# Preventing Reading Failure: Phonological Awareness Assessment and Instruction

**HOLLY B. LANE, PAIGE C. PULLEN, MARY R. EISELE, and LuANN JORDAN**

**Abstract.** The article addresses translating phonological awareness research for classroom reading instruction. It presents a practical overview of phonological awareness development and its relationship to beginning reading, including a synopsis of findings of recent research and an explanation of the development of phonological skills. It presents methods for formal and informal assessment of children's phonological awareness and describes strategies for classroom-based instruction in phonological skills with emergent readers.

Reading is a foundation skill for school learning and life learning—the ability to read is critical for success in modern society. Learning to read is one of the most important events in a child's school career (Anderson, Hiebert, Scott, & Wilkinson, 1985; Lyon, 1999; National Reading Panel, 2000). Unfortunately, many children experience difficulties in the early stages of learning to read that become barriers to later reading and learning. A primary focus of recent research in education, therefore, has been the prevention of early reading problems (Adams, 1990; Snow, Burns, & Griffin, 1998; Torgesen, 1998). One area of beginning reading research that has received enormous attention in the professional literature is phonological awareness. This research has been called "a scientific success story" (Stanovich, 1987) because phonological awareness has been shown to be both a reliable predictor of reading achievement and a key to beginning reading acquisition (Smith, Simmons, & Kame'enui, 1995).

### What Is Phonological Awareness?

Phonological awareness can be defined as conscious sensitivity to the sound structure of language. Children with strong phonological awareness can detect, match, blend, segment, and manipulate speech sounds. Such facility with the sounds of spoken language enables children to learn more readily how to apply these skills to decode print. An understanding of phonemes, the smallest detectable unit of sound in spoken language, is essential to the understanding of grapheme-phoneme (letter-sound) relationships. Numerous studies have demonstrated the importance of phonological awareness, particularly at the phoneme level, as the foundation for skilled decod-

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ing and, therefore, for fluent reading (Blachman, Tangel, Ball, Black, & McGraw, 1999; Cornwall, 1992; Lenchner, Gerber, & Routh, 1990; Liberman & Shankweiler, 1985; Pratt & Brady, 1988; Wagner & Torgesen, 1987).

Phonological awareness tasks have been shown to be excellent predictors of reading ability or reading disability. That is, children who perform well on tasks of phonological awareness typically are or will become good readers, but children who perform poorly on them are or will become poor readers (Blachman, 1991; Catts, 1991; Perfetti, 1991; Perfetti, Beck, Bell, & Hughes, 1987; Snow et al., 1998; Stanovich, 1986, 1992; Torgesen, Wagner, & Rashotte, 1997). To benefit from instruction in decoding and spelling, a child must have a fundamental level of phonological awareness (Chard & Dickson, 1999; National Reading Panel, 2000).

Many educators confuse the terminology related to this research. In particular, the terms *phonological awareness*, *phonemic awareness*, and *phonics* are sometimes used interchangeably. As previously stated, phonological awareness is a child's sensitivity to the sound structure of language. *Phonemic awareness* refers to a child's ability to manipulate individual sounds (phonemes) within words. *Phonics* is an instructional approach used to help children make sense of the connection between sounds and letters. Each is important to early reading instruction.

### *Phonological Awareness Research*

Phonological awareness has gained considerable attention in educational research during the last 15 years. The primary attraction to this relatively new area of reading research is the repeated positive results in studies of phonological awareness interventions. Among the numerous reliable predictors of later reading performance (e.g., socioeconomic status, mother's education) that educational researchers have identified phonological awareness is one of the few that educators are able to influence significantly.

Numerous studies of phonological awareness have contributed to the knowledge base in this area. These studies can and should inform future educational research and practice. Syntheses of this research (see, for example, Smith et al., 1995; National Reading Panel, 2000) have yielded several important generalizations:

1. Phonological awareness is directly related to reading ability.
2. Although the relationship is reciprocal, phonological awareness precedes skilled decoding.
3. Phonological awareness is a reliable predictor of later reading ability.
4. Deficits in phonological awareness are usually associated with deficits in reading.
5. Early language experiences play an important role in the development of phonological awareness.
6. Early intervention can promote the development of phonological awareness.
7. Improvements in phonological awareness can and usually do result in improvements in reading ability.

### *Phonological Skills and Developmental Levels*

Several skills that are commonly associated with beginning reading instruction help children develop phonological awareness. Typically, the first phonological skill that children master is the ability to rhyme. Very young children may also master skills such as phoneme detection and sound matching with little instruction. More advanced phonological skills such as phoneme deletion, blending, and segmentation pose problems for many emergent readers. Most instruction designed to increase phonological awareness emphasizes these difficult skills (activities designed to enhance these skills will be described in detail in a subsequent section).

The levels of phonological awareness development are associated with the different phonological components of spoken language, including words, syllables, onsets and rimes, and phonemes (Blachman, 1991; Smith, 1995). In Figure 1, we depict phonological awareness as an umbrella term that includes awareness at each level of spoken language. Effective assessment and instruction should address the various levels of phonological awareness development. In the following sections, we describe each of these four levels of phonological awareness.

*Word level.* The awareness that the speech flow is a compilation of individual words is typically achieved at a very young age. The linguistic play of young children, including rhyming and the generation of nonsense words, provides evidence of this early level of phonological awareness (Bradley, 1988). When a child utters a single word that he has only heard in combination with other words, he is demonstrating the word level of phonological awareness.

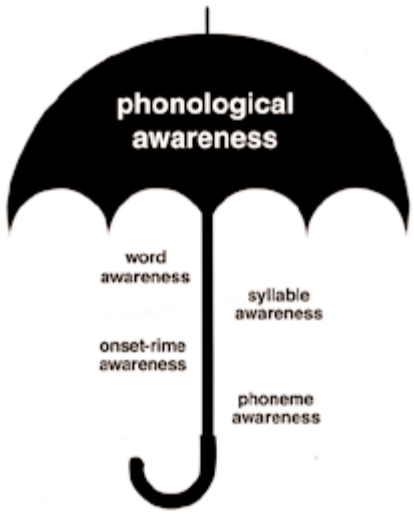


**FIGURE 1. Phonological awareness can be illustrated as an umbrella term that comprises four levels. Phonemic awareness is an understanding of the sound structure of language at the phoneme level.**

*Syllable level.* Syllables are the most easily distinguishable units within words. Most children acquire the ability to segment words into syllables with minimal instruction (Liberman, Shankweiler, & Liberman, 1989; Lundberg, 1988). Activities such as clapping, tapping, and marching are often used to develop syllable awareness. This level of phonological awareness is useful for initial instruction in detection, segmentation, blending, and manipulation of phonological components of language. The ability to detect, segment, and count syllables is more important to reading acquisition than the ability to manipulate and transpose them (Adams, 1990).

*Onset and rime level.* The onset-rime or intrasyllabic level of phonological awareness is an intermediate and instructionally useful level of analysis between the sylla-

ble and the phoneme (Adams, 1990). The *onset* is the part of the syllable that precedes the vowel (e.g., the /k/ in *cat*, the /br/ in *brown*). The *rime* is the rest of the syllable (e.g., the /og/ in *dog*, the /ack/ in *black*). Because a syllable must contain a vowel, all syllables must have a rime, but not all syllables have an onset (e.g., *and, out, or*).

Treiman (1985) found that children make more errors with consonants at the end of words or with consonant blends than with initial or medial consonants. This finding suggests that children naturally segment words at neither the syllable nor the phoneme level, but at the intrasyllabic level. In addition, most children spell rimes more accurately than individual vowel sounds, which illustrates the level at which they are attending. Onset-rime segmentation skill is an essential component of phonological awareness (Adams, 1990; Goswami & Mead, 1992).

Instruction at the onset-rime level is an important step for many childen (Treiman,1985, 1991, 1992). Because tasks that require onset and rime analysis require the segmentation of syllables, they are more sophisticated than syllable-level tasks. Yet these same tasks are easier than phoneme-level tasks because they do not require discrimination between individual phonemes. Onset-rime tasks could, therefore, be considered an intermediate step in the development of phonological awareness. The difficulty that many children experience when progressing from syllabic analysis to phonemic analysis may arise because the intermediate step, the intrasyllabic unit, is often omitted from early reading instruction. Providing experience working with onsets and rimes may alleviate this difficulty.

*Phoneme level.* The most sophisticated level of phonological awareness is the phoneme level, most commonly referred to as phonemic awareness. Children with strong phonemic awareness are able to manipulate individual phonemes, the smallest sound units of spoken language. Phonemic awareness skills include the ability to detect, segment, and blend phonemes and to manipulate their position in words (Adams, 1990; Lenchner et al., 1990).

Because humans coarticulate or overlap sounds in speech, phonemes are impossible to segment in a pure sense. In the speech flow, phonemes are formed and blended in such a way that one phoneme's production is influenced by the surrounding phonemes. For example, the /k/ is formed in slightly different ways in the words *cat* and *cot* due to the influence of the vowel that follows it. Because phonemic analysis requires the reader to detect, segment, and manipulate individual phonemes, it is a much more sophisticated task and, consequently, a much more difficult task than either syllabic or intrasyllabic analysis (Treiman, 1991, 1992).

## Assessing Phonological Awareness

Educators face the formidable challenge of determining which children have weaknesses in phonological awareness and, therefore, which children are likely to develop reading problems. Several ways to assess phonological awareness have been developed. Which method to use should be determined based on the number of children to be assessed, the amount of existing information about the children, and the amount of time available. The most reliable and informative method of assessing phonological awareness is through, individual testing. Other methods have been developed, however, that are quick and easy to administer and that have reliability adequate for most classroom purposes. Yopp (1988) investigated some of the most commonly used measures of phonological awareness and determined that the reliability and validity of measurement tasks were greatest when a combination of measures was employed.

### *Group Assessment*

Several methods have been developed for group screening and assessment of phonological skills. Tests of invented spelling can be administered in a group setting, and the analysis of children's attempts to spell words provides the teacher with information about their ability to segment phonemes, their knowledge of the alphabet, and their understanding of letter-sound correspondences (Invernizzi, Meier, Swank, & Juel, 1998; Moats, 2000; Snow et al., 1998). Mann, Tobin, and Wilson (1987) have advocated the use of children's invented spellings as a tool for screening phonological awareness. They developed a system for scoring an invented spelling that can help determine if additional assessment is warranted. In this and other similar scoring methods, points are awarded on the basis of a spelling's phonological accuracy. For example, in an attempt to spell an unfamiliar word, a child may produce a scrib-

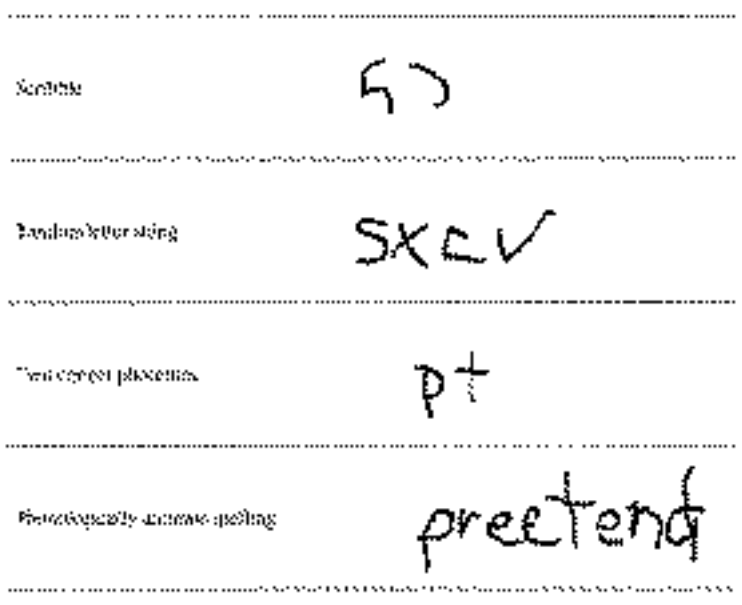


**FIGURE 2 These example spellings for the word *pretend* begin with a series of scribbles and move to a spelling that is phonologically accurate.**

**TABLE 1**
**Method for Scoring Invented Spelling**

| Characteristics of spelling | Example spellings | Score |
|---|---|---|
| One phoneme accurately represented other than initial phoneme | t | 1/2 |
| Initial phoneme accurately represented | f<br>fesry | 1 |
| Initial phoneme and one other phoneme accurately represented | ft | 2 |
| Initial phoneme and two or more other phonemes accurately represented | fot<br>flt | 3 |
| Word is phonologically accurate | flot<br>flote | 4 |

ble, a random letter string, one or two correctly represented phonemes, or even a phonologically accurate spelling (Figure 2). Each of these attempts represents significant information about that child's phonological knowledge. See Table 1 for a summary of one method for scoring invented spellings.

*The Screening Test of Phonological Awareness* (*STOPA*) has been demonstrated to be an effective group assessment tool (Torgesen, Wagner, Bryant, & Pearson, 1992). The *STOPA*, designed for use with kindergarten students, requires students to identify sounds that are the same and different. The test is simple to administer in a group setting, yet sophisticated enough to detect individual differences in phonological awareness.

*Individualized Assessment*

To collect the kind of information about a child's phonological knowledge that is necessary to design effective instructional interventions, individual assessments are particularly useful. The assessment method can be informal, criterion-referenced, or norm-referenced.

Clearly, the most direct informal method of measuring a child's phonological awareness is repeated observation by a knowledgeable teacher of the child's ability to perform tasks that require the use of phonological skills. Such observation provides a teacher with an authentic measure of what a child can or cannot do (Valencia, 1997). A variety of skill areas may be examined to measure phonological awareness; these include rhyme detection and production, sound matching, phonemic oddity detection, deletion, segmentation, and blending. Sample questions for informal assessment of a child's phonological awareness appear in Table 2. Several formal measures of phonological awareness have been developed, as well. Descriptions of some of the most widely used appear in Table 3.

## Developing Phonological Awareness

Just as assessing phonological awareness is best accomplished by observing students as they perform tasks that demonstrate phonological skills, developing phonological awareness requires practicing phonological skills. Most skill instruction can be easily embedded within the context of meaningful reading or writing (Wadlington, 2000; Yopp, 1992). Some children, however, require more extensive practice with skills. Students who have very low levels of reading ability benefit most from explicit instruction in phonological skills paired with explicit instruction in how to apply those skills in a meaningful context (Cunningham, 1990; Lane, 1994). As these children develop sensitivity to the sound structure of language, instruction in phoneme segmentation and blending should be coupled with instruction using letters (Pullen, 2000).

Instruction in phonological skills can be conducted as formal, structured lessons, as an integrated part of ongoing reading instruction, or as fun activities throughout the school day. Instruction may be individualized, small-group, or whole-class. For students who have significant weaknesses in phonological awareness, 10–20 minutes of individual or small-group instruction each day may be necessary to promote adequate growth. Of course, student needs should dictate the form and amount of instruction provided.

*Commerically Available Instructional Programs*

As educators have become aware of the research on phonological awareness, publishers have recognized the demand for classroom materials. Numerous commercial programs are currently available. Several of these programs have undergone field testing and evaluation. We provide a list and brief description of research-based materials for teachers in Table 4. In addition to these classroom materials, several programs for computer-assisted instruction have become available. A listing of these software programs is provided in Table 5.

*Informal Methods of Instruction*

Most activities in commercial programs such as those described can be incorporated informally within existing reading instruction. The following tasks are useful for practicing and developing phonological skills. The tasks are sequenced in an order that approximates the developmental sequence. However, the sequence and rate of skill development vary from child to child, and skills overlap during development. We also wish to stress that these activities are auditory and interactive in nature; children do not develop phonological skills by doing independent written work.

*Tapping words.* Children can be taught to tap with a rhythm stick or finger for each word in a sentence or phrase. Most children acquire this skill with minimal instruction. Teacher modeling and guidance are useful for those children who have difficulty with this task. Children who struggle with this activity typically confuse words and syllables. Care should be taken to make this distinction explicit.

*Counting and tallying words.* Tallying the number of words in a sentence requires a greater degree of cognitive engagement than tapping words and is considered a

more sophisticated task. Another method of word counting involves moving a marker to indicate the number of words in a sentence.

*Tapping syllables*. Children may be taught to tap out the number of syllables in a word. This task requires auditory attention. The teacher should provide extensive modeling and guided practice to help children understand the concept of syllable. Starting with long but familiar multisyllable words (e.g., refrigerator, motorcycle) makes the acquisition of this skill easy for most children.

*Segmenting syllables.* Teaching students to segment multisyllable words into individual syllables can begin in kindergarten. This process can be made into a game in which children separate their names or the names of familiar objects into syllables. Instruction may begin with segmentation of compound words (e.g., football, outside, sidewalk). Children may also be taught to count the number of syllables in other long but familiar words. These tasks require auditory attention and memory.

*Rhyme recognition.* Children can be taught to determine if two one-syllable words rhyme. Some children have an inherent understanding of rhymes based on extensive experiences with language and print. Other children who have not developed this understanding may need explicit instruction about what a rhyme is (i.e., words rhyme when they sound the same in the middle and at the end). This instruction should be accompanied by numerous examples and nonexamples of rhymes. Rhyme recognition simply requires the student to indicate whether or not a pair of spoken words rhymes. Instead of simply providing a pair of words, to promote rhyme recognition, the teacher might say, "*Cat* and *sat* both have an *at*. Does *hat* have an *at*?"

*Rhyme generation.* Generating a word or list of words that rhyme with a given word is more difficult than determining if two given words rhyme. The additional cognitive and language requirements of

**TABLE 2**
**Sample Assessment Questions**

| Assessment | Directions | Sample |
|---|---|---|
| | *Word level* | |
| Tapping words | Teacher reads sentence aloud. Child taps for each word in the sentence. | *The little frog is jumping.* |
| Deleting words | Teacher reads a compound word, the child deletes one word. | Teacher says, "Say cowboy." Child repeats. "Now say *cowboy*, without saying *cow*." |
| | *Syllable level* | |
| Blending syllables | Teacher reads word one syllable at a time. The child listens, then blends the sounds together to make the whole word. | What word do these sounds make? *tea-cher.* |
| Tapping syllables | Teacher reads word aloud. Child taps for each syllable in the word. | *alligator* |
| Deleting syllables | Teacher reads child a multisyllable word and the child deletes a specific syllable. | Teacher says, "Say *wonder*." Child repeats. "Now say *wonder* without saying *der*. |
| | *Onset-rime level* | |
| Matching rhymes | Teacher gives child a word pair, the child decides whether or not the pair rhymes. | Do these two words rhyme? *sack/black*<br>Do these two words rhyme? *beat/bean* |
| Blending onsets and rimes | The teacher segments the word orally between the onset and rime. The child listens, then blends the sounds together to make the whole word. | What word do these sounds make? *n-ote.* |
| Generating rhymes | The teacher gives child a target word and the child must provide a word that rhymes with the target word. | Tell me a word that rhymes with *sat.* |
| | *Phoneme level* | |
| Blending phonemes | Teacher segments a word into phonemes and the child is asked to blend the sounds to make the whole word. | What word do these sounds make? *b-o-th.* |
| Segmenting phonemes | Teacher reads child a whole word and the child is asked to produce the word sound-by-sound. | I will say a word, then you say it sound by sound. *mat.* |

rhyme generation make it quite challenging for some children. The ability to generate rhymes, however, is an excellent indicator of a child's ability to apply phonological knowledge. Many children engage in spontaneous word games that employ rhyming skills. This fun way to practice skills should be encouraged. Using nonsense words in such games reinforces the child's attention to sounds.

*Rhyme oddity detection*. This task requires children to indicate which in a list of three or four words does not rhyme with the other words in the list. The familiar song from the television show *Sesame Street* does this well: "Which of these words is not like the others? Which of these words just doesn't belong?"

*Rhyme matching.* Given a list of three or four words, students indicate which one from the list rhymes with a target word. For example, the teacher might say, "Which word rhymes with *stamp*: *map, lip,* or *lamp*?"

*Sound detection.* Given a target phoneme, students determine which words on a list begin or end with that sound. This activity can be used during story or passage reading, as well. While reading connected text, students find all words in the selection that include the target phoneme. As students become comfortable with beginning and ending sounds, activities that include detection of a target medial sound should be added.

*Sound matching.* To match sounds, students must determine which in a selection of words begins or ends with the same sound as a given word. For example, the teacher may ask students, "Which word begins with the same sound as *dog*: *can, must*, or *dish*?

As students master this skill, the activity should be modified to request ending or middle sound-matching, and more words may be added to the list.

*Sound oddity detection.* The procedures for this activity are very similar to those for rhyme oddity detection. The difference, however, is that students are asked to determine which in a list of words begins or ends with a sound different from a given word. For example, the teacher may ask, "Which of these words does not have the same ending sound as *cat*: *mutt, lift, cake,* or *bite*?" Again, work with medial sounds should start when students become skilled with beginning and ending sounds.

*Rhyme and sound matching using pictures.* For these activities, children are asked to look at pictures and generate the sounds themselves by naming the word the picture represents. Students match pictures illustrating words that share a common rime or a common initial, medial, or final phoneme. This activity is somewhat more advanced than activities that begin with the teacher generating the sounds, because some students find it more difficult to detect individual phonemes when they do not hear someone else say the word.

*Oddity detection using pictures.* As in the previous activity, the student is expected to generate the name of the word the pictures represents. The student then determines which in a set of pic-

**TABLE 3**
**Assessments of Phonological Awareness**

| Assessment | Author/publisher | Description |
|---|---|---|
| Lindamood Auditory Conceptualization Test (LAC) | Lindamood and Lindamood/ Pro-Ed | The *LAC* is a comprehensive, individually administered assessment for both children and adults. It is effective for a wide range of ages, however, it is difficult for very young children (kindergarten). |
| Comprehensive Test of Phonological Processing (CTOPP) | Wagner, Toregesen and Rashotte/Pro-Ed | The *CTOPP* is an individually-administered assessment that measures (a) phonological awareness (e.g., sound matching, blending, elision); (b) phonological memory (memory of digits, nonword repetition); and (c) rapid serial naming (rapid naming of objects, numbers, and letters). |
| Test of Phonological Awareness (TOPA) | Toregesen and Bryant/ Pro-Ed | *TOPA* is a measure of young children's ability to isolate individual phonemes in spoken words. It can be administered to groups of children and is available in Kindergarten and Early Elementary versions. |
| Phonological Awareness Literacy Screening (PALS) | Invernizzi, Meier, Swank and Juel/University of Virginia | *PALS* measures the child's rhyming abilities and sound awareness. In addition to these phonological skills, alphabet knowledge, letter sound knowledge, concept of word, and word recognition are also assessed. |
| The Developmental Spelling Analysis in Word Journey | Ganske/Guilford Press | This assessment includes a screening inventory for determining a child's stage of spelling development and two parallel feature inventories for high lighting strengths and weaknesses in a child's knowledge of specific spelling features. |

tures illustrating words does not share a common rime or a common initial, medial, or final phoneme.

*Counting phonemes.* Elkonin (1963) introduced a method of developing phonemic segmentation skills that has become quite popular in recent years. This method involves the use of Elkonin boxes—picture cards with boxes under each picture representing the number of phonemes in the word (see Figure 3). While saying the word slowly, sound by sound, the student moves a marker into each box to represent each sound in the word. This activity may be modified to allow the teacher and student to practice the skill orally. The teacher demonstrates using fingers to count phonemes, raising one finger as each phoneme is pronounced. With teacher guidance, the student should be able to learn how to count phonemes independently.

*Phoneme deletion.* Phoneme deletion activities require students to detect and manipulate sounds in a word. Students are asked to delete a specified sound from a target word. For example, the teacher may say, "Say *seat*. Now say *seat* without saying the /t/ sound." Again, practice with this activity should begin with initial sounds and progress to final and, eventually, medial sounds.

*Blending and segmenting.* Blending and segmenting phonemes are the most sophisticated skills associated with phonological awareness and the most important for application to decoding. Blending and segmenting may be taught in a variety of ways. One of the most useful methods for helping young children to understand the concepts of phonemic blending and segmentation is teaching them to "converse" with a puppet or toy robot in a secret language. Torgesen and Bryant (1994) used this approach in *Phonological Awareness Training for Reading*, but the method is easy to adapt to informal instruction. In this approach, the puppet or robot can only

**TABLE 4**
**Commercially Available Instructional Programs**

| Program | Author/publisher | Description |
|---|---|---|
| Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (LiPS) | Lindamood/ProEd | *LiPS* is designed to provide intensive remedial instruction for students struggling to develop phonological awareness. Sounds are represented with objects and descriptive names to develop students' concrete understanding of distinct sounds by drawing a child's attention to the motoric features of phoneme articulation through individual or small group instruction. Students learn how to position their mouths to produce sounds and how to distinguish among various types of sounds. |
| Road to the Code: A Program of Early Literacy Activities to Develop Phonological Awareness | Blachman, Ball, Black, and Tangel/Brookes | *Road to the Code* includes activities to move students from phonological awareness to letter knowledge. The program gradually moves into activities that encourage the application of these skills in writing and spelling. |
| Phonological Awareness Training for Reading | Torgesen and Bryant/ProEd | This program includes games and activities to help children develop sound segmenting and blending, reading and spelling. An audiotape guide for sound pronunciation is included. |
| Phonemic Awareness in Young Children | Adams, Foorman, Lundberg, and Beeler/Brookes | This curriculum provides a basis for assessment and instruction in phonological awareness. The book includes a variety of language games, listening games, rhyming activities, and activities for developing students' understanding of sounds in words. Several instruments for assessing phonological awareness are also included. |
| Ladders to Literacy | O'Connor, Notari-Syverson, and Vadasy/Brookes | These preschool and kindergarten activity books provide early literacy activities in phonological awareness, vocabulary development, and letter names and sounds. The program is designed to emphasize the provision of appropriate levels of instructional support for developing students. |
| Sounds Abound | Catts and Vartiainen/ LinguiSystems | *Sounds Abound* is for children in grades PreK–3. It targets listening and rhyming skills as students work toward matching sounds with letters. Five sections include fun activities in (1) speech sound awareness, (2) rhyming, (3) beginning and ending sounds, (4) segmenting and blending sounds, and (5) putting sounds together with words. |

say words and can only understand words when they are said one sound at a time. Young children seem to accept and understand this explanation quite readily and are eager to try communicating in this unusual fashion.

When teaching or assessing blending and segmentation skills, the teacher should be careful to completely segment phonemes before blending them. Many teachers have the tendency simply to say a word slowly, drawing out the phonemes. The teacher should be certain to include a brief but discernible pause between segmented sounds. When children learn to decode, it is necessary for them to identify the sounds of separate letters and then to blend those letter sounds together. Previous oral blending practice is helpful for students when they are ready to become more fluent with decoding skills.

Another important caution for teachers is that individual phonemes must be pronounced in a manner that will make them blendable. In other words, teachers should be very careful to model correct letter sound pronunciation. Many teachers, in an effort to make short or "stop" consonant sounds more audible, add a vowel sound to the consonant. This additional sound, usually a schwa or short *u* sound, distorts the consonant sound, making it very difficult to blend with other phonemes. For example, *a b* may be incorrectly pronounced "buh," and a *t* may be incorrectly pronounced "tuh." Blending the letters *b*, *a*, and *t* then produces "buh-a-tuh," and many children have serious difficulty identifying the word. It is important to pronounce these stop consonants as quickly as possible, without the confusing "uh." Because it is impossible to pronounce a voiced stop consonant such as *b* or *d* in isolation with no vowel sound attached, the teacher should model saying the sound with an extremely brief short *i* sound following it. The place in the vocal anatomy where the short *i* is produced is closer to the location of more of the other vowel sounds than the short *u*. Teaching children to use this strategy may help them blend stop consonants more readily.

Another way to alleviate this problem is to begin instruction in blending and segmenting using only words with continuous consonant sounds (e.g., /s/, /v/, /z/, /f/, /m/, /n/) at the beginning position. These sounds are much easier to blend than the stop consonants, and their use in early instruction makes the skill of blending more accessible for children. As children are introduced to blending skills, stop consonants may be used at the end of words. In the final position, stop consonants are easier to pronounce quickly and with little distortion. When students become competent with pronunciation, the introduction of stops at the initial position becomes less troublesome.

### *Including Phonological Awareness Instruction in an Existing Reading Program*

Many of the activities we have described can be integrated into any read-

**TABLE 5**
**Instructional Software Programs**

| Program | Author/publisher | Description |
|---|---|---|
| Earobics | Wasowicz/Cognitive Concepts | *Earobics* is a software program designed to develop phonemic awareness and letter-sound knowledge through engaging games. |
| Daisy Quest and Daisy's Castle | Erikson, Foster, Foster, and Torgesen/ProEd | *Daisy Quest and Daisy's Castle* are computer programs for the Macintosh. The games are motivating for children while providing opportunities to develop phonological awareness at each level. Research studies have found these software programs to be an effective way to stimulate phonological awareness in young children. |
| The Waterford Early Reading Program | The Waterford Institute/ Electronic Education | *The Waterford Early Reading Program* is a comprehensive computer program for Kindergarten. It provides activities in phonological awareness, concepts of print, letter names, and letter sounds. |
| Read, Write, and Type! Learning System | Herron and Grimm/ Talking Fingers | This computer software program merges the teaching of phonics skills with an introduction to typing. Children move through a progressively challenging sequence games that begins with single letters, advances to whole words, and concludes with complete sentences, including capitalization and punctuation. |
| Fast ForWord | Merzenich, Tallal, Jenkins, and Miller/Scientific Learning | *Fast ForWord* is an interactive program that stimulates children's phonological skills using acoustically modified speech sounds. This acoustic training is provided in five 20-minute sessions each day. Requires teacher training. |

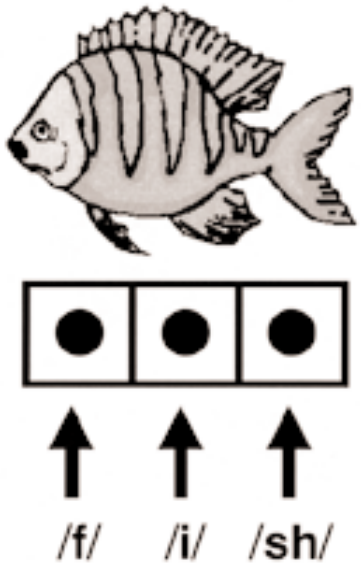


**FIGURE 3. The teacher models moving one chip into a square for each sound in *fish*. The student then moves the chips into the squares with help from the teacher, until the student is able to move the chips into the squares independently. Eventually, the student learns to write letters in the boxes.**

ing activity or used as games during instruction or during noninstructional time. For example, singing and play activities offer many opportunities for kindergarten teachers to incorporate phonological skill development. Stories or poems that include rhyming words may be used as a tool to introduce and develop concepts and skills in rhyming. A teacher of older students could ask them to count the number of syllables or phonemes in the names of story characters or in new vocabulary words. If a teacher encourages the use of carefully invented spellings, students learn to segment words and represent the correct number of phonemes. Modeling how to sound out a word to invent a spelling can help students develop these skills. As students learn about decoding, numerous other opportunities for instruction in blending and segmentation arise.

The teacher could make a simple whole-class game out of rhyme or phoneme matching (e.g., "Line up for lunch if your name rhymes with _____," or "if your name has a /t/ at the end"). Teachers can challenge students to think of words that have a particular number of syllables or phonemes. Finding many fun and innovative ways to include such sound play in the school day will address the instructional needs of many students. Additional practice in specific skills will certainly be required for some students who have difficulty acquiring phonological skills, but such informal opportunities to practice throughout the day will help these students, as well.

Combining informal sound play and formal phonological awareness instruction during typical reading and writing activities for all students with explicit skill instruction for students who need additional practice should address the diverse needs in most elementary classrooms. The most important thing for teachers to do is to make the sound structure of language conspicuous to students who do not develop phonological awareness independently.

The activities presented here are designed to develop phonological awareness. Applying these auditory skills to reading requires students to have a working knowledge of sound-symbol relationships, which is typically acquired through phonics instruction. Despite popular misconceptions, phonological awareness instruction is not the same as phonics instruction; instead, phonological awareness instruction prepares students to be able to benefit from instruction in phonics.

## Conclusion

Reading research has clearly demonstrated the significance of phonological awareness in the development of early reading skills, and a variety of effective methods for assessment and instruction of phonological skills has been developed. Teachers in remedial and special education programs now have another tool for addressing students' reading problems. Teachers of young children must recognize the importance of incorporating phonological awareness into programs designed to promote emergent literacy, because these teachers now have a tool for preventing reading problems.

*Key words: phonological awareness, phonemic awareness, phonics, beginning reading, early intervention*

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