

Foundational skills instruction in Boost Reading

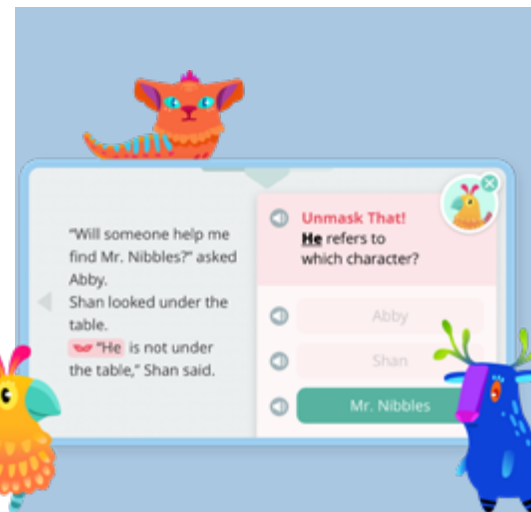


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Introduction to Boost Reading

Boost Reading is a supplemental digital literacy program that provides students with practice and explicit instruction in the underlying phonics, phonological awareness, vocabulary, and comprehension skills that are essential for fluent reading with strong comprehension (e.g., Cartwright, 2010; NICHD, 2000; Oakhill, Cain, & Elbro, 2015). It is a research-based, standards-aligned curriculum that engages and motivates students through a variety of mini-games, each focusing on building proficiency in foundational reading skills, while providing opportunities to apply those skills in increasingly complex texts.

The program was designed to include the content most effective at building word reading and comprehension skills of elementary students (e.g., NICHD, 2000; NIFL, 2008), including at-risk and struggling readers (e.g., NICHD, 2000) and English learners (e.g., August & Shanahan, 2006). The purpose of this paper is to describe the approach to reading comprehension instruction incorporated into Boost Reading.

The importance of a strong foundation

Skilled readers employ a variety of skills and strategies to make meaning of text, and students' reading success is impacted by many variables both internal to the student (e.g., reading skills, knowledge, etc.) and included in the larger context (e.g., type of text, purpose for reading, etc.) (Duke & Cartwright, 2018). While we know that reading is not a "simple" process, the Simple View of Reading (Gough & Tunmer, 1986) highlights that reading requires skills in two major areas: Readers must convert written words into speech (decode), and understand that speech (comprehend). Mastery of the written code or the ability to read words with automaticity is necessary but not sufficient for reading success (LaBerge & Samuels, 1974; Pikulski & Chard, 2005).

There is a continuum of phonological awareness and phonics skills (together referred to as foundational skills) that students must learn to become successful decoders. Ample research has documented the importance of foundational skills (the skills required to master the written code) and the impact of instruction in

foundational skills on overall reading success and long term student outcomes. Students' mastery of the code is causally related to comprehension (Garcia & Cain, 2014; McCandliss, Beck, Sandak, & Perfetti, 2003). Decoding skill is essential to reading new words and developing reading fluency — but the opacity of English makes it one of the most difficult orthographies to learn (Ellis, et al., 2004; Aro & Wimmer, 2003; Wimmer & Goswami, 1994). Phonics instructional approaches help students crack the code by highlighting spelling regularities and giving students rules for letter-sound correspondences so that they are able to decode new words, building toward automatic word recognition.

In order to convert written words into speech or decode, students must master many skills, which broadly fall into the domains of phonological awareness and phonics/word analysis. Phonological awareness refers to an understanding that words are made up of sounds, and the ability to manipulate the sounds in words from syllables (e.g., tell me the parts of jacket, jack-et) to phonemes, the smallest unit of sound (e.g., tell me the sounds in cat, /c/ /a/ /t/; what is cat without the /c/, at). Phonological awareness skills are necessary for students to decode text (Smith, Simmons, & Kame'enui, 1998; Torgesen, Wagner, & Rashotte, 1994). Students must also master skills in the phonics domain, from the sounds that individual letters and letter combinations make (e.g., b says /b/, oo says /oo/), and to the use of strategies for breaking words into parts (roots, prefixes, suffixes, syllables) to read them (e.g., look for the root and ending in jumped to read the word). Further, it isn't enough for students to demonstrate accuracy with these skills; they must also be able to engage in phonological awareness and phonics skills with a level of fluency or automaticity to facilitate fluent reading for meaning (Ritchey & Speece, 2006; Hudson, Pullen, Lane, & Torgesen, 2009).

Because Boost Reading is a supplemental program, the skills included allow for a balance of breadth and depth of instruction. The program covers the foundational skills included in the Common Core State Standards (National Governors Association Center for Best Practices, & Council of Chief State School Officers, 2010) and gives extra emphasis to those that have been consistently documented as predictive of future reading success. Table 1 includes a list of foundational skills that Boost Reading teaches.

Table 1. A snapshot of the foundational skills taught in Boost Reading:

Phonological awareness	Recognize rhyming words
	Blend and segment compound words
	Blend, segment, and count syllables
	Blend and segment onset-rime
	Blend, segment, and count phonemes
	Segment compound words
	Isolate individual phonemes (first, middle, last)
Phonics	Identify individual letter sounds
	Decode regular words (VC, or vowel-consonant, through CCCVCC)
	Decode words with common rime families
	Identify sounds for letter combinations (consonant digraphs, vowel digraphs and diphthongs)
	Decode one-syllable words with letter combinations
	Identify common spellings for long and short vowel sounds
	Know and apply final -e conventions
	Read words with r-controlled vowels
	Read words with l-controlled vowels
	Read words with inflected endings
	Read words with prefixes and suffixes
	Read two-syllable words with various syllable types
	Read multi-syllable words
	Apply grade-level phonics and word analysis in text

Foundational skills instruction in Boost Reading

It isn't enough to identify the right skills to teach and expose students to them or allow them to engage in practice. To facilitate the ultimate goal of fluent and automatic reading that permits a reader to construct meaning (Pikulski & Chard, 2005), these critical skills must be taught systematically and explicitly. The skills must be presented in a meaningful sequence, through clear and concise models with specific feedback for students' responses. Students must have ample opportunities to engage in ongoing practice of newly learned skills and to apply what they have learned to increasingly complex tasks (Carnine, Silbert, Kame'enui, Tarver, & Jungjohann, 2006; Schuele & Boudreau, 2008). Instruction is more effective when data-driven; placement and next steps for instruction should be aligned to a students' current level of skill and any progress made as a result of instruction.

Systematic instructional design: Boost Reading's scope and sequence

A large body of research on the features of effective instruction for struggling readers has documented key principles of sequencing skills. Table 2 provides a summary of those principles, and examples of how they are incorporated within the scope and sequence of Boost Reading.

Table 2. Guidelines for Sequencing Skills (adapted from Carnine, et al., 2006)

Design principle	Description	Implementation in Boost Reading
Teach preskills before the new skill or strategy is presented	Students must master the skills required to use a strategy before they are taught the strategy.	Students learn basic letter-sound correspondences for consonants and vowels and the VCe rule (the e at the end of the word makes the vowel long like in <i>cape</i>) before they are required to decode words with the VCe pattern in them.
Introduce high-utility skills before less useful ones	Students should learn skills they will need to apply more often first so that they can read as many words as possible right away.	Students are taught higher frequency letter sounds like the sounds for <i>m, a, t,</i> and <i>o</i> first because they appear in many words.
Introduce easy skills before more difficult ones	Students should be taught easier skills first so that they can learn the concept, then apply what they learn to harder contexts.	After students are taught individual letter sounds, they are taught to decode shorter regular words (e.g., CVC, like <i>sat</i>) before moving to longer regular words (e.g., CCVCC, like <i>start</i>).
Separate strategies and information likely to be confused	Information must be separated to decrease the learning load for students and prevent confusion. Students should become proficient in one skill before moving to something that could easily be confused.	The sounds for <i>b</i> and <i>d</i> are separated so that students can master one before the other is introduced. The same is true for letter combinations like <i>ow</i> and <i>oy</i> .
Introduce new information at a realistic rate	The rate at which new information is presented should be driven by the skills and growth of the individual child.	The rate of introducing new skills is based on the rate at which typical core reading programs introduce new skills. This rate is adapted based on a students' initial skills as well as their performance within Boost Reading.
Provide adequate practice and review	Students must practice newly learned skills when they are first taught and review them later so that they are retained and to facilitate fluency and automaticity.	Skills are introduced and practiced multiple times within one activity. Skills are revisited throughout the course of the program in multiple contexts—as isolated skills and within the context of connected text.

In addition to the principles above, research has documented that providing simultaneous instruction in phonological awareness and phonics has a stronger impact on the early literacy skills of struggling students than instruction in one of the domains alone (Haskell, Foorman, & Swank, 1992; Torgesen, et al., 1994). Boost Reading instruction incorporates both phonological awareness and phonics simultaneously, including multisensory approaches to both. For example, the sounds associated with individual letters are taught using videos that show students how to form the letters in their mouths using their teeth, tongue, and lips. Students hear the sound, see the letter, and are guided to practice correct formation of the sound. This approach has been shown to improve both phonological awareness and phonics skills (Boyer & Ehri, 2011). See figure 1 for an image of the mouth videos that support students as they learn phonemes and letter-sound correspondence.

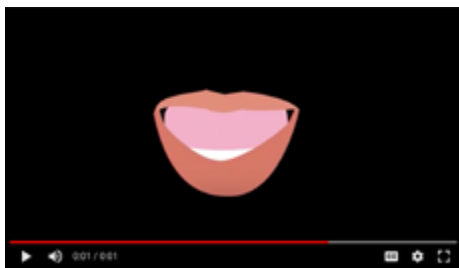


Figure 1. A still frame of the mouth video used to teach the /a/ sound

Initial instruction within the program starts with the most basic of phonological awareness skills, rhyming, and quickly moves students into blending and segmenting compound words and syllables, while also introducing individual letter-sound correspondences. Easier sounds (continuous sounds, like the sounds for m and s, and vowel sounds) are introduced before harder and less common sounds (stop sounds, like those for t and j). The ordering of sounds and phonics skills is aligned with that of the Core Knowledge Language Arts reading program, a research-based core reading program with a documented impact on students' skills in decoding, spelling, and oral comprehension (New York City Department of Education: Research Policy and Support Group, 2010; 2011; 2012). As soon as individual letter sounds are introduced, students engage in activities that require them

to decode and build their automaticity in reading words with those specific sounds. They then move to reading short, decodable text that includes words with those sounds. Students engage in distributed practice or multiple exposures to a concept or skill, spaced over time to promote mastery of skills (Carpenter, et al., 2012; Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006; Gerbier & Toppino, 2015). Because using knowledge across tasks promotes student learning (Merrill, 2002). Boost Reading encourages generalization through ebooks with embedded activities that reinforce recently practiced skills from related games.

An alternative approach to phonological awareness and phonics

Much of the instruction in Boost Reading is centered on teaching students the sounds for individual letters and common letter combinations (e.g., consonant digraphs like ch, vowel teams like ea). An additional approach is included to facilitate strong foundational skills acquisition for struggling learners. In order to employ letter-sound correspondences while decoding, students must be able to identify the individual phonemes that make up words. While phonological awareness at the level of rhyme and alliteration develops as a natural consequence of learning oral language by the time children reach preschool age, phoneme-level awareness does not develop naturally in most children and instead develops as a result of reading instruction (Goswami & East, 2000). An additional decoding strategy can be taught that takes advantage both of children's naturally developing awareness of onsets and rimes and of the increased regularity of English spelling at the onset-rime level. Wylie and Durell (1970) found that students were better at identifying vowel sounds in the context of rimes than in isolation, even though they had not been instructed in the onset-rime decoding strategy. Goswami and East (2002) found support for an approach to decoding instruction that attends to the rime level of phonology in addition to the phoneme level, in order to build on students' implicit awareness of rimes, take advantage of a more consistent level of letter-sound mapping in English, and impart a broader strategy of reading by analogy.

While learning and employing individual letter-sound correspondences is indispensable for reading in English, reading by analogy at a larger grain size can help beginning readers resolve ambiguities encountered while decoding, particularly when it comes to vowels that vary in isolation but have a more consistent pronunciation within rimes. When a student comes across an unknown word, having more than one decoding strategy to solve it is helpful — they can decode it letter by letter, or they can think of a word that is spelled the same and apply the same rime pronunciation. As the children in Goswami and East's rime-based intervention were reminded, "We can think of a word we do know to help us spell/read a word we don't know." For example, a student who can read cat can

apply the concept of rime analogies to read 15 other words that rhyme, such as mat, rat, and that. The onset-rime decoding strategy is particularly useful for students struggling with phonemic awareness; however, all students can benefit from the larger lesson of making analogies while learning to read. To prioritize the most useful English rimes for instruction in Boost Reading, 223 rime families were extracted from a set of monosyllabic words relevant to elementary students and categorized according to three quantitative dimensions of utility: family size, frequency, and consistency. Based on thresholds set for each of these factors, 31 high-utility rime families are highlighted for instruction within Boost Reading.

Explicit instruction of skills: Mini-games

Research based on decades of work with students who struggle with reading has generated guidelines for teaching skills and content. This research highlights methods for teaching that benefit all students. Table 2 provides a summary of those methods, and examples of how they are incorporated within instruction in Boost Reading.

Table 3. Guidelines for explicit teaching (adapted from Carnine, Silbert, Kame'enui, Slocum, & Travers, 2016).

Design principle	Description	Implementation in Boost Reading
Use explicit teaching demonstrations	Present new material using a model to demonstrate the task when appropriate.	New skills are introduced in mini-games. These games include onboarding, which provides a model of the task. More explicit models are provided when students demonstrate a need for additional support.
Control the language used in teaching	Explanations, especially for foundational skills, must be easy to understand.	The instructional language provided within the mini-games is minimal and focused on the specific target skill.
Control the amount of skills introduced at one time	Especially in the early stages, it is important to limit the learning load placed on students.	Instruction begins with discrete skills and becomes increasingly complex. The first games students encounter require students to either identify rhyming words or match letters to sounds. Later games require students to read text with multiple letter sounds and word features.

Design principle	Description	Implementation in Boost Reading
Provide guided practice in applying strategies	Instruction should begin with more models and feedback and gradually move toward students completing tasks independently with minimal amounts of feedback.	Each mini-game includes an onboarding sequence. Instructional feedback is provided when students respond incorrectly. Feedback is minimal as students progress through a mini-game successfully.
Present appropriate introductory examples	When learning a new skill, students should only see the new skill and previously mastered material.	Each example in the onboarding sequence is simple, allowing for students to focus on the new skill.
Provide discrimination practice	After students demonstrate understanding of the new skill, provide ongoing practice of that new skill in the context of other strategies they already know.	When students learn new letter sounds, they first practice reading words with a larger percentage of the new sounds. They then move to reading words with more letter sounds that they have already learned.

Instruction in Boost Reading capitalizes on the benefits of computer-based instruction to implement these instructional methods. Instructional routines are explicit and scripted according to what a highly skilled teacher or interventionist would do and say to present a new skill and in response to both correct and incorrect student responses, allowing all students equal opportunity to experience evidence-based instructional practices (Moats, 2014). New skills and concepts are introduced and practiced in a variety of mini-games. While the games are highly engaging and fun for students, the format of the games also allows for the teaching of skills and strategies using the key principles of instructional design described previously.

After a brief introduction to each activity, students are given repeated opportunities to practice these skills with varied stimuli. They receive immediate feedback for their responses and are given more explicit instruction in areas that are challenging. The activities engage students in multiple opportunities to practice critical skills at an appropriate pace with consistent feedback and prioritize student engagement and motivation, helping students to see their own growth toward reading goals (Carnine, et al., 2016; Gersten, et. al., 2008; Deci & Ryan, 2012). Further, the mini-games within Boost Reading all have specific

mastery criteria built into them. Content within a game is leveled according to difficulty, and students only progress to the next level if they meet a certain benchmark. If that score is not met, students continue to practice the skill at the current level of difficulty in the context of additional instruction.

Using data to support Boost Reading

The scope and sequence and instructional methods incorporated in Boost Reading are grounded in decades of research on foundational skills instruction. In addition, throughout the development of Boost Reading, design decisions were verified by both teacher input and student data. All instructional approaches have been reviewed with teachers and field tested with students with varying skill levels in one-on-one and small-group settings. Data from hundreds of students have been analyzed to revise and enhance the content and methods for instruction and feedback included in the program. This process of development, field testing, and data-driven modifications will continue throughout the life of the program to ensure Boost Reading is effective in improving reading outcomes for all students.

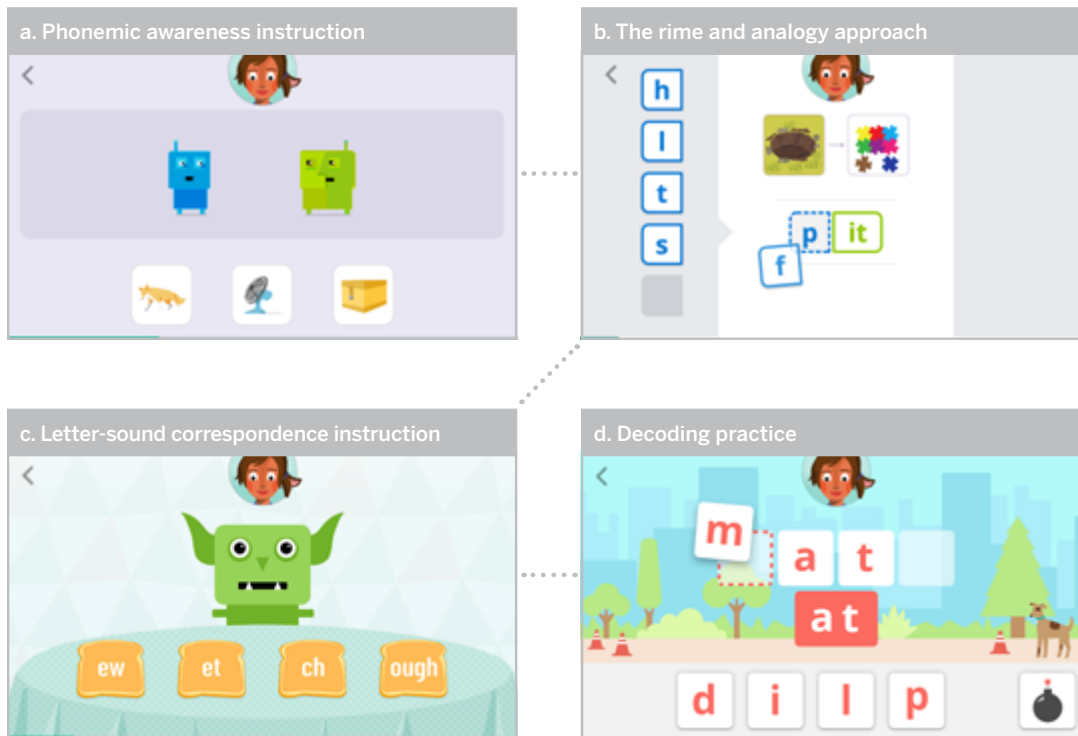


Figure 2. Screenshots from games teaching foundational skills in Boost Reading

References

- Aro, M. & Wimmer, H. (2003). Learning to read: English in comparison to six more regular orthographies. *Applied Psycholinguistics*, 24, 621–635.
- August, D., & Shanahan, T. (2006). *Developing literacy in second language learners: Report of the National Literacy Panel on language-minority children and youth*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Boyer, N., & Ehri, L. C. (2011). Contribution of phonemic segmentation instruction with letters and articulation pictures to word reading and spelling in beginners. *Scientific Studies of Reading*, 18, 440–470.
- Carnine, D., Silbert, J., Kame'enui, E., Slocum, T.A. & Travers, S. (2016). *Direct Instruction Reading, 6th Edition*. Upper Saddle River, NJ: Pearson.
- Carnine, D., Silbert, J., Kame-enui, E.J., Tarver, S.G., & Jungjohann, K. (2006). *Teaching struggling and at-risk readers: A direct instruction approach*. Upper Saddle River, NJ: Pearson.
- Cartwright, K.B. (2010). *Word callers: Small-group and one-to-one interventions for children who "read" but don't comprehend*. Portsmouth, NH: Heinemann.
- Cepeda, N. J., Pashler, H., Vul, E., Wixted, J. T., and Rohrer, D. (2006). Distributed practice in verbal recall tasks: a review and quantitative synthesis. *Psychological Bulletin*, 132(3), 354.
- Deci, E. L., & Ryan, R. M. (2012). Motivation, personality, and development within embedded social contexts: An overview of self-determination theory. In R. M. Ryan (Ed.), *Oxford handbook of human motivation* (pp. 85–107). Oxford, UK: Oxford University Press.
- Duke, N.K., & Cartwright, K.B. (2018). The DRIVE model of reading: Deploying reading in varied environments. In D. E. Alvermann, N. Unrau, & M. Sailors (Eds.), *Theoretical models and processes of reading* (7th ed.). Abingdon, UK: Routledge.
- Ellis, N., Natsume, M., Stavropoulou, K., Hoxhallari, L., van Daal, V., Polyzoe, N., Tsipa, M, & Petalas, M. (2004). The effects of orthographic depth on learning to read alphabetic, syllabic, and logographic scripts. *Reading Research Quarterly*, 39, 438–468.
- García, R. & Cain, K. (2014). Decoding and reading comprehension: A meta-analysis to identify which reader and assessment characteristics influence the strength of the relationship in English. *Review of Educational Research*. 84. 74–111.
- Gersten, R., Compton, D., Connor, C.M., Dimino, J., Santoro, L., Linan-Thompson, S., and Tilly, W.D. (2008). *Assisting students struggling with reading: Response to Intervention and multi-tier intervention for reading in the primary grades. A practice guide*. (NCEE 2009–4045). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://ies.ed.gov/ncee/wwc/publications/practiceguides/>.
- Goswami, U., & East, M. (2000). Rhyme and analogy in beginning reading: Conceptual and methodological issues. *Applied Psycholinguistics*, 21, 63–93.
- Gough, P.G., & Tunmer, W.E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6–10.
- Haskell, D. W., Foorman, B. R., & Swank, P. R. (1992). Effects of three orthographic/phonological units on first-grade reading. *Remedial and Special Education*, 13, 40–49.
- Hudson, R.F., Pullen, P.C., Lane, H.B., & Torgesen, J.K. (2009). The complex nature of reading fluency: A multidimensional view. *Reading & Writing Quarterly*, 25(1), 4–32.
- LaBerge, D., & Samuels, S. J. (1974). Towards a theory of automatic information processing in reading. *Cognitive Psychology*, 6, 293–323.

McCandliss, B.D., Beck, I., Sandak, R., & Perfetti, C. (2003). Focusing attention on decoding for children with poor reading skills: A study of the Word Building intervention. *Scientific Studies of Reading*, 7(1), 75–105.

Merrill, M.D. (2002). First principles of instruction. *Educational Technology, Research, and Development*, 50(2), 43–59.

Moats, L. (2014). *Teacher, teacher, don't go away! Advantages and limitations of computer assisted instruction for adolescents* [Video webinar]. Retrieved from <http://www.voyagersopris.com/resources>.

National Governors Association Center for Best Practices, & Council of Chief State School Officers. (2010). *Common Core State Standards for English Language Arts*. Washington DC: Author.

National Institute of Child Health and Human Development (NICHD). (2000). *Report of the National Reading Panel. Teaching Children to read: An evidence-based assessment of scientific research literature on reading and its implications for reading instruction. Report of the subgroups* (NIH Publication No. 00-4754). Washington DC: US. Government Printing Office.

National Institute for Literacy (NIFL). (2008). *Developing early literacy: Report of the National Early Literacy Panel. Executive Summary*. Washington DC: U.S. Government Printing Office.

New York City Department of Education: Research Policy and Support Group. (2010). *Evaluating the NYC Core Knowledge language arts pilot: Summary of Kindergarten and Grade 1 results highlights*. New York.

New York City Department of Education: Research Policy and Support Group. (2011). *Evaluating the NYC Core Knowledge early literacy pilot: Year 2 report*. New York.

New York City Department of Education: Research Policy and Support Group. (2012). *Evaluating the NYC Core Knowledge early literacy pilot: Year 3 report*. New York.

Oakhill, J., Cain, K., & Elbro, C. (2015). *Understanding and teaching reading comprehension: A handbook*. New York: Routledge.

Pikulski, J. J., & Chard, D. J. (2005). Fluency: Bridge between decoding and reading comprehension. *The Reading Teacher* 58(6), 510–519.

Ritchey, K.D., & Speece, D.L. (2006). From letter names to word reading: The nascent role of sublexical fluency. *Contemporary Educational Psychology*, 31, 301–327.

Schuele, C.M. & Boudreau, D. (2008). Phonological awareness instruction: Beyond the basics. *Language, Speech, and Hearing Services in Schools*, 39(1), 3–20.

Smith S. B., Simmons, D. C., & Kame'enui, E. J. (1998). Phonological awareness: Instructional and curricular basics and implications. In D. C. Simmons & E. J. Kame'enui (eds.), *What reading research tells us about children with diverse learning needs: Bases and basics*. Mahwah, NJ: Lawrence Erlbaum Associates.

Torgesen, J.K., Wagner, R.K., & Rashotte, C.A. (1999). Longitudinal studies of phonological processing and reading. *Journal of Learning Disabilities*, 27(5), 276–286.

Wimmer, H., & Goswami, U. (1994). The influence of orthographic consistency on reading development: Word recognition in English and German children. *Cognition*, 51(1), 91–103.

Wylie, R. & Durrell, D. (1970). Teaching vowels through phonograms. *Elementary English*, 47(6), 787–791

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