A 2020 Perspective on Research Findings on Alphabetics (Phoneme Awareness and Phonics): Implications for Instruction

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Published in The Reading League Journal – January/February 2020 Edition

ISSN: 2691-7955

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The *Alphabetics* section in the Report of the National Reading Panel (NRP; NICHD, 2000) covered two topics, *Phonemic Awareness Instruction and Phonics Instruction*, presenting the research evidence on the roles of each of these in reading development. A similar organization will be followed here with phoneme awareness and letter knowledge discussed in Part I and phonics discussed in Part II.

Part I. Phoneme Awareness and Letter Knowledge

For the NRP report, a meta-analysis was conducted to answer a number of questions pertaining to phoneme awareness. The analyses led to the strong conclusion that phoneme awareness can and should be taught: "[*Phonemic awareness*] training benefits not only word reading, but children's ability to read and spell for months, if not years, after the training has ended" (pp. 2-40). In addition, they reported that "it is essential to teach letters as well as phonemic awareness to beginners" (pp. 2-41).

In the past twenty years, the prediction of later literacy performance by early phoneme awareness and letter knowledge has been replicated in several longitudinal studies (e.g., Hulme et al., 2002) and by subsequent reviews of research (e.g., NELP, 2008). Reciprocal benefits of phoneme awareness for learning how to read and of phonic skills for improving phoneme awareness noted in the NRP report have been confirmed (e.g., Clayton et al., 2020). Hulme and colleagues (2012) determined that "the development of children's word literacy skills is causally influenced by children's early letter knowledge and phoneme awareness" (p. 576), strengthening the case that these two skills should be directly taught to all beginning readers. In sum, the convergent evidence for the importance of phoneme awareness and letter skills for learning to read is indisputable.

The explanation for the importance of phoneme awareness and letter knowledge is as follows: The learner of a writing system (an orthography) has to understand that sound units in the spoken language are represented by written symbols. In writing systems that are alphabetic, the beginner first has to become aware of individual phonemes in spoken words and then understand that those phonemes are represented by letters. This sequence provides students with a necessary understanding of how the alphabetic writing system works, referred to as the *alphabetic principle*.

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Clarifying the terminology. The words containing *phon* can be confusing and often are misused. Three words central to the topic at hand will be described: phonological awareness, phonological sensitivity, and phoneme awareness.

Phonological awareness is an umbrella term that refers to being consciously aware of sound structures in *spoken* words, whether large chunks of sound such as rhymes or individual phonemes. This term encompasses the two concepts described next.

Phonological sensitivity is awareness of the larger and more noticeable units of speech sounds in *spoken* words such as rhymes,

word onsets, and syllables. Children often acquire this type of awareness before attaining phoneme awareness.

Phoneme awareness (also called phonemic awareness) is the *conscious awareness* of the individual speech sounds (phonemes) in *spoken* words. This awareness is evident, for example, if one can segment or separate each of the phonemes or can identify what the last speech sound in a spoken word is. Instead of the broader label *phonological awareness*, using the term *phoneme awareness* is recommended for this skill to ensure that the correct meaning is conveyed.

Is it necessary to teach phonological sensitivity skills before teaching phoneme awareness?

Performance on phoneme awareness measures is a stronger predictor of later reading skill than is phonological sensitivity ability. An important question is whether it is necessary to teach a developmental sequence of phonological awareness instruction for students to gain phoneme awareness. Treiman & Zukowski (1991) proposed that awareness development progresses from whole syllables, to subparts of syllables (onsets and rimes), to attaining the ability to detect individual phonemes within words. However, this may not be the case. For example, phoneme awareness does not appear to be the final phase in a natural development of phonological awareness abilities. In cultures not having the benefits of literacy, phonological sensitivity skills have been documented, but not full awareness of phonemes, even by adulthood (Morais et al., 1979). Rather, gaining phoneme awareness appears to require instruction. A study confirming this point compared phoneme awareness skill development over a year for two groups of children differing very slightly in age (i.e., by a month or two): the slightly older five-year-olds started school whereas the slightly younger children did not (Bentin et al., 1991). Large gains in phoneme awareness were documented at the end of the school year only for those children who had spent the year in school engaged in reading and reading-related activities, pointing to the role of instruction. A key test of whether earlier phonological sensitivity skills are an essential step toward awareness of phonemes is whether students who have not yet learned how to segment syllables can be taught to identify and segment phonemes: And, the answer is "yes" (Cary & Verhaege, 1994). The important implication is that it is not necessary to devote the time and effort to foster skills in phonological sensitivity in order for children to acquire phoneme awareness.

Growing research evidence documents the value of systematic and explicit reading instruction that begins in kindergarten by teaching phoneme awareness, bypassing any instruction in phonological sensitivity, and later focuses on phonics (e.g., Blachman et al., 1999). The success of such projects underscores that phoneme awareness should be a kindergarten goal. In turn, the phonological sensitivity activities that have been thought by many to be suitable for kindergarten are actually appropriate for preschool (see Figure 1 for an outline for teaching phonological sensitivity and phoneme awareness, as well as phonics from pre-K through second grade).

So, one might ask, why is the focus on phonological sensitivity instruction widespread in published kindergarten and first-grade reading programs in the U.S.—with limited attention to phoneme awareness? One explanation is that the sequence of the development of phonological awareness abilities observed in young children led to a faulty, though understandable, assumption that a child cannot reach a later skill without having mastered the earlier one(s). A second explanation is that since the NRP report was released there has been pushback in mainstream education about adopting evidence-aligned methods of instruction in phoneme awareness and phonics, with discomfort about focusing on phonemes. This has contributed to *tokenism* (Brady, 2020). In this instance, tokenism has been illustrated by programs that spend more time on teaching phonological sensitivity for larger speech segments and insufficiently cover phoneme awareness skills, while claiming to have provided instruction on phonological awareness. Yet, make no mistake: it is phoneme-level awareness skills that directly support learning to read and spell.

In short, the necessity of proceeding in kindergarten and first-grade from phonological sensitivity instruction to phoneme awareness instruction is not supported. Instead, teachers in these grades should target student mastery of phoneme awareness.

Is there a sequence of *phoneme awareness* development?

For young students, the location of a phoneme in a spoken word influences the ease of becoming aware of that phoneme. Phoneme awareness development can be summarized

Figure 1
An Outline for Phonological Awareness and Phonics Instruction in Pre-K Through Grade 2 (by Kari Kurto & Susan Brady)

<table>
<tr><th></th><th>Pre-K</th><th colspan="2">Kindergarten</th><th>Grades 1 and 2</th></tr>
<tr><td rowspan="2">Phonological Awareness Skill</td><td>Phonological Sensitivity</td><td colspan="2">Early Phoneme Awareness</td><td>Advanced Phoneme Awareness</td></tr>
<tr><td>Awareness of larger speech sounds in spoken words: rhymes, onsets, syllables</td><td colspan="2">Awareness of individual phonemes in spoken words using words with simple syllable patterns: CV, VC, CVC
Initial → Final → Medial</td><td>Awareness of individual phonemes in spoken words using words with complex syllables that have consonant blends: CCVC, CVCC, CCVCC</td></tr>
<tr><td colspan="2"></td><td>↕</td><td>Alphabetic Principle
Insight/understanding that printed letters represent phonemes in spoken words</td><td></td></tr>
<tr><td rowspan="4">Letter-Sound / Phonics Skill</td><td>Pre-Phonics</td><td colspan="2">Beginning Phonics</td><td>Building Phonics, Spelling, & Word Recognition</td></tr>
<tr><td rowspan="3">Students begin to learn letter names and some letter sounds.</td><td colspan="2">Students learn and practice grapheme-phoneme correspondences for single letter graphemes and three digraphs: sh, ch, th.</td><td>Students learn and practice remaining phoneme-grapheme correspondences for all speech sounds in English.</td></tr>
<tr><td colspan="3">Syllable type instruction to provide students with strategies to recognize vowel patterns by noticing what letters follow the vowel (See Moats, 2020).</td></tr>
<tr><td colspan="2">Morphemes are introduced (e.g., -s, -ed, -ing).</td><td>Advanced Phonics: Syllable division strategies, additional common spelling patterns, and and morpheme knowledge.
Beyond Grade 2, continue advanced phonics (e.g., final stable syllables, rule breakers, spelling rules, morphemes).</td></tr>
</table>

The necessity of proceeding in kindergarten and first-grade from phonological sensitivity instruction to phoneme awareness instruction is not supported. Instead, teachers in these grades should target student mastery of phoneme awareness.

as typically progressing from awareness of *external phonemes* at the beginning of a word, followed by those at the end of a word, to advanced awareness of *internal phonemes*: first the medial vowel in a CVC (i.e., consonant-vowel-consonant) item, followed by the ability to segment and identify the internal consonants in consonant clusters (i.e., blends; see Figure 2 for the sequence of development of phoneme awareness with examples included).

One of the most informative indications of this sequence of development comes from students' invented spellings and later spelling errors of words they have learned. Simply put, if a speech sound is not represented in the spelling of a word (or when reading), it is a flag that the child may not be aware of that phoneme in the spoken word. The early beginner may just put a single letter, *B*, for *butterfly*, indicating, at least in part, that the child can isolate and identify the first phoneme but not the following phonemes. A later spelling might be *bd* for *bed*, with the initial and final phonemes represented, but not the medial vowel. As students progress, normally-developing readers often have difficulty with consonant blends, having trouble isolating and identifying internal consonants. Thus one often sees errors such as *jup* for *jump*, *wet* for *went*, and *sop* for *stop*). In young students and in older struggling readers, omission of the internal *r* and *l* phonemes in blends are highly common (e.g., *pan* for *plan*, *pinsos* for *princess*), indicating ongoing difficulties with phoneme awareness of the absent speech sound. Of course, there are many spelling errors that reflect incomplete learning of the orthographic patterns (e.g., as in writing *boil* as *boyl*) and educators need to be able to sort out which errors stem from phoneme awareness difficulties, which from orthographic weaknesses, and how to identify and assist with each (Moats, 2020). The frequency of errors on internal consonants by students in the mid-elementary grades suggests that phoneme awareness curricula are insufficiently targeting and verifying this final level of phoneme awareness development that should be a first-grade goal.

Figure 2
The Development of Phoneme Awareness

Awareness of External Phonemes

1. Initial consonants in spoken words (e.g., /b/ in *bed*; /d/ in *dancer*)
2. Final consonants in spoken one-syllable words (e.g., /s/ in *bus*; /ch/ in *teach*)

Awareness of Internal Phonemes

3. Phoneme awareness of medial phonemes in spoken CVC words (e.g., /a/ in *sat*; /u/ in *duck*)
4. Internal consonants in consonant clusters (blends) in spoken one-syllable words (e.g., /t/ in *stop* (CCVC), /m/ in *pump* (CVCC), /r/ and /s/ in *brisk* (CCVCC)

Note. Students who can segment and identify internal consonants in spoken words with CCVCC structures generally also do well with words with three consonants in a cluster (e.g., strike, scrape) but, if need be, could practice with words of that type as well.

Summary: Phoneme Awareness and Letter Knowledge

Three instructional recommendations are informed by the research topics discussed here.

1. *Phonological awareness instruction in kindergarten should concentrate on early phoneme awareness, as reported by the NRP, not on phonological sensitivity*. Results since the report was published support this conclusion, indicating that teaching students in homogeneous, small groups is effective (Gillon, 2018). The widespread adoption of lower phonological sensitivity goals in kindergartens in the U.S. (and by publishers) needs to change to phoneme awareness goals in order to help students make timely and important progress in requirements for beginning reading.
2. *Phoneme awareness instruction in first grade should continue the sequence of phoneme awareness instruction*. This should include the remaining consonant and vowel phonemes in the language beyond those taught in kindergarten, including diphthongs, remaining consonant phonemes represented with digraphs, etc., ensuring that students have awareness of all of the phonemes in English (i.e., they are able to identify, segment and blend those phonemes). By monitoring students' progress and differentiating instruction, teachers should make sure that students in first grade attain mastery of all levels of phoneme awareness development, including the internal consonants in consonant clusters.
3. *Phoneme awareness instruction should be integrated with letter instruction*. After first establishing awareness of individual phonemes, instruction in phoneme-grapheme correspondences should follow. This order helps clarify that phonemes are elements in spoken words and avoids confusion with visual letters or letter names. Once students have solid phoneme awareness of each of the phonemes in spoken CVC words, some introduction of letters as part of phoneme awareness activities can facilitate the discovery of the phonemes in internal consonant positions. As discussed earlier, the NRP report and subsequent studies have confirmed that linking phoneme awareness with letter-sound knowledge strengthens the application of phoneme awareness for improved reading and spelling performance.

Part II. Phonics
Findings of the NRP

The effects of phonics instruction were studied for the NRP report, again by carrying out a meta-analysis. The results indicated that systematic phonics instruction yielded better

reading gains than did all of the types of non-systematic or non-phonics instruction provided to comparison groups. When students had received phonics instruction during kindergarten and first grade, the benefits for reading achievement were the greatest. Notably, children at all socio-economic levels (SES) made better gains in reading when provided with systematic phonics instruction.

Yet, comparisons of three different types of phonics instruction did not yield significant differences in the reading achievement of students. These were: a) synthetic phonics programs that emphasized teaching students to convert letters (graphemes) into sounds (phonemes) and to blend those sounds to form words; b) analytic phonics programs that targeted the analysis and blending of onsets and rimes in word families; and c) miscellaneous programs that taught phonics in other ways not described sufficiently. All three resulted in statistically noteworthy gains, but did not differ significantly in outcomes.

Phonics Research Since the NRP Report

Since the NRP report was published in 2000, research pertaining to phonics instruction has continued. Here three specific areas of research will be covered: the merits of synthetic versus analytic methods of reading instruction, the value of teaching phonics beyond the first grade, and the outcomes of phonics interventions with struggling readers.

Phonics Instruction: Grapheme-Phoneme vs. Onset-Rime

In the two decades since the NRP report, there has been much interest in further comparing the efficacy of synthetic and analytic methods of phonics instruction. For this discussion, I will focus on three carefully designed experimental studies.

Not long after the release of the NRP report, Johnston and Watson (2004) published a study comparing the reading achievement for 5-year-olds beginning school who each were taught by one of three reading programs: synthetic phonics (without phoneme awareness), analytic phonics using a word family method (plus phoneme awareness), or analytic phonics alone. Within the three groups, students came from a range of SES circumstances, although the children in the synthetic phonics group were from relatively disadvantaged backgrounds. Nonetheless, the synthetic phonics group had significantly better reading, spelling, and phoneme awareness at the end of the kindergarten intervention. Interestingly, these children were the only ones who could read by analogy and they performed better at reading both irregular words and nonwords. Long-term benefits for this group of students on word-level skills and on comprehension were documented for seven years (Johnston et al, 2012). Johnston and Watson concluded that synthetic phonics is more effective, that it has benefits for acquisition of phoneme awareness, and that introducing phonics in kindergarten is advantageous.

Two additional studies that were designed to match instructional materials while varying instructional methods suggest that explicit, systematic methods of synthetic phonics facilitate the acquisition of advanced code skills. The first, by deGraff et al. (2009), had a narrow focus of instruction on teaching ten grapheme-phoneme correspondences to kindergarten students in two experimental conditions: a nonsystematic program with random activities and a systematic condition with a planned set of phonics-through-spelling and synthetic phonics. The study also included a no-treatment control group. The two training groups made the same progress on letter-sound knowledge and both were better than the control group. Yet, the synthetic phonics group made significantly more progress than the other two groups on phoneme awareness and on more advanced spelling and reading measures.

The second study, by Christiansen and Bowey (2005), compared the outcomes of three methods: an orthographic rime (OR) program with word families, a grapheme-phoneme correspondence (GPC) method, and a regular whole language program. The students, from Australia, were described as being at an advanced-beginner phase of reading development. The lessons for the OR and GPC conditions followed the same basic format: students practiced the same number of words per session and were taught the same words. A key feature of the study was that the words within each program were presented in different orders and combinations so that the OR group had sets of words in the same word family (e.g., *top, mop, shop*), whereas in the corresponding GPC condition, students had lists of words that did not have any shared spelling (e.g., *mat, hop, shin*). The OR and GPC groups both demonstrated significant superiority to the whole language cohort on nearly all of the reading and spelling measures, consistent with the findings by the NRP. The GPC group had significantly better performance on the more advanced reading

measures than the other two groups (i.e., on accuracy and speed of reading transfer words with the same spelling patterns, spelling new words, and reading comprehension). The deGraff et al. and the Christiansen and Bowey experiments clearly show that studies of different methods of instruction require a sufficient range of outcomes to ensure that effects have been adequately assessed. Lack of differences in early, easier skills seems to have been misleading. These studies and Johnston and Watson (2004) point to the superiority of systematic, synthetic methods of phonics instruction for attaining more advanced reading and spelling skills.

Analytic and synthetic methods do not have to be an either/or choice, but a question of when and for what purpose.

As a final comment for this section, I want to note that analytic and synthetic methods do not have to be an either/or choice, but a question of when and for what purpose. Instead of focusing on word families in kindergarten and at the beginning of first grade, it can be constructive to do so at a later point to reinforce knowledge of spelling patterns and orthographic mappings in mid-first grade and later (assuming that synthetic phonics instruction has been provided during kindergarten and in the first half of first grade). Thus, practicing reading a set of words that shares a particular spelling pattern (e.g., the vowel team pattern with *ea*: *meat, seat, beat, heat, neat*) after direct instruction in that pattern has been provided may help students consolidate their knowledge of the pattern and build their repertoire of words recognized (Carol Tolman, personal communication).

Phonics instruction: Not Just in Kindergarten and First Grade

As noted, the NRP report cited stronger benefits from systematic, explicit code instruction in kindergarten and first grade than in later grades. However, school practices commonly allocate less time for code instruction after the first grade. This timeline brings up the important issue of whether the extent of phonics instruction typically provided is sufficient, not only for those students who are lagging in decoding, spelling, and word recognition skills, but for all students.

The value of code instruction beyond first grade is evident in the results of a study by Connor et al. (2007). This study followed children through the first and second grades, monitoring their reading achievement and assessing classroom instruction along two dimensions: child managed versus teacher managed and code focused versus meaning focused. The results showed that: a) students who began first grade with *weaker* letter-word reading scores did better by the end of second grade if they had had teacher-managed, code-focused instruction in *both grades* and b) students who began first grade with *stronger* letter-word reading skills had better skills at the end of second grade if they had received teacher-managed, code-focused instruction in *second grade,* not in first grade. The pattern for the more skilled readers at the start of first grade may indicate that they had already known what was taught in first grade. However, phonics instruction in second grade in teacher-managed classes resulted in reading performance several years above grade level, in contrast to being at grade level if they received child-managed, meaning-focused instruction that year. These findings suggest that the inclusion of explicit, code-based instruction beyond first grade is critical for at-risk students and allows students with stronger reading skills to be far more likely to reach their potential. (See Figure 2 for an outline of phonics instruction that extends phonics instruction past first grade.)

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Moving forward, research on the value of advanced phonics instruction in the regular classroom needs to be expanded. Further studies are needed on reading outcomes when instruction in second grade and later focuses on expanding knowledge of how the orthographic system works through increased understanding of spelling patterns, spelling origins, morphemes, and features of multisyllabic words (e.g., Henry, 2010).

Phonics Instruction for Struggling Readers

Difficulties in phonics (i.e., in decoding, spelling, word recognition) are very common among students with low levels of reading achievement. It is essential to appreciate that the instructional needs of struggling readers vary in terms of their areas of difficulty within the phonics domain and across other areas. Connor et al. (2009) reported stronger literacy gains for first-grade students when intervention teachers more precisely delivered amounts of instruction specified by software that had been programmed, based on a student's assessment results, to determine the code and comprehension instruction needed. This verifies the value of differentiation and points toward ways to facilitate teachers' decision making about instructional needs whether or not students are making adequate progress.

The research evidence on the benefits of systematic, explicit phonics intervention for students not making adequate progress extends across a wide age range. In kindergarten and first grade, multiple studies have reported improvements in reading skills by children at risk (e.g., Hatcher et al., 2004). After first grade, intervention studies have documented the merit of word-building activities that systematically foster mastery of orthographic skills (e.g., McCandless et al., 2003), as well as those that teach complex grapheme-phoneme correspondences (Savage et al., 2020). Interventions with middle-school students showed positive benefits from a variety of systematic methods for building phonics skills such as analysis of graphosyllabic patterns in words (Bhattacharya & Ehri, 2004) and Response-to-Intervention methods (Vaughn et al, 2010). At the high school level, Lovett et al. (2012) had positive results with remediation that taught word identification strategies along with knowledge of text structures and reading comprehension strategies.

A further point is that intensive intervention appears to be necessary for students who have significant reading difficulties (e.g., Miciak et al., 2017). An encouraging finding is that beneficial effects on word identification from an intensive form of reading remediation in Grades 2 or 3 were found to still be evident many years later (Blachman et al., 2014), possibly in part because the intervention was provided in early grades (Lovett et al., 2017).

Summary Remarks: Phonics

The three topics reviewed in this section each have implications for instruction.

1. *Phonics instruction is most effective with a synthetic method*. Teaching code skills with this method fosters not only basic but more advanced phonics concepts, and also facilitates reading by analogy and sight word recognition (Aaron et al., 1999). In addition, synthetic code instruction in kindergarten is recommended, providing a more productive coordination of phoneme awareness and code skills than analytic instruction does, leading to strong reading outcomes.
2. *Phonics instruction should extend beyond kindergarten and first grade*. The striking results of Connor et al. (2007) indicated the value for all students of teacher-managed, code-focused instruction in the second grade, helping those with weaker skills succeed at reading and those with stronger skills reach their potential. These results suggest that teaching code-related concepts in kindergarten and first grade is not sufficient.
3. *When struggling readers have weaknesses in phonics, explicit phonics remediation should be provided, tailored to their level of skill development*. The evidence of successful phonics interventions for struggling readers across the grades validates treating code weaknesses whenever they are present and aiming to provide intervention as early as possible.

Closing Remarks

The research reviewed here underscores the importance of the kindergarten year for teaching phoneme awareness and letter knowledge, and for segueing into beginning reading with phonics instruction that is systematic, explicit, and synthetic. Subsequent word-level instruction needs to extend beyond first grade, covering more advanced content about the structure of the writing system. For students needing further support in word reading skills, phonics interventions should be provided at the level required.

In closing, I want to add that evidence clearly indicates the benefits for students of being consistently engaged with reading and writing activities in addition to being provided with phoneme awareness and phonics instruction. For example, Xue and Meisels (2004) published results from a large sample of kindergarten children (n = 13,609), reporting that "integrated language arts works better in classrooms where phonics is also taught more frequently (p. 219)" and vice versa. This observation concurs with conclusions reached decades ago by Chall (1967) and in the NRP report—that teaching phonics

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well is not in opposition to providing ongoing reading and writing activities with a focus on comprehension and communication. In short, it is long past time for the reading wars to be over and for widespread recognition that both components are essential for literacy success. In turn, it is of the utmost importance to give current and future teachers the knowledge and skills required to provide this breadth of instruction. ■

Note: A longer version of this article will be featured at thereadingleague.org in the near future.

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