Reading Psychology, 21:335–352, 2000

0270–2711/00 $12.00 + .00

WHAT DO WE KNOW ABOUT PHONOLOGICAL AWARENESS IN SPANISH?

CAROLYN A. DENTON
University of Texas-Houston, Houston Texas, USA
JAN E. HASBROUCK
Texas A&M University, College Station, Texas, USA
LAURIE R. WEAVER
University of Houston-Clear Lake, Clear Lake, Texas, USA
CYNTHIA A. RICCIO
Texas A&M University, College Station, Texas, USA

In this review, we examined the role of phonological awareness in literacy development for Spanish-speaking students. There appears to be a close relationship between Spanish-language phonological awareness and literacy development. In particular, Spanish phonological awareness appears to develop in stages. Not only is the development of phonemic awareness skills probably supported by reading instruction, but it likely contributes to reading development as well. Sensitivity to syllables in Spanish may be particularly important for later reading success, and the ability to segment words into their phonemes may play a critical role in reading acquisition. Training students in spelling, blending, and segmenting syllables and phonemes may be especially valuable because these skills are closely related to those which students use when actually reading and writing words. Finally, there is evidence of cross-language transfer of phonological awareness skills between Spanish and English. Suggestions for Spanish phonological awareness instruction are given, and an agenda for further research is included. Based on this review, many different experimental procedures have been used to evaluate students' Spanish-language phonological awareness, but there is a need for measures that are psychometrically sound and that have documented validity and reliability to assess phonological awareness in Spanish. In addition, although training in Spanish phonemic awareness seems to have a positive effect on the development of spelling ability, we found little direct evidence that this type of training increases Spanish reading performance. Further research in this area is needed.

Address correspondence to Jan E. Hasbrouck, Department of Educational Psychology, Texas A&M University, 704 Harrington Tower, College Station, TX 77843-4225. E-mail: jhasbrouck@tamu.edu

Phonological awareness has been recognized as a key component of reading development. Research has shown that a child's level of phonological awareness is a better predictor of success in learning to read than IQ, general language proficiency, or other traditional measures of reading readiness (Bravo-Valdivieso, 1995; Juel, Griffith, & Gough, 1986; Lombardino, Riccio, Hynd, & Pinheiro, 1997; Stanovich, Cunningham, & Cramer, 1984; Wagner, 1988). Early literacy interventions that promote phonological awareness may actually prevent the development of serious reading disabilities (Lyon, 1995; Snow, Burns, & Griffin, 1998; Stanovich, 1986).

Phonological awareness is the awareness of separate syllables and sounds within words in speech, and the ability to carry out mental operations on these units of speech. Phonological awareness is not reading, and it is not phonics. It is the ability to segment and manipulate words, syllables, and sounds which are heard and spoken. It is the awareness of words as entities separate from the meanings attached to them (the insight that "cat" is a word made up of sounds, not just a furry animal). Phonemic awareness, a sub-category of phonological awareness, refers specifically to awareness and sensitivity to phonemes, or individual sounds. Some examples of phonological awareness tasks are (a) providing words that rhyme with other words, (b) clapping the syllables in a word, (c) saying the sounds of a word separately, (d) blending sounds together to make words, (e) deleting a sound or syllable from a word and saying what remains ("Say *meat* without the /m/": *eat*; "Di *sonrisa* sin /son/": *risa*), (f) tapping a pencil once for each sound heard in a word (sometimes called phoneme counting), and (g) grouping words together that start with the same sound, or end with the same sound. Phonological awareness also can refer to single syllables which may be made up of single phonemes or multiple phonemes.

Much of the available information on the topic of phonological awareness deals with its applications to English speakers. There is also a documented relationship between phonological awareness and reading in non-English languages, such as German (Näslund, 1990), Hebrew (Bentin, Hammer, & Cahan, 1991), Danish (Lundberg, Frost, & Petersen, 1988), Swedish (Lundberg, Olofsson, & Wall, 1980), Portuguese (Cardoso-Martins, 1991), Italian (Cossu, Shankweiler, Liberman, Katz, & Tola, 1988), and French

(Alegria, Pignot, & Morais, 1982; Comeau, Cormier, Grandmaison, & Lacroix, 1999).

Many students in American schools come from diverse linguistic backgrounds. A large number of these students speak Spanish as their native language. The population of students for whom Spanish is the native language is growing rapidly in our schools. In 1990, the U.S. census indicated that about 14% of all the school students in the U.S. lived in a home where English was not the primary language. Most of these (73%) were Spanish-speaking. Unfortunately, the reading achievement of these students lags behind that of other groups (August & Hakuta, 1997). Projections for the state of Texas are that by the year 2008, Hispanics will make up about 46% of the state's population, with European Americans accounting for 37%, and African Americans about 10% (Alford, 1999). Similar growth patterns are forecasted for other states.

The school enrollment of students speaking Spanish as their first language is likely to continue to increase. There is a need, therefore, for a close examination of the role of phonological awareness in literacy development for Spanish-speaking students. In this review, we examined research conducted in Spanish on the topic of phonological awareness. The questions we investigated were: (a) Which phonological awareness tasks are more or less difficult in Spanish?, (b) Is phonological awareness a good predictor of reading achievement in Spanish?, (c) Does training in Spanish phonological awareness increase Spanish reading achievement?, (d) What are some examples of phonological awareness activities that can be included in Spanish early literacy programs?, and (e) Does Spanish phonological awareness have an effect on English reading achievement? In addressing these questions, it was of interest to determine how phonological awareness of Spanish-speaking children was being assessed.

Phonological Awareness Tasks and Reading in Spanish

A basic sensitivity to subtle differences between words seems to be the simplest form of phonological awareness. In a study of Spanish-speaking illiterate adults, Adrian, Alegria, and Morais (1995) found that adults who could not read had some sensitivity to sounds, allowing them to distinguish between similar-sounding words or syllables in order to understand speech. These subjects

also performed well in rhyming tasks, indicating that rhyme appreciation is an early phonological awareness skill that probably develops prior to literacy acquisition. However, tasks requiring conscious manipulation of syllables, such as syllable deletion (the repetition of a pseudoword without a target syllable) and syllable reversal (the repetition of CVC (e.g., cat–tac dim–mid) words or pseudowords in reverse order) tasks, were difficult for these nonreaders, and they performed especially poorly on similar tasks involving the manipulation of individual phonemes within words.

As Spanish-speaking students are exposed to early instruction in the alphabetic code, most seem to develop a sensitivity first to syllables, then to onsets and rimes within words, and finally to individual phonemes. The onset is the initial consonant or consonant cluster in a syllable (i.e., *sl-* in *slip*; *tr-* in *tren*), and the rime is the portion of a syllable that follows the onset (i.e., *-ip* in *slip*; *-en* in *tren*). A study conducted with 40 preschool and 40 beginning first-grade native Spanish-speaking children in Argentina found that both groups could accurately identify the number of syllables in a word about 50% of the time. However, only 5% of the preschool children and 35% of the first graders could correctly identify the number of sounds or phonemes in a word, even after more than 6 examples were provided (Manrique & Gramigna, 1984). In a study of monolingual English-speaking and bilingual Spanish-speaking (with Limited English Proficiency) kindergarten and first-grade students in Massachusetts, Cisero and Royer (1995) confirmed that both English- and Spanish-speaking students appeared to first develop sensitivity to onsets and rimes, and then to individual phonemes.

It appears that basic phonological awareness is necessary for the development of early reading, but there is also evidence that more complex forms of phonological awareness are developed after reading instruction has begun, as children are exposed to the alphabetic principle and letter-sound correspondences (Bentin, Hammer, & Cahan, 1991; Goswami & Bryant, 1990; Morais, Cary, Alegria, & Bertelson, 1979). In a Spanish-language study conducted in Murcia, Spain, Carrillo (1994) studied which phonological awareness skills are present in children who have not yet had reading instruction, and which skills develop after reading instruction has begun. Prereaders in this study exhibited sensitivity to rhyme (words that end in the same way) and alliteration (words that begin in the same way). Children who received minimal instruction

in letter–sound correspondences were able to isolate the onset from the rime in simple words. The author concluded that these abilities develop prior to reading. Early readers in the study developed more advanced awareness of individual phonemes. The tasks that most separated prereaders and early readers were those which involved phoneme segmentation (pronouncing the separate sounds within a word); performance on segmenting tasks also separated good first-grade readers from average and poor readers. Carrillo concluded that the ability to segment a word into its phonemes is critical in the beginning stages of reading acquisition in Spanish. By the time children are in the first grade, simple phonological awareness tasks such as rhyme detection no longer separate good readers from poor readers. This finding has important implications for the development and evaluation of early literacy screening assessments for first grade Spanish-speaking children.

Aspects of the Spanish Language That Affect Phonological Awareness

Certain properties of the Spanish language appear to have an effect on the difficulty of phonological awareness tasks. In Spanish, the pronunciation of a word can usually be derived directly from print as Spanish is phonically regular. Because of this regularity and predictability, the syllable is an important unit in Spanish reading, and reading instruction is often based on the recognition and spelling of syllable units as opposed to single phonemes (Freeman & Freeman, 1998).

Some researchers think that the syllable may be a more important unit of phonological awareness in Spanish than it is in English, but there are mixed results in studies that have examined this issue. Carreiras, Alvarez, and De Vega (1993) found that syllables are important processing units in Spanish, and that they have a strong effect on word recognition. González and Garcia (1995), in a study of preschool and kindergarten children in the Canary islands, concluded that a student's ability to segment Spanish words into syllables may be more important than his or her ability to separate words into phonemes. Other studies discussed by González and Garcia (1995), however, had mixed conclusions. Some research has shown that syllable awareness is a more important predictor of Spanish reading success than phonemic awareness, while other researchers have found that phonemic awareness

is more important than syllabic awareness in predicting future success in mastering the alphabetic code in Spanish.

A number of different tasks have been used to study phonemic awareness in Spanish. For example, in some of these studies, students listened to pairs of similar words and told whether the words were the same or different (Adrian et al., 1995; Bravo-Valdivieso, 1995). In other studies, students were asked to tell whether words rhyme with each other (Adrian et al., 1995; Carrillo, 1994; Cisero & Royer, 1995), whether they begin with the same sound (Carrillo, 1994; Cisero & Royer, 1995; Durgunoglu, Nagy, & Hancin-Bhatt, 1993), or end with the same sound (Carrillo, 1994; Cisero & Royer, 1995). Students in one study heard pairs of nonsense words and identified whether or not the pairs had an identical syllable (e.g., *mosa/moti* = sí; *lura/pebu* = no) or an identical phoneme (Adrian et al., 1995). Several of the studies implemented experimental procedures for measuring phonological awareness. Students were asked to listen to a series of sounds pronounced separately and blend them into a word (Bravo-Valdivieso, 1995; Durgunoglu et al., 1993), and to blend onsets and rimes (d-on) or separate syllables (do-ce) into words (Durgunoglu et al., 1993). Some researchers asked students to count phonemes by placing chips on a board (Carrillo, 1994), or by tapping a pencil once for each phoneme they hear in the word (Manrique & Gramigna, 1984, Manrique & Signorini, 1994).

Some assessments involved phoneme segmentation, requiring students to pronounce the phonemes of a word separately (Bravo-Valdivieso, 1995; Durgunoglu et al., 1993). In other studies, students heard a whole word and had to pronounce only the initial or final phoneme of the word (Carrillo, 1994; González & Garcia, 1995). Students have been asked to separate words into syllables (Durgunoglu et al., 1993), and to identify the position (i.e., beginning, middle, or end) of a target sound within a word as well (Carrillo, 1994). Some of the more difficult phonemic awareness tasks included phoneme deletion (i.e., repeating the word without a specified sound; Adrian et al., 1995; Carrillo, 1994; Signorini, 1997), syllable deletion (i.e., repeating the word without a specified syllable; Adrian, Alegria, & Morais, 1995), word reversal (i.e., students hear a pair of words and repeat them in reverse order; Adrian et al., 1995), and phoneme reversal (i.e., students listen to brief syllables and say the phonemes in them backwards, such as

mil = *lim*; *osa* = *aso*; Adrian et al., 1995; Bravo-Valdivieso, 1995; Carrillo, 1994).

González and Garcia (1995) compared the performance of Spanish-speaking pre-kindergarten and kindergarten children on phoneme isolation tasks in different kinds of words. In these tasks, students were asked to pronounce either the initial or final sound of a word separately. The researchers found that children were more successful in isolating continuous consonants (consonant sounds which can be pronounced for several seconds without distortion, e.g., /m/ or /s/) than stop consonants (consonant sounds which can only be pronounced for an instant without distortion, e.g., /t/ or /p/). They also discovered that children found it more difficult to isolate initial consonant sounds when they are part of an initial consonant cluster, and that this task is more difficult in longer words than in shorter words. In a separate study, Manrique and Signorini (1994) found that low-performing Spanish readers had difficulty spelling words containing consonant clusters. González and Garcia (1995) also compared children's ability to isolate beginning sounds in two-syllable words in which the initial consonant belonged to stressed and unstressed syllables, but found that there was no difference in the difficulty of these tasks. Thus, there is some evidence that phonological awareness tasks have differing levels of difficulty beginning with simple rhyme and extending to the isolation and deletion of single sounds from consonant clusters. Although it is not known if the differences in difficulty level are based on characteristics of the task demands or the child's conceptual understanding of those task demands (i.e., does the child understand what is being asked), the differing difficulty levels of the tasks are important to note when planning instruction in phonemic awareness.

Phonological Awareness as a Predictor of Reading Achievement in Spanish

Several studies have found that Spanish-speaking students with strong phonemic awareness are generally successful in reading and spelling. Bravo-Valdivieso (1995) followed the reading progress of low socioeconomic status urban children in Chile over a four-year period. He compared average readers with children who had severe reading difficulties. During the first, second, and fourth years

of this study, Bravo-Valdivieso administered several tests, including measures of intelligence, decoding, phonological awareness, and reading comprehension. In this study, IQ was not a good predictor of future reading progress. The best predictor of reading achievement in the older children was their ability to decode words in the first year of reading instruction. Students with weak decoding skills in the early grades had the most severe reading difficulties when they were older. Younger students who had poorly-developed phonological awareness and verbal abilities were also likely to have reading problems as they progressed through school.

Durgunoglu et al. (1993) also found evidence of a relationship between Spanish phonological awareness and reading. For students in their study, Spanish-speaking American first-grade students, phonological awareness in Spanish was closely related to word-recognition ability. Carrillo (1994) similarly found that the strongest first-grade readers were those who performed the best on phoneme segmenting tasks.

In contrast, Manrique and Signorini (1994), in their comparison of 39 Spanish-speaking skilled and less-skilled readers, found that even poor first-grade readers in Argentina performed well on a phoneme counting task (tapping a pencil for each phoneme heard in a word). Children's performance on this task was closely related to their spelling ability, but not to their ability to read lists of words. The authors conclude that this lack of relationship between word reading and performance on the phoneme counting task may be due to the fact that the task was not complex enough to discriminate good from poor readers. All children in the study were near ceiling in their performance on the counting task at the end of first grade. None of the students who performed poorly on the phoneme segmentation task could read well; however, some students who were poor readers did well on the phonemic task. The poor readers with higher phonemic awareness could spell many words that they could not read. Manrique and Signorini concluded that the ability to spell correctly develops early in Spanish, due to its transparent orthography and phonological features such as the small number of vowels in the language and its predominantly open syllable structure.

In a later study, Signorini (1997) concluded that even complex phonemic awareness tasks are only moderately related to first-grade

children's ability to read lists of words. The results of this study may not apply to children in other situations, however, because of the small number of students studied and problems with some of the phonemic awareness measures that were used.

Effects of Training in Spanish Phonological Awareness on Spanish Reading Achievement

Research suggests that there is a relationship between Spanish-language phonemic awareness and successful literacy development. There is research in English (Bradley & Bryant, 1983; Foorman, Francis, Novy, & Liberman, 1991; Wagner, 1988) and in German (Näslund, 1990) indicating that children's levels of phonemic awareness not only predict their future reading achievement, but actually *cause* them to be successful or unsuccessful in learning to read. The next important question, then, is whether providing phonemic awareness training programs to Spanish-speaking children in Spanish will enable them to be more successful in learning to read and spell in Spanish.

Although some of these studies may be limited by certain flaws in the methods used by the researchers, studies in English have provided evidence of the effectiveness of this type of training (Troia, 1999). In one English-language study, preschool children were successfully taught phonemic awareness skills, and those who had high phonemic awareness and knew the required letter-sound associations were able to decode unfamiliar words (Byrne & Fielding-Barnsley, 1991). Ball and Blachman (1991) found that training in phoneme segmentation, delivered along with letter-sound instruction, produced significantly higher gains in early reading and spelling than letter-sound instruction alone. Bradley and Bryant (1983) taught four and five-year-old children to categorize sounds which had common beginnings, middles, and endings. Training in phonological awareness, combined with letter-sound instruction, was shown to be effective in promoting reading and spelling ability. Cunningham (1990) found that phonemic awareness skills instruction, even when not actually using letters, was especially effective when it included explicit instruction in ways to apply these skills in actual reading activities.

Although there is an indication that Spanish phonemic aware-

ness training is related to improved spelling achievement (Manrique & Signorini, 1994), we found no direct research evidence that this type of training is effective in increasing reading performance for Spanish-speaking students. There is evidence that early literacy intervention that includes instruction in phonological awareness increases reading performance in English-speaking students, and the same is likely true for Spanish-speaking children, but there is a need for further research of this question.

Spanish Phonological Awareness and English Reading Achievement

As noted at the outset, there are an increasing number of children who are Spanish-speaking in our schools; the low literacy rate among Hispanic students is a concern. It is believed that literacy instruction in a student's native language supports successful literacy development in a second language (Cummins, 1979, 1981, 1984). Royer and Carlo (1991), for example, found that students' English reading performance was highly correlated with their reading performance in Spanish. That is, good readers in Spanish became good readers in English the following school year. The transfer of reading strategies from one language to the other may require instruction and support, however (Gersten, Brengelman, & Jiménez, 1994).

Does training in phonological awareness in Spanish makes it easier for children to learn to read in English? Cisero and Royer (1995) found that English and Spanish-speaking first-grade students who were able to isolate initial sounds in words in their native languages in December were likely to do well on the same task administered in their non-native language in May. This was true even though many students had little or no familiarity with the non-native language. The researchers interpreted this as evidence of cross-language transfer of this phonological skill, although they did not find the same pattern on other phonological awareness tasks.

Durgunoglu et al. (1993) studied the impact of Spanish-language phonemic awareness on English word recognition for Spanish-speaking first-grade students in the United States. Students in this study who performed well on Spanish phonological awareness tasks were much more successful in learning to read English words and

English-like pseudowords than were students with low phonological awareness in their native language. Both Spanish phonological awareness and Spanish word-reading ability seemed to transfer to English word recognition. Spanish oral language proficiency was not a good predictor of English reading ability in this study.

There is additional evidence of cross-language transfer of phonological skills in a study of English-speaking students who studied Spanish as a foreign language (Ganschow & Sparks, 1995). Many of these at-risk adolescents had learning disabilities, but explicit, direct instruction in Spanish phonology resulted in significant gains in English spelling, phonological awareness, and word attack skills.

Training in Spanish phonological awareness may make it easier for students to learn to read and spell English words. When a student learns strategic processing skills in a language, these skills may be applicable to other similar languages (Cisero & Royer, 1995; Comeau et al., 1999). The student learns *how language works* and *strategies for processing language*, regardless of the language in which these insights and strategies are developed. Further study of the question of cross-language transfer is needed, particularly in the form of longitudinal training studies in which Spanish-speaking students receive phonological awareness training, and in which their future reading performance in Spanish and in English is monitored.

Examples of Phonological Awareness Activities That Can be Included in Spanish Early Literacy Programs

Although we found insufficient direct evidence of the effectiveness of providing students with Spanish phonological awareness training, there is clearly a relationship between phonological awareness and reading and spelling ability in Spanish, as in other languages. We found that the ability to manipulate syllables within words (González & Garcia, 1995), and the ability to separate words into phonemes (Carrillo,1994) seem to be particularly important in early Spanish reading development. Early phonological awareness instruction may include rhyming practice and exposure to songs and poetry, although these skills seem most valuable as a preparation for more complex phonemic awareness skills, and are probably not sufficient in themselves (Carrillo, 1994; Chard &

Dickson, 1999). Lewkowicz (1980) observed that phoneme segmenting and blending tasks appear to be closely related to reading, and therefore the most deserving of inclusion in phonological awareness training programs. Writing activities, such as spelling words as they sound (invented or estimated spelling), may also be valuable in developing and refining phonemic awareness (Chard & Dickson, 1999). Some phonological awareness activities which may be included in Spanish early literacy programs are syllable segmentation, syllable blending, phoneme segmentation, phoneme blending, and phonetic spelling. The segmentation and blending activities described below are adapted from activities described by Carnine, Silbert, and Kameenui (1997).

Syllable Segmentation and Blending

The simplest way to teach syllable segmentation is to ask students to clap or tap once for each syllable in a word. Students' names or other familiar words can be used for this activity. The teacher models or demonstrates clapping once for each syllable, then leads the students by performing the task along with them. Finally, the students perform the activity independently.

In syllable blending activities, the teacher pronounces the syllables in a word individually, in a smooth, connected way. There should be a hesitation, but no silence, between the syllables. The students' task is to pronounce the word as a unit. For example, the teacher would say *paaaa-to* and the students would blend the two syllables into the word *pato*. Again, the skill is modeled by the teacher, then performed along with the students, and finally performed by the students without the teacher's support.

Phoneme Segmentation and Blending

In phoneme segmentation activities, the students learn to say a word slowly and smoothly, so that each individual sound in the word can be heard. It is important that students do not pronounce each sound as a separate unit with silence between the sounds. Instead, they should say the word in a "stretched-out" but connected way. As described above, this skill is first modeled by the teacher, then practiced with and without teacher support. One example of this would be to have the children say the word *mesa*

slowly, pronouncing each sound clearly (*mmmeeeessssaaa*). Some students will find it easier to separate only the onset (the initial consonant or consonant cluster), from the rest of the word (*mmmmesa*), before they learn to pronounce all the phonemes in a word separately.

Phoneme blending practice is very similar to syllable blending, described above. The teacher pronounces a word slowly and smoothly, so that each individual sound in the word can be heard. This is sometimes called "rubber-banding" a word. The students listen to the "stretched out" word and say the word as a unit, as it would normally be pronounced. Students may be given picture cards to represent several words. They select the card that matches the word that the teacher is pronouncing slowly (Chard & Dickson, 1999).

Phoneme segmentation and blending can be taught using puppets who say words in special ways, modeling the slow, drawn-out pronunciation of words. Students can imitate the puppets as they learn to segment words into phonemes, and they can try to guess the "real" word that the puppet is saying in phoneme blending exercises (Chard & Dickson, 1999). Some teachers move plastic markers or blocks, or put out colored cards as they pronounce the separate phonemes, in order to supply a concrete representation of the abstract sounds (Chard & Dickson, 1999).

Phonetic Spelling

When students try to write words phonetically, they say the word slowly and smoothly (as in phoneme segmentation, above), then write the letters which represent the sounds or syllables they hear. Unlike English-speaking students, Spanish-speaking students normally learn to record vowels before consonants in the beginning stages of instruction. Phonetic spelling should be modeled by the teacher and can be taught using magnetic letters to represent the sounds.

There are several pre-spelling games that can increase phonemic awareness and prepare students for phonetic spelling activities. In one game, students sort picture cards or small objects into piles according to the initial sound in the words they represent. The teacher then supplies magnetic letters or letter tiles which represent those initial sounds. When this activity is first introduced,

the picture cards may only represent two different sounds. Later, students may sort cards which represent several initial sounds into multiple piles, and they may select the appropriate magnetic letter for each pile themselves. In another pre-spelling game the teacher provides two or more different magnetic letters or letter tiles, and says, "Pick up the letter that you hear at the beginning of _____." or "Ensé ame la letra que oyes al principio del _____." As students become adept at sorting words by their initial sounds, they may practice sorting words by their final or medial sounds.

Word Choices for Phonological Awareness Practice

When introducing new phonological awareness tasks, teachers should start with simpler types of words and progress to more difficult examples. The easiest types of words for phoneme blending, segmentation, spelling, and classification activities are one and two-syllable words, words which begin with continuous consonant sounds (e.g., *sol*, *mano*) rather than "stop" sounds, and words which begin with single initial consonants rather than consonant blends (e.g., *pez* rather than *primo*; *gusto* rather than *grupo*; González & Garcia, 1995).

Summary: What Do We Know About Phonological Awareness in Spanish?

Spanish phonological awareness appears to develop in stages. Phonological awareness skills seem to progress from (a) the ability to discriminate between similarities and differences of sounds in words (necessary for understanding speech), to (b) a sensitivity to rhyme and alliteration, (c) an awareness of separate syllables in words, (d) the ability to isolate onsets and rimes within words or syllables, and (e) the awareness of individual phonemes. Tasks that require the manipulation of syllables appear to be easier for Spanish-speaking children than those which require the manipulation of phonemes (Signorini, 1998). The development of phonemic awareness skills is probably supported by reading instruction, and likely contributes to reading development as well.

There appears to be a close relationship between Spanish-language phonological awareness and literacy development, although

some studies have found that even poor Spanish-language readers may have high phonemic awareness (Manrique & Signorini, 1994; Signorini, 1997). Phonological awareness ability has been shown to be a better predictor of a student's success in learning to read in Spanish than IQ. Students who have poor phonological awareness or difficulty learning to decode words in the early years of school may develop severe reading difficulties in later years. Further, high levels of phonological awareness in Spanish may aid in the development of phonological awareness skills in English, and appear to facilitate success in learning to read English words. Strategies and insights about how language works that are acquired in one language may be readily applied to a second similar language.

One of the problems with the available literature, however, is that none of the Spanish tests of phonological or phonemic awareness located in our review have been subjected to psychometric study of validity and reliability. Most of the studies we reviewed did not provide information about how reliable or valid experimental procedures are, although Durgunoglu and colleagues (1993) supplied some of this type of information. We found only four studies (Adrian et al., 1995; Durgunoglu et al., 1993; González & Garcia, 1995; Signorini, 1997) that supplied lists of all or some of the actual items used in their assessments. Thus, there is a need for well-tested and technically adequate instruments for the assessment of phonological awareness in Spanish-speaking children. We know that some measures of Spanish phonological awareness are being developed at this time by various researchers (B. R. Foorman, personal communication, March 4, 1999). Hopefully, these measures will have the technical adequacy required by current standards (American Educational Research Association, 1999).

Further study of phonological awareness in Spanish is needed. In particular, there is a need for studies that evaluate the impact of training in phonological awareness on future reading achievement in both Spanish and English. Investigations of the development of phonological awareness in Spanish-speaking students in different types of language environments—monolingual Spanish, monolingual English (English as a Second Language), and Spanish-English bilingual—would assist teachers in making appropriate curriculum and instruction decisions. In English, certain combinations of phonological awareness measures administered together in sets are very accurate predictors of reading progress (Lombardino et

al., 1997; Stanovich et al.,1984). There is a need to identify those combinations of tasks that are reliable predictors of reading progress in Spanish-speaking children.

Should teachers of Spanish-speaking students spend valuable instructional time in activities designed to increase students' phonological awareness? What types of instructional activities produce the greatest gains? These are practical questions that must be evaluated directly in studies of Spanish-speaking children. There is much research to indicate that phonemic awareness training is effective in the development of English-language reading. The same is likely true in Spanish, but this question must be investigated directly in Spanish-language studies. Although training in Spanish phonemic awareness seems to have a positive effect on the development of spelling ability, we found little direct evidence that this type of training increases Spanish reading performance.

References

Adrian, J. A., Alegria, J., & Morais, J. (1995). Metaphonological abilities of Spanish illiterate adults. *International Journal of Psychology, 30*(3), 329–353.

Alegria, J., Pignot, E., & Morais, J. (1982). Phonetic analysis of speech and memory codes in beginning readers. *Memory & Cognition, 10*(5), 451–456.

Alford, A. (1999, December 29). For twenty million people and growing, Texas is where they hang their hat (pp. A1, A8). *The Austin American-Statesman.*

American Educational Research Association. (1999). *Standards for educational and psychological testing.* Washington, DC: Author.

August, D., & Hakuta, K. (Eds.). (1997). *Improving schooling for language-minority children: A research agenda.* Report of the National Research Council Institute of Medicine. Washington, DC: National Academy Press.

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

Bentin, S., Hammer, R., & Cahan, S. (1991). The effects of aging and first-grade schooling on the development of phonological awareness. *Psychological Science, 2,* 271-274.

Bradley, L., & Bryant, P. E. (1983). Categorizing sounds and learning to read—a causal connection. *Nature, 301,* 419-421.

Bravo-Valdivieso, L. (1995). A four year follow-up study of low socioeconomic status, Latin American children with reading difficulties. *International Journal of Disability, Development, & Education, 42*(3), 189–202.

Byrne, B., & Fielding-Barnsley, R. (1991). Evaluation of a program to teach phonemic awareness to young children. *Journal of Educational Psychology, 83*(4), 451–455.

Cardoso-Martins, C. (1991). Awareness of phonemes and alphabetic literacy acquisition. *British Journal of Educational Psychology, 61*, 164–173.

Carnine, D. W., Silbert, J., & Kameenui, E. J. (1997). *Direct instruction reading* (3rd ed.). Upper Saddle River, NJ: Merrill.

Carreiras, M., Alvarez, C. J., & De Vega, M. (1993). Syllable frequency and visual word recognition in Spanish. *Journal of Memory and Language, 32*, 766–780.

Carrillo, M. (1994). Development of phonological awareness and reading acquisition: A study in Spanish language. *Reading and Writing, 6*(3), 279–298.

Chard, D. J., & Dickson, S. V. (1999). Phonological awareness: Instructional and assessment guidelines. *Intervention in School and Clinic, 34*, 261–270.

Cisero, C. A., & Royer, J. M. (1995). The development and cross-language transfer of phonological awareness. *Contemporary Educational Psychology, 20*, 275–303.

Comeau. L., Cormier, P., Grandmaison, E., & Lacroix, D. (1999). A longitudinal study of phonological processing skills in children learning to read in a second language. *Journal of Educational Psychology, 91*, 29–43.

Cossu, G., Shankweiler, D., Liberman, I. Y., Katz, L., & Tola, G. (1988). Awareness of phonological segments and reading ability in Italian children. *Applied Psycholinguistics, 9*, 1–16.

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research, 49*, 222–251.

Cummins, J. (1981). Empirical and theoretical underpinning of bilingual education. *Journal of Education, 163*, 16–29.

Cummins, J. (1984). *Bilingualism and special education: Issues in assessment and pedagogy*. Austin, TX: Pro-ed.

Cunningham, A. E. (1990). Explicit versus implicit instruction in phonemic awareness. *Journal of Experimental Child Psychology, 50*, 429–444.

Durgunoglu, A. Y., Nagy, W. E., & Hancin-Bhatt, B. J. (1993). Cross-language transfer of phonological awareness. *Journal of Educational Psychology, 85*(3), 453–465.

Foorman, B. R., Francis, D. J., Novy, D. M., & Liberman, D. (1991). How letter-sound instruction mediates progress in first-grade reading and spelling. *Journal of Educational Psychology, 83*, 456–469.

Freeman, Y. S., & Freeman, D. E. (1998). *La ense anza de la lectura y la escritua en espa ol en el aula bilingüe* [Teaching reading and writing in the bilingual classroom]. Portsmouth, NH: Heinemann.

Ganschow, L., & Sparks, R. (1995). Effects of direct instruction in Spanish phonology on the native-language skills and foreign-language aptitude of at-risk foreign-language learners. *Journal of Learning Disabilities, 28*(2), 107–120.

Gersten, R., Brengelman, S., & Jiménez, R. (1994). Effective instruction for culturally and linguistically diverse students: A reconceptualization. *Focus on Exceptional Children, 27*, 1–16.

González, J. E. J., & Garcia, C. R. H. (1995). Effects of word linguistic properties on phonological awareness in Spanish children. *Journal of Educational Psychology, 87*(2), 193–201.

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

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.

Lombardino, L. J., Riccio, C. A., Hynd, G. W., & Pinheiro, S. B. (1997). Linguistic deficits in children with learning disabilities. *American Journal of Speech-Language Pathology, 6*, 71–78.

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.

Lyon, G. R. (1995). Toward a definition of dyslexia. *Annals of Dyslexia, 45*, 3-27.

Manrique, A. M. B., & Gramigna, S. (1984). La segmentación fonológica y silábica en ni os de preescolar y primer grado [Phological segmentation and syllabication in preschool and 1st grade children]. *Lectura y Vida, 5*, 4–13

Manrique, A. M. B., & Signorini, A. (1994). Phonological awareness, spelling and reading abilities in Spanish-speaking children. *British Journal of Educational Psychology, 64*, 429–439.

Morais, J., Cary, L., Alegria, J., & Bertelson, P. (1979). Does awareness of speech as a sequence of phonemes arise spontaneously? *Cognition, 7*, 323–331.

Näslund, J. C. (1990). The interrelationships among preschool predictors of reading acquisition for German children. *Reading and Writing: An Interdisciplinary Journal, 2*, 327–360.

Royer, J., & Carlo, M. (1991). Transfer of comprehension skills from native to second language. *Journal of Reading, 75*(10), 450–455.

Signorini, A. (1997). Word reading in Spanish: A comparison between skilled and less skilled beginning readers. *Applied Psycholinguistics, 18*, 319–344.

Signorini, A. (1998). La conciencia fonológica y la lectura. Teoría e investigación acerca de una relación compleja [Phonological awareness and reading, theory and research about a complete relationship]. *Lectura y Vida, 19*(3), 15–22.

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.) (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*, 360–397.

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

Troia, G. A. (1999). Phonological awareness intervention research: A critical review of the experimental methodology. *Reading Research Quarterly, 34*, 28–52.

Wagner, R. K. (1988). Causal relations between the development of phonological processing abilities and the acquisition of reading skills: A meta-analysis. *Merrill-Palmer Quarterly, 34*, 261–279.