chang, & Rossi, 2017). Practice with production helps in the learning of language, whether it is spoken (Hopman & MacDonald, 2018) or written, and educators could take better advantage of it (for a discussion of spelling instruction, see Treiman, 2018).

To provide good instruction about how a writing system works, teachers need to have a good understanding of this themselves. They also need a good understanding of how children learn to read and spell (e.g., knowledge of the mistakes that are typical of children of different ages). Many teachers have little opportunity to obtain such knowledge during their training. An important part of improving children's reading performance, therefore, is improving the teaching of teachers. This will help teachers to answer children's questions, such as a question about why *book* does not have the same sound as *boot* and *spoon* do

(not that *book* is an isolated exception; most words with *oo* before *k* have this same vowel pronunciation) and respond in a helpful way to children's reading and spelling mistakes.

Learning how a writing system works to represent a language is essential for learning to read because children who can connect the marks on the page with their language system can use the processes and knowledge that they have developed for spoken language to understand what they read. However, children can have difficulty when the structure and content of written language differs from the structure and content of the language that they are accustomed to hearing. As Castles et al. point out, there are some differences between written and spoken language even for young children: Less common words such as *treasure* and *llama* are more likely to occur in books than in everyday speech (Hayes & Ahrens, 1988). Differences between written language and spoken language can be larger for older children. Therefore, teaching children to read requires not only teaching them how their writing system represents language but also teaching them about the language of books. Production of writing can play an important role in the learning of both aspects. Advocates of phonics instruction have sometimes ignored or downplayed the complexities of written language comprehension, and a valuable feature of the article by Castles and colleagues is that it does not do so.

## Conclusions

Much of the research in the field of reading has examined the relationships between children's reading ability and their other cognitive skills. For example, there is a good deal of work on the associations between reading and working memory. Such work is of limited educational value, however, if the other skill in question—working memory, in this example—cannot be improved through teaching or if any improvements do not generalize to reading. Training of working memory does not appear to generalize, in fact (Melby-Lervåg, Redick, & Hulme, 2016), and the same may be true for a number of other skills outside of reading as well. Whether the task is learning to read or learning to do something else, we should teach children how to perform the task rather than teach something else and hope for generalization.

Children differ from one another in their reading ability, as in their performance on other tasks. Researchers and educators cannot erase these differences. But research can improve our understanding of how written language works and of how children learn, and educators can use this information to design instruction. Better instruction will raise the level of all children, whether they are faster or slower learners. Castles and colleagues provide a comprehensive overview of what researchers

have learned so far, and the information in their report will benefit teachers, parents, and policy makers.

### Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

### References

- Alfieri, L., Brooks, P. J., Aldrich, N. J., & Tenenbaum, H. R. (2011). Does discovery-based instruction enhance learning? *Journal of Educational Psychology, 103*, 1–18. doi:10.1037/a0021017
- Aslin, R. N. (2017). Statistical learning: A powerful mechanism that operates by mere exposure. *Wiley Interdisciplinary Reviews: Cognitive Science, 8*, 1–7. doi:10.1002/wcs.1373
- Bowers, J. S., & Bowers, P. N. (2017). Beyond phonics: The case for teaching children the logic of the English spelling system. *Educational Psychologist, 52*, 124–141. doi:10.1080/00461520.2017.1288571
- Castles, A., Rastle, K., & Nation, K. (2018). Ending the reading wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest, 19*, 5–51.
- Evans, M. A., & Saint-Aubin, J. (2005). What children are looking at during shared storybook reading: Evidence from eye movement monitoring. *Psychological Science, 16*, 913–920. doi:10.1111/j.1467-9280.2005.01636.x
- Gough, P. B., & Hillinger, M. L. (1980). Learning to read: An unnatural act. *Bulletin of the Orton Society, 30*, 179–196. doi:10.1007/BF02653717
- Hayes, D. P., & Ahrens, M. G. (1988). Vocabulary simplification for children: A special case of “motherese”? *Journal of Child Language, 15*, 395–410. doi:10.1017/s0305000900012411
- Hopman, E. W. M., & MacDonald, M. C. (2018). Production practice during language learning improves comprehension. *Psychological Science*. Advance online publication. doi:10.1177/0956797618754486
- Liberman, I. Y., Shankweiler, D., Fischer, F. W., & Carter, B. (1974). Explicit syllable and phoneme segmentation in the young child. *Journal of Experimental Child Psychology, 18*, 201–212. doi:10.1016/0022-0965(74)90101-5
- Mayer, R. E. (2004). Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction. *American Psychologist, 59*, 14–19. doi:10.1037/0003-066X.59.1.14
- Melby-Lervåg, M., Redick, T. S., & Hulme, C. (2016). Working memory training does not improve performance on measures of intelligence or other measures of “far transfer”: Evidence from a meta-analytic review. *Perspectives on Psychological Sciences, 11*, 512–534. doi:10.1177/1745691616635612
- Morais, J., Cary, L., Alegria, J., & Bettelson, P. (1979). Does awareness of speech as a sequence of phonemes arise spontaneously? *Cognition, 7*, 323–331. doi:10.1016/0010-0277(79)90020-9
- Ouellette, G., Martin-Chang, S., & Rossi, M. (2017). Learning from our mistakes: Improvements in spelling lead to gains in reading speed. *Scientific Studies of Reading, 21*, 350–357. doi:10.1080/10888438.2017.1306064
- Read, C., Zhang, Y.-F., Nie, H.-Y., & Ding, B.-Q. (1986). The ability to manipulate speech sounds depends on knowing alphabetic writing. *Cognition, 24*, 31–44. doi:10.1016/0010-0277(86)90003-X
- Shultz, S., & Vouloumanos, A. (2010). Three-month-olds prefer speech to other naturally occurring signals. *Language Learning and Development, 6*, 241–257. doi:10.1080/15475440903507830
- Treiman, R. (2018). The teaching and learning of spelling. *Child Development Perspectives*. Advance online publication. doi:10.1111/cdep.12289