
**Abstract:** The ability to read on grade level is a fundamental skill required for children to achieve academic success. Students who are English language learners (ELLs) and/or those who have learning disabilities often find it extremely difficult to achieve at the reading expectation level. This study examines English phonemic awareness and phonic skills in four groups of kindergarten students with and without disabilities: (a) 20 high-reading-level English monolinguals, (b) 20 low-reading-level English monolinguals, (c) 20 high-reading-level English-Spanish bilinguals, and (d) 20 low-reading-level English-Spanish bilinguals. Findings indicated differences for monolingual versus bilingual speakers in their ability to identify voiced versus voiceless contrasts. It appears from these findings that an achievement gap in reading levels between monolingual and bilingual students exists even at the kindergarten grade level.

**Introduction**

The ability to read is the primary fundamental skill required for children to achieve academic success. Currently, the expectation is that all children should begin reading early and be able to read on grade level by third grade (U.S. Department of Education, 2002). Some children achieve this goal easily, but many children find it extremely difficult to learn to read fluently at even the most basic reading levels. Spafford and Grosser (1996) estimate that at least 95% of all children can be taught to read to some level of proficiency. The other 5% have significant difficulty learning to read but may acquire some basic reading skills. Driving the nationwide focus to improve children’s reading abilities are statistics that reveal a very alarming reality. Moats (1999) stated that there is “an alarming prevalence of struggling and poor readers that is not limited to any one segment of society” (p. 7). Approximately 20% to 30% of elementary students nationwide have significant problems learning to read (Lyon, 1998; McEwan, 2002; Moats, 1999; Shaywitz, 1996). In addition, the U.S. Department of Education (2003) found that 38% of fourth-grade students are reading below the basic reading level. The U.S. Department of Education (2002) reported that Hispanic, African American, and limited-English-proficient (LEP) students; students with disabilities; and poor children are among the highest groups for reading failure.

Torgesen (1998) stated that children who have a poor start in reading abilities rarely catch up because “the consequences of a slow start in reading become monumental as they accumulate over time” (p. 32). Some of the most basic skills needed to begin decoding words are phonological awareness, phonemic awareness, and phonics skills (National Reading Panel, 2000).

**Phonological awareness** is a general appreciation of the sounds of speech separate from their meaning. “When that insight includes an understanding that words can be divided into a sequence of phonemes, this finer-grained sensitivity is termed phonemic awareness” (Snow, Burns, & Griffin, 1998, p. 51). **Phonemic awareness** is the ability to perceive, identify, and manipulate the phonemes in spoken (National Reading Panel, 2000). Cunningham, Cunningham, Hoffman, and Yopp (1998) elaborated on the differences between phonemic and phonological awareness when they stated, “To be precise, phonemic awareness refers to an understanding about the smallest units of sound that make up the speech stream: phonemes. Phonological awareness encompasses larger units of sound, such as syllables, onsets, and rimes” (p. 3). **Phonics** is the grapho-phonemic connection, which is the systematic and predictable relationship that exists between written letters (i.e., graphemes) and spoken sounds (i.e., phonemes) (Armbuster, Lehr, & Osborn, 2001).
Phonemic Awareness and Phonological Awareness in English
Phonemic awareness and phonological awareness have been examined with a variety of tasks. Recent research studies have used numerous procedures to elicit phonemic and or phonological awareness with young children: (a) phoneme discrimination (Masterson, Laxon, Carnegie, Wright, & Horlsen, 2005; Moore, Rosenberg, & Coleman, 2005), (b) phoneme identification (Chiappe, Chiappe, & Gottardo, 2004), (c) phoneme deletion (Blaiklock, 2004), (d) rhyming (Bernhardt & Major, 2005; Blaiklock, 2004), (e) segmenting and blending (Pullen, Lane, Lloyd, & Nowak, 2005), (f) phoneme substitution (Griffith, 1989), and (g) rapid automatized naming (Clarke, Hulme, & Snowling, 2005). For a summary of the current research in English phonemic awareness and phonological awareness, refer to Table 1.

Phonemic Awareness and Phonological Awareness in Spanish
Phonemic and phonological awareness studies in Spanish have been limited. Some studies have included a subset of Spanish speakers (Chiappe, Siegel, & Gottardo, 2002; Cisero & Royer, 1995), whereas other studies have included Spanish-English bilinguals or Spanish-Catalan bilinguals (Brice, Castellon-Perez, & Ryalls, 2004; Navarra, Sebastián-Galles, & Soto-Franco, 2005). These studies have focused on phonemic awareness solely in Spanish (Dickinson, McCabe, Clark-Chiarelli, & Wolf, 2004). As with English phonemic awareness, research studies have used a variety of procedures to elicit phonemic and/or phonological awareness: (a) phoneme discrimination (Brice et al., 2004; Navarra et al., 2005), (b) rhyming (Cisero & Royer, 1995), (c) phoneme deletion (Dickinson et al., 2004), and (d) rapid automatized naming (Chiappe et al., 2002). For a summary of the current research in Spanish phonemic awareness, refer to Table 2.

Few studies have been conducted with regard to Spanish phonemic awareness. Consequently, there exists a need for specific research in how Spanish phonemic awareness affects English phonemic awareness and beginning reading. Further research on cross-linguistic transfer or phonological awareness and phonemic awareness and the effect on reading in English appears warranted. Grandmaison, Cormier, Comeau, and Lacroix (1996) stated that few studies exist in the area of phonological processing related to reading achievement in bilingual classrooms that “support the expectation that phonological processing skills play a role in the prediction of reading achievement in a second language” (p. 5).

Factors Influencing Phonemic Awareness
There are several underlying theoretical components that serve as a foundation for phonemic awareness in bilingual individuals. The following theories, as they pertain to second language (L2) development and phonemic awareness, will be discussed: (a) motor speech theory, (b) interlanguage phonology theory, (c) contrastive analysis and the speech learning model, and (d) the acoustic difference theory.

Motor speech theory. Liberman and Mattingly’s (1985) motor speech theory states that speech perception is based on the motor ability to speak. The motor speech theory model purports a reciprocal and interactive relationship between speech perception and speech production. According to the motor speech model, bilingual children are capable of perceiving only those sounds that they can say. Their perception is influenced by their ability to articulate English phonemes. In other words, a bilingual child’s ability to perceive English phonemes and consequently manipulate English phonemes will depend on fluent and native-like articulation of English.

Interlanguage theory. Interlanguage theory postulates that children approximate their L2 through stages in learning until they are proficient speakers of their L2. Interlanguage phonology is the study of how a first language (L1) phonology interacts with and affects the L2 phonology. Carey
(2002) reported that success of phonological transfer among bilingual individuals is dependent on the amount that negative transfer or interference is minimized. Duncan (1983) stated that “a number of educators have concluded that some of the problems faced by language-minority children in learning to read are caused by phonological differences between English and the home language” (p. 16).
Table 1. Current research in English phonemic awareness.

<table>
<thead>
<tr>
<th>Area</th>
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<tr>
<td>Phoneme discrimination.</td>
<td>Masterson, Laxon, Carnegie, Wright, and Horslen (2005).</td>
<td>40, normally developing five year old children.</td>
<td>The following tests were administered: (a) Children’s Test of Nonword Repetition (b) Auditory Discrimination and Attention Test; and (c) Block Design Test.</td>
<td>They found a correlational relationship between nonword repetition and phonemic discrimination. Hence, phonemic discrimination may be related to underlying phonological representations.</td>
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<td>Phoneme discrimination.</td>
<td>Moore, Rosenberg, and Coleman (2005).</td>
<td>30, 8-10 year old normally developing children</td>
<td>The Phonological Assessment Battery (covering areas of alliteration, rhyme, spoonerisms, and nonword reading) was administered. Sound games utilizing 96 phonemic contrasts of vowels or CVs.</td>
<td>Improvement in phonemic awareness was noted following phonemic discrimination training.</td>
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<td>Segmenting and blending.</td>
<td>Pullen, Lane, Lloyd, and Nowak (2005).</td>
<td>Nine first grade children identified as struggling readers.</td>
<td>Pseudoword reading lists and alphabetic decoding instruction (segmenting and blending sounds) with choral reading.</td>
<td>They found that segmenting and blending skills increased gradually during the course of the ten lesson study.</td>
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<td>Phoneme identification.</td>
<td>Chiappe, Chiappe, and Gottardo (2004).</td>
<td>62 children in grades one to three identified as poor or good readers.</td>
<td>The Wide Range Achievement Test-3; the Letter Word Identification of the Woodcock Diagnostic reading Battery; the Peabody Picture Vocabulary Test-III; the Expressive Vocabulary Test; and a researcher minimal pair contrasts test were administered.</td>
<td>Poor readers had shallower phoneme identification, i.e., decreased categorical phoneme perception, than the good readers. Sentential context affected the overall rate at which phonemes were identified, suggesting that semantic information may</td>
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<td>Rhyming</td>
<td>Bernhardt and Major (2005).</td>
<td>12 children from ages 6:1 to 8:5.</td>
<td>Articulation/Phonology tests included the Goldman-Fristoe of Articulation-Revised and the Assessment of Phonological Processes-Revised. Reading tests included the Peabody Individual Achievement Test-Revised and Reading recognition and Reading Comprehension subtests and the Test of Language Development-2 Primary word discrimination subtest.</td>
<td>The strongest predictor for literacy development was performance on metaphonology tasks such as rhyme and alliteration. Consequently, risk for literacy and speech difficulties can be reduced through early therapeutic intervention.</td>
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<td>Rhyming and Phoneme deletion.</td>
<td>Blaiklock (2004).</td>
<td>27 children in first and second year classes in New Zealand.</td>
<td>The Ready to Read Word Tests; Peabody Picture Vocabulary Test-III; a researcher developed letter-name test; a researcher developed letter sound test; the Forward Digit Span subtest of the WISC-R; a sound categorization task; the Rosner’s Test of Auditory Analysis Skills (TAAS); the Burt Word Reading Test.</td>
<td>The children in this study showed rhyming awareness before being able to read, however, they showed phoneme deletion abilities after they developed word reading skills.</td>
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<td>Phoneme substitution.</td>
<td>Griffith (1989).</td>
<td>96 1st grade children and 87 3rd grade children.</td>
<td>The GKR Test of Phonemic Awareness with subtests of substitution of phonemes, phonemic segmentation, blending, and phoneme deletion. Spelling was measured by means of a test with 60, two alternative, forced choice items.</td>
<td>A significant amount of variance in spelling scores could be explained by phonemic awareness and spelling word specific information. By 3rd grade students should have the necessary phonemic awareness skills, as...</td>
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Table 2. Current research in Spanish phonemic awareness.

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<tbody>
<tr>
<td>Phoneme discrimination.</td>
<td>Brice, Castellon-Perez, and Ryalls (2004).</td>
<td>30 bilingual university students in the U.S.</td>
<td>60 multisyllabic words in Spanish and English containing initial CCV, and CV syllables. Respondents identified words in a timed gating speech perception task.</td>
<td>Bilingual participants were able to differentiate items with regard to the specific language being heard when the initial stop consonant was voiced (English) and when the vowel was tense (Spanish). Bilingual speakers were able to identify and discriminate between native and non-native stops sounds at an implicit level.</td>
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<td>Phoneme discrimination.</td>
<td>Navarra, Sebastián-Galles, and Soto-Franco</td>
<td>65 bilingual university students from the</td>
<td>40 disyllabic words in Spanish and Catalan in a response timed task when presented with first language (L1) and second language (L2) phoneme.</td>
<td>Catalan dominant speakers suffered interference when a non-native vowel variation was introduced in the second syllable. Spanish dominant speakers did</td>
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<td>Phoneme identification and rhyming</td>
<td>Cisero and Royer (1995).</td>
<td>14 mainstream students and 22 students from a transitional bilingual education program. All students were enrolled in first grade.</td>
<td>Researcher developed tasks for rhyme detection, initial phoneme detection, and final phoneme detection were developed. Each task contained 13 pairs of CVC words.</td>
<td>Results support the cross language transference hypothesis. First language accuracy on the initial phoneme identification task was a significant predictor of performance in English. For the TBE students rime detection performance was followed by initial phoneme detection and final phoneme detection. Differences were found for rhyming for the TBE group.</td>
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<td>Phoneme deletion.</td>
<td>Dickinson, McCabe, Clark-Chiarelli, and Wolf (2004).</td>
<td>123 Spanish-English bilingual preschool children attending head Start programs.</td>
<td>Peabody Picture Vocabulary Test- 3; Test de Vocabulario Imagines Peabody; Spanish and English versions of the Early Phonological Awareness Profile; Emergency Literacy Profile.</td>
<td>Phonological awareness in each language was related to phonological awareness in the other language. A strong transfer of phonological skills from Spanish to English and English to Spanish was noted.</td>
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<tr>
<td>Rhyming, phoneme identification, and rapid</td>
<td>Chiappe, Siegel, and Gottardo (2002).</td>
<td>540 native English speakers (NS); 59 bilingual children</td>
<td>Wide Range Achievement Test- 3; Sound mimicry subtest of the Goldman Fristoe Woodcock Sound Symbol Test; Rhyme</td>
<td>Bilingual and ESL students showed similar performances to native English speakers on letter identification, spelling, and word</td>
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automatized naming (RAN). (BIL); 59 children whose exposure to English was when they began school (ESL). All children were of kindergarten age.

detection task, syllable and phoneme identification, phoneme deletion, and RAN from the Phonological Awareness Test; oral cloze test; verbal memory from the Memory for Sentences subtest of the Stanford-Binet.

identification. Native English speakers had the highest rhyme detection followed by bilingual children, and the ESL children.
**Contrastive analysis theory and the speech learning model.** Contrastive analysis hypothesis is the belief that errors in L2 (i.e., English) can be traced to the learner’s L1 or the differences caused by difference in the two languages (Carey, 2002; Fisiak, 1981). These errors can be understood by means of contrastive analysis, where researchers systematically compare the two languages in terms of similarities and differences. One contrastive analysis model is the speech learning model proposed by Flege (1987). Flege and colleagues have postulated that sounds similar in two languages are harder to acquire than new phonemes (Flege, 1987; Meador, Flege, & MacKay, 2000). Saying the English /v/ (not found in Spanish) is easier than saying the English /d/ versus the Spanish /d/ in the initial word position. In the above example, the complexity in learning the English /b/ versus the Spanish /b/ relates to the voice onset time features of these two sounds. Children may also get confused with perception and production of /p/ in Spanish and the English /b/ because their voice onset times overlap (Brice et al., 2004; Zampini, 1998). Carey (2002) stated that “nationalities with a vastly different phonetic inventory to that of English, often find it easier to learn to produce an acceptable phonetic target in the L2 than a nationality whose L1 contains contrasting sounds” (p. 72).

Meador et al.’s (2000) study of early and late Italian-English-speaking bilinguals found support for the speech learning model. They found that there were significantly higher word recognition scores (perceiving English vowels and consonants) for early bilinguals who used Italian seldom than for early bilinguals who used Italian relatively often. That is, the often-speaking bilinguals experienced more interference between the languages. They shared more contrasting sounds between the languages and hence experienced more difficulty.

**Acoustic difference theory.** Acoustic analysis theory states that a phoneme can be described by several articulatory and acoustical features, such as voicing. Voicing is a feature that is particularly important in language sound systems (Mack, 2003). The voicing feature, or the difference in time between prevoiced consonants (voiced) and consonants that lag in voicing (voiceless) with regard to articulatory release, or voice onset time (VOT), may predict the order of sound acquisition for stop consonants and the ability to acquire those stop sounds. In other words, the consonant voicing component may be an important developmental feature that assists young children to perceive and acquire the different stop consonant sounds across languages. Mack (2003) stated, “In English, it [voice onset time] is a primary although not sole cue for differentiating homorganic voiced and voiceless consonants (i.e., /b, d, g/ vs. /p, t, k/) and the voicing contrast is acquired quite early in L1” (p. 312). Thus, voicing is an important distinction in the perception of individual phonemes.

There are auditory acoustic variations between English and Spanish based on the voice timing features of certain phonemes. Spanish and English phonemes may differ when the phoneme is voiced, that is, prior to articulatory release (i.e., prevoicing) or after articulatory release (i.e., lag). These features of voicing refer to the time between release of the constrictors and subsequent voice onset. The /p, t, k/ Spanish stop consonants have short lags but can have long lags with regard to voicing in English (Lisker & Abramson, 1964). Voiceless consonants are voiced after the release of the air pressure, resulting in the stop consonant. The other consonants of /b, d, g/ (i.e., prevoiced) voice the consonant prior to the release of the air pressure, thus resulting in a listener’s being able to hear the voiced feature. Spanish plosive consonants of /b, d, g/ are produced with prevoicing or short lags compared to longer lags in English (Zampini, 1998). English speakers may require longer voicing (i.e., more of a lag) to recognize voiced or voiceless stops than Spanish speakers. This may be because of longer lags for English voiceless and voiced consonants (Flege & Eefting, 1988). In addition, Spanish speakers may confuse some English sounds also because of the difference in the voicing features between Spanish and English.
In addition, Chiappe et al. (2002) stated that “there is evidence suggesting that young children who are learning English as a second language may show poorer performance on phonological measures than native English speakers” (p. 98). Therefore, a relationship between Spanish and English phonological or phonemic awareness seems to play a vital role in beginning reading development in English. As a result, differences between Spanish and English may cause difficulties for young children in the perception and discrimination of phonemes necessary for phonological awareness and beginning reading. Therefore, a Spanish speaker learning English will often fail to identify this phoneme and may encounter difficulty pronouncing the sound.

**Phonemic Awareness Interference**

Phonological representations from the L1 can influence naming in the L2, that is, can cause interference errors in naming specific words and delay the naming of those words (Jared & Szucs, 2002). Jared and Szucs (2002) stated that “if a bilingual’s two languages share the same alphabet but have different pronunciations for the letters, and if phonological representations for both languages are activated simultaneously, then there will be two conflicting pronunciations at the same time” (p. 225). Ferroli and Shanahan (1992) supported this notion. They found that “Spanish speakers perceive English sounds as if they are Spanish and spell those sounds in Spanish-like ways. Many of the errors these students produced resulted from confusing voiced (sound uttered with vocal cord vibration) and unvoiced consonants” (p. 3).

**Statement of the Problem**

Strong reading skills are a necessity for success in school (Simmons, 1999). Hispanic children who are ELLs are at risk for reading difficulties because of the dual challenge of learning both spoken and written language simultaneously. Phonemic awareness is an essential skill required in learning to read. “Phonemic awareness is the insight that every spoken word can be conceived as a sequence of phonemes . . . [and] is key to understanding the logic of the alphabetic principle and thus the learnability of phonics” (Snow et al., 1998, p. 52). Hispanic students whose L1 is not English may have problems in learning to read “because they are operating in two languages and have difficulty separating the different [phonemic,] phonological and orthographic systems” (Durán & Shefelbine, 2003, p. 220). Therefore, knowledge of phonemic awareness and phonics needs to be examined in light of the special language needs of bilingual English-Spanish-speaking children (Wapole, 2001).

**Research Questions**

The purpose of this study was to examine English phonemic awareness (ability to identify initial and final sounds in spoken words) and phonics skills (ability to identify the associated initial and final letters in auditorially presented words) in four groups of kindergarten students comparing high versus low abilities in monolingual and bilingual populations. The results reported here were part of a larger study; therefore, not all comparisons will be reported in this article. Students were grouped accordingly: (a) high-reading monolingual (Control Group 1), (b) high-reading bilingual (Experimental Group 1), (c) low-reading monolingual (Control Group 2), and (d) low-reading bilingual (Experimental Group 2).

This study sought to answer the following research questions: (a) Is there a difference in phonemic awareness and phonics skills based on high versus low reading abilities? (b) Is there a difference in phonemic awareness and phonics skills based on monolingual versus bilingual language abilities? (c) Is there a statistical interaction (as measured by the tests of between-subject effects) of reading abilities (high versus low reading abilities) versus language abilities (monolingual versus bilingual abilities)? (d) Is there a difference in identification of voiced and voiceless phonemes based on monolingual versus bilingual language abilities? (e) Is there a
difference in identification of voiced and voiceless graphemes (letters) based on monolingual versus bilingual language abilities?

Method

Setting
This study was conducted in an elementary school located in a large metropolitan school district in central Florida. The school is located in the vicinity of several neighborhoods of low socioeconomic status (SES). Approximately 75% of the student population in this school qualified for the Free and Reduced Lunch Program. At the time of the study, the student population consisted of approximately 950 students and reflected the diversity of the surrounding community. The school profile indicated that the student body was 56% Hispanic, 32% White non-Hispanic, 9% Black, and 3% Other. Home language surveys, which were completed after enrollment, indicated that primarily English and/or Spanish was spoken in the homes of the students at this elementary school. This elementary school had a higher-than-average percentage special education student population, with about 25% of the total student population seen in special education programs. The school site was selected for this study because of the high special education, Hispanic, and LEP student populations.

Student Characteristics
The participants for the study consisted of 80 randomly selected students, using stratified random sampling procedures, from a pool of 140 kindergarten students. Seven students did not pass vision and/or hearing screenings and were removed from the possible participant pool. All the children selected as participants in the study passed both vision and hearing screenings, which were administered by either the school or a community health professional within the academic school year in which the study was conducted. The students ranged in age from 5 years 5 months to 6 years 7 months. The chronological age was calculated for each student on the day that the student participated in the study.

Participant Selection Criteria
The study had 80 participants in four distinct groups consisting of (a) 20 high-reading-level English monolinguals, (b) 20 low-reading-level English monolinguals, (c) 20 high-reading-level English-Spanish bilinguals, and (d) 20 low-reading-level English-Spanish bilinguals. The bilingual participants were Hispanic and ELL students. These students received instruction in the English for Speakers of Other Languages (ESOL) Program. The students had been previously identified in ESOL and placed for services using the local school district established eligibility procedures. In addition, 14 of the participants in this study (approximately 18%) were being served in special education programs. Only 1 student in the high-reading English monolingual group was being served in a special education program (i.e., a mild articulation impairment). The other 13 students were fairly evenly distributed between the two low-reading groups, that is, monolingual and bilingual. These 13 students’ disability or disorder severity levels ranged from mild to moderate.

To establish comparability of the four groups across ages and skill levels, multistage stratified random sampling procedures were used (Minke & Haynes, 2003). In the first grouping strata, multiple sources were used to support the accuracy of the determined reading levels for grouping students by high or low reading skills. The Dynamic Indicators of Basic Early Literacy Skills, 6th Edition (DIBELS; Good & Kaminski, 2003) was used to assist in grouping the students for reading levels. Good and Kaminski (2008) stated,

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) are a set of standardized, individually administered measures of early literacy development. They are designed to
be short (one minute) fluency measures used to regularly monitor the development of pre-
reading and early reading skills. (p.1)

The DIBELS is used in many Florida school districts (and others around the nation) as a way to
periodically measure basic reading skills. In this study, two DIBELS bench-
marks were obtained for the kindergarten grade level: (a) Benchmark 1 (Initial Sound Fluency, Letter Naming Fluency)
was obtained in the fall (September 2003), and (b) Benchmark 2 (Initial Sound Fluency, Letter
Naming Fluency, Phoneme Segmentation Fluency, Nonsense Word Fluency) was obtained in the
winter (January 2004). The results from the DIBELS ranked the students’ performances
according to the three levels of at risk, moderate risk, and low risk. Students identified as at risk
on the DIBELS qualified for the participant selection pools for the low-reading groups. Students
identified as low risk qualified for the participant selection pools for the high- reading groups.
Additionally, the teachers rated each student’s reading risk for failure based on their documen-
tation and observation of overall daily reading activities carried out in the classroom (1 = very
high at risk, 2 = high at risk, 3 = moderate risk, 4 = low risk, and 5 = very low risk). Teacher ratings
were the same or at maximum within one risk level of the DIBELS scores.

The second strata grouped the participants into classifications of English monolingual students
and English–Spanish bilingual students as defined by the two following criteria: (a) English
monolingual—participants were classified as English monolingual when the student’s L1 was
English as documented on the Home Language Survey completed after school enrollment. The
classroom teacher verified, through a survey, that the student spoke exclusively English. (b)
English-Spanish bilingual—Hispanic students who met the LEP LY classification (i.e., used by
the local education agency) were included in this study. The classification code of LY was
defined by district procedures and district and placement criteria as students with limited English
proficiency who are enrolled in classes specifically designed for LEP students with less than 1
year of ESOL instruction. In addition, Spanish was used in the students’ homes (as documented
on the Home Language Survey completed after school enrollment). According to teacher
interviews, both groups of bilingual students (high and low readers) were comparable to their
monolingual peers (high and low readers) in other areas besides phonemic skills, for example,
overall classroom performance. The teachers also reported that the students spoke both Spanish
and English in the classroom setting. All participants who were classified English-Spanish
bilingual met the three criteria of being classified as being bilingual, that is, the district
classification, parent report on the Home Language survey, and teacher interview results.

For the third strata, the researchers used a simple random sample to obtain 20 participants for
each of the four groups (high-reading-level English monolingual students, low-reading-level
English monolingual students, high- reading-level English-Spanish bilingual students, low-
reading-level English-Spanish bilingual students). According to Hair (1998), a sample size of 18
per group will achieve statistical power of 0.80 in MANOVA, resulting in a very large effect size.
Therefore, this study used 20 participants per group to minimize the internal validity effects of
mortality and met the criteria of statistical power.

**Equipment**
The auditory stimuli in this study were recorded using a TASCAM DA-P1 portable digital audio
tape recorder with a sampling rate of 44.1 kHz with 16-bit quantization. An AKG headset
Micromic II C420 microphone was used to record the stimuli words. The microphone was
positioned approximately 2 inches away from the mouth, as indicated by the manufacturer’s
instructions. The recorded stimuli were then moved to an Apple G5 desktop computer via an
iMic Griffin adapter. The computer also sampled sound at 44.1kHz and 16-bit quantization into
the Sound Studio program. The Apple computer has the sound card built into the motherboard and not as a separate card.

The computer program Sound Studio, Version 2.1.1, was used to digitally record and manipulate the stimuli words. The recorded stimuli words were then inserted into a Microsoft PowerPoint X for Mac presentation program to pause and present each of the individual stimuli words to the participants. The auditory stimuli were presented to the participants using an Apple PowerBook G4 notebook computer with specifications of 700 MHz and a PowerPC G4 processor.

In the administration of the identification tasks, the participants listened to the stimuli words through a high-quality JBL external speaker plugged into the notebook computer. This quality of speaker was optimal because it nearly matched the human hearing frequency range of 20 Hz to 20,000 Hz (Bess & Humes, 1995). During the presentation of all stimuli words, the external speaker was positioned approximately 3 feet away, directly in front of the participants. A Radio Shack Digital Sound Level Meter was used to conduct a sound field test before each day of testing to ensure that the stimuli words were presented at a consistent decibel (dB) level of approximately 60 dB (i.e., between 55 dB and 65dB). This intensity level is considered adequate for the perception of a typical speech conversation level (Bess & Humes, 1995).

A Panasonic Super VHS 456 Pro-Line video camera was also used to videotape sessions and record the pointing and verbal responses of the participants. The Panasonic camera microphone has a frequency response of 50 Hz to 20,000 Hz and a signal-to-noise ratio of greater than 47 dB. To assure a higher-quality audio recording, a Sony TCD-D8 Digital Audio Tape Recorder with a Sony ECM-717 external high-quality microphone was also used to record the participants’ verbal responses.

**Test Protocol Development**

The test protocol used for this study and the redundancy with the DIBELS is a measure of concurrent validity. One enhanced feature of the test protocol in this study is that it is a comprehensive instrument. The DIBELS is a screening instrument that uses 1-min fluency measures to periodically monitor children’s prereading and early reading skills. In contrast, the test protocol in this study assessed students, depending on their ability level, from 15 to 35 min. This test protocol assessed both phonemic awareness and phonics abilities in initial and final positions of words, resulting in 136 measures. Hence, the test protocol in this study offers a more in-depth assessment of phonemic awareness and phonics identification abilities in the kindergarten participants.

The word stimuli used in this study were developed by the first author. The first author has 10 years of teaching and clinical experience in general education and special education settings and is a certified speech-language pathologist. The first author is a native speaker of English. The second author has 21 years of teaching and clinical experience in speech-language pathology and is also a certified speech-language pathologist. The second author is a native speaker of Spanish with native-like abilities in English.

Content validity of the stimuli word list was established using three methods. First, a comprehensive review of the corresponding phonology, phonetics, phonological awareness, phonemic awareness, phonics, L2 acquisition, and reading literature was conducted to establish a list of English words. Second, the list of stimuli words was reviewed by the participants’ kindergarten teachers to assure that the words were at the appropriate level for kindergarten students. Third, the stimuli were piloted before their use in the study. Preliminary item testing, or trialing, of the recorded word stimuli was conducted to assure the appropriateness of the items.
The pilot testing was administered to a total of 7 kindergarten students who were representative of each group in the study regarding reading levels and language spoken (high-reading-level English monolinguals, low-reading-level English monolinguals, high-reading-level English-Spanish bilinguals, low-reading-level English-Spanish bilinguals). No changes or revisions were required for the procedures or the word stimuli list.

**Theoretical Basis for Selection of the Stimuli**

The word stimuli list was developed on the basis of the following theoretical criteria:

1. Use of most English consonants in the initial phoneme and final phoneme word positions (including English consonant sounds that do not occur in the Spanish language, for example /θ/, /ð/ “th” and /ʃ/ “sh”). Sixty-eight one- and two-syllable words were selected that included English consonant phonemes in the initial and final positions of those words. The 17 English phonemes used in the initial and final position of words included /p, b, f, v, t, d, s, z, k, g, m, n, l, j, f, ð, θ/. Certain phonemes that do not occur in the initial position of words or phonemes that are pronounced differently than the initial pronunciation were not used in the word stimuli list (i.e., /h, r, w, j, θ/ and corresponding graphemes h, r, w, j, ng). The phonemes /h, w, j/ do not occur in the final position of words. English words with final “r” were not used as target sounds because the pronunciation in the initial position of words (consonant “r”) is different from the pronunciation in the final position of words (vocalic “r”). The phoneme /dʒ/ (grapheme “j”) was not used in stimuli words for the final position of words because one to three graphemes are used to represent the sound (as in judge). The phoneme /ŋ/ (represented by the letters ng) was not used in the word stimuli because the phoneme occurs only in the medial and final positions of words (as in jungle or sing). The specific phonemes selected for the word stimuli were carefully considered on the basis of the above phonetic criteria and because these are used in oral communication and in the reading curriculum with this population of kindergarten students.

2. Use of words containing phoneme cognate pairs. Particular attention was paid to selecting phoneme cognates. Cognates are two consonants that are produced in the same place and manner but differ in the feature of voicing (Bernthal & Bankson, 1998; Singh & Singh, 1982). The following cognate phoneme pairs were used in the words for the stimuli list: /p, b/; /f, v/; /t, d/; /s, z/; /k, g/; /ð, θ/.

3. Use of phonemes and graphemes that are developmentally appropriate for kindergarten-age students. Specific attention was paid to letters and sounds that have been taught in the participants’ kindergarten classrooms and are developmentally appropriate for both English and Spanish (Jimenez, 1987). The kindergarten teachers verified that all phonemes and graphemes used in the word stimuli list had been taught in the reading curriculum during the school year prior to the test administration. The data were collected near the end of the kindergarten academic year.

4. Use of words containing one and two syllables, selected to approximate kindergarten reading word lists or reading materials. One-syllable words were selected using the consonant-vowel-consonant (CVC) phonetic structure. Two-syllable words were selected with CVC–CVC phonetic structure (with the exception of the stimulus word therefore). The following sources served as exemplars for the word stimuli chosen for this study: (a) reading curriculum textbooks, storybooks, and materials used to teach kindergarten students at the participating school; and (b) 40,000 Selected Words Organized by Letter, Sound, and Syllable (Blockcolsky, Frazer, & Frazer, 1987).
5. Arrangement of the words divided into initial phoneme stimuli words (Words 1–34), and final phoneme stimuli words (Words 35–68). Each set of words (initial and final) was presented in random order with the exception of the first five words, which consisted of one-syllable words. The rationale was to ease the participants into the task by not immediately overwhelming them with the more complex, two-syllable words.

6. Use of a standard scoring method. The researchers documented the student’s verbal phoneme responses by writing the actual response (e.g., /t/), as well as a numerical score for each verbal response. The child’s pointing response in identifying the graphemes was recorded by writing the grapheme the student selected (e.g., “t”) as well as by recording the numerical score. The numerical score was assigned for the purpose of entering the data into SPSS for data analysis (i.e., 0 = incorrect or no response; 1 = correct; 2 = self-correction; 3 = modified answer to incorrect). In scoring the responses or both the initial and final phoneme-grapheme identification tasks, a ceiling was set at five consecutive errors and/or nonresponses. If a student gave incorrect answers or did not respond to both phonemes and grapheme responses for five consecutive stimuli words, the ceiling was reached for that set of words (i.e., initial phoneme stimuli word list or final phoneme stimuli word list). If a student reached the ceiling on the initial phoneme-grapheme task, the researcher ceased the assessment using the initial stimuli words and moved to the final phoneme-grapheme identification task. If the student reached the ceiling for the final phoneme-grapheme task, the researcher stopped the assessment. For each list (i.e., initial and/or final) where a ceiling was reached by a student, all the remaining responses were scored as incorrect (numerical score of 0).

7. All stimuli words were established to be presented in the same order for the initial and final phoneme stimuli words. The initial phoneme stimuli words were presented first, followed by the final phoneme stimuli words. The rationale for this order of presentation was based on teacher reports and the following research.

Smith, Simmons, and Kameenui (1998) examined the research to investigate the difficulty levels of various phonological tasks. In particular, they found that a continuum of difficulty exists in the position location of phonemes in words, indicating that it is easiest to identify phonemes in words in the initial positions of words, followed by phonemes in the final positions of words, and finally, phonemes in the medial positions of words. Snow et al. (1998) also indicated that developmentally, children acquire and learn initial phonemes in words before final phonemes in words. Additionally, the kindergarten teachers reported that the participants had received more classroom instruction in identifying initial phonemes in words than final phonemes in words during the school year of the study. Therefore, because of established developmentally appropriate levels for kindergarten students, it was determined that the initial phoneme-grapheme identification task, followed by the final phoneme-grapheme task, was most appropriate.

**Data Collection Procedures**

All children were tested individually in a quiet area of the school free from visual and auditory distractions. The time of data collection occurred during the normal school day at the elementary school. All participants were tested in the same room, with the placement of furniture, equipment, and materials remaining consistent throughout the testing of all participants. The testing lasted from approximately 15 to 35 min per student. The length of testing time was dependent on the various skill levels and range response times of each of the participants. All efforts were made to avoid fatiguing the students during testing. Each participant was tested during one data collection session with a 3-min break in between the two tasks presented (i.e., initial and final
phoneme and grapheme identification tasks). Therefore, internal validity issues of history, maturation, and testing were minimized (Campbell & Stanley, 1963).

**Phoneme and Grapheme Identification Task Administration**

*Orientation and practice.* The researcher scheduled times during the school day to take the students from the classroom to a quiet area of the school (i.e., free from visual and auditory distractions) to individually test the participants. A few minutes at the beginning of the session was used to establish rapport. Each student received a sticker before, during, and after the test administration to increase motivation. Initially, the student reviewed the Grapheme Chart (i.e., all letters of the alphabet and some diagraphs) for approximately 30 s. The purpose of the familiarization of the Grapheme Chart was to ensure that the student became familiar with the placement and organization of the graphemes on the chart. The student was asked to name each letter as he or she pointed to the letter (i.e., letters a to z). The student was given one opportunity to identify each letter on the Grapheme Chart. Any letters identified incorrectly by the child were documented by the researchers, who wrote the actual incorrect response on the Pre-Task Information Form. If the student did not respond, *nr* was circled on the form below the letter.

The four digraphs (i.e., th, sh, ch, and ck) were introduced by the researcher, who pointed to each one and said, “Now see these other letters? For some sounds in words, we use two letters. These letters are here.” The researcher again pointed to the digraphs, th, sh, ch, and ck. No response was required from the student. The phoneme and grapheme identification task directions immediately followed the Grapheme Chart familiarization task.

*Task directions.* Specific directions were provided to all participants in English for the phoneme-grapheme identification tasks. Directions were given in both English and Spanish for eight bilingual Hispanic students who showed a higher proficiency level in Spanish as documented via three data points (i.e., Home Language survey, teacher verification, and a conversational sample with the researchers). The second author, who is a bilingual Spanish-English speaker, read the directions in Spanish to these students. Those students who were identified as Spanish dominant were also tested by the bilingual researcher.

To assure understanding of the directions and expectations, a familiarization task was administered for both the initial and final identification tasks. The participants were asked to identify phonemes and graphemes by listening to five trial items and by pointing to corresponding letters on a Grapheme Chart. The English directions provided to the participants for the initial phoneme-grapheme identification task are as follows (note that the bolded print is what was actually said to the participants):

“You are going to hear some words from these speakers [point to speakers]. You will hear the word only one time, so you will need to listen carefully. I want you to listen to the word and say the sound at the beginning of the word [emphasis added] and then point to the letter or letters that goes with that sound. I will do the first one. Listen. [Play recorded word *ham*; model verbal and pointing responses.] *Now you try one. Listen.*” [Play next trial word.] If inappropriate response (or after 15 seconds), model correct response; ask student to repeat the response by saying, “*Now you do it with me.* [Present all five trial words. Model all five trial items if needed. Review directions before starting test stimuli.] *Remember, you will hear the word only one time, so you will need to listen carefully. I want you to listen to the word and say the sound at the beginning of the word [emphasis added] and then point to the letter or letters that goes with that sound. Are you ready?* [Wait for acknowledgement.] *Listen.*” Present stimuli word. If the child says the letter rather than the sound, then say, “What
“sound does that letter make?” If the child says the correct phoneme, score as correct. \(nr = \) no response.

The same directions were used to introduce the final phoneme-grapheme identification task. For the final phoneme-phonics identification task, the directions were changed from “beginning of the word” to “end of the word.” Five trial items were presented before both the initial phonemic-phonics identification task and the final phonemic-phonics identification task. All participants in this study understood the task expectations after the directions, modeling, and/or trial items were presented. All participants included in this study were able to successfully complete the trial items. The participants then proceeded to the actual administration of the test items.

**Test Items**

The test items included two separate stimuli word lists (i.e., 34 initial phoneme stimuli words and 34 final phoneme stimuli words). These words had been digitally recorded so that each participant would hear the same stimuli at a consistent decibel level of 60 dB. The 34 initial phoneme stimuli words were presented first and in the same order for each participant. The test stimuli words were presented one time, with no repetition of the stimuli words permitted. In the initial phoneme-grapheme identification task, the students were told to listen to the stimulus word and (a) identify the beginning sound in the word by saying the beginning sound and (b) correctly point to the letter (or letters) on the Grapheme Chart (see the directions above as presented to the participants). For example, if the student heard the word *mop*, he or she must have verbally responded by saying /m/ and pointed to the letter *m* on the Grapheme Chart. Before the first 5 initial phoneme stimuli test words were presented, the following cue was provided to each student: “Listen for the beginning sound.” If the student became distracted or off task, the researcher administering the stimuli redirected the student by stating, “Listen,” before presenting the stimuli word. The participant continued to identify the 34 initial phonemes and graphemes (or until he or she reached the ceiling). After the participant had finished the initial phoneme-grapheme identification task, the researcher allowed for a short break and the child selected another sticker. Directions and practice then followed for the administration of the final phoneme-grapheme identification task.

In the final phoneme-grapheme identification task, the students were asked to listen to the word and (a) identify the final sound in the word by saying the ending sound and (b) point to the corresponding letter (or letters) on the Grapheme Chart (see the directions above as presented to the participants). For example, if the student heard the word *hit*, he or she must have verbally responded by saying /t/ and pointed to the letter *t* on the Grapheme Chart. For the first five final phoneme words presented, the cue of “Listen for the ending sound” was provided to each student. This cue was especially necessary when the task switched from initial to final identification of phonemes and graphemes, as students needed prompting that the task had changed.

All verbal and pointing responses by the participants for the phoneme and grapheme (i.e., letter sound and letter) identification tasks were video and audio taped and documented by the investigator on a data collection form.

**Interrater Reliability**

Interrater reliability for this study was established through scoring agreement across two raters for the participants’ phoneme and grapheme identification responses. The researchers collected the data as they occurred for all participants in the study. In addition, the responses were recorded using a Panasonic Super VHS 456 Pro-Line video camera and a Sony TCD-D8 Digital Audio Tape recorder. Twenty percent of the participants’ responses were verified through interrater
reliability agreement between the two researchers. A total of 16 of 80 students (i.e., 20%) were rated by both researchers. To establish interrater reliability (i.e., after all the data were collected), video and digital audio tapes were played back (by both raters) and used for participants’ responses that were in question. The second rater scored the participants’ responses independently via the video and audio tape recordings.

Table 3. Multivariate and Tests of Between-Subjects Effects for Questions 1, 2, and 3 (High and Low Readers and Monolingual and Bilingual Students)

<table>
<thead>
<tr>
<th>Group</th>
<th>Dependent Variable</th>
<th>Mean Square</th>
<th>df</th>
<th>F</th>
<th>p</th>
<th>Effect Size: Partial Eta Square</th>
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<tbody>
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<td></td>
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<tr>
<td>High/Low readers</td>
<td></td>
<td>2, 75</td>
<td>77.620</td>
<td>.000**</td>
<td>.674</td>
<td></td>
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<td>Interaction between high/low readers and monolingual/bilingual</td>
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<td>.003*</td>
<td>.146</td>
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<tr>
<td>High/low readers</td>
<td>All Phonemes</td>
<td>13261.250</td>
<td>1, 76</td>
<td>133.979</td>
<td>.000**</td>
<td>.638</td>
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<td></td>
<td>All Graphemes</td>
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<td>148.418</td>
<td>.000**</td>
<td>.661</td>
<td></td>
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<td>Monolingual/bilingual</td>
<td>All Phonemes</td>
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<td></td>
<td>All Graphemes</td>
<td>51.200</td>
<td>.444</td>
<td>.507</td>
<td>.006</td>
<td></td>
</tr>
</tbody>
</table>

*p < .01. **p < .001.

The two raters observed a total of 2,176 scores for the responses of the 16 participants. The number of agreements was divided by the total number of responses (i.e., agreements and disagreements), for an interrater agreement of 91.2% (1,984 divided by 2,176 = 91.2%).

Results

Analyses were conducted to examine the four research questions with alpha level preset at less than .05. To address the main questions of the effects of phoneme and grapheme identification scores pertaining to the high versus low reading groups, and pertaining to the monolingual versus bilingual groups, a MANOVA using the Wilks’s Lambda $F$ statistic was performed. The research questions sought to determine if there were significant differences in phonemic awareness skills and phonics skills abilities based on high versus low reading levels and monolingual versus bilingual group classifications (i.e., between-group comparisons and interaction).
Results indicated significant differences for the high versus low reading groups \( (F = 77.620; df = 2, 75; p < .001) \) on phoneme and grapheme identification. Effect size (i.e., using partial eta square) accounted for 67.4\% of the total variability for the high versus low reading groups. According to Cohen’s (1988) criteria (i.e., small \( = .10–.29 \), medium \( = .30–.49 \), large \( \geq .50 \)), the variable effect size was judged to be large.

Results also indicated significant differences for the monolingual versus bilingual language groups \( (F = 6.394; df = 2, 75; p < .01) \) on phoneme and grapheme identification. Employing partial eta square as the effect size measure, 14.6\% of the entire variability was explained by the high versus low reading group comparison. This effect size was deemed to be small. The interaction of high and low reading groups versus monolingual and bilingual language groups was found to be nonsignificant \( (p = .702) \). See Table 3 for these results.

The following tests of between-subjects effects demonstrated significant differences:
1. High versus low reading groups versus all phoneme identifications yielded significant differences \( (F = 133.979, df = 1, p < .001) \). The magnitude of effect, using partial eta square, showed that 63.8\% of the variability in scores can be accounted for by high- and low-reading-level groups. Using Cohen’s (1988) criteria for effect size, 63.8\% was deemed to be high.

2. High versus low reading groupings versus all grapheme identifications also showed significant differences \( (F = 148.418, df = 1, p < .001) \). Partial eta square indicated that 66.1\% of the entire variability was accounted for by high- and low-reading-level groups. This effect size was also judged to be high.

3. Monolingual versus bilingual language groups versus all phoneme identifications yielded significant differences \( (F = 10.475, df = 1, p < .01) \). Partial eta square indicated that 12.1\% of the variance in scores could be explained by monolingual versus bilingual language groups. This effect size was deemed to be small.

4. Monolingual versus bilingual language groups versus all grapheme identifications resulted in significant differences \( (F = 12.534, df = 1, p < .01) \). Partial eta square showed that 14.2\% of the variance accounted for the monolingual versus bilingual language group comparisons. This was deemed to be small.

The interaction between high and low readers and monolingual and bilingual students was not found to be significant \( (F = .44, df = 1, p = .507) \). See Table 3 for these results.

To answer the main questions of the effects of voiced and voiceless identification pertaining to the high versus low reading groups, and pertaining to the monolingual versus bilingual groups, a general linear model MANOVA was performed using the Wilks’s Lambda \( F \) test. The research questions sought to establish if there was a difference in voiced and voiceless identification abilities based on high versus low reading levels and monolingual versus bilingual group classifications (i.e., between-group comparisons and interaction).

Results indicated significant differences for the high versus low reading groups \( (F = 67.558; df = 2.75; p < .001) \) on voiced and voiceless phoneme identification. In this analysis, partial eta square indicated that 64.3\% of the total variability in scores was accounted for by the high versus low reading groups; consequently, the effect size was judged to be large. Results also indicated significant differences for the monolingual versus bilingual language groups \( (F = 5.713; df = 2, \)
75; \( p = .005 \)) on voiced and voiceless phoneme identification. The measure of effect size using partial eta square indicated that 13.2\% of the total variability in scores was accounted for by the mono-lingual and bilingual language groups. This effect size was judged to be small. The interaction of the two main effects between the high and low reading groups and monolingual and bilingual language groups was found to be nonsignificant (\( p = .945 \)) for voiced and voiceless phoneme identification scores. Refer to Table 4 for these results.

The tests of between-subjects effects indicated significant and nonsignificant differences for the following comparisons:

1. High versus low reading groups versus voiced identifications yielded significant differences (\( F = 132.452, df = 1, p < .001 \)). The magnitude of effect, using partial eta square, indicated that 63.5\% of the total variability in scores can be accounted for by high versus low reading grouping. Using Cohen’s (1988) criteria for effect size, 63.5\% was judged to be high.

2. High versus low reading groupings versus voiceless identifications also resulted in significant differences (\( F = 107.317, df = 1, p < .001 \)). In this analysis, 58.5\% of the total variability in scores was attributed to high versus low reading groupings when using partial eta square. This effect size was also judged to be high.

3. Monolingual versus bilingual language groups versus voiced identifications yielded significant differences (\( F = 11.575, df = 1, p = .001 \)). Partial eta square indicated that 13.2\% of the total variability in scores can be explained by monolingual versus bilingual language groups. This effect size was deemed to be small.

4. Monolingual versus bilingual language groups versus voiceless identifications resulted in significant differences (\( F = 7.334; df = 1, p = .008 \)). Using partial eta square, 8.8\% of the entire variability in scores was accounted for by language groups. This effect size was also deemed to be small.

The interaction of the two main effects between high and low readers and monolingual and bilingual students was not found to be significant (\( F = .017, df = 1, p = .898 \)). Table 4 presents these results.

**Discussion and Implications**

Phonemic awareness is the ability to perceive, identify, and manipulate the phonemes in spoken language (National Reading Panel, 2000). Some students who speak English as an L2 may be at risk for reading difficulties because they face simultaneous dual language challenges of learning to speak and also read English (Brisk & Harrington, 2000). These students may struggle with basic phonemic awareness skills and phonics skills. Consequently, there exists a need for specific research in how Spanish phonemic awareness affects English phonemic awareness and beginning reading. However, Grandmaison et al. (1996) stated that few studies exist in the area of phonological processing related to reading achievement for bilingual students. Chiappe et al. (2002) stated that the relationship between Spanish and English phonological or phonemic awareness seems to play a vital role in beginning reading development in English.

This study was conducted in an effort to identify some problem areas that all young students, and in particular, bilingual students, face when learning to read. Research indicates that some Hispanic ELL students have difficulty with sound acquisition in English because of interference issues between Spanish and English (Fashola, Drum, Mayer, & Kang, 1996). Consequently,
acquisition of phonemic awareness and phonics skills in English are affected (Durán, 2003). Therefore, knowledge of phonemic awareness and phonics needs to be examined in light of the special language needs of bilingual English-Spanish-speaking children.

Table 4.

<table>
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<th>Group</th>
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<th>df</th>
<th>F</th>
<th>p</th>
<th>Effect Size: Partial Eta Square</th>
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*p < .01. **p < .001.

Phoneme and Grapheme Identification Based on Reading Levels

The high reading level versus low reading level distinctions were very important in distinguishing phoneme and grapheme identification abilities (i.e., with high readers performing better than low readers). This finding confirms and supports the previous research indicating that phoneme and grapheme identification are important beginning reading skills (Adams, 1990; Lyon, 1998; Smith et al., 1998; Snow et al., 1998; Shaywitz, 1996). Therefore, identification of phonemes and graphemes appears to be a developmental beginning reading skill in English for both monolingual and bilingual students.

Phoneme and Grapheme Identification Between Monolingual and Bilingual Groups

It was expected that a greater gap would be found; nevertheless, it appears that the existing achievement gap between monolingual and bilingual students has become apparent, even at the kindergarten level (i.e., with mono-lingual students performing better than bilingual students). As the bilingual students’ language levels increase, it is expected that their sound repertoires, vocabulary skills, and language skills will increase, and the possibility for greater phonemic and language interference will also increase as a result (Chiappe et al., 2002; Cisero & Royer, 1995; Rupley, Rodriguez, Mergen, Willson, & Nichols, 2000). In sum, it is still imperative that early reading intervention target phoneme and grapheme identification at this grade level in an attempt to diminish the apparent early gap (Durán & Shefelbine, 2003; Durgunoglu, 2002).
**Phoneme and Grapheme Identification and Interaction Effects of Reading Abilities and Language**

The interaction of high and low reading groups versus monolingual and bilingual language groups was found to be nonsignificant. However, it was noted the phoneme-grapheme identification rankings (from highest to lowest ability levels) of the four groups was as follows: (1) the high monolingual readers, (2) the high bilingual readers, (3) the low monolingual readers, and (4) the low bilingual readers. This was most likely because of the lesser influence that the monolingual and bilingual language group comparisons contributed to this comparison, that is, 15% of the total variance. It appears that at the kindergarten level, the bilingual language distinctions did not influence the identification of phonemes and graphemes as much as the high and low reading levels.

**Voiced Versus Voiceless Phoneme Identification Based on Reading Levels**

All students in the study consistently identified words with voiced phonemes more often than in words with voiceless phonemes. Therefore, the issue of voicing appears to have played an important role in helping young students differentiate among different phonemes (Chiappe et al., 2002; Cisero & Royer, 1995; Rupley et al., 2000). This finding supports earlier research indicating that distinction of voicing is an important phonological and reading skill for monolingual and bilingual speakers (Chiappe et al., 2002; Cisero & Royer, 1995; Davis, 1995; Flege, 1987; Flege & Eefting, 1988; Rupley et al., 2000).

**Voiced Versus Voiceless Phoneme Identification Between Monolingual and Bilingual Groups**

It was expected that the role of two languages would account for greater variability in the scores; however, this finding is still valuable to document that a reading gap exists between the monolingual and bilingual students. It is important to note that language interference resulting from voiced and voiceless distinctions appeared to be occurring as the bilingual students performed statistically different from their monolingual peers (p < .05) with this aspect (Flege, 1987; Flege & Eefting, 1988; Rupley et al., 2000). This finding indicates the importance of further research into voiced versus voiceless phoneme distinctions at the kindergarten level. Explicit instruction specifically targeting consonant voicing could improve children’s ability to better identify phonemes (Davis, 1995; Durán & Shefelbine, 2003; Durgunoglu, 2002).

**Voiced Versus Voiceless Phoneme Identification and Interaction Effects of Reading Abilities and Language**

The interaction of high and low reading groups and monolingual and bilingual for voiced versus voiceless phoneme identification was found to be nonsignificant. At the kindergarten level, the bilingual language distinctions did not influence the overall identification of voiced versus voiceless phonemes as much as the high versus low reading level grouping.

**Contributions of This Study**

This research study has investigated early reading skills in monolingual and bilingual kindergarten students of high and low reading abilities. Specifically, this study has added to the literature and potentially the future practices in the fields of speech-language pathology, special education, bilingual education, and general education.

With regard to speech-language pathology, the findings from this study have strengthened the importance of phonemic awareness and phonics skills related to reading for English-language-learning children. Half of the participants in this study included bilingual English–Spanish-
speaking kindergarten students. The results from this study supported previous research regarding Spanish interference on the acquisition of literacy abilities in English. It was found that the feature of voicing in correct sound and letter identification contributed significantly to the results. Voicing is an important distinctive feature in phonemic awareness and phonics in learning to read. In sum, this study has documented that a reading achievement gap, even at the kindergarten level, exists between bilingual and monolingual students at both high and low reading levels. It is important to note that all bilingual children, even high readers, experience some difficulties and need specific instruction in phonemic awareness and phonics to achieve at the same level as the high-performing monolingual students. This information will also assist general education teachers in making appropriate referrals for special education assessments.

**Recommended Research in the Field**

Current studies have provided scientifically based research into specific areas of phonemic awareness and phonics skills for bilingual school students (Brice et al., 2004; Chiappe et al., 2002; Cisero & Royer, 1995; Dickinson et al., 2004; Navarra et al., 2005). The nature of research is such that all studies can be further developed. Therefore, the following recommendations for future research are provided:

1. **Students with disabilities and/or students with low reading abilities should be included in bilingual research studies.** Future studies should incorporate a diversity of Spanish-English-speaking student populations that reflect the diversity of Hispanics in the United States. Other languages beyond English and Spanish should also be investigated with school-age children.

2. **It is suggested that further research address which phonemes and graphemes cause interference errors for English-language-learning students, particularly, Spanish speakers.** It would be helpful for speech-language pathologists and teachers to know what phonemes or letters are difficult for Spanish speakers to acquire because of interference factors, developmental factors, or factors associated with different disabilities. Specific phonemes and/or graphemes that pose difficulty for students learning to read should be mentioned and incorporated into the suggestions for instructional practice.

3. **Research should focus on the relative importance of voicing in phonemic and grapheme identification.** In addition, the emphasis should be placed on how speech-language pathologists and teachers can explicitly incorporate aspects of voicing of phonemic elements into their reading instructional practices. This is especially crucial for teaching students who are ELLs, students at risk for reading difficulties, and/or students with disabilities.

This study has attempted to provide some information regarding emergent reading skills (i.e., phonemic awareness and phonics skills) in kindergarten students from various reading levels, with and without disabilities, and from monolingual and bilingual backgrounds. It is important to investigate how students with disabilities and bilingual students acquiring an L2 develop emergent literacy skills. Researchers must attempt to link research to practice to provide speech-language pathologists and teachers with the knowledge to assist young children in becoming efficient readers. The aim is that all children will learn to read, have meaningful access to the general education curriculum, and ultimately achieve academic success. Therefore, as school-based speech-language pathologists and teachers, our job is to affect the lives of students by giving them the means to succeed. Success will result when all students learn to read early and well, graduate from school, and ultimately become productive members of our diverse society.
References


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