School Psychology Review
Volume 24, No. 3, 1995, pp. 443–455

Related, Unsolicited Article

A PRIMER ON PHONEMIC AWARENESS: WHAT IT IS, WHY IT'S IMPORTANT, AND HOW TO TEACH IT

Vicki E. Snider
University of Wisconsin–Eau Claire

Abstract: This article defines and describes phonemic awareness, summarizes the research regarding its importance for success in reading, and reviews the literature on teaching phonemic awareness. A synthesis of this research suggests that effective instruction in phonemic awareness needs to be directly and systematically taught in order to ameliorate reading disabilities among at-risk youngsters. A scope and sequence for teaching phonemic awareness is suggested and specific activities are described. Explicit instruction, as part of a prereferral intervention, may help to reduce the number of referrals for learning disabilities in the primary grades.

Phonemic awareness is an understanding that speech is composed of individual sounds. There is a growing consensus that phonemic awareness bears an important relationship to achievement in reading (Liberman, 1973; Lundberg, Olofsson, & Wall, 1980; Stanovich, Cunningham, & Feeman, 1984) and that instruction in phonemic awareness improves reading skills (Ball & Blachman, 1988, 1991; Bradley & Bryant, 1985; Wagner & Torgesen, 1987). Furthermore, many students with reading disabilities seem to lack phonemic awareness regardless of whether they are identified as poor readers or as having a learning disability (Stanovich, 1988).

This information is useful for school psychologists involved in identification of learning disabilities in kindergarten and first grade because there is growing concern about the increase in the number of students who have been labeled as learning disabled. During the 1980s the category of learning disabilities increased 129% (Ysseldyke & Christenson, 1988). Recent statistics indicate that students with learning disabilities comprise over one-half (52.4%) of those receiving special education (U.S. Department of Education, 1994). Some have suggested that no reliable differences exist between poor readers and students with learning disabilities (Ysseldyke et al., 1983) and that many students without handicaps are being classified as handicapped (Algozzine & Korinek, 1985). The ambiguities of classification are exacerbated with young children. Objective criteria that are applied to school-age children (e.g., discrepancy or regression formulas) may be less valid for children in the early grades.

Prereferral practices have been advocated in the wake of widespread criticism of classification practices (Graden, Casey, & Bonstrom, 1985). Prereferral instruction to increase phonemic awareness may provide an alternative to special education placement for young children. Direct teaching of phonemic awareness has increased reading achievement among preschoolers (Bradley & Bryant, 1985; Bryant & Fielding-Barnsley, 1991; Lundberg, Frost, & Petersen, 1988), kindergarten and first grade children (Ball & Blachman, 1988, 1991; Lie, 1991); low-readiness first-graders (Wallach & Wallach, 1976), and students with learning disabilities (Williams, 1980). This sug-

Address all correspondence concerning this article to Dr. Vicki E. Snider, Department of Special Education, University of Wisconsin–Eau Claire, Eau Claire, WI 54702-4004.

gests that prereferral instruction can be implemented in a general education classroom and will be beneficial to all children.

WHAT IT IS

Phonemic awareness is the conscious awareness that words are made up of phonemes or sounds. English is comprised of two to three dozen phonemes that can be combined in a variety of ways to form every word that ever was or will be (Liberman & Shankweiler, 1985). Phonemic awareness requires the ability to attend to one sound in the context of other sounds in the word (Griffith & Olson, 1992). This is difficult because speech sounds are not discrete, but rather the phonological units are "coarticulated" (Liberman & Shankweiler, 1985). That is, they overlap and merge in speech.

Phonemic awareness is necessary to read and spell because English (along with most other languages) is alphabetic. In an alphabetic language, squiggles (letters) represent sounds. To appreciate the unique qualities of an alphabetic language, it is instructive to contrast English to a logographic language such as Japanese Kanji. Unlike an alphabetic language, the Kanji symbols convey meaning (Sakamoto & Makita, 1976). The Kanji for moon was derived from the shape of the crescent moon and the Kanji for tree was derived from the shape of branches and roots (Sakamoto & Makita, 1976). Logographic symbols have meaning in and of themselves, but in an alphabetic language visual symbols have no meaning. For example, a squiggle in the shape of a cat has meaning, but the alphabetic squiggle "cat" does not. The meaning is only apparent when the squiggles are translated into a word in one's spoken vocabulary through the process known as decoding.

Phonemic awareness is part of a hierarchy of metalinguistic skills that develops gradually (Liberman & Shankweiler, 1985; Stahl & Murray, 1994). Children become aware of larger linguistic units (words and syllables) before they become aware of smaller linguistic units (phonemes; Fowler, 1991). Children develop awareness that sentences and phrases are comprised of discrete words at about age 3 (Sawyer, Dougherty, Shelly, & Spaanenburg, 1990). For example, children younger than 3 are likely to say that the sentence "George went walking" is comprised of two words, "George" and "wentwalking" (Sawyer et al., 1990). Syllable awareness seems to be a necessary intermediate step on the way to phonemic awareness. Liberman, Shankweiler, Fischer, and Carter (1974) found that only about one-half of the preschool children they tested could tap out syllables in words, but by the end of kindergarten 90% could do this task. Although only 10% failed the syllable counting at the end of kindergarten, 30% were still failing phoneme counting indicating that phonemic awareness (specifically, the ability to segment phonemes) develops after syllable awareness. Treiman and Zukowski (1991) suggested that recognition of onsets and rimes (e.g., /dr/ + /op/) may be an intermediate step between awareness of syllables and awareness of phonemes.

Recent research indicates that phonemic awareness is not a unitary ability and is, in fact, comprised of different components, some of which are more difficult than others (O'Connor, Jenkins, Leicester, & Slocum, 1993; Torgesen & Morgan, 1990; Yopp, 1988). Mastery of one aspect of phonemic awareness does not assume transfer to other types of tasks (O'Conner et al., 1993). Adams (1990) identified five levels of phonemic awareness beginning with the easiest and progressing to the most difficult. First is the appreciation of sounds in spoken language as evidenced by recitation of nursery rhymes. Second is the ability to compare and contrast sounds in words by grouping words with similar or dissimilar sounds at the beginning, middle, or end of a word. Third is the ability to blend and split syllables. Fourth is phonemic segmentation or the ability to isolate individual sounds in syllables. Fifth is the ability to manipulate phonemes by omitting and deleting phonemes to make new words. Torgesen and his colleagues (Torgesen & Morgan, 1990; Torgesen, Morgan, & Davis, 1992) have divided phonemic awareness tasks into phonemic analysis and synthesis. Phonemic analysis refers to segmenting tasks in which children must say the individual phonemes in a word (e.g., "/c/ /a/ /t/")

or delete an initial or final sound (e.g., "say the cat without the /c/ sound"). Phonemic synthesis refers to blending tasks in which children must pronounce a word after hearing the segments (either individual phonemes or onsets and rimes). Performance on both segmenting and blending tasks is highly correlated to the acquisition of early reading skills (Wagner & Torgesen, 1987), although segmenting appears to be a more complex linguistic activity (Perfetti, Beck, Bell, & Hughes, 1987).

WHY IT'S IMPORTANT

Research during the past 2 decades has established a strong link between phonemic awareness and beginning reading. Phonemic awareness is highly correlated to both concurrent reading achievement (Juel, 1991; Liberman & Shankweiler, 1979; Rosner, 1975) and future reading achievement (Alegria, Pignot, & Morais, 1982; Juel, 1988; Liberman, 1973; Lundberg, Olofsson, & Wall, 1980; Mann & Liberman, 1984; Share, Jorm, Maclean, & Matthews, 1984; Stanovich et al., 1984; Treiman & Baron, 1983; Tunmer & Nesdale, 1985). Despite the consistently high correlations between phonemic awareness and reading achievement, the extent to which phonemic awareness is a cause or a result of learning to read remains unclear. Some have argued that phonemic awareness is a result of learning to read (Ehri & Wilce, 1986; Morais, Bertelson, Cary, & Alegria, 1986). However, training studies provide strong evidence that instruction in phonemic awareness increases reading achievement (Ball & Blachman, 1988, 1991; Bradley & Bryant, 1985; Lie, 1991; Lundberg et al., 1988; Wagner & Torgesen, 1987) indicating that phonemic awareness is a precursor to success in reading. A better understanding of the components of phonemic awareness may reveal that some abilities are causes and others are effects. For example, phonemic synthesis (blending) may play a more causal role in learning to read whereas phonemic analysis (segmenting) may develop along with beginning reading (Perfetti et al., 1987). Most researchers now agree that the relationship is reciprocal (Adams, 1990; Lundberg, 1991) and that linguistic complexity may confound our ability to measure the development of phonological awareness and its effect on reading achievement (Stahl & Murray, 1994).

Phonemic awareness is important because English is an alphabetic language The nature of beginning reading is different in an alphabetic as compared to a logographic language. The learning curve for Chinese readers is slow and gradual and the number of new vocabulary items acquired gradually decreases as memory overloads (Rozin & Gleitman, 1977). After 7 or 8 years of school, recognition vocabulary levels off at a few thousand characters (Rozin & Gleitman, 1977). Presumably, Chinese characters are initially easier to learn since they make immediate sense; however, thousands of Chinese characters must be acquired by rote and many years of schooling are spent on this process. Beginning readers of English have a more puzzling task at the outset. In the United States the learning curve of novice readers begins slowly; however, once children can map sounds to letters (indicating they have acquired the alphabetic principle), their reading vocabulary suddenly jumps to nearly the number of words they can comprehend orally (Gleitman, 1985).

Some beginning readers may approach English like a logography, memorizing each word as a holistic visual pattern and never managing to see the alphabetic principle on their own (Goswami & Bryant, 1990; Liberman, 1985). Children without phonemic awareness may have a learning curve that more closely resembles Chinese readers. They acquire a relatively small reading vocabulary (estimated at a few thousand) in the primary grades and then they learn no more (Gleitman, 1985).

Phonemic awareness indicates that children understand the nature of a phonetic language. This knowledge is crucial to the development of the alphabetic principle which is a necessary, though not sufficient, condition for skilled reading of an alphabetic script (Adams, 1990; Byrne & Fielding-Barnsley, 1989; Tunmer, Herriman, & Nesdale, 1988).

Phonemic awareness is *not* the same thing as phonics. Phonics generally refers to using letter sounds and other rules to sound

out words. Memorizing letter–sound correspondences does not necessarily mean that children are using the alphabetic principle to read (Goswami & Bryant, 1990). Students who lack phonemic awareness probably do not benefit from phonics instruction (Juel, Griffith, & Gough, 1986). If they attempt to memorize visual wholes, they may not understand how to use the letter–sound correspondences. This accounts for children who laboriously sound out a word (e.g., "/c/ /a/ /t/"), only to take a wild guess ("cheetah!") or who produce totally unrecognizable words in their invented spelling.

Children who begin school with little phonemic awareness will have trouble acquiring the alphabetic principle which will, in turn, limit their ability to decode words (Blachman, 1991). The consequences of early reading failure have been described by Stanovich (1986) as "Matthew Effects." The young poor reader is exposed to less print, practices less, and fails to develop fluency which limits comprehension. In other words, the result of the failure to acquire phonemic awareness may be functional illiteracy.

In summary, phonemic awareness is the conscious awareness that words are made up of sounds. This awareness is not necessary to speak and understand speech, but children need to be aware of those small parts to read and spell in an alphabetic language. Phonemic awareness plays an important role in beginning reading, although the precise nature of that role is not yet fully understood. Research suggests that children without phonemic awareness tend to be poor readers and that training in phonemic awareness can improve reading achievement. It may be that children without phonemic awareness are approaching English like Chinese, memorizing whole words and failing to acquire the alphabetic principle. This strategy will limit their potential to become skilled readers.

HOW TO TEACH IT

An abundance of evidence suggests that phonemic awareness is important for success in reading, however activities to teach phonemic awareness are rarely seen in practice (Blachman, 1991). A review of research on phonemic awareness training suggests that effective instruction in phonemic awareness requires explicit instruction that informs children about phonemic awareness and the alphabetic principle and careful attention to the order in which activities are presented.

Research on Teaching Phonemic Awareness

Two early programs for developing phonemic awareness have stood the test of time. Auditory Discrimination in Depth (Lindamood & Lindamood, 1969) is an auditory training program that uses colored blocks to emphasize the number, order, and similarity or difference of sounds pronounced by the teacher. Letter sound correspondences are taught concurrently in preparation for spelling and decoding activities. Another program developed in the 60s incorporating auditory blending of syllables and phonemes with the teaching of letter sound correspondences and decoding activities was DISTAR (Englemann & Bruner, 1969). Although the phonemic awareness activities were only one part of a complete reading program, it is worth noting that the effectiveness of DISTAR has been well-documented (Schwartz & Thomas, 1992; Stebbins, St. Pierre, Proper, Anderson, & Cerva, 1977; White, 1988). Furthermore, evidence from a recent longitudinal study suggests that phonemic training is most effective when integrated with the teaching of reading (Hatcher, Hulme, & Ellis, 1994). Teachers may want to examine DISTAR's revised edition called Reading Mastery (Englemann & Bruner, 1995).

Most phonemic training programs include segmentation activities. Segmentation activities require children to say the individual sounds in words. Segmentation activities also include phoneme deletion or grouping words that begin (alliteration) or end (rhyming words) the same. Training children to segment words improves segmentation skills. Rosner (1974) taught disadvantaged 4- and 5-year-olds to add, omit, substitute, and rearrange phonemes. Although the students who received the training were more successful than the control group at deleting an initial phoneme, the ef-

fect on reading achievement was not measured.

The more important question is whether training children to segment words improves reading and spelling achievement. Lundberg and colleagues (1988) began their training for preschool children with listening games and nursery rhymes. They began with activities for segmenting words in sentences and proceeded to activities such as clapping out syllables before introducing initial phonemes and final phonemes within words. They never taught letter–sound correspondences. In addition to positive effects on phonemic tasks, they found a positive effect on reading and spelling achievement in second grade. In general, however, training that includes information about phonemes and their corresponding letters has a greater effect on reading and spelling than programs that do not (Ball & Blachman, 1991). For example, Williams (1980) taught students with learning disabilities to segment syllables into phonemes and blend phonemes into syllables using wooden squares similar to those used in Auditory Discrimination in Depth (Lindamood & Lindamood, 1969). Letters and decoding were introduced only after the auditory training was complete. She found that students improved in both phonemic skills and reading one-syllable real and nonsense words; however, there was no control group for comparison. Bradley and Bryant (1985) assigned 5- to 7-year-old children into four experimental groups: (a) instruction in categorizing pictures on the basis of beginning or ending sounds (rhyming words), (b) the same categorization training with the addition of plastic letters to represent those common sounds, (c) instruction in categorizing pictures on the basis of semantic sameness, and (d) no intervention. They found that both groups instructed in sound categorization outperformed the other two, but the group that received instruction in letter sounds did the best on reading tasks.

Although phonemic awareness activities appear to have a greater effect on reading and spelling skills when letter–sound correspondences also are taught, teaching letter sounds without the accompanying phonemic awareness training is not effective (Ball & Blachman, 1988, 1991). Ball and Blachman (1988, 1991) randomly assigned kindergarten students to three groups. The first group received training in segmenting and letter–sound correspondences. The second group received training in letter–sound correspondences along with language activities. The third group received no intervention. There were no differences between the second and third groups in segmentation skills or early reading and spelling skills.

Most of the training programs described above include segmentation activities, however, only a few include explicit sound blending activities. In sound blending tasks children hear a word with the sounds elongated (e.g., "mmmmmaaaaaaaaat") and they must say the word ("mat"). Perfetti et al. (1987) found that blending may play a more causal role in early reading than segmenting. This would suggest that blending be included in early prereading activities, however, other research has indicated that both segmenting and blending are more effective for improving performance on analog reading tasks than either segmenting alone (Fox & Routh, 1984) or blending alone (Torgesen et al., 1992).

Some conclusions are warranted based on the training studies that have been conducted. First, phonemic awareness can be developed before reading ability and it facilitates subsequent acquisition of reading skills. Second, training programs that have been studied and found to be effective are explicit in their presentation of phonemic skills. Third, letter sounds should be taught along with auditory skills. Fourth, both segmenting and blending activities should be included in a training program.

Effective Instruction in Phonemic Awareness

When these conclusions are combined with what is known about effective teaching in general (for example, see Rosenshine, 1986), it suggests that effective instruction for teaching phonemic awareness must include modeling before practice and careful sequencing of activities from easy to hard.

Importance of modeling. Many activities that purport to teach phonemic awareness only provide practice for children who

TABLE 1
Examples of Teaching Versus Practice Activities

Task	Teaching Activity	Practice Activity
Rhyming	Model how to rhyme. For example, "Rhymes with /at/ and begin with /f/. Fat." Rhymes with /at/ and begins with /s/. Sat."	Play a board game in which students get to move ahead if they can say a word that rhymes with a picture in the "draw" pile.
Segmenting	Use a "Say-it-and-move-it" activity to model how to say the sounds in a word. For example, "Watch me. Every time I hear a sound, I'm going to move one of these chips down. Fffffaaaaatt."	Play a game in which the students say the sounds in a word and get to move ahead one space for each sound.
Phoneme Substitution	Model how to substitute a sound to make a new word. For example, "If I say the word fat and then change the first sound to /s/, the new word will be sat. They end with /at/. Fat-sat."	Have students make a list of words using the ending /at/ and then read the list aloud.
Blending	Model how to blend sounds into words. For example, "I'm going to say a word the slow way and then I'll say it fast. Mmmmaaaaannnn. Man. Now you try. If you can say the word fast, I'll show you a picture!"	Have students draw a picture after you say a word slowly.

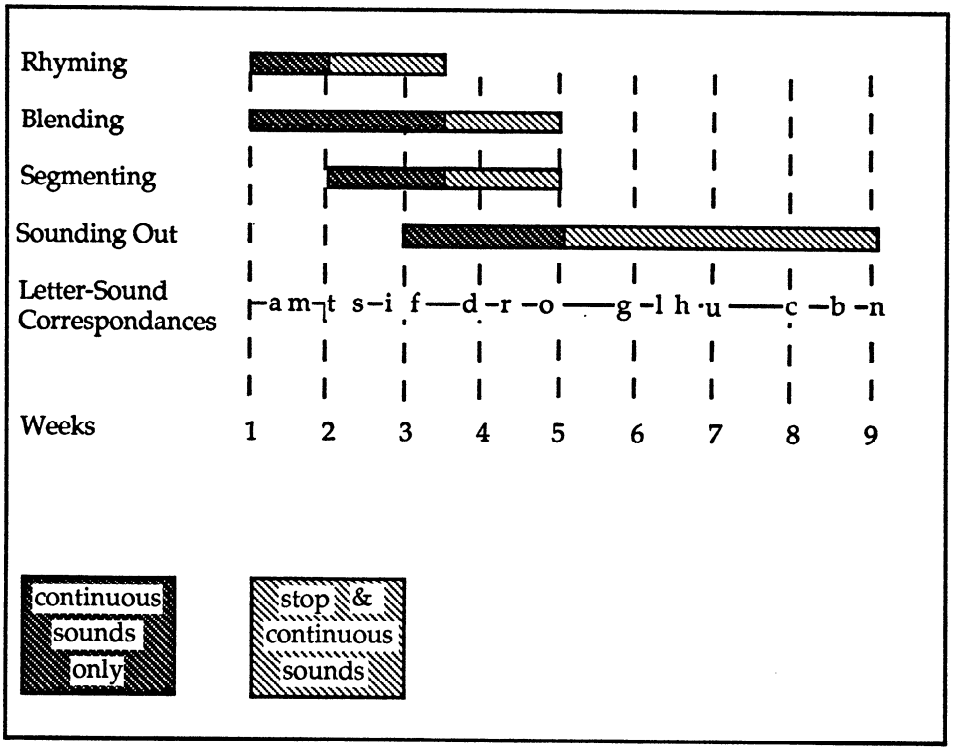
can already perform the task. Here's an example: Teacher X has designed a board game in which students must produce a rhyming word when they land on a square with a picture. If they say a word that rhymes, they get to move ahead one space. This is a practice activity because there is no instruction provided unless students make an error and the teacher provides instruction in the form of corrective feedback. The problem is that Teacher X has forced naive students to fail in order to receive instruction. This can be damaging to both motivation and self-concept. Practice activities are fine *if* the intent is to provide practice or review on a skill students already understand.

Instructional time must be divided between new learning and practice activities. It is essential to provide sufficient instruction *before* providing practice activities. Table 1 gives some examples of teaching versus practice activities for four phonemic awareness tasks.

The nature of the instruction also is important. Instruction in phonemic awareness is much more explicit when the teacher models, rather than explains the concept. This is how a teacher might *model* rhyme: "Listen, I can rhyme with /at/ and begin with /f/. Fat. I can rhyme with /at/ and begin with /s/. Sat. I can rhyme with /at/ and begin with /m/. Mat." This is an example of how a teacher might *explain* rhyme. "Rhyming words always have the same ending sound. Rat and sat rhyme because they both end in /at/, but they start differently." This explanation won't make any sense to a student who can't think about language on a phonemic level. For a child who has not developed phonemic awareness, words are not linear parts with a beginning and an end, they are holistic units. Even students who understand beginning and end of a word may wonder if the end of the word is /t/ or /at/? Explanations offer nothing but confusion to naive learners. Demonstrations via modeling are less ambiguous.

For instructionally naive students, modeling should be followed by guided practice. That is, the teacher should perform the task with the child. Only then should the child be

FIGURE 1. Scope and sequence for phonemic awareness activities.



asked to perform the task independently. If the child can consistently perform the task independently after a period of time has elapsed since instruction, then practice activities such as games, learning stations, and independent work are appropriate.

Some reading experts have emphasized more implicit approaches to teaching phonemic awareness (Griffith & Olson, 1992; Yopp, 1992). They suggest reading literature that plays with the sounds in language (e.g., Dr. Suess books), singing songs that manipulate sounds in words (e.g., The Name Game song — "Joanie Joanie Bo Bonie Banana Fana Fo Foanie Fe Fi Mo Moanie"), and providing experiences with invented spelling. The problem with these kind of activities for instructionally naive students is that (a) they have probably already been exposed to this type of instruction, and (b) there is no research to support the effectiveness of these approaches for increasing phonemic awareness or reading achievement. Therefore, I recommend that implicit approaches may be used along with, but not in place of, the explicit activities described in this article.

Scope and sequence. Activities for teaching phonemic awareness must progress from easy to hard. This recommendation may seem obvious, but because phonemic awareness is componential and complex, it is difficult to do in practice. Based on the conclusions gleaned from a review of previous training studies and other research, a scope and sequence for teaching phonemic awareness activities is suggested in Figure 1. Specific examples for the first 2 weeks of instruction are provided in Table 2. (See Carnine, Silbert, & Kameenui, 1990 for specific wording for teaching rhyming, blending, segmenting, sounding out, and letter–sound correspondences.)

Larger units before smaller units. Phonemic awareness is part of a hierarchy of metalinguistic skills that begins with word awareness, so it is important to ascertain that naive learners have acquired these prerequisite skills before proceeding to

TABLE 2
Sample Words for Teaching Letter Sounds and Phonemic Awareness

Lesson	New Letter Sound	Review	Rhyming [onset]{rime}	Blending/ Segmenting
1	/a/		[s,f,m,r] {at} [z,l,r,sh] {ip}	am, an, if, at
2	/m/	a,m	[f,m,r,v] {an} [f,m,n,s] {eat}	am, me, up, mat
3	/t/	a,m,t	[s,v,m,n] {et} [l,r,s] {ock}	mat, miss, at, Sam, mit
4	/s/	a,m,t	[s,l,th,k] {ick} [l,r,s,p] {ay}	sat, fat, fit, sit, am, mad
5		a,m,t,s	[m,s,b,t] {ee} [f,n,g,s] {ame}	it, am, mat, fit, Sam, Sid
6	/i/	a,m,t,s	[f,c,v,p] {an} [b,f,r,h] {ed}	at, sit, if, fit, sad, mat
7		a,m,t s,i	[b,n,s,r] {ag} [k,l,p,th] {ick}	sat, it, am, fat, fit, miss
8	/f/	a,m,t s,i	[b,c,f,t] {all} [b,s, f, sh] {ell}	mad, Sid, fit, rat, dad, at
9		a,m,t s,i,f	[d,f,m,sh] {ine} [b,j,qu,t] {ack}	rad, fit, sad, add, rat, mit
10		a,m,t s,i,f	[b,h,l,s] {and} [b,d,j,l] {ump}	rag, sad, did, fit, at, mad

phonemic awareness. An easy way to informally assess children's awareness of words in spoken language is to ask them to clap their hands for each word in a sentence. Begin with sentences in which every word is picturable, such as "Susan ran home" and advance to sentences that contain abstract words such as "Susan went to the store" (Sawyer et al., 1990). Follow the same procedure for counting syllables. Since syllable segmentation is easier than phoneme segmentation (Liberman et al., 1974), delay phonemic awareness activities until syllable segmentation is mastered. Speech and language clinicians may have suggestions for teaching these preskills to phonemic awareness.

Awareness of onsets and rimes may be an intermediate step between syllable awareness and phonemic awareness (Treiman & Zukowski, 1991). This is one aspect of metalinguistic awareness commonly taught in basal curricula in the form of activities that require students to name words

that begin the same to identify words that rhyme. Only one training study used this type of activity to train phonemic awareness and they found it to be effective, especially in combination with training in letter–sound correspondences (Bradley & Bryant, 1985). Furthermore, segmenting onsets and rimes is easier than fully segmenting a word (Bradley & Bryant, 1985; Lewkowicz, 1980). On the other hand, performance on tasks of this type have lower correlations to success in reading than performance on segmenting tasks (Stanovich, Cunningham, & Cramer, 1984; Yopp, 1988) so they should be treated as important prerequisites but not as an end in themselves.

Continuous before stop sounds. Continuous sounds should be introduced before words that begin with stop sounds (Lewkowicz, 1980; Lundberg et al., 1988). Continuous consonant sounds, which can be "stretched out," include f, l, m, n, r, s, v, w, y, and z. Stop sounds include b, c, d, g, h, j, k, p, q, and x. All vowels are continuous. Stop sounds are difficult to say in isolation because a vowel sound may be inadvertently added so that instead of /b/, you get "buh" or "buh-uh." Teachers must be careful when pronouncing stop sounds and require students to pronounce only the consonant sound. If students routinely mispronounce stop consonants, it may cause confusion when students start sounding out words.

Initial rhyming activities should use words that begin with a continuous sound, but after a few days words that begin with stop sounds can be introduced. This will prepare students for saying stop sounds in segmenting activities.

Fewer sounds before more sounds. It is easier to segment words with only two phonemes, vowel-consonant (VC) or consonant-vowel (CV), than words with three segments, consonant-vowel-consonant (CVC; Lewkowicz & Low, 1979). CVC words with a continuous beginning consonant should be presented before CVC with beginning stop sounds. Words with four sounds, either an initial or ending blend, should not be presented until students can segment words with three sounds.

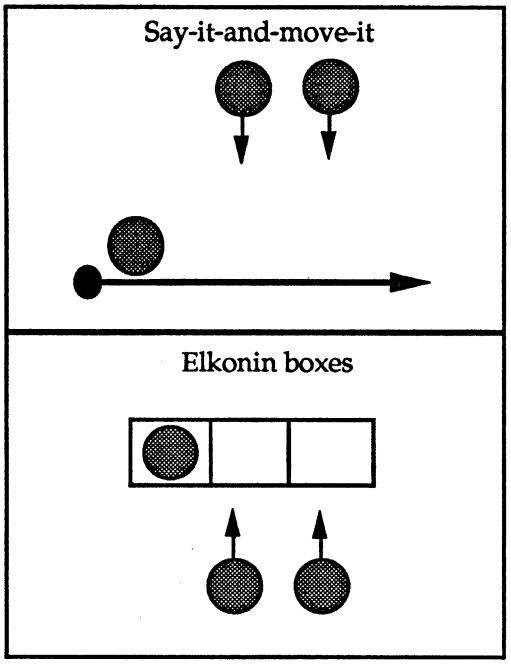
Words with initial and final blends are considerably more difficult to segment than CVC words because they require the child to segment not just the onset rime (e.g., f and at in fat), but to segment *within* the onset or rime. For example, to say the sounds in "flat," a child must segment the onset "fl" into two sounds, even though it is a blended unit. Better readers tend to say that a word like flat begins with "/fl/", not "/f/" (Stahl & Murray, 1994) and skilled readers need to attend to common letter *combinations* (Adams, 1990). Therefore, it may not be necessary to explicitly teach students to segment blends.

Auditory blending before segmenting. Blending and segmenting can be regarded as the basic phonemic awareness tasks (Lewkowicz, 1980). Auditory blending requires the teacher to pronounce the sounds in a word and have students say the word "the fast way." For some very naive students, the teacher may need to go back to auditory blending of syllables. For example, the teacher would model: "I'm going to say a word the slow way and then I'll say it fast. Listen. Fooot-Baaaall. Football. I'll say a word the slow way and if you can say it the fast way, then I'll show you a picture." Then the teacher can make it more difficult by saying the sounds, not the syllables in a word. For example, "I can say a word the slow way. Mmmmmm-aaaaaaa-t. I can say it fast. Mat. Your turn. I'll say it the slow way then you say it fast." Segmenting is the opposite of blending. The teacher says a word and the student must say the sounds in the word. Once again, the teacher should begin instruction by modeling segmenting. For example, "I can say the sounds in the word mat. Listen. Mmmmmm-aaaaaaa-t."

Blending and segmenting require a very stretched pronunciation of the word so that the child can hear the separate sounds (Lewkowicz, 1980). It is essential to elongate the sounds in the words without stopping between sounds. Teachers must do this when they model and require students to "not stop between sounds" when they say the words the "slow way."

After students can segment sounds, blending and segmenting activities should be integrated by having students say a word the slow way and then say it fast.

FIGURE 2. Two examples of multisensory activities for teaching segmenting.



Multisensory activities may be beneficial for teaching sound segmenting. Two activities have been reported in the literature in which students move a chip or token each time they say a sound. The Russian psychologist D. B. Elkonin (1973) suggested an activity in which children moved a chip or token for each sound into a set of boxes. A picture of the word being pronounced may be provided if additional prompts are necessary. This procedure has been adopted by Clay (1985) as part of the Reading Recovery program. A variation is to provide a board with a ball and arrow as done by Ball and Blachman (1988, 1991) in their "Say-it-move-it" activity. An example of each of these multisensory activities is shown in Figure 2.

Blending and segmenting before manipulation. Activities to enhance the development of phonemic manipulation require students to make new words from a stimulus word. For example, "I can make a new word from flat by taking out the /l/ sound. Fat." Rhyming activities also can be structured as phonemic manipulation tasks. For example, "I can make a word that rhymes with "fat" and begins with /s/. Sat." More sophisticated manipulation tasks involve deleting a middle consonant to make a new word (say "monkey" without the /k/ sound) or phoneme reversal tasks (say "pat" backwards).

These tasks are more difficult than segmenting (Lewkowicz, 1980). Although research has documented the importance of blending and segmenting activities for enhancing reading achievement, no research has explored the benefit of instruction in phoneme manipulation. Some evidence indicates that phonemic analysis (including phonemic manipulation) develops as a result of or at least along with reading (Adams, 1990). Therefore, it is probably more important to emphasize blending and segmenting in separate skill drills than to spend time on phoneme manipulation tasks.

Oral before written language. A complete beginning reading program must combine instruction in phonemic awareness with the teaching of letter–sound correspondences (Blachman, 1991; Simmons, Gunn, Smith, & Kameenui, 1994). It would not make sense to wait until students master all phonemic abilities before introducing the alphabet because there would be a long

gap in instruction while they learned the letter sounds. Sounds should be taught in isolation at the same time that auditory tasks are presented. Segmenting and blending activities should include sounds that have already been introduced and sounds that are going to be introduced soon. Sounds should be continually reviewed and introduced slowly so that students can master each sound without confusion. The order and rate for introduction of sound–symbol correspondences in Figure 1 is designed to (a) introduce the most useful letters first, (b) separate letters that are visually or auditorily similar, (c) introduce lowercase before uppercase letters, and (d) allow sufficient time for mastery (see Carnine et al., 1990 for a more complete discussion).

Sounding out is defined here as an activity in which students use letter–sound correspondences to read words. The difference between blending/segmenting and sounding out is that the former are purely auditory, whereas sounding out involves reading the written symbols. Sounding out activities can begin when students (a) can easily segment CVC words auditorily and (b) know enough letter–sound correspondences to make real words.

CONCLUSION

Phonemic awareness is the bridge between spoken and written language. Some children will construct this bridge for themselves in the absence of explicit instruction, but many children, particularly children at-risk for reading and learning disabilities, will not. Lacking this bridge, written language will remain a puzzle. Many of these at-risk children may end up being labeled as learning disabled unless effective interventions occur early.

Effective instruction in phonemic awareness must be explicit and it must be sequenced logically. Given the myriad of problems associated with classification of learning disabilities, it seems prudent to delay identification and implement effective interventions to build phonemic awareness in the general education classroom. School psychologists can assist toward this end by recommending a well-designed intervention to teach phonemic awareness prior to making recommendations for retention or special education.

REFERENCES

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print.* Cambridge, MA: MIT Press.

Alegria, J., Pignot, E., & Morais, J. (1982). Phonetic analysis of speech and memory codes in beginning readers. *Memory & Cognition, 10,* 451–456.

Algozzine, B., & Korinek, K. (1985). Where is special education students with high prevalence handicaps going? *Exceptional Children, 51,* 388–397.

Ball, E. W., & Blachman, B. A. (1988). Phoneme segmentation training: Effect on reading readiness. *Annals of Dyslexia, 38,* 208–225.

Ball, E. W., & Blachman, B. A. (1991). Does phoneme segmentation training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly, 26,* 49–66.

Blachman, B. A. (1991). Phonological awareness: Implications for prereading and early reading instruction. In S. A. Brady & D. P. Shankweiler (Eds.), *Phonological processes in literacy* (pp. 29–36). Hillsdale, NJ: Erlbaum.

Bradley, L., & Bryant, P. (1985). *Rhyme and reason in reading and spelling.* Ann Arbor, MI: University of Michigan Press.

Byrne, B., & Fielding-Barnsley, R. (1989). Phonemic awareness and letter knowledge in the child's acquisition of the alphabetic principle. *Journal of Educational Psychology, 81,* 313–321.

Byrne, B., & Fielding-Barnsley, R. (1991). Evaluation of a program to teach phonemic awareness to young children. *Journal of Educational Psychology, 83,* 451–455.

Carnine, D., Silbert, J., & Kameenui, E. J. (1990). *Direct instruction reading.* Columbus, OH: Merrill Publishing Co.

Clay, M. M. (1985). *The early education of reading difficulties* (3rd ed.). Portsmouth, NH: Heinemann.

Ehri, L. C., & Wilce, L. S. (1986). The influence of spellings on speech: Are alveolar flaps /d/ or /t/? In J. D. B. Yaden & S. Templeton (Eds.), *Metalinguistic awareness and beginning literacy* (pp. 101–114). Portsmouth, NH: Heinemann.

Elkonin, D. B. (1973). U.S.S.R. In J. Downing (Ed.), *Comparative reading* (pp. 551–580). New York: MacMillan.

Englemann, S., & Bruner, E. (1969). *DISTAR Reading.* Chicago: Science Research Associates.

Engelmann, S., & Bruner, E. (1995). *Reading Mastery I & II.* Chicago: Science Research Associates.

Fowler, A. E. (1991). How early phonological development might set the stage for phoneme awareness.

In S. A. Brady & D. P. Shankweiler (Eds.), *Phonological processes in literacy* (pp. 97–117). Hillsdale, NJ: Erlbaum.

Fox, B., & Routh, D. K. (1984). Phonemic analysis and synthesis as word attack skills: Revisited. *Journal of Educational Psychology, 76*, 1059–1061.

Gleitman, L. R. (1985). Orthographic resources affect reading acquisition — If they are used. *Remedial and Special Education, 6*(6), 24–36.

Goswami, U., & Bryant, P. (1990). *Phonological skills and learning to read.* London: Erlbaum.

Graden, J. C., Casey, A., & Bonstrom, O. (1985). Implementing a prereferral intervention system: Part II. The data. *Exceptional Children, 51*, 487–496.

Griffith, P. L., & Olson, M. W. (1992). Phonemic awareness helps beginning readers break the code. *The Reading Teacher, 45*, 516–522.

Hatcher, P. J., Hulme, C., & Ellis, A. W. (1994). Ameliorating early reading failure by integrating the teaching of reading and phonological skills. *Child Development, 65*, 41–57.

Juel, C. (1988). Learning to read and write: A longitudinal study of fifty-four children from first through fourth grade. *Journal of Educational Psychology, 80*, 437–447.

Juel, C. (1991). Beginning reading. In R. Barr, M. L. Kamil, P. B., Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 759–788). New York: Longman.

Juel, C., Griffith, P. L., & Gough, P. B. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. *Journal of Educational Psychology, 78*, 243–255.

Lewkowicz, N. K. (1980). Phonemic awareness training: What to teach and how to teach it. *Journal of Educational Psychology, 72*, 686–700.

Lewkowicz, N. K., & Low, L. Y. (1979). Effects of visual aids and word structure on phonemic segmentation. *Contemporary Educational Psychology, 4*, 238–252.

Liberman, I. Y. (1973). Segmentation of the spoken word and reading acquisition. *Bulletin of the Orton Society, 23*, 65–77.

Liberman, I. Y. (1985). Should so-called modality preferences determine the nature of instruction for children with reading disabilities? In F. H. Duffy & N. Geschwind (Eds.), *Dyslexia: A neuroscientific approach to clinical evaluation* (pp. 93–103). Boston: Little Brown & Company.

Liberman, I. Y., & Shankweiler, D. (1979). Speech, the alphabet and teaching to read. In L. B. Resnik & P. A. Weaver (Eds.), *Theory and practice of early reading* (Vol. 2, pp. 109–134). Hillsdale, NJ: Erlbaum.

Liberman, I. Y., & Shankweiler, D. (1985). Phonology and the problems of learning to read and write. *Remedial and Special Education, 6*(6), 8–17.

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.

Lie, A. (1991). Effects of a training program for stimulating skills in word analysis in first-grade children. *Reading Research Quarterly, 26*, 234–250.

Lindamood, C. H., & Lindamood, P. C. (1969). *Auditory discrimination in depth.* Boston: Teaching Resources.

Lundberg, I. (1991). Phonemic awareness can be developed without reading instruction. In S. A. Brady & D. P. Shankweiler (Eds.), *Phonological processes in literacy* (pp. 47–53). Hillsdale, NJ: Erlbaum.

Lundberg, I., Frost, J., & Petersen, O. (1988). Effects of an extensive program for stimulating phonological awareness in preschool children. *Reading Research Quarterly, 23*, 263–284.

Lundberg, I., Olofsson, A., & Wall, S. (1980). Reading and spelling skills in the first school years, predicted from phonemic awareness skills in kindergarten. *Scandinavian Journal of Psychology, 21*, 159–173.

Mann, V. A., & Liberman, I. Y. (1984). Phonological awareness and verbal short-term memory. *Journal of Learning Disabilities, 17*, 592–599.

Morais, J., Bertelson, P., Cary, L., & Alegria, J. (1986). Literacy training and speech segmentation. *Cognition, 7*, 323–331.

O'Connor, R. E., Jenkins, J. R., Leicester, N., & Slocum, T. A. (1993). Teaching phonological awareness to young children with learning disabilities. *Exceptional Children, 59*, 532–546.

Perfetti, C. A., Beck, I., Bell, L. C., & Hughes, C. (1987). Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children. *Merrill-Palmer Quarterly, 33*, 283–319.

Rosenshine, B. A. (1986). A synthesis of research on explicit teaching. *Educational Leadership, 43*(7), 60–69.

Rosner, J. (1974). Auditory analysis training with prereaders. *The Reading Teacher, 27*, 379–384.

Rosner, J. (1975). *Helping children overcome learning difficulties.* New York: Walker.

Rozin, P., & Gleitman, L. R. (1977). The structure and acquisition of reading. II: The reading process and the acquisition of the alphabetic principle. In A. S. Reber & D. L. Scarborough (Eds.), *Toward a psychology of reading* (pp. 55–151). Hillsdale, NJ: Erlbaum.

Sakamoto, T., & Makita, K. (1976). Japan. In International Reading Association (Ed.), *Cross-cultural perspectives on reading and reading research* (pp.

440–465). Newark, DE: International Reading Association.

Sawyer, D. J., Dougherty, C., Shelly, M., & Spaanenburg, I. (1990). Auditory segmenting performance and reading acquisition. In C. S. Simon (Ed.), *Communication skills and classroom success: Assessment of language-learning disabled students* (pp. 375–402). Austin, TX: PRO-ED.

Schwartz, J., & Thomas, K. (1992). Overview of the research on reading and direct instruction. *ADI News, 11*(4), 29–32.

Share, D. L., Jorm, A. F., Maclean, R., & Matthews, R. (1984). Sources of individual differences in reading acquisition. *Journal of Educational Psychology, 76*, 1209–1324.

Simmons, D. C., Gunn, B., Smith, S. B., & Kameenui, E. J. (1994). Phonological awareness: Applications of instructional design. *LD Forum, 19*(2), 7–10.

Stahl, S. A., & Murray, B. A. (1994). Defining phonological awareness and its relationship to early reading. *Journal of Educational Psychology, 86*, 221–234.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in reading. *Reading Research Quarterly, 21*, 360–407.

Stanovich, K. E. (1988). Explaining the differences between the dyslexic and the garden-variety poor reader: The phonological-core variable-difference model. *Journal of Learning Disabilities, 21*, 590–612.

Stanovich, K. E., Cunningham, A. E., & Cramer, B. (1984). Assessing phonological awareness in kindergarten children: Issues of task comparability. *Journal of Experimental Child Psychology, 38*, 175–190.

Stanovich, K. E., Cunningham, A. E., & Feeman, D. J. (1984). Intelligence, cognitive skills, and early reading progress. *Reading Research Quarterly, 19*, 278–303.

Stebbins, L. B., St. Pierre, R. G., Proper, E. C., Anderson, R. B., & Cerva, T. R. (1977). *Education as experimentation: A planned variation model. Vols. IV A–D, an evaluation of follow through.* Cambridge, MA: Abt Associates.

Torgesen, J. K., & Morgan, S. T. (1990). Phonological synthesis tasks: A developmental, functional, and componential analysis. In H. L. Swanson & B. Keogh (Eds.), *Learning disabilities: Theoretical and research issues* (pp. 263–276). Hillsdale, NJ: Erlbaum.

Torgesen, J. K., Morgan, S. T., & Davis, C. (1992). Effects of two types of phonological awareness training on word learning in kindergarten children. *Journal of Educational Psychology, 84*, 363–370.

Treiman, R., & Baron, J. (1983). Phonemic-analysis training helps children benefit from spelling-sound rules. *Memory and Cognition, 11*, 382–389.

Treiman, R., & Zukowski, A. (1991). Levels of phonological awareness. In S. A. Brady & D. P. Shankweiler (Eds.), *Phonological processes in literacy* (pp. 67–83). Hillsdale, NJ: Erlbaum.

Tunmer, W. E., Heriman, M. L., & Nesdale, A. R. (1988). Metalinguistic awareness abilities and beginning reading. *Reading Research Quarterly, 23*, 134–158.

Tunmer, W. E., & Nesdale, A. R. (1985). Phonemic segmentation skill and beginning reading. *Journal of Educational Psychology, 77*, 417–427.

U.S. Department of Education. (1994). *Sixteenth annual report to Congress on the implementation of the Education of the Handicapped Act.* Washington, DC: Author.

Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin, 101*, 192–212.

Wallach, M. A., & Wallach, L. (1976). *Teaching all children to read.* Chicago: University of Chicago Press.

White, W. A. T. (1988). A meta-analysis of the effects of direct instruction in special education. *ADI News, 7*(4), 19–24.

Williams, J. P. (1980). Teaching decoding with an emphasis on phoneme analysis and blending. *Journal of Educational Psychology, 72*, 1–15.

Yopp, H. K. (1988). The validity and reliability of phonemic awareness tests. *Reading Research Quarterly, 23*, 159–177.

Yopp, H. K. (1992). Developing phonemic awareness in young children. *The Reading Teacher, 45*, 696–703.

Ysseldyke, J. E., & Christenson, S. L. (1988). Linking assessment to intervention. In J. L. Graden, J. E. Zins, & M. J. Curtis (Eds.), *Alternative educational delivery systems: Enhancing instructional options for all students* (pp. 91–109). Washington, DC: National Association of School Psychologists.

Ysseldyke, J. E., Thurlow, M., Graden, J., Wesson, C., Algozizne, B., & Deno, S. (1983). Generalizations from five years of research on assessment and decision making: The University of Minnesota Institute. *Exceptional Education Quarterly, 4*(1), 75–93.

Vicki E. Snider, PhD, is an Associate Professor and Coordinator of the Program in Learning Disabilities at the University of Wisconsin-Eau Claire. Her primary interests are related to effective instruction for low-performing students.