

The Role of Phonemic Awareness in Learning to Read and Spell Successfully

by Joanna K. Uhry

What is phonemic awareness (PA)? How does it differ from phonics? How is it related to the acquisition of word reading and spelling? Is PA instruction an effective way to provide instruction in early literacy? What are the most important aspects of PA to keep in mind when planning instruction? These are all important questions for the teachers, tutors, and parents of children struggling with word reading.

What Is Phonemic Awareness?

The term *phoneme* refers to the smallest unit of speech sound that changes the meaning of a word. For example, the phonemes /o/ and /a/ allow us to distinguish between the spoken words *pod* and *pad*. However, PA involves more than being able to perceive an auditory difference in spoken words; it involves awareness of just where these differences lie in terms of the sound structure of spoken language. For example, *pod* and *pad* sound the same at the beginning and end, but different in the middle. A phonemically aware child would recognize a difference in sound structure as well as in meaning; whereas a child with weak PA might recognize only that the words have different meanings.

Is Phonemic Awareness the Same as Phonics?

PA is sometimes confused with phonics. Several differences are described here. PA involves strictly oral activities, while phonics involves both print and sound. PA is considered a high-level, metacognitive concept, often learned in an *aha!* moment. Once a child understands the concept, PA ability can be transferred to other words. English-language phonics instruction, on the other hand, involves memorizing the names of 26 letters as well as approximately 98 letter-sound combinations (e.g., the letter-name sound of /a/ as in *cake, great, rain, ray, hey, vein, eight, a-corn*). This involves memorizing and practicing until all 98 combinations are quick and automatic.

Are Phonological Awareness and Phonological Processing the Same as PA?

Phonological awareness is a broader term than PA. Phonological awareness involves the ability to segment words in sentences and syllables in words, as well as phonemes in words. *Phonological processing* is an even broader term. It includes phonological awareness as well as verbal short-term memory, rapid serial naming (reading arbitrarily arranged letters as quickly as one can), and articulation speed (i.e., saying short strings of syllables over and over as quickly as possible). All of these phonological processes are associated with reading difficulty, but PA is the phonological process that is the most strongly associated with early word reading.

Why Is PA So Important?

PA is an important foundation for learning to read. English is an alphabetic language in which phonemes—these tiny speech sounds—are mapped onto written letters for reading and spelling. Reading (*decoding*) in an alphabetic language involves mapping a spatial sequence of letters, ordered left to right, onto a temporal sequence of phonemes, ordered first to last. Spelling (*encoding*) involves a similar process but in the other direction—from sound to print. PA is an important foundation for learning both reading and spelling.

Why Is PA So Difficult?

To take advantage of the letter-to-sound association in learning to read, or the sound-to-letter association for spelling, young readers must be able to *segment* or isolate individual phonemes in the speech stream. This stream of sounds is not articulated one phoneme at a time. Rather, phonemes in spoken words are *co-articulated*; the initial sound flows into the medial (middle) sound, which then flows into the final phoneme. That is, early readers and spellers need to be able to listen to a word and break it apart into phonemes.

In addition, these readers need to be able to conceptualize phonemes. I am using the word *conceptualize* because a phoneme said alone can differ subtly in sound from the same phoneme pronounced within a word. It can be influenced by its neighbors. For example, the short vowel sound /a/ has /a/-like sounds in the middle of the spoken words *sad* and *sand*. We say that the /n/ sound in *sand* nasalizes the phoneme /a/. Other examples of this are subtler, but can keep children from becoming adept in PA. Some children can grasp the idea of isolating and conceptualizing phonemes with a minimum of instruction while others need extensive support in developing PA.

PA and Struggling Readers

Early difficulty with PA is widely acknowledged to be associated with difficulty learning to read at the word level. Correlational research studies tell us that emergent readers who are weak in PA grow into struggling readers, and that children strong in PA become strong word readers. The term *dyslexia* is associated with both PA and struggling readers.

PA and Dyslexia

The most universal definition of dyslexia is that it involves extreme difficulty in learning to read words and is associated with extreme difficulty in PA. Dyslexia is commonly associated with oral language difficulties such as speech perception (e.g., Snowling & Hulme, 2011). Siegel (2006) defines *dyslexia* as a disability in reading words accurately and quickly.

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Comprehension can be affected, especially in very slow readers. Dyslexia occurs on a continuum from mild to severe. Although most children with dyslexia are responsive to good instruction, they often continue to read slowly and to struggle with spelling. Dyslexia runs in families. If a child has a close family member with dyslexia, the child has a 50% chance of being a struggling reader and speller (Olson, 2006). Research using neuroimaging indicates that readers who struggle with PA and reading utilize the brain differently while reading compared to typical readers (Pugh et al., 2001; Shaywitz et al., 2004).

English Learners and PA

Not all children with language-based difficulty in reading are dyslexic. For example, young children with Spanish as a first or home language (L1) are dealing with learning English vocabulary but they also have to learn differences in sounds across languages (Gersten & Geva, April 2003). The Spanish language has five vowel sounds while English has 14, providing many opportunities for mispronouncing and misspelling across languages. In addition, kindergarten English learners (ELs) are more apt than native English speakers to confuse sound-alike English consonant pairs such as /k-g/ and /p-b/, a confusion attributed to subtle English-Spanish differences in the articulation of these phonemes.

Unlike dyslexia, which usually persists into adulthood, these possibilities for confusion disappear over time as English is acquired and with instruction in PA (Raynolds & Uhry, 2010, 2012). As ELs become bilingual, PA tends to transfer across languages (e.g., Durgunoglu, Nagy, & Hancin-Bhatt, 1993; Sun-Alperin & Wang, 2011). This supports the notion that PA involves the conceptualization of the sound structure of any alphabetic language.

Research on PA and Reading

Bradley and Bryant (1983) conducted one of the most influential early studies of PA, following preschoolers through the early elementary grades. These researchers report both a large scale correlational study (establishing a strong relationship) and a small scale training study with a control group (establishing that the relationship was causal). Preschoolers with the lowest PA scores in the correlational study served as participants in the training study. This early training was highly successful. The authors report that preschool PA instruction provided an advantage in later reading and spelling, and that this advantage held, even three years after the PA instruction ended. The researchers compared three forms of instruction plus a control group. This advantage was most pronounced when instruction involved using letters to represent phonemes.

The effect of PA instruction is the most highly researched aspect of literacy instruction. Since Bradley and Bryant studied these preschoolers there have been hundreds of studies asking questions about the effects of PA instruction on reading and spelling (e.g., Ball & Blachman, 1991; Uhry & Shepherd, 1993).

The National Reading Panel (NRP) summarized these multiple findings in 2000. The NRP report was funded and published by the National Institute of Child Health and Development (NICHD) and its findings continue to have an impact on instruction. The study used *meta-analysis*, which is a statistical method for combining the findings of a number of studies in order to report scientifically derived patterns. Meta-analysis was used to establish a scientific comparison of the results of 52 well-designed studies.

Following is a brief summary of some of the NRP findings regarding PA (NRP, 2000; Ehri et al., 2001).

- PA can be taught, and PA instruction has a positive effect on most children for reading and spelling. Older children with reading disabilities are least responsive to PA instruction in terms of their spelling.
- A total of 5–18 hours of PA instruction is optimum.
- The most effective PA instruction focuses on just a few activities, such as segmenting and blending offered on a regular basis.
- Instruction using letters to represent phonemes is more effective than the use of PA alone.

Instruction in PA

PA involves a number of oral tasks that can be used to plan and carry out instruction. While PA itself is strictly oral, PA in combination with print tasks has been found to be more effective than instruction in PA alone (Ehri, 1989).

Oral Language PA Tasks

Following are some oral language tasks that demonstrate PA abilities in young children. The tasks are arranged in a hierarchy of levels of difficulty suggested by Adams (1990). The examples at each level are from my classes for teachers and are typical of a number of instructional tasks used in both PA assessment and PA instruction.

- Level 1. Sensitivity to rhyme and alliteration in familiar rhymes and songs:
“One, two, buckle my” _____. (*shoe*)
“Twinkle, twinkle little star. How I wonder what you” _____. (*are*)
- Level 2. Oddity tasks requiring the matching of words by initial sound (onset) or by rhyme:
“Which word is different at the beginning? *Mateo, Marc, Martha, or Josh?*”
“Listen to the ends of these words. Which word does not belong?” (*stop, pop, mat, or hop*)
- Level 3. Blending phonemes into spoken words and splitting syllables:
“Say /p/-/i/-/g/. Now say it the fast way.” _____ (*pig*)
“What’s the first sound in Max?” (/m/) or “Spell Max.” (*m or ma or ms*)

- Level 4. Full phonemic segmenting:
 "Say all of the phonemes in tag." /t/-/a/-/g/
 "Spell tag."(t-a-g)
- Level 5. Manipulation, deletion:
 "Say stable. Now say it again without the /s/?"
 (table)

Most of these tasks are strictly oral (e.g., reading aloud, asking the child to listen to a word and then say the first sound, saying all the phonemes in a word and asking the child to blend the sounds into a word, saying a word and asking the child to say each of the sounds, one at a time.)

PA abilities are considered to be developmental, that is, to develop in stages and to be responsive to developmentally appropriate instruction. In a developmental model, tasks become more and more complex, with each stage providing a foundation for the next. A strictly linear view of PA acknowledges each level as causal to the next-harder task. This model leaves out the influence of learning to read as the various stages of PA are mastered. It is important to note that Adams's hierarchy organizes the tasks by difficulty but not by influence on reading.

Another consideration is manifested by the finding that rhyme (Level 1) is a weak predictor of later reading in comparison with factors using segmenting (Muter, Hulme, Snowling, & Taylor, 1997; Nation & Hulme, 1997). Rhyme seems to require a set of skills that differs from those used in segmenting.

Using Print in PA Instruction

During the learning-to-read process, the relationship between PA and reading becomes reciprocal. Knowing how to read a word helps the beginning reader conceptualize the idea of segments of sound. The sounds of many consonants are similar to their letter names (e.g., B, D, F, J, K, L, M, N, P, R, S, T, V, Z).

The main idea here is that PA facilitates learning to read and knowing how to read facilitates PA. Using letters to represent phonemes during instruction is more effective than using phonemes without letters (NRP, 2000). The following two instructional tasks incorporate both phonemic segmentation and letters.

Invented Spelling

The first of these two tasks is *invented spelling*, a term used to describe spellings that children construct themselves. The first step in inventing spellings is listening for a phoneme and the second step is figuring out the letter that's associated with that phoneme and then writing the letter. Spelling words are either dictated by a teacher or taken from children's stories and then scored and interpreted. The advantage of the first method is that scores can be compared both over time and across students.

There are a number of similar developmental scoring systems, most of which can be traced back to the work of Henderson and his students at the University of Virginia (e.g., Henderson & Beers, 1980; Morris, 1984). Most early invented spellings are characterized by omissions (e.g., B or BK for *back*). Consonants are usually spelled before vowels because consonants are easier to spell; they can be spelled with letter names. Vowels tend to occur in the medial position in consonant-vowel-consonant (CVC) words. The sound of a vowel is influenced by the surrounding consonants, making it hard to identify. Early spelling is also characterized by the substitution of sound-alike letters. For example, short *a* and short *e* are articulated near each other in the mouth so *bag* is often spelled as *beg*. The sounds /g/ and /k/ are alike in articulation position but /g/ is voiced and /k/ is voiceless, so *back* is often spelled *bag*. See Table 1 for an invented spelling scoring system modeled on Morris and Perney (1984) and used in research (Raynolds & Uhry, 2010, 2012).

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TABLE 1. Sample Words from a Developmental Scoring for Invented Spelling Words Adapted from Morris & Perney (1984)

Partial Phonemic Stage 1	Partial Phonemic Stage 2	Phonemic (every sound) 3	Transition to Orthography 4	Orthographically Correct 5
J	JP JB	JOP	JOMP	JUMP
M	MN	MEN	MENE	MEAN
D	DG TK	CHERK	TUCK	TRUCK
U O	ON	ONUSD	UNYOUSD	UNUSED

- In the first two columns partial phoneme representation is evidenced. The score of 1 for an initial consonant indicates partial representation; the score of 2 suggests a higher (but incomplete) level.
- The score of 3 in the third column indicates that all sounds are represented but not spelled correctly.
- The fourth column demonstrates orthographic patterns commonly associated with the phonemes in these words, but not used correctly here, such as *you* in *unused*.
- The final column is for orthographically correct spellings.

Finger-Point Reading

The second task, *finger-point reading*, also involves using both PA and print. The first step is memorizing a poem or song through repetition. The teacher reads the large-print poem aloud, exaggerating some initial sounds in the word, touching the first letter as the student reads with the teacher. After several re-readings the emergent reader is asked to “read” the poem on her own. This involves saying the poem from memory and touching the first letter of each word with a finger as the word is said aloud (Uhry, 2002b). This practice is also called *concept of word* (Morris, 1983). Success with this task can be influenced by one-to-one correspondence or through segmenting each phoneme in the spoken poem and matching it with the initial letter in a word. This activity provides practice in both segmenting and letter sound associations.

These studies tell us that there are strong correlations between measures of phoneme segmentation, invented spelling, finger-point reading, and beginning reading (Ehri, 1989; Ehri & Sweet, 1991; Morris, 1983; Uhry, 1999, 2002a, 2002b). In addition, there are a number of training studies that indicate a strong advantage for young readers trained in PA and spelling in comparison with controls (e.g., Ball & Blachman, 1991; Uhry & Shepherd, 1993). The structure of these studies included training as well as control groups. These studies indicate that a number of instructional components in combination had a positive effect on reading.

All of these PA-based activities (rhyme, initial segmenting, blending, full phoneme segmenting) are related to early reading and to each other. How do these relationships change over time? Morris, Bloodgood, Lomax, & Perney, (2003) conducted a complex longitudinal study using *structural equation modeling*, a statistical method for testing proposed causal relationships among multiple variables. The study involved relationships among instructional tasks that shifted across five times of testing in kindergarten and grade 1. Morris and his colleagues found evidence of the following causal relationships:

- Time 1: Alphabet knowledge at Time 1 causes growth in beginning consonant segmenting at Time 1, which, in turn, contributes to concept-of-word (finger-point-reading) and spelling beginning and ending phonemes at Time 2.
- Time 2: Concept-of-word (finger-point-reading) and spelling beginning phonemes at Time 2 are causal to full phoneme segmentation at Time 3.
- Time 3: Full phoneme segmentation at Time 3 is causal to word reading at Time 4.
- Time 4: Word reading at Time 4 is causal to story reading at Time 5.

Note that letters are part of this model from the beginning. This finding is consistent with the findings of the NRP.

Summary and Suggestions for Instruction

There is probably more research on PA than on any other aspect of reading acquisition. To summarize, PA involves a metacognitive sensitivity to phonemes in spoken words, and it is strongly correlated with word-level reading. Struggling word-level readers almost always struggle with PA as well. Early instruction in PA is highly effective. PA instruction including print is more effective than instruction in PA alone. Using letters to represent phonemes provides a concrete approach to learning the sound structure of words.

PA Instruction

This research provides teachers with a rich source of information about PA to use in early childhood classrooms. What teaching methods are most effective? The NRP (2000) suggests that teachers use a small number of tasks (e.g., segmenting and blending) on a regular basis. It also suggests the use of instructional methods that are both direct and systematic. Direct instruction is explicit. For example, sensitivity to rhyme could involve reading a rhyming picture book aloud and stopping to exaggerate the /ill/ sound in *Jill* and *hill*, and saying, “They rhyme. *Jill* and *hill* rhyme.” This is a direct or explicit method of pointing out a rhyme. Simply reading the rhyme aloud provides implicit or indirect teaching, which is not so effective.

Systematic instruction involves methodical planning of a sequence leading from easy to hard. In PA instruction this might involve a plan to teach initial consonant sounds first because they are more easily perceived in words than middle or final phonemes. Early instruction can be as simple as contrasting two initial sounds as different as /m/ and /t/. Contrasting voiced and unvoiced pairs, such as /b/ and /p/ in *tab* and *tap* is a much more difficult task, and should occur much later in a sequence.

How can teachers learn enough about PA to teach it? Most university-based teacher education programs do not include sufficient instruction in PA to provide emergent readers with knowledge of the sound structure of words. Meeting the instructional needs of young students with dyslexia is a particular difficulty. How can teachers learn more about this? Louisa Moats’ book *Speech to Print: Language Essentials for Teachers* (2010) is a valuable resource for teachers of emergent readers. It fills in many of the linguistic gaps in teacher education programs. However, most inexperienced teachers will benefit from using an existing systematic program rather than developing one on their own.

One source of information about PA instruction can be provided by the Common Core Standards. This set of standards was developed at the national level and is being implemented across states in order to provide a systematic set of skills and goals for children at each grade level, K–12. The Common Core Language Arts Standards suggest the teaching of PA as a foundational skill, together with print concepts, phonics, and word recognition (National Governors Association Center for Best Practices, 2010, pp. 25–26). These skills provide a base for higher level language arts skills such as listening,

speaking, writing, and interpreting read-aloud stories and informational text.

Another source of information for teaching PA systematically involves published curriculum programs. None of these PA materials provide a complete language arts program. In compliance with both the NRP and the Common Core Standards, PA materials act as foundations to other aspects of language arts programs.

Two examples of PA programs are cited here as exemplary research studies in the NRP report. The first, *Phonemic Awareness in Young Children* (Adams, Foorman, Lundberg, & Beeler, 1998) was based on an early study of Danish preschool children by Lundberg, Frost, & Petersen (1988), and then was translated to use in K–1 NIH-funded research. The second, *Road to the Code* (Blachman, Ball, Black, & Tangel, 2000) was used in several NRP studies. Both are systematically planned and utilize explicit instruction. Both provide instruction in both blending and segmenting phonemes. Neither of these programs links phonemes with letters, but, despite this, both appear to be effective.

A third instructional program, *Foundations* (Wilson, 2012), teaches K–1 PA through invented spellings. This structure includes both sound identification in spoken words and phonics (letter-sound relationships). It differs from both of the above PA programs in its linking letters and sounds. Like the above, instruction in *Foundations* is direct, systematic, and effective.

We have strong evidence that difficulties in PA are linked with early word-level reading difficulty. We also have strong evidence that skills in both PA and word-level reading increase in response to PA instruction. Given the strength of the research on PA and the availability of effective programs, it is clear that PA should be taught to all young children as a preventive or interventional measure.

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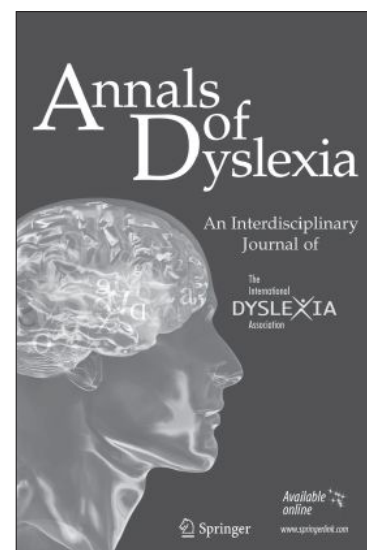
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