PHONOLOGICAL AWARENESS AND DEVELOPMENTAL SPELLING: A PILOT STUDY COMPARISON OF MONOLINGUAL ENGLISH-SPEAKING CHILDREN AND ESL-LEARNING CHILDREN

by

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ABSTRACT

Research in the area of phonological awareness and young children has shown that phonological awareness skills are extremely important and positively correlated with the development of spelling and reading abilities. There is limited research investigating phonological awareness and spelling abilities in English-as-a-Second-Language (ESL)-learning children. So far it has been found that the phonological awareness skills of ESL-learning children are similar to those of native English-speaking children and they are also positively related to spelling and reading skills. Previous research that has examined the advantages of bilingual children over monolingual children has found that bilingual children develop skills of metalinguistic awareness earlier than monolingual children. In other studies, skills from bilingual children’s first language have been found to transfer both positively and negatively to their spelling in English. Differing results have been found with respect to the spelling abilities of ESL-learning children and native English-speaking children. Some studies have found greater spelling abilities for ESL-learning children whereas others have demonstrated lower or equal abilities compared to native English-speaking children. In order to further examine the spelling skills of ESL-learning children, this study was developed to address the following research questions: (1) Are there significant differences in the number of spelling errors made by ESL-learning children and children with English as their native language? (2) Are the errors influenced by the sounds used (phonology) in the first language of the child? (3) Are the errors influenced by the child’s exposure to print and literacy activities? (4) Are the number of spelling errors correlated with the child’s degree of phonological awareness in English?

Participants in this study were three Vietnamese ESL-learning children and five monolingual native English-speaking children. Three of the native English-speaking children were receiving Speech-Language Pathology services. Tasks used in the study were an articulation evaluation, a
letter identification task, three phonological awareness tasks, two reading tasks and two spelling tasks. Background questionnaires were filled out by the children’s parents to provide information about home literacy experience. When interpreting the results it is important to keep in mind that three of the monolingual English-speaking children were receiving speech and language services and this could affect differences found between language groups. The results indicated that by the end of grade one the three ESL-learning children outperformed their native English-speaking peers on real word spelling and had fewer spelling errors. Moreover, the phonology of the ESL-learning children’s first language did not appear to influence errors in their speech or spelling in English. Children who were read to at an earlier age and more often performed better on non-word spelling. Those children with high spelling scores also had higher reading levels. Finally, phoneme deletion and phoneme deletion and substitution were highly correlated with real word spelling for both groups of children. These results lead to important for future research in studies with children from different language backgrounds as well as clinical importance to Speech-Language Pathologists.
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INTRODUCTION

The purpose of the present study is to investigate the effects of phonological awareness (PA) and phonological representations (for the speech sounds the child currently produces) on monolingual English-speaking and ESL (English-as-a-Second-Language)-learning children’s early spelling abilities. Literacy (including spelling and reading) plays a large and important part in our society. To be successful academically and in life, children require competency in literacy skills. It is important to look at what factors and predictors are involved in developing good literacy skills so we can help children to become competent readers and writers. There is a consensus in the literature regarding the importance of phonological awareness skills and their positive correlation with early reading and writing abilities (Bryant, Bradley, MacLean & Crossland, 1989; Bryant, MacLean & Bradley, 1990; Chiappe, Siegel & Gottardo, 2002; Chiappe, Siegel & Wade-Woolley, 2002; Lundberg, Olofsson & Wall, 1980; Nation & Hulme, 1997; Perfetti, Beck, Bell & Hughes, 1987; Pullen & Justice, 2003; Stahl & Murray, 1994; Stanovich, Cunningham & Cramer, 1984). Studies involving instruction or training in phonological awareness skills also contribute to the knowledge that phonological awareness plays a key role in literacy development (Ball & Blachman, 1991; Cunningham, 1990; Ehri & Wilce, 1987; Lundberg, Frost & Peterson, 1988; Nag-Arulmani, Reddy & Buckley, 2003).

Speech-Language Pathologists (SLPs) can play an important and active role in literacy development. SLPs’ “work with children may naturally target skills (e.g., phoneme awareness, vocabulary growth, attention to inflectional and morphological markers) that are relevant to reading success” (Snow, Scarborough, & Burns, 1999 p. 56). Since early language abilities and phonological awareness prior to entering school are important for later literacy development, SLPs play a crucial role in developing screening tools to assess children’s skills in these areas. Early identification of difficulties in preliteracy skills can provide children with the opportunity
to receive intervention and increase their success in reading and writing. Screening tools and assessments can provide a more in-depth examination of the children’s problem areas and lead to the direction of intervention. SLPs then become more involved in the area of literacy development by organizing intervention with teachers, parents and direct SLP services with the child (Justice, Invernizzi, & Meier, 2002).

There is a growing number of children entering Canadian English schools who are learning English as a second language (ESL). It is important to examine the performance of these ESL-learning children as well as monolingual English-speaking children. Upon school entry, children may have been exposed to two languages simultaneously or they may have learned their first language and are in the process of learning their second language. Williams and Snipper, (1990) in a study of literacy and bilingualism, state that proficiency in a language requires four abilities: (1) the ability to comprehend the intended message in the language, (2) the ability to respond in the language, (3) the ability to read in the language and understand what was read, and (4) the ability to write in the language. The more of these abilities a person has, the greater their level of language proficiency. The amount of exposure to English children have plays a role in their ability to learn spoken English as well as their ability to read and write English (Anderson, 2004; Bialystok, 1988; Hecht & Mulford, 1982; Piper, 1984). Researchers have also examined the development of literacy and phonological awareness in reading and writing in bilingual children compared to monolingual children, looking at possible advantages and disadvantages of bilingualism in language development (Bialystok, 1988; 1997; Cisero & Royer, 1995; Durgunoglu & Verhoeven, 1998). The issue of transfer of skills from one language to the other has also been explored (Bialystok, Majumder & Martin, 2003; Durgunoglu and Verhoeven, 1998; Quiroga, Lemos-Britton, Mostafapour, Abbott, & Berninger, 2002).

Following is a review of: (1) research on the effects of phonological awareness on literacy development; (2) research on bilingualism, literacy and phonological awareness; and (3)
research on spelling development, with a focus on how the phonological system can affect spelling.

**Phonological Awareness**

Phonological awareness, syntactic awareness and working memory are skills that have been identified as having a relationship with literacy development (Lesaux & Siegel, 2003). For the purposes of this pilot study only phonological awareness will be examined. Phonological awareness has been used to describe a number of different skills involved in discriminating and manipulating the sounds of English and has been used interchangeably with phonemic awareness (McBride-Chang, 1995). Different studies examining phonological awareness have looked at different types of phonological awareness tasks. Adams (1990) developed an order of these tasks from least to most difficult:

1) Rhyme – knowledge of nursery rhymes and rhyming
2) Sound Oddity – compare and contrast rhymes or alliteration
3) Blending and Syllable Splitting – put individual sounds together to make words and break words into smaller parts (syllables).
4) Phoneme segmentation – break down words into phonemes
5) Phoneme manipulation – delete, add or move phonemes

Performance scores on these different tasks have been found to have different levels of correlations with literacy development.

**Development of Phonological Awareness and Its Effects on Literacy**

Bradley and Bryant (1983) completed a longitudinal study over four years looking at rhyme and alliteration. This study began with 403 children, aged 4 and 5 years. Children who showed signs of reading words were eliminated from the study. Rhyme and alliteration oddity tasks were given to the children. For the rhyme tasks the experimenter would give the children a list of four words, three of which had a common sound (e.g., ‘hat’, ‘bat’, ‘can’, ‘sat’) and the
child was asked to identify the odd one out. For the alliteration task the first sound in the word was common (e.g., 'ham', 'tap', 'had', 'hat') and the child was asked to identify the odd one out. Bradley and Bryant (1983) found that children's overall performance on both tasks was above chance level, which indicates that the children were able to detect rhyme and alliteration before learning to read. Bryant et al. (1990) performed another longitudinal study using rhyme and alliteration tasks and gained similar results. Children's scores on rhyme and alliteration oddity tasks at age 4;7 were found to be correlated with, and predictive of, reading ability at age 6;7. From this study Bryant et al. (1990) concluded that awareness of rhyme might also play a role in spelling due to spelling sequences of rhyming words being similar (e.g., cat, bat, hat). Bryant et al. (1989) also examined knowledge of nursery rhymes, rhyme detection and oddity tasks. The results of this study indicated that children's knowledge of nursery rhymes led to enhanced phonological sensitivity (rhyme and phoneme tasks) which led to increased reading scores. Rhyme alone was found to be a better predictor of spelling due to rhyming words having similar spellings (e.g., cat, hat, bat). Wimmer, Landerl and Schneider (1994) reported similar results. They used the oddity tasks of Bradley and Bryant (1983) and found that rhyme awareness was predictive of word recognition and later orthographic spelling. These studies agree with Adams' (1990) hierarchy of phonological awareness development in which nursery rhymes and sound oddity are seen as the earliest skills to develop. These earlier skills seem to be a precursor to later developing abilities (e.g., phoneme blending, segmenting and manipulation).

Other studies have examined the later-developing phonological awareness skills that require a more in-depth knowledge of words and their parts. Researchers have found that these later-developing skills require more explicit knowledge of words and sounds and play an even greater role in the development of early literacy (Ehri & Wilce, 1980; Lundberg et al., 1980; Nation & Hulme, 1997; Perfetti et al., 1987; Pullen & Justice, 2003; Stahl & Murray, 1994; Stanovich et al., 1984; Yopp, 1995). Stanovich et al. (1984) administered 10 different
phonological tasks to 49 Kindergarten students with a mean age of 6;2. The tasks were: (1) rhyme supply (say a word that rhymes with a target), (2) rhyme choice (choose a word, from three stimulus words, that rhymes with a target), (3) initial consonant same and (4) final consonant same (say which word, from a list of three, had the same sound as a target word), (5) strip initial consonant (delete the first consonant and say what is left), (6) substitute initial consonant (substitute the first sound of a word with another sound), (7) initial consonant different and (8) final consonant different (repeat three words and say which one does not begin or end with the same sound), (9) initial consonant not same (listen to a target word followed by three other words, then identify the word that does not start with the same sound as the target word), and (10) supply initial consonant (say two words, e.g., 'cat' 'at', and identify the phoneme that is missing from the other word).

The most difficult task was the one that required children to strip the initial consonant. Children found the rhyming-based tasks (substitute initial consonant, rhyme supply and rhyme choice) to be the easiest tasks. This agrees with previous research indicating that children tend to have more exposure and ability in rhyming than in other phonological tasks before entering kindergarten (Bradley & Bryant, 1983; Bryant et al., 1989). The interrelationships between the different phonological awareness tasks were analyzed and there were moderate to strong correlations among the non-rhyming tasks, but only weak correlations between the rhyme choice and rhyme supply tasks and the other tasks (Stanovich et al., 1984). Although the initial consonant substitution task was similar to the rhyme task in that the new word made a rhyming word, performance on this was not correlated with any other tasks. This indicates that rhyme is a separate skill in phonological awareness compared to the other tasks. The children were tested one year later and it was found that scores on all of the non-rhyming tasks were significantly correlated with reading scores measured at the end of grade one. This study indicates that
performance on a rhyme-based task alone is not a sufficient measure for reading achievement when examining children near the end of kindergarten.

More research has been completed involving the more complex phonological awareness skills (segmenting, blending and manipulation) and their importance in spelling. In a study by Vandervelden and Siegel (1995) a variety of phonological awareness tasks were examined (initial phoneme recognition, final phoneme recognition, phoneme location, phoneme recognition/location identification, sequential segmentation, and deletion and substitution) and it was found that performance on the more difficult tasks was more strongly correlated with spelling ability than performance on the less difficult tasks. It was found that phoneme recognition (the ability to listen to a sound and tell if a spoken word has that sound in it) in kindergarten, and phoneme deletion and substitution tasks in grade one were strongly correlated with spelling ability. The better the children were at these more complex tasks, the better they were at spelling in English. Roper (1991) found similar results in her study. She examined children’s abilities in phoneme segmentation, syllable deletion and phoneme deletion and found that these phonological awareness abilities were correlated with spelling abilities.

Stahl and Murray (1994) studied 52 kindergarteners and 61 grade one students on four tests of phonological awareness: (1) blending – put phonemes together to make a word, (2) isolation – say the beginning or ending sound of a word, (3) segmentation – say each phoneme of a given word, and (4) deletion – take away the first or last sound of a word and say what is left. They also examined written language measures (alphabet knowledge, reading words, short passages and common logos, spelling, memory). Results indicated that there were strong correlations between all phonological awareness skills and spelling ability. The ability to isolate phonemes from the beginning or ending of words was most highly correlated with reading ability. These results as well as others (e.g., Chiappe, Siegel & Gottardo, 2002) on spelling indicate that for grade one children, performance on the more difficult phonological tasks
(phoneme manipulation such as phoneme deletion and substitution) is more strongly correlated with spelling ability.

Effects of Training in Phonological Awareness

Results from training studies involving phonological awareness indicate the importance of phonological awareness instruction in increasing children’s reading and writing abilities. Lundberg et al. (1988) divided kindergarten children into two groups: an experimental group that received training in listening games (listening to verbal and non-verbal sounds), rhyme, segmenting sentences into words, segmenting words into syllables, and identifying phonemes in words and a control group who received regular classroom instruction (which typically does not involve early reading instruction or linguistic training).

Lundberg et al. (1988) found that training in segmenting sentences into words, syllables and the rhyming tasks had only a modest effect on phonological awareness scores at the end of kindergarten, but the other tasks of phonological awareness (initial phoneme, phoneme segmentation and phoneme synthesis) had a dramatic effect. The training group had significantly higher scores on all phonological tasks than the control group at the end of kindergarten, which indicates that the training was important in the development of phonological awareness skills. At the beginning of grade one, children were tested again on similar tasks of phonological awareness as well as tasks of reading and spelling. The training group outperformed the control group on all phonological awareness tasks, reading tasks and spelling tasks. The effects of training were stronger on measures of reading and writing in grade two. This study emphasizes the importance of phonological awareness in reading and writing and how children can benefit from specific instruction.

A study by Ball and Blachman (1991) examined kindergarten children in three different training groups. Group one was the phoneme awareness group. In this group children were taught (1) segmentation of words into phonemes by saying each phoneme of a word and
representing it with a letter tile, (2) rhyme and alliterations tasks similar to that of Bradley and
Bryant (1983), and (3) sound-symbol correspondences (which sounds correspond to which
letters or letter combinations). Group two was the language activity group. They took part in
activities including vocabulary work, listening to stories, semantic categorization and sound
symbol correspondences. The third group received no intervention besides classroom
instruction. Training for all groups consisted of 20-minute sessions, four times a week for seven
weeks. All children were tested prior to training and at the end of the seven-week training period.
The researchers found that the phoneme awareness group performed better on phoneme
segmentation tasks, and had higher reading and spelling scores than the other groups after the
seven-week training period. Both groups one and two were found to perform better on sound
symbol relationships in post-testing than group three. The authors concluded that instruction on
sound-symbol relationships on its own is not enough to facilitate better reading and spelling.
Specific phonological training, as of that in group one, increased children's reading and spelling
scores.

Effects of Bilingualism on Phonological Awareness

Previous researchers have examined phonological awareness and literacy abilities in
children learning two languages. Chiappe, Siegel and Gottardo (2002) examined bilingual and
monolingual children’s performances on tasks of phonological awareness and reading and
writing in kindergarten. Their study included three groups of children: (1) 540 monolingual
English speakers, (2) 59 children who spoke both English and another language at home
(bilingual) and 60 children who spoke only one language at home that was not English (ESL).
The children received phonological awareness training as part of their instructional program in
kindergarten. This training was based on the Launch into Reading Success program (Bennett &
Ottley, 2000) and also included teaching of letter-sound relationships and phonics. Measures of
literacy (reading, letter identification, simple spelling and environmental print), phonological
processing (sound mimicry, rhyme detection, syllable and phoneme identification, phoneme deletion and rapid naming), syntactic awareness, and verbal memory (memory for sentences) were included in testing.

All of the children showed improved scores in literacy from November testing to May testing, although the ESL-learning children showed the greatest growth, possibly because of their recent exposure to English. Spelling performance in May was predicted by letter identification, sound mimicry, reading and rhyme detection performance six months earlier but not by language background. Phonemic awareness (excluding rhyme and syllable identification) was correlated with literacy skills by the end of kindergarten. Monolingual English-speaking children scored higher on rhyme detection in the spring and were more successful at the phonological processing tasks of sound mimicry, rhyme detection, syllable and phoneme identification, phoneme deletion and rapid naming. The ESL-learning and bilingual children performed similarly to the monolingual English-speaking children on tasks of letter identification, simple spelling and word recognition, but the ESL-learning children had lower scores on syntactic awareness and verbal memory than the monolingual English-speaking children. Although there are differences in the levels attained on the tasks, the ESL-learning and bilingual children developed the skills with the same ability as their monolingual English-speaking peers. The ESL-learning and bilingual groups scored comparably to the monolingual group on spelling even though they had differences on phonological processing tasks.

Chiappe, Siegel and Wade-Woolley (2002) and Lesaux and Siegel (2003) gained similar results. In addition, Chiappe, Siegel and Wade-Woolley (2002) found that by the end of grade one, the phonological skills of the ESL-learning children had caught up to those of the monolingual children but their scores on syntactic awareness and working memory had not. Lesaux and Siegel (2003) found that by grade two, the ESL-learning children were significantly better than the monolingual children at reading, rapid naming, real word and non-word spelling
and arithmetic. This suggests a possible bilingual advantage. With a phonological awareness program in effect, ESL-learning children who had poorer phonological skills than their English peers in kindergarten were found to catch up to English peers by grade one.

Research by Nag-Arulmani et al. (2003) examined seven-to nine-year-old ESL-learning children who were having difficulties with literacy in English. The researchers provided a three-week intervention program. One group of children received phonological awareness intervention targeting identification, blending, segmentation, deletion, substitution and transposition in phonemes, syllables and words. Another group received language exposure intervention that involved spontaneous exploration of their second language (L2) in an open-ended interactional setting. Activities included a reading activity, vocabulary building, “silly” sentences, and listening comprehension games. Two control groups were used, one with reading difficulties and one without reading difficulties. These two groups participated in art and craft activities and could interact in whichever language they chose with no feedback on their use of the language.

Results from this study indicate improvements in reading, spelling and letter-sound correspondences in the phonological awareness intervention group, leading to the conclusion that phonological awareness intervention and knowledge, in addition to reading activities and vocabulary, are important for ESL-learning children to attain higher reading and writing skills.

In summary, these studies show the importance of phonological awareness skills in later literacy development. It is important to examine the different levels of phonological awareness (from rhyme to phoneme manipulation) to gain a clear picture of children’s skills and how these skills are involved in writing. Training in phonological awareness has been shown to improve literacy skills in both monolingual and bilingual children. Similarities and differences between bilingual and monolingual children on tasks of phonological awareness and later reading and writing indicate similar abilities as well as possible bilingual advantages.
Spelling Development

The written system of English is basically alphabetic in that it has relationships between the sounds in the language and the letters in the print, but it also has many complexities and irregularities (Treiman, 1993). English is described as a deep orthography language, due to the multiple relationships between phonemes (the individual units of sound in the language) and graphemes (the letters and letter combinations). One of the aspects that make English a more complex language is that it has one-to-one relationships between phonemes and graphemes but it also has one-to-many (e.g., /k/ can be represented graphically by ‘c’, ‘k’ or ‘ck’) and many-to-one relationships (e.g., /θ/ and /ð/ are both represented by the letters ‘th’) (Treiman, 1993). The example of the many-to-one relationship also adds more complexity to the English writing system; two letters, not just one, represent the sounds. Children and adults learning English as a second language, as well as children acquiring English as a first language, have to discover and learn these irregularities in the language. English is also a language with irregular spellings that cannot be worked out by phoneme-grapheme relationships (e.g., ‘said’). These irregular spellings have to be learned.

Stages of Spelling Development

In order to study the development of spelling, Read (1975) gathered samples of children’s writings over different ages and times. From these samples Read (1975) discovered patterns in children’s spelling development. Gentry (1984) took Read’s (1975) patterns and developed a sequence of developmental spelling. This sequence was divided into five developmental stages:

1. Pre-communicative spelling- random strings of letters are put together to make “words” or “stories”. (e.g., OPSPO = eagle)

2. Semiphonetic spelling – letters are beginning to represent sounds but only some sounds are present. (e.g., E = eagle)
3. Phonetic spelling – words are beginning to be represented by their sounds but not all phonemes are represented and sounds are represented by letter names (e.g., EGL = eagle).

4. Transitional spelling – Spellings are beginning to show knowledge of English orthography but are still not always correct (e.g., EGUL = eagle).

5. Correct spelling – Words are correctly spelled.

As children learn more about spelling and the orthography of English, their spelling begins to change and become more conventional.

Spelling development in languages other than English has been examined by Ferreiro and colleagues (Ferreiro & Teberosky, 1979/1982; Ferreiro & Gomez Palacio, 1992, in Kamii & Manning 1999). They found that, as in English, Spanish children begin by writing random strings of letters. When English children begin to represent sounds, they usually represent consonants (e.g., pp = pop). In contrast, Spanish children begin to use vowels to represent syllables (e.g., o o = gato). Spanish children also begin to represent words phonetically, but leave out some phoneme-grapheme correspondences. Eventually Spanish children reach correct spelling. Similarities and differences in spelling development are seen between these two languages due to different aspects of each language system.

Roper (1991) has further expanded on Gentry’s (1984) stages of spelling development and used these as a way to identify at which level of spelling development children may be. This system includes six parameters of spelling knowledge along with the five stages of spelling development (based on previous research – Beers & Beers, 1981; Gentry, 1982). The present study examined children’s later spelling abilities in single word dictation; therefore, Roper’s parameters 2 (directionality –left/right, top/bottom), 4 (upper and lower case) and 5 (word segmentation- words separated in sentences) were not included (refer to Roper, 1991, for further explanations of these parameters). Parameters used were as follows:

Parameter 1. Sound symbol correspondence
Parameter 3. Vowel sound representation

Parameter 6. Type of spelling strategy evidenced by spelling errors: Invented acoustic-articulatory versus visual-orthographic strategies.

Each of these parameters has different features in each stage of spelling development. These are outlined for the stages grade one children were found to be in:

Stage III: Phonetic Spelling

Parameter 1. One-to-one sound-symbol correspondence (not necessarily by correct letters) is evident in most words spelled.

Parameter 3. Vowel sounds are represented, either correctly or incorrectly in most syllables.

Parameter 6. Visual/orthographic strategies for vowels emerges at Stage III, where we see the following kinds of spelling errors:

i. incorrectly spelled vowel digraph patterns (e.g., YOOS/use, CLAUD/cloud; where the / means for)

ii. short vowel substitution by using the letter which typically represents the sound, rather that by using the letter-name strategy (e.g., SAM/some, LANDID/landed).

iii. reduction of invented articulatory/acoustic strategies as new visual/orthographic strategies for spelling emerge, but strategies noted in Parameter 6, Stage II continue to be used.

Stage IV: Transitional Spelling

Parameter 1. One-to-one sound-symbol correspondence is evident for all words spelled. Words are not necessarily conventionally spelled.

Parameter 3. Vowel sounds are represented, typically correctly, in all syllables.

Parameter 6. Visual/orthographic strategies rather than invented articulatory/acoustic strategies are evident in most spelling errors. The letter-name strategy is absent. New visual orthographic strategies include:

i. overgeneralization of punctuation (e.g., CONE’s/cones, ROBOT’s/robots)
ii. overgeneralization of word segmentation (e.g., LIFT IT/ lifted, A GO/ago)

iii. surface sounds represented by commonly occurring English letter sequences (e.g., SPASHUTUL/spaceshuttle, Picher/picture)

iv. E-marker incorrectly used (e.g., CLIME/climb, PUTE/put)

v. E-marker omitted in otherwise correctly spelled words (e.g., THER/there, WHER/where)

vi. Reversal of commonly occurring English letter sequences (e.g., OPNE/open, TIGRE/tiger).

Each parameter was given a different stage score depending on the child’s spelling. The stage scores of each parameter were added to produce a modal spelling score. This was determined by having at least two parameters at a specific stage. For example if a child scored at stage III for parameter 1, stage IV for parameter 3 and stage III for parameter 6 they would receive a modal spelling score of stage III.

Spelling Development in ESL-learning Children

Although the spelling development of English children has been examined, it is also important to discuss spelling development and abilities of children who are learning English as a second language. Current research on spelling differences between ESL-learning and monolingual English-speaking children have shown differing results on spelling achievement. Some researchers have found no difference on measures of real word spelling versus pseudo-word spelling (e.g., Wade-Woolley & Siegel, 1997; Chiappe, Siegel, & Wade-Woolley, 2002). Others have found that ESL-learning children have performed better on measures of real word and pseudo-word spelling (e.g., Lesaux & Siegel, 2003), and yet others have found that ESL-learning children have performed more poorly on pseudo-word spelling (e.g., Wang & Geva, 2003a). Pseudo-words are used to factor out participants’ sight word knowledge or memorization of word spellings. They provide information on how a participant incorporates
their knowledge of rules and relationships between spoken words and written words that they have never encountered.

As discussed earlier, Chiappe, Siegel and Wade-Woolley (2002) examined children from differing language backgrounds and their abilities in English (their second language). This study indicated that monolingual English-speaking children and ESL-learning children not at risk for reading failure in kindergarten, could read and spell with comparable levels of accuracy in pseudo and real words. Lesaux and Siegel (2003) examined similar groups of children and found that by grade two the ESL-learning children performed significantly better than monolingual English-speaking children on tasks of real word and non-word spelling.

Wang and Geva (2003a) examined the English spelling abilities of children whose first language was Chinese. The participants were 30 Cantonese-speaking children (age 7;3) who had received literacy instruction in Cantonese as well as literacy instruction in English, and 33 monolingual English-speaking children (age 7;4). The testing took place when these children were in grade two. Testing included vocabulary, nonverbal ability, real word spelling, pseudo-word spelling, confrontation pseudo-word spelling and spelling selection. For the confrontation pseudo-word spelling children were shown a word for two seconds, then asked to write the word. Words consisted of orthographically legitimate words (e.g., ‘NESH’) and orthographically illegitimate words (e.g., ‘NFSH’). For the spelling selection task children were asked to listen to a word, then match the auditory stimulus with the correct written stimulus. Both groups of children performed equally well on spelling real words but ESL-learning children performed more poorly on spelling pseudo-words. This was explained by the lack of phoneme-grapheme relationships, which were not present in their logographic language (Wang & Geva, 2003a). The ESL-learning children did better then the monolingual English-speaking children on visually presented, orthographically legitimate words. This further indicated that the ESL-learning children are transferring their skills from their logographic language to the spelling of English.
Longitudinal data of these children from another study by Wang and Geva (2003b) showed that phonological sound differences between the first language and English influenced spelling errors. They found that if a sound was absent in the first language (Chinese), the absence might contribute to spelling errors in English. For example, they looked at the English phonemes /ʃ/ and /θ/ and found that, because the ESL-learning children did not have these sounds in their first language (Chinese), they made errors in spelling English words containing these sounds. It was also found that the children substituted the closest sound in their phonemic inventory, substituting /s/ for /ʃ/ and /s/ or /z/ for /θ/ in their spelling.

Similar results have been found in Spanish-English bilingual children. Fashola, Drum, Mayer and Kang (1996) looked at Spanish ESL-learning students and monolingual English-speaking students in grades two, three, four and six. They examined the students spelling abilities in English and found that Spanish students in all grades (although the number of errors decreased with age) had spelling errors consistent with Spanish phonological and orthographic rules. For example, in Spanish, /x/ is represented orthographically by the letter ‘j’ and is the “closest” Spanish phoneme to the English /h/. Therefore a word such as ‘hero’ in English would be spelled ‘jero’ when relying on Spanish orthography and thus lead to an orthographic error. A similar error was seen for /ʃ/. The English sound /ʃ/ is not in the Spanish phonetic inventory, and so they tended to substitute /ʃ/ with /ʃ/, the closest phoneme from Spanish.

In summary, the English writing system is complex and irregular. It requires one to learn rules and irregularities to become a competent speller. Individuals learning English as a second language may have difficulties learning all the rules and irregularities. The studies mentioned in the above section show the differences and similarities found in ESL and English spelling. Some studies found that ESL-learning students had more difficulty with pseudo-word spelling tasks. Other studies found that students from both monolingual and ESL-learning groups had equivalent spelling abilities by the end of kindergarten or beginning of grade one, while others
found that by grade two ESL-learning students have better spelling abilities than monolingual students. The first language background of the ESL-learning students is important to examine in conducting research, due to the findings that the writing and phonological systems of the first language have been found to influence the second language.

Factors Effecting Literacy Development

*Bilingualism and Language/Literacy Development*

Studies with bilingual children have revealed some advantages over monolingual children as well as some disadvantages in the early stages of metalinguistic awareness and literacy development. Studies reviewed by Hakuta (1986) investigated disadvantages and advantages of bilingualism. These studies revealed that bilingual children were considered at a disadvantage in cognitive development due to their lower IQ scores. The problem with this belief is that the IQ tests were completed in English (the non-dominant language) possibly revealing the bilinguals' lack of proficiency in English, not lower mental abilities. Bilinguals were not 'handicapped,' but their IQ was being measured according to an English-based IQ test and did not take into account their socio-economic background and lower skills in English. Later studies (e.g., Peal & Lambert, 1962) controlled for socio-economic background and language ability and looked at children who were equally proficient in their first language and their second language and compared them with scores of monolingual children. These studies found that the bilinguals were more advanced in "cognitive flexibility" and had advantages compared with monolingual children. Again the methodology behind these studies is questionable in that there is no random sample of children and their different levels of bilingualism were not examined (Hakuta, 1986). The type of methodology utilized in research has played a key role in finding out whether bilingualism is a positive or a negative influence on cognitive and language development.
Positive Effects of Bilingualism on Language/Literacy Development

Recent research has further examined the possible advantages and disadvantages of bilingualism on literacy development and on metalinguistic awareness. Bialystok (2001) identified three stages of literacy: (1) preliteracy - children build the concept of symbolic representation and start to learn about the written system of language, (2) early reading - children learn the rules for decoding the language, and (3) fluent reading - the meaning of the written language becomes the main focus. Bialystok (1988) examined the influences of bilingualism on levels of linguistic awareness in grade one children (age 6;6 to 7;0). Her groups consisted of 20 monolingual English-speaking children, 20 partial English-French bilinguals (these students spoke English at home but were instructed in French at school and had only French literacy skills), and 17 fluent French-English bilinguals (these students spoke French and English at home, had both French and English literacy skills and were educated in French). These children were matched on levels of IQ. All children completed three tasks of metalinguistic ability that were tested in English. These were: (1) arbitrariness of language (a measure of control processing), (2) concept of word, and (3) syntax correction. Arbitrariness of language consisted of the experimenter changing the labels of a pair of familiar words and asking questions about the ‘new’ labels. With the “sun/moon” problem, for example, the children were asked, “If you could make up names for things could you call the sun the moon and the moon the sun?” The children were then told that this would indeed be possible. It was then suggested that everyone could call the sun the moon and the moon the sun. The children were then asked questions such as “What would you call the thing in the sky at night?” Children were given a correct score if they answered ‘sun.’ Similar questions were asked about ‘cat’ and ‘dog.’ For the “concept of word” task, children were shown written words representing objects, numbers, verbs, conjunctions and phrases and asked to tell the experimenter which ones were words. They were also asked to define what a word was. The “syntax correction” task required
the children to listen to a sentence with incorrect syntax, and then repeat the sentence back with correct syntax.

The monolingual children scored higher than the full and partial bilinguals on the English vocabulary test, and the full bilinguals scored higher than the partial bilinguals on the French vocabulary test. Both groups of bilinguals scored higher than the monolinguals on the “sun/moon” task, which indicates that the bilingual groups have a better awareness of the arbitrariness of language. There were no differences found for the judging of words task, but the full bilinguals did better than partial and monolinguals on the definition of words. Bilingual children appeared to have a better idea of what words are and how to define them. The full bilinguals did better on correcting sentences for syntax than the partial bilinguals and the monolinguals, and the partial bilinguals did better than the monolinguals. This study showed an overall bilingual advantage on metalinguistic skills of thinking about language and attaching meaning to form (an important reading skill). Although English children presumably do obtain these skills eventually, the bilingual children seem to obtain them earlier.

Another study by Bialystok (1997) examined literacy acquisition in bilingual children. This study looked at three groups of children who were 4 and 5 years old. The first group were monolingual English children, the second were French-English bilingual children (who spoke French and English at home and attended French schools), and the third group were Chinese-English bilingual children (who spoke Mandarin and English at home, had an English preschool program and had weekly Mandarin language classes). None of the children could read words but could recognize written form (e.g., could recite the alphabet, name letters and say the sounds they made, print or recognize their name in print). Three tasks were completed in both languages for the bilingual children. These included a vocabulary task, the “moving word” problem and the “word size” problem. The vocabulary task was a standardized task of vocabulary comprehension (Peabody Picture Vocabulary Task-revised; Dunn & Dunn, 1981).
The "moving word" problem looked at children's understanding of symbolic relationships and how they vary. This requires an understanding of the fact that the meaning of a word is represented by a written word and that meaning does not change with variation in context. Children were asked to name two pictures placed in front of them. Two cards with the written names of the pictures were placed under the corresponding pictures and the children were told what each card said. The children were then asked what each card said. While the children were distracted the cards were switched. Children were again asked what each card said. The "word size" problem was designed to examine the children's understanding that spoken language is represented by print. Word pairs included those that were consistent (size relation of the word was the same as the size relation of the objects e.g., 'hat/rhinoceros;' for the Chinese children, the relation was between the amount of strokes used in the character and the size of the objects), and inconsistent (size of the words was different from size of the objects, e.g., 'dandelion/bus').

Both groups of bilingual children did better than the monolinguals on the "moving word" problem, which suggests a possible bilingual advantage for identifying print as connected to language. The "word size" task results depended on the first language. The French-English bilinguals scored equally to their monolingual peers. The languages of the two groups of children were both alphabetic in nature and relied on the letter-sound correspondence rules. The Chinese-English children scored better on the "word size" task than both other language groups, which suggests that their first language writing system influenced their ability on the task by providing a more visual connection between written and spoken words. It is important to note that bilingualism was not harmful for any of these skills; bilingual children did not score lower than the monolingual children.

In summary, it seems that bilingual children develop metalinguistic skills in thinking about language and attaching meaning to the written form earlier than monolingual children. Their exposure to more than one language provides them with an increased awareness of
language. They have an advantage when it comes to knowing that print is connected to language. It is important to notice that different writing systems (Chinese versus English and French) in the first language can influence performance in the second language. It is important then to examine the written system of the first language to find reasons for a bilingual advantage. These advantages in metalinguistic awareness will help bilingual children in later developing reading and writing skills. Bilingual children may develop reading and writing skills earlier than monolingual children due to their metalinguistic knowledge.

Transfer and Interference of Bilingualism on Language/Literacy Development

In addition to studies revealing advantages of bilingual children on metalinguistic awareness tasks, studies on transfer or interference of skills from the first language onto the second have also been completed. As bilingual children learn two languages, the language system of their first language may influence their acquisition of a second language. The children may transfer the skills learned in their first language into their second language. Durgunoglu (in Durgunoglu & Verhoeven, 1998) examined 46 grade one children in two bilingual education classes in Spanish. In grade one these children received most of their instruction in Spanish. They received English instruction in oral proficiency and listening and comprehension, but not in literacy. The predictive measures of this study (measured in November) were phonological awareness in Spanish (segmenting into phonemes or onset/rime and blending phonemes or onset/rime), Spanish syntax (morphological changes and word order), listening comprehension in Spanish, letter identification, functional print (identify an object that uses print, e.g., newspaper, calendar, and describe what it is used for) and concepts about print in Spanish (the experimenter would read a book and ask questions about conventions and function of print). The outcome measures were word recognition and spelling in English and Spanish, and phonological awareness in English (same as Spanish tasks). English word recognition scores correlated with Spanish word recognition and Spanish spelling scores (all three of these were measured in
November). Spanish phonological awareness scores (measured in November) correlated with English phonological awareness scores (measured in January) and accounted for a large amount of variance in English phonological awareness scores. Spanish phonological awareness and letter identification scores also correlated highly with English spelling scores. Spanish phonological awareness and letter knowledge were a major influence on Spanish and English word recognition and spelling abilities as well as on English phonological awareness. These results indicate the importance of phonological awareness and literacy not only in English but also in Spanish. The developmental progression of Spanish literacy skills was also found to be similar to the development of monolingual literacy skills. Since the children from the above study had little experience with English literacy it is evident that their phonological awareness in Spanish transferred positively to their abilities in English.

Quiroga et al. (2002) examined 30 children with Spanish as their first language whose school instruction was in English only. These children lived in an English-speaking country and their families had immigrated within the last ten years. Children were given phonological awareness tasks in Spanish and English. Spanish tasks included blending (blend-syllables, onset-rime units, and phonemes), segmenting (divide a word in to small parts - syllables, onset-rime, and phoneme) and a matching task (match sounds of target word with three alternative choices). Children were then given the Spanish Modified Rosner (Lemos-Britton & Mostafapour, 1997) for phonological awareness and the English Modified Rosner for phonological awareness. These instruments include syllable deletion, single phoneme deletion and phoneme blend deletion. The children were asked to name the letters of the alphabet that were presented in random order. Tasks of vocabulary comprehension and production, listening comprehension, and language comprehension and production tested the children’s oral proficiency in both languages. Verbal intelligence was also measured, as well as real-word and
pseudo-word reading tasks in Spanish and English. The battery of tasks was given in two one-hour sessions on different days or all in one day with frequent breaks between tasks.

Although results from this study indicate that Spanish phonological awareness was correlated with Spanish and English word reading, English phonological awareness was also related to Spanish and English word reading. With further analysis it was found that English phonological awareness uniquely contributed to reading in English and Spanish. It is unclear whether the children's specific knowledge of Spanish phonological awareness transferred to their English phonological awareness.

Bilingual advantages in phonological awareness and transfer effects may depend on the degree of difference between the first and second language involved. To examine this, a consideration of phonological awareness in other languages is important. Bialystok et al. (2003) examined phonological awareness skills in grade one and two children with three different language backgrounds from a multicultural area: English monolinguals (who had little or no exposure to another language), Chinese-English bilinguals and Spanish-English bilinguals. The bilingual children used their first language (Chinese or Spanish) with family and in the cultural community and English at school and in the environment. All children received English instruction in school. Children completed a task of vocabulary comprehension (Peabody Picture Vocabulary Test-Revised; Dunn & Dunn, 1981) two phonological awareness tasks: phoneme segmentation and phoneme substitution (initial, medial and final). Bialystok et al. (2003) found that the monolingual children scored higher than the Chinese-English bilinguals but the Spanish-English bilinguals did not differ from either group. They found no difference between groups on phoneme substitution tasks. On the phoneme segmentation tasks the Spanish bilinguals performed better than the monolinguals, who in turn performed better than the Chinese bilinguals. The specific language backgrounds, not just bilingualism, seemed to influence performance on these tasks. Spanish has a very similar structure to English whereas Chinese is
quite different. Similarities in structure between two languages would seem to facilitate a
greater knowledge of similar skills between the languages.

Wang, Koda and Perfetti (2003) studied college students with a background in either
Korean (an alphabetic L1) or Chinese (a nonalphabetic L1) literacy background. The majority of
these students were learning English at the English Language Institute at a university. This study
provides information on the knowledge that bilingual students have about the two languages and
also information on language transfer depending on the writing system of a student’s first
language. Korean is an alphabetic language somewhat similar to English in that it relies on
grapheme-phoneme correspondences in reading, whereas Chinese is a non-alphabetic language
that relies more on orthographic-visual information. Wang et al. (2003) looked at semantic
category judgement and phoneme deletion. For semantic category judgement, participants were
shown a written word for a category name (e.g., flower) and then another word (e.g., rows).
They then had to judge whether the word was a member of the category given (e.g., whether
‘rows’ is ‘a flower’). The choices for category members could be phonologically similar
(homophones–‘beach/beech’) or spelled similarly (spelling controls–‘beach/bench’). The foil for
this category member would have similarly spellings (‘beech/bench’). The foils could also have
less similar spellings (‘bear’ – ‘bare/beat’). The phoneme deletion task consisted of initial, final,
middle and cluster deletion. Students read a word, and then removed a designated sound. They
then said the resulting word and wrote it down. All word resulted in new words (e.g., ‘might’
without /t/ is ‘my’).

In this study Wang et al. (2003) found that the Korean students performed better on the
phoneme deletion tasks by showing a great awareness of phonological skills. This was
considered to be due to their L1. These students had more orally correct responses to deletion
and more correct spellings of the words after deletion. For the semantic category judgements,
results indicated that the Chinese students were not affected by homophone foils and were better
at judging less similarly spelled foils. These results indicate that the Chinese students are more attentive to the orthographic information in a word. They use their previous knowledge of orthographic skills of their first language in their second language.

A study by Hvenekilde (in Durgunoglu & Verhoeven, 1998) examined the Norwegian spelling abilities of 10-to 17-year-old native speakers of Turkish and Vietnamese. The students had been in Norway for one to six years. The children’s early literacy and language abilities in their first language appeared to play a large role in their literacy learning in Norwegian. Vietnamese students had fewer spelling errors but their writings had less meaning. For example Vietnamese students may have written ‘farlig’ (meaning danger) when the word should have been ‘ferdig’ (meaning finished). These children were recognizing the words as larger units, substituting one word for another, which changed the meaning of their writing. The Vietnamese reading instruction prior to Norwegian was focused on letter introduction and letter combinations. Vietnamese is a monosyllabic language and therefore words are shorter and may be easier to memorize in chunks. The Turkish students had many spelling errors that stemmed from their different phonological system. Turkish does not have initial consonant clusters, so when writing in Norwegian (which allows consonant clusters) the Turkish children tended to insert vowels. These students were relying on their knowledge of their first language literacy and phonology, which increased their number of errors in Norwegian words.

In summary, these studies show that bilinguals have a possible advantage in tasks of metalinguistic awareness, in that they are able to make the connection between spoken language and print earlier than monolingual children. Bilinguals have also been found to transfer aspects (phonological awareness, writing system) from their first language to their second language. Some of these aspects can interfere with the second language if the systems of the two languages are different but some advantages were also found for different systems.
Early Literacy Exposure

As research by Read (1975) and Gentry (1984) suggests, children tend to go through stages of spelling development as they experience literacy activities. Early literacy experiences prior to school involving book reading, and print knowledge have been found to contribute to later literacy skills (Dickinson and Tabors, 1991). Home literacy experiences (e.g., early reading, 'writing', sound play, nursery rhymes) can contribute to vocabulary development, letter name knowledge and early concepts of print (Evans, Shaw & Bell, 2000). Most children are able to identify rhyming words before entering kindergarten and this ability could be due to exposure to nursery rhymes (Bradley & Bryant, 1983; Bryant et al., 1990). These studies also found that knowledge of or ability to complete nursery rhymes was a precursor to later phonological awareness, which is related to literacy development. Talking about language and becoming aware that language can be spoken and written, are skills that pre-readers and writers can acquire before entering school. By being more aware of language early on, children have a head start in literacy abilities needed for later reading, writing and understanding (Evans et al., 2000). Due to these previous findings, effects of exposure to early literacy are an important factor to consider when studying ESL-learning and monolingual children.

English and Vietnamese Phonemic Inventories

Due to previous findings that first language phonology can affect spelling development, the phonemic inventories of English and Vietnamese will be examined and a brief description of the Vietnamese language given. The phonemic inventories of English (Kent & Read, 1992) and Vietnamese (Lowe, 1994) (the language focus of this study) can be found in appendix A. Vietnamese, like English, is an alphabetic language. Unlike in the deep orthography of English, in Vietnamese, each speech sound corresponds to a single phoneme. The language has few consonant clusters, is a tonal language and is also monosyllabic (Hwa-Froelich, Hodson & Edwards, 2002). The phonemic inventories indicate that the sounds /θ/, /ð/, /ɕ/, /dʒ/, /ʒ/, /ʃ/, /ι/,
and /u/ occur in English but do not occur in Vietnamese and the sounds /θ/, /tʰ/, /s/, /z/, /n/, /l/, /d/, /c/, /ʃ/, /x/, /v/, /o/, /w/ and /l/ occur in Vietnamese but not in English. Vietnamese speakers of English may make spoken substitutions for sounds that cause difficulty (Hwa-Froelich et al., 2002). For example:

<table>
<thead>
<tr>
<th>Vietnamese</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>/θ/</td>
<td>[t], or [s]</td>
</tr>
<tr>
<td>/θ/</td>
<td>[d], or [z]</td>
</tr>
<tr>
<td>/p/</td>
<td>[b]</td>
</tr>
<tr>
<td>/p/</td>
<td>[b] or [z]</td>
</tr>
<tr>
<td>/g/</td>
<td>[k]</td>
</tr>
<tr>
<td>/g/</td>
<td>[k] or [ʒ]</td>
</tr>
<tr>
<td>/j/</td>
<td>[z]</td>
</tr>
<tr>
<td>/j/</td>
<td>[z] or [ʒ]</td>
</tr>
<tr>
<td>/s/</td>
<td>[ʃ]</td>
</tr>
<tr>
<td>/s/</td>
<td>[ʃ] or [ʒ]</td>
</tr>
<tr>
<td>/ʃ/</td>
<td>[ʃ]</td>
</tr>
</tbody>
</table>

There are few consonants found in the final position of Vietnamese words and these tend to be produced in English as follows (Hwa-Froelich et al., 2002):

<table>
<thead>
<tr>
<th>Vietnamese</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>/b/</td>
<td>[p]</td>
</tr>
<tr>
<td>/d/</td>
<td>[t]</td>
</tr>
<tr>
<td>/t/</td>
<td>[p]</td>
</tr>
<tr>
<td>/v/</td>
<td>[b] or [p]</td>
</tr>
<tr>
<td>/s/, /z/, /ʃ/</td>
<td>[s] or [ʃ]</td>
</tr>
<tr>
<td>/ʃ/</td>
<td>[ʃ]</td>
</tr>
</tbody>
</table>

Initial consonants /t/ and /k/ are unaspirated in Vietnamese. To an English speaker, Vietnamese /t/ and /k/ might sound like /d/ and /g/. Along with phonology differences between the two languages, Vietnamese ESL-learners might have differences in spelling because letters represent different sounds in the two languages. For example, ‘ch’ at the end of a word is pronounced /t/, initial ‘d’ is /d/, ‘gi’ initially is /d/, initial ‘nh’ is /nj/, initial final ‘t’ is /t/, /k/ or /p/ depending on the preceding vowel, initial ‘th’ is /t/ and initial ‘x’ is /s/. Knowledge of both Vietnamese and English phonological and writing systems is necessary when examining the early spellings of children from these language backgrounds.

**Summary**

Previous research has found that phonological awareness is positively correlated with literacy development. Specifics of this research indicate that score on the more difficult
phonological awareness tasks outlined by Adams (1990), such as phoneme manipulation, are more highly correlated with reading and spelling ability than the easier tasks of rhyme and sound oddity. These positive relationships have also been found for ESL-learning students although fewer studies in this area have been conducted. Researchers examining spelling development have found that children tend to go through stages in their development (Gentry, 1984; Read, 1975). Roper (1991) further examined these stages and developed a system that enables people to score spelling samples and derive spelling stage scores for children. Differing results have been found in studies comparing ESL-learning and monolingual English-speaking children's spelling abilities. Some research indicates that both groups of children perform equally (Chiappe, Siegel, & Wade-Woolley, 2002; Wade-Woolley & Siegel, 1997), others indicate that ESL-learning children perform lower than monolingual English-speaking children on non-word spelling, and yet others indicate that by grade two, ESL-learning children perform higher than monolingual English-speaking children on real and non-word spelling. In addition, first language phonology has been found to affect spelling. Sounds that are not shared between two languages have been shown to relate to errors in spelling (Fashola et al., 1996; Wang & Geva, 2003a). Early literacy exposure has also been found to affect spelling. Exposure to book reading at an early age has been correlated with later literacy abilities. Previous research has found possible advantages for bilinguals on tasks of metalinguistic awareness such as thinking about language and attaching meaning to form (Bialystok, 1988). Similarities between first and second languages have been found to show a possible advantage to bilingual children whereas differences between languages have been found to show a possible disadvantage (Fashola et al., 1996; Wang et al., 2003; Wang and Geva, 2003a).
Research Questions

In order to examine the effects of bilingualism on literacy development and to further explore the effects of additional factors as identified in the literature review above, the following research questions were devised:

1. Are there significant differences in the number of spelling errors made by ESL-learning children and monolingual English-speaking children?

2. Are the errors influenced by the sounds used (phonology) in the first language of the child?

3. Are the errors influenced by the child’s exposure to print and literacy activities?

4. Are the number of spelling errors correlated with the child’s degree of phonological awareness in English?

Predictions

1. ESL-learning children may have more spelling errors than monolingual English-speaking children.

2. Sounds that are not shared between English and Vietnamese may result in spelling errors in English.

3. Children with more exposure to print and literacy activities will produce fewer spelling errors.

4. Children with higher phonological awareness will have fewer spelling errors.
METHOD

Participants

This study consisted of eight children from a suburban school in the Lower Mainland, British Columbia. Participants’ parents were contacted through letters that were given to the children’s teachers and sent home with all children in grade one. Only those children whose parents consented to their child’s participation took part in the study. The children were divided into two groups: those whose first language was English (N = 5) and those whose first language was Vietnamese (N = 3). Children with Vietnamese as their first language spoke Vietnamese fluently at home with their parents and some attended Vietnamese school once a week. All five of the children with English as their first language, and one of the children with English as their second language, came from the same grade one classroom within the school. The two other children with English as their second language (ESL) came from a grade one/two split classroom within the same school. Table 1 shows information about the participants. Children ranged in age from 6;8 to 7;4. There were seven boys and one girl. The teacher of participants 6, 7 and 8 indicated that they had been receiving speech and language services since entering kindergarten. All three of these children were English-speaking and came from the same classroom. Specifics of the services provided were not obtained due to lack of parental permission to contact the Speech-Language Pathologist, although it was stated that the children were continuing to receive speech and language services.

Table 1: Participant Information

<table>
<thead>
<tr>
<th>ID Number</th>
<th>First Language</th>
<th>Age</th>
<th>Sex</th>
<th>Reading Level</th>
<th>Receiving SLP services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vietnamese</td>
<td>6;8</td>
<td>Male</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Vietnamese</td>
<td>6;9</td>
<td>Male</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Vietnamese</td>
<td>6;8</td>
<td>Male</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>English</td>
<td>7;4</td>
<td>Male</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>5</td>
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<tr>
<td>6</td>
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<td>18</td>
<td>✓</td>
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<tr>
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<td>6;8</td>
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<tr>
<td>8</td>
<td>English</td>
<td>7;0</td>
<td>Male</td>
<td>17</td>
<td>✓</td>
</tr>
</tbody>
</table>
Teachers provided reading level scores from a leveled reading assessment (*PM Benchmark Kits*; Nelley & Smith, 2001) that they completed with each child. This assessment consisted of two parts, namely reading production and comprehension. During the first part the teacher kept a running tally of reading errors as the child read from a book. The teacher then asked the child comprehension questions based on the book the child had just read. This is a standardized test that is used to identify and assess reading abilities throughout school districts across Canada. It uses fiction and non-fiction texts and involves a reading record sheet as well as an assessment record sheet. Scores were determined according to the standardized guidelines for assessing data. This assessment is used for children in kindergarten to grade six and has a reading level range from 1-30. Grade one students tend to have scores at level 16, grade two students at level 20 and grade three students at level 24. Reading level scores for children in this study ranged from 17 to 30, which are average to above average for the children’s grade level.

The ESL-learning children received extra English instruction from an ESL teacher once per week for half an hour. According to classroom teachers these sessions consisted mostly of phonics work. Two out of the three ESL children reported that they attended Vietnamese school on Saturdays where they learned to read and write in Vietnamese.

**Measures and Procedures**

A parent or a guardian of each participant completed a language and literacy background questionnaire prior to testing (see appendix B). Reading level scores were obtained from classroom teachers and a series of tasks were completed with each participant. These tasks included an English articulation and phonology evaluation (*CAPES – Computerized Articulation and Phonology Evaluation*; Masterson & Bernhardt, 2001), a letter identification task, three phonological awareness tasks, two reading tasks and two spelling tasks.
Each child participated in two individual sessions of thirty minutes each. Sessions took place in a quiet room within the school. Tasks were balanced across the two sessions and began and ended with “easier” tasks to provide children with a sense of success. Session one consisted of the articulation and phonology evaluation, a real word spelling task, a real word reading task, a phoneme deletion task and a letter identification task. Session two consisted of a non-word spelling task, a non-word reading task, a phoneme deletion and substitution task and a rhyming task.

**Articulation and Phonological Evaluation (CAPES)**

The articulation and phonology evaluation examined the participant’s production of all English phonemes (except /ʃ/) in a variety of word structures and positions using the phonemic profile of the CAPES (Masterson & Bernhardt, 2001). This test of 46 words was used to reveal the children’s phonemic repertoire, which allows for investigation of the possible connection between sound production differences and their effects on children’s spelling in English. A Toshiba lap top computer was used to administer the articulation and phonology evaluation. The children’s responses were also recorded on an Optimus (CTR-115) voice-activated cassette tape recorder.

For this task children were shown colour pictures one at a time on a computer screen and were asked to tell the experimenter the name of each picture. If the children did not correctly name the picture (i.e., the target sounds were not produced) they were prompted with a fill in the blank (e.g., while looking at a picture of a girl with an open book the experimenter would say, “She’s turning the ______”), questions or asked to think of another name for the object presented. If they still did not name the picture using the word with the target sounds they were told the word and asked to repeat it. The participants’ responses were tape recorded for later transcription verification, entered into the computer program and the next picture was displayed.
Letter Identification Task

This task was used to examine the children’s ability to identify the 26 letters of the English alphabet, presented in lower case. It provided information on the children’s familiarity with the written letters of English. Each letter was presented to the child individually and the child was asked to say the name of the letter presented (see appendix C). A score of one was given for each letter the child named correctly. The scores were added and converted into a percentage correct score.

Phonological Awareness Tasks

These tasks were adapted from Lesaux and Siegel’s (2003) tasks used in their previous study on the development of reading in children who speak English as a Second Language. The phonological awareness tasks were designed to look at the children’s ability to manipulate and identify the sounds in words. Tasks included rhyming, phoneme deletion, and phoneme deletion and substitution as follows:

1. Rhyming task. This task consisted of three demonstration items and ten test items (see appendix D). Participants were shown four pictures together (a picture of a target word above three other pictures, one word of which rhymes with the target) corresponding to four words. They were told the name of the target word and asked which of the other words rhymed with the target word. For example, children were shown a picture of a cat along with three other pictures: a fish, a sun and a hat. The examiner said the word *cat* and then pointed at the other pictures as the labels *fish, sun* and *hat* were said. The child was then asked which one (*fish, sun* or *hat*) rhymed with *cat*. For the demonstration items the examiner provided corrective feedback if the incorrect rhyming word was chosen. During the test items no feedback was provided. A score

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I acknowledge Dr. Linda Siegel and thank her for providing me with these tasks and allowing me to use these measures in my study.
of one was given for each word that correctly rhymed with the target word. The number of correctly identified rhyming words was added and converted into a percentage score.

(2) Phoneme deletion task. This task consisted of initial phoneme deletion and final phoneme deletion each with three demonstration items and ten test items (see appendix E). Participants were shown a picture (e.g., a picture of a cat) and for the demonstration items they were provided with an example of phoneme deletion (e.g., "Cat without /k/ says ‘at’") as well as corrective feedback. For the test items the child was given the prompt of the word without the initial sound and asked what the word said (e.g., “Bus without /b/ says...”). No feedback was provided. This task was also completed with sounds at the ends of words (e.g., “Cat without /t/ says ‘ca’”). In the initial sound deletion task, an English word resulted after the sound was deleted (e.g., ‘cat’ to ‘at’, ‘bus’ to ‘us’). This was not the case for most of the final sound deletion, where deletion of the final sound resulted in a non-word. One point was given for each correct deletion of the sound required. Points were added and scores were converted to percentages.

3) Phoneme deletion and substitution task. This task consisted of initial, final and sound blend deletion and substitution. There were two demonstration items and four test items for each category (see appendix F). Participants were provided with a word (e.g., ‘goat’) and were given the same instructions as for the phoneme deletion task. The children were then asked to say the word again and then change the first sound to a different sound (e.g., “Say ‘goat.’ Now change /g/ to /b/”). This procedure was completed with sounds at the ends of words and in blends (e.g., ‘slip’- change /l/ to /n/). All sound substitutions resulted in a new real English word. For demonstration items children were provided with corrective feedback. During test items no feedback was provided. One point was given for correct deletion of the sound and another point was given for correct substitution of the sound. If a child deleted or substituted the sound correctly but changed another part of the word, they were given half a point (e.g., ‘slip’ became
'snilt' instead of 'snip,' the child correctly substituted /n/ for /l/ but changed the end of the word).

Reading Tasks

These tasks were used to measure the participants' early reading abilities with simple real words and non-words (see appendices G & H). They were also adapted from Lesaux and Siegel's (2003) work. The real word reading task consisted of ten simple, familiar one-syllable words, and the non-word reading task consisted of ten one-syllable non-words, some of which were orthographically similar to the real words (e.g., 'said,' 'yaid'). All of the real words should have been relatively easy for the grade one children to read, due to the frequency and familiarity of the words.

(1) Real Word Reading: The list of ten real words was presented to each participant one word at a time. Each word was presented on a card typed in Times New Roman 48 point font. The child was asked to read the word on the card as best they could. The experimenter paused to write the child's pronunciation of each word after the child read it. If the child made a correction to a word during this time the correct reading was recorded and used as the child's final answer. Words read were scored as correct or incorrect according to proper pronunciation of the word. Exceptions were made for words produced with an articulation mismatch. These types of reading errors were scored as correct. One point was given for each correctly read word. Points were added and scores were converted into percentages.

(2) Non-word Reading: Prior to the presentation of the words the children were told they would be presented with made-up words they had never seen before. They were asked to read the words as best as they could. The list of ten non-words was presented to the participant one word at a time. Each word was presented on a card typed in Times New Roman 48 point font. The experimenter paused to write the child's pronunciation of each word after the child read it. If the child made a correction to a word during this time, the correct reading was recorded and
used as the child’s final answer. Non-words read were scored as correct if the child provided a
correct grapheme-phoneme correspondence for the word (e.g., ‘pood’ like ‘food’) or a correct
pronunciation according to English spelling rules (e.g., ‘pood’ like ‘good’). One point was given
for each correctly read word. Points were added and converted to percentages correct.

**Spelling Tasks**

These tasks were designed to examine and measure the participants’ early spelling
abilities of single words of varying syllable length. Tasks included a list of twenty real words
and twenty non-words (see appendices I & J). Ten of the twenty words in each list were
borrowed from Lesaux and Siegel’s (2003) work and ten new ones were added for the purposes
of this study. Words were examined to include sounds used in English, particularly those sounds
that are not used in Vietnamese (e.g., ‘jug,’ ‘thick,’ ‘cherry’). Words for the non-word list were
also chosen to correspond with the real words in English for comparison of spelling (e.g.,
‘measure’ and ‘beasure’) between real words and non-words. The words were also chosen
taking into account spelling rule development and syllable length (e.g., double letter – ‘hill’ and
one to three syllables – ‘pen’ vs. ‘elephant’). The spelling lists consisted of words with regular
spellings (e.g., ‘pen,’ ‘sad,’ ‘gan’) as well as irregular spellings (e.g., ‘said,’ ‘love,’ ‘beasure’).

(1) Real Word Spelling: Participants were asked to write their name at the top of the
paper provided for them. They were then asked to write some more words as best they could
and told that it was “ok” to guess at the spelling. The experimenter read the target word alone,
then in a sentence, then repeated the word alone. The children wrote the words on the paper
provided. Participants were asked to tell the experimenter when they were finished writing the
word and the experimenter presented the next word.

(2) Non-Word Spelling: Participants were asked to write their name at the top of the
paper provided for them. They were then told they would be writing words that they had never
seen before. They were asked to write the words as best as they could. The experimenter then
read the target word and repeated it once if asked. The children wrote the word and were asked
to tell the experimenter when they were finished. The experimenter then proceeded to the next
word. If the children began to make up their own non-words they were stopped and reminded of
the task.

Scoring of Spelling Tasks

Real Word Spelling

Real words received either a correct or incorrect score according to the rules of English
spelling. If a word had any spelling errors it was marked as incorrect. (Incorrect words were
classified according to type of error as shown below under ‘Types of Spelling Errors’). Words
with one or more spelling errors were scored and categorized in more detail in the spelling error
scoring that follows. Each correctly spelled word was given a score of one. Words with reversed
letters were scored as correct (e.g., ‘Tug’ for ‘jug’). Incorrectly spelled words were given a
score of zero. The number of correctly spelled words were added and converted to a percent
score.

Non-Word Spelling

Non-words received a score of correct or incorrect according to the rules of English
spelling. Although these words had no “correct” spelling because they were made-up words,
certain rules of English spelling can account for correct or incorrect responses. For example,
spelling of the word /tæv/ as ‘tav’ was counted as incorrect because English words ending with
short vowels and ‘v’ are followed by an ‘e’ (e.g., ‘have,’ ‘love,’ ‘dove’). Although there are
exceptions to this type of rule (e.g., ‘rev’ as in ‘rev your engine,’ ‘Bev’ a person’s name)
children are less likely to have experienced these types of words in print and have been
influenced by them. Spelling of the word /dʒʌf/ as ‘guf’ was counted as incorrect because /dʒ/ is
only written as ‘g’ initially before the ‘ʒ’ sound (e.g., ‘germ,’ ‘giraffe’). Correct scores were
added and converted into percentages (number of non-words correct out of the total number of non-words). It is recognized that because non-words do not have a designated spelling, phonetically spelled non-words (e.g., ‘tav’ for /taev/) could be ‘correct.’ For the purposes of consistency between real words, non-words and error counts, non-words such as ‘tav’ were counted as incorrect and were categorized as a phonetic only error. In the error counts, phonetically spelled words were counted as having only one error.

Types of Spelling Errors

Certain types of errors were particularly frequent in the children’s spelling samples. These errors were then classified into ten mutually exclusive categories for types of spelling errors. One word could contain one or more of these types of errors (e.g. ‘measure’ spelled as ‘mger’ would have a phonetic error ‘er’ for ‘ure,’ a letter sound error ‘g’ for /ʒ/, and a missing sound error ‘no letters’ for /ɛ/; this word would be recorded as having three errors).

(1) Phonetic only errors: These include spellings that reflect one to one phoneme-grapheme correspondences. Errors of this type included ‘tuf’ for ‘tough,’ ‘hil’ for ‘hill,’ and ‘rutashen’ for ‘rutation.’

(2) Phonetic plus errors: These included spellings the reflect phoneme-grapheme correspondences, but they occurred in words that are not strictly phonetically spelled. These words could have other errors in them as well (e.g., ‘tufe’ for ‘tough’ – the word is spelled phonetically but also has incorrect use of final ‘e’; this word would have a phonetic error and a rule violation error).

(3) Letters sound errors: These are errors that arise due to a sound in English having an absence of a specific corresponding letter (e.g., /ʒ/, /ʃ/). Errors of this type include ‘meger’ or ‘mezer’ for ‘measure,’ ‘beger’ for ‘beasure,’ and ‘ckery’ for ‘cherry.’
(4) Missing sounds/letters: These include errors caused by a missing sound or letter in a word. These include errors such as 'elfent' or 'efit' for 'elephant,' and 'ste' for 'steez.' Each missing sound/letter counted as one error.

(5) Added letter errors: These included errors caused by letters added into words. Errors of this type included 'song' for 'sog,' 'hend' for 'head,' 'therery' for 'therry,' and 'saiyd' for 'said.'

(6) Letter name errors: These included errors made using the name of a letter representing a sound. Errors of this type included 'bed' for 'bead' where the letter 'e' is used as sounding like its name rather than the sound it usually makes (e.g., /ɛ/). Other examples are 'chop' for 'chope,' and 'chare' for 'cherry.'

(7) Rule violations: These included errors caused by violating an English spelling rule. Errors included incorrect use or overgeneralization of final 'e,' (e.g., 'cafe' for 'calf,' 'tufe' for 'tough,' and 'soge' for 'sog'), misuse of a letter combination rule such as 'qu' at the beginning of words for /kw/ (e.g., 'qweb' for 'queb,' and 'qween' for 'queen').

(8) Vowel distortion: These included errors caused by substituting one vowel sound for another. Errors of this type included 'pin' for 'pen,' and 'gid' for 'ged.'

(9) Consonant distortion: These included errors caused by substituting one consonant for another. Errors of this type included 'tor' for 'toy,' and 'fick' for 'thick.'

(10) Other: The other category included errors that only occurred once or twice throughout all spelling samples or did not fit into any other category.

Real Word and Non-Word Spelling Errors

The numbers of errors of all types listed above were counted from the children's spelling samples (real words and non-words). These errors were added for each task (real word spelling and non-word spelling) and presented in a raw score as number of errors made. The number of
real word and non-word errors were added to provide the total number of spelling errors on all words. These errors are presented as a raw score as a number of errors made. In order to assess reliability of these spelling error types, two judges scored the data. One judge rated the complete set of data and the other rated 20% of the data. The rate agreement between the two judges was moderately high (Cohen’s Kappa = .77).

Modal Spelling Score

Spelling was also examined using the scoring system developed by Roper (1991). This system provided information on the children’s developmental spelling. By examining spelling using this system, it was possible to see what stage of spelling development children reached, and what type of spelling strategies the children used.
RESULTS

The main goal of this study was to examine early spelling abilities of monolingual English-speaking children and ESL-learning children. In particular, we examined the number and types of errors the children made, possible factors that affected their spelling in English and the relationship between Phonological Awareness (PA) and the children’s spelling. In the following discussion the two groups were compared as though they were equivalent and limitations will be addressed later in the discussion section.

Number and Type of Errors

In order to examine any differences in the number of spelling errors between monolingual English-speaking and ESL-learning children, we first compared the mean scores for real and non-word spelling (real and non-word spelling scores) and mean scores for spelling errors (real word, non-word and total errors) for the two groups. The group mean scores are presented in Tables 2 and 3. A repeated measures ANOVA revealed that the ESL-learning group produced significantly more correctly spelled real words than the monolingual English-speaking group ($F(1,6) = 21.12, p < .01$) and had fewer spelling errors on real words ($F(1,6) = 8.39, p < .05$). There was no significant difference between groups on the number of correctly spelled non-words or the number of non-word spelling errors. The ESL-learning children had fewer spelling errors in total (in both real and non-words combined) (ESL-learning = 26.6, monolingual English-speaking = 44.8).

Table 2. Mean Proportion of Words Spelled Correctly by Language

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<th>ESL</th>
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<td>Mean</td>
<td>SD</td>
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Table 3. Mean Number of Spelling Errors by Language

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<th>ESL Mean</th>
<th>ESL SD</th>
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<td>7.46</td>
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<tr>
<td>Total spelling errors</td>
<td>44.8</td>
<td>12.38</td>
<td>26.6</td>
<td>5.86</td>
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</table>

The types and number of spelling errors made by each child for each word type (real words, non-words and combined) can be found in tables 4, 5 and 6. A summary of the total number of each type of error by word type is presented in Table 7 (most common errors types are underlined). Phonetic errors, including phonetic only and phonetic plus errors, (e.g., ‘tuf’ or ‘tufe’ for ‘tough’) were the most common error type in both real word spelling (62 errors) and non-word spelling (32 errors). The second highest numbers of errors made in real word spelling were missing sounds/letters (25 errors) (e.g., ‘elfent’ or ‘efit’ for ‘elephant’), whereas for the non-word spelling the second highest numbers of errors made were consonant distortions (26 errors) (e.g., ‘fick’ for ‘thick,’ ‘tor’ for ‘toy’). There were three times more consonant distortion errors in the non-word spelling than in the real word spelling.

Table 4. Real Word Spelling Errors by Child and Type of Error

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Table 5. Non-Word Spelling Errors by Child and Type of Error

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<td>E</td>
<td>18</td>
<td>20</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>E</td>
<td>17</td>
<td>22</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>E</td>
<td>17</td>
<td>32</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total errors</td>
<td>17</td>
<td>15</td>
<td>10</td>
<td>19</td>
<td>12</td>
<td>12</td>
<td>18</td>
<td>12</td>
<td>26</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 6. Combined Spelling Errors by Child and Type of Error

<table>
<thead>
<tr>
<th>ID#</th>
<th>LI</th>
<th>RL</th>
<th>TSE</th>
<th>PhO</th>
<th>Ph</th>
<th>LS</th>
<th>MS</th>
<th>AL</th>
<th>LN</th>
<th>RV</th>
<th>VD</th>
<th>CD</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V</td>
<td>23</td>
<td>31</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>V</td>
<td>30</td>
<td>20</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>V</td>
<td>22</td>
<td>29</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>E</td>
<td>30</td>
<td>25</td>
<td>11</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>24</td>
<td>46</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>14</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>E</td>
<td>18</td>
<td>45</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>E</td>
<td>17</td>
<td>49</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>E</td>
<td>17</td>
<td>59</td>
<td>7</td>
<td>8</td>
<td>4</td>
<td>9</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total errors</td>
<td>42</td>
<td>52</td>
<td>26</td>
<td>44</td>
<td>22</td>
<td>18</td>
<td>29</td>
<td>22</td>
<td>33</td>
<td>16</td>
</tr>
</tbody>
</table>

Legend: ID#=identification number of each child, LI= first language; V=Vietnamese, E=English, RL=reading level score, NWSE=total real word spelling errors, TSE=Total spelling errors PhO=phonetic only error, Ph=phonetic plus error, LS=letter sound error, MS=missing sound/letter error, AL=added letter, LN=letter name error, RV=rule violation, VD=vowel distortion, CD=consonant distortion

Table 7. Total Types of Spelling Errors by Word Type

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Real</th>
<th>Non</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phonetic</td>
<td>62</td>
<td>32</td>
<td>94</td>
</tr>
<tr>
<td>Phonetic only</td>
<td>25</td>
<td>17</td>
<td>42</td>
</tr>
<tr>
<td>Phonetic plus</td>
<td>37</td>
<td>15</td>
<td>52</td>
</tr>
<tr>
<td>Letter Sound</td>
<td>16</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>Missing Sound</td>
<td>25</td>
<td>19</td>
<td>44</td>
</tr>
<tr>
<td>Added Letter</td>
<td>10</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Letter Name</td>
<td>6</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Rule Violation</td>
<td>11</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td>Vowel Distortion</td>
<td>10</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Consonant Distortion</td>
<td>7</td>
<td>26</td>
<td>33</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>11</td>
<td>16</td>
</tr>
</tbody>
</table>
Figure 1 shows the average number of errors per type for the two groups of children for real words. A repeated measures ANOVA (analysis of variance) was completed between first language and type of spelling error. The monolingual English-speaking group had significantly more total phonetic errors in real word spelling than ESL-learning group ($F(1,6) = 5.85, p = .05$). The monolingual English-speaking group also had significantly more consonant distortion errors in real word spelling than ESL-learning group ($F(1,6) = 6.89, p < .05$). No significant error differences were found between language groups in non-word spelling or for real word and non-word errors combined.

![Mean Number of Real Word Errors by Type and Language](chart.png)

Ph=phonetic errors, LS=letter sound error, MS=missing sound/letter error, AL=added letter, LN=letter name error, RV=rule violation error, VD=vowel distortion, CD=consonant distortion

Figure 1. Mean Number of Real Word Errors by Type and Language

Error analysis was also completed according to criteria developed by Roper (1991). This analysis provides additional information on spelling errors made as well as where each child is at in his/her spelling development. Children’s stage level scores for each parameter can be found in table 8. The ESL-learning children were all found to have modal spelling scores at stage IV. The monolingual English-speaking children had modal spelling scores at either stage III ($N = 3$; the children receiving Speech-Language Pathology services) or stage IV ($N = 2$).
Table 8. Parameter and Stage Scores

<table>
<thead>
<tr>
<th>ID#(Lang)</th>
<th>Stage III</th>
<th>Stage IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Parameter</td>
<td>Parameter</td>
</tr>
<tr>
<td>1 (Viet)</td>
<td>1</td>
<td>√</td>
</tr>
<tr>
<td>2 (Viet)</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>3 (Viet)</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>4 (Eng)</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>5 (Eng)</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>6 (Eng)</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>7 (Eng)</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>8 (Eng)</td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>

Factors Affecting Spelling

Articulation and Phonology (CAPES)

Six out of the eight children in the study had one or more articulation errors in English as examined by the CAPES program. The children made errors as follows:

Table 9. Articulation/Substitution Errors

<table>
<thead>
<tr>
<th>ID #</th>
<th>θ</th>
<th>δ</th>
<th>s</th>
<th>z</th>
<th>r</th>
<th>l</th>
<th>v</th>
<th>f</th>
<th>dʒ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>f(i,f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>dz</td>
</tr>
<tr>
<td>3</td>
<td>f(i,f)</td>
<td>s</td>
<td>z(i)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>d(m)</td>
<td></td>
<td>w(m)</td>
<td>l(j(m)</td>
<td>b(m,f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>f(i,f)</td>
<td>d(m)</td>
<td>s(m)</td>
<td>b(f)</td>
<td>s(m,f)</td>
<td>dz(i,f)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>f(i,f)</td>
<td>d(i)</td>
<td>z(m)</td>
<td>w(O)</td>
<td>l(w(m)</td>
<td>b(f)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: letters shown in columns next to ID #'s are the phone the child substituted for those labeled above.

*i* = initial, *m* = medial, *f* = final

As shown in the table 9 above, four of the children substituted /f/ for /θ/ initially and finally in words. Two of these four were ESL-learning children and the other two were monolingual
English-speaking children who were receiving SLP services. This substitution error appeared in three (ID #1, 7 and 8) of the four children’s spellings (see table 10). The voiceless ‘th’ sound (/θ/) was present in four of the spelling words, one real word (‘thick’) and two non-words (‘coth’ and ‘therry’). The ESL-learning children who substituted [f] for /θ/ did not make this error in spelling real words but the monolingual English-speaking children who made the substitution did make the error in spelling real words. The real words were read alone and in a sentence, so the children had contextual cues to identify them as the correct words. The non-word spelling words were read only in isolation. The /θ/ to [f] articulation error was the only articulation/substitution error that was also present in spelling. Table 11 shows some spelling samples of children who had other articulation errors.

Table 10. Spelling Errors Due to /θ/ -/f/ Substitution Error

<table>
<thead>
<tr>
<th>Child</th>
<th>Language</th>
<th>Substitution</th>
<th>Real Word</th>
<th>Non-Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Vietnamese</td>
<td>/θ/ -/f/</td>
<td>thick</td>
<td>coaf</td>
</tr>
<tr>
<td>#7</td>
<td>English</td>
<td>/θ/ -/f/</td>
<td>fic</td>
<td>coa</td>
</tr>
<tr>
<td>#8</td>
<td>English</td>
<td>/θ/ -/f/</td>
<td>fic</td>
<td>cop</td>
</tr>
</tbody>
</table>

Table 11. Articulation Errors and Spelling Samples

<table>
<thead>
<tr>
<th>Child</th>
<th>Substitution</th>
<th>Correct in Spelling</th>
<th>Incorrect in Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>#8</td>
<td>/r/ -/w/ /θ/ -/f/</td>
<td>cherry -&gt; chary</td>
<td>thick -&gt; fic</td>
</tr>
<tr>
<td>#7</td>
<td>/v/ -/b/</td>
<td>nove(love) -&gt; nuv</td>
<td>cherry -&gt; chire</td>
</tr>
</tbody>
</table>
Vietnamese first language phonology did not appear to be reflected in the children’s pronunciation of English phonemes except for dentalized /s/ and /z/ in one child. These errors produced by child number 3 did not show up in his spelling tasks. He did not write ‘th’ (which is a similar sound to dentalized /s/) for words containing an /s/. Other alveolar sounds were correctly articulated. Overall, Vietnamese first language phonology did not seem to influence English spelling.

**Exposure to Print and Literacy**

Not all parents completed the questionnaire fully, which resulted in incomplete data regarding literacy experience at home. Results are reported for those children whose parents did complete the questionnaire fully (six of the eight children). Children who were read to at an early age (e.g., six months to three years old), tended to have higher scores on the non-word spelling and reading tasks compared with children who were read to at a later age (e.g., five years old). Children who were read to more often (e.g., once a day or once every other day) also tended to have higher scores on non-word spelling and reading tasks than children read to less often.

Reading levels were obtained from classroom teachers and were used to examine the relationship between reading level and spelling ability. The ESL-learning children had an average reading level of 25 and the monolingual English-speaking children had an average reading level of 21.2. This difference was not statistically significant ($F(1,6) = .96, p = .36$). Reading levels were categorized as high (25-30), medium (20-25) and low (15-19) according to teachers’ groupings of similar level abilities. For the ESL-learning children, those with higher reading levels tended to have fewer real word spelling errors ($r = -.99, p < .05$). This was also found for the monolingual English-speaking children ($r = -.87, p < .05$). The monolingual English-speaking children with higher reading levels also tended to have fewer total spelling errors ($r = -.90, p = .05$). Similarly there were positive correlations between reading level and
real word spelling for ESL-learning children \( (r = .92) \) and monolingual English-speaking children \( (r = .71) \), where children with higher reading levels tended to have higher real word spelling scores.

Phonological Awareness and Spelling

All children scored 100% on tasks of rhyme detection and letter identification (except for participant #8, who scored 80% on rhyming). These scores were therefore not included in the analysis of phonological awareness and its effects on spelling. Due to phoneme deletion and substitution scores showing variable results among children, only analyses with those scores were completed. Due to the small sample size and associated limitations for generalization of the results, the following discussion will be only focused on the strength of the relationship between variables.

Phoneme Deletion

There was no significant difference in performance between the two groups of children on phoneme deletion tasks \( (F(1,6) = 2.64, p = .15) \). Correlation analyses were completed to examine the relationship between phoneme deletion and spelling. There were strong positive correlations between phoneme deletion and real word spelling for both the ESL-learning group \( (r = .98) \) and monolingual English-speaking group \( (r = .84) \). The children who had high phoneme deletion scores also had high real word spelling scores. A surprising result for the ESL-learning group was that there was a negative correlation between phoneme deletion and non-word spelling \( (r = -.65) \). The children who had high phoneme deletion scores tended to have low non-word spelling scores. The opposite was found for the monolingual English-speaking group; there was a moderate positive correlation for phoneme deletion and non-word spelling \( (r = .70) \). The children who had high phoneme deletion scores tended to have high non-word spelling scores. For both groups of children negative correlations were found between
phoneme deletion and total spelling errors (ESL: $r = -0.63$, ENG: $r = -0.81$). The higher the children scored on phoneme deletion, the fewer total spelling errors they tended to make.

**Phoneme Deletion and Substitution**

There was no significant difference in performance between the two groups of children on phoneme deletion and substitution tasks ($F(1,6) = 1.61, p = .25$). Phoneme deletion and substitution was not correlated with real word spelling in the ESL-learning group ($r = .18$) but was moderately correlated with real word spelling in the monolingual English-speaking group ($r = .70$). For the monolingual English-speaking children, those with high phoneme deletion and substitution scores tended to have high real word spelling scores. There was a positive correlation between phoneme deletion and substitution and non-word spelling for the ESL-learning group ($r = .76$) and for the monolingual English-speaking group ($r = .60$). For both groups of children, those with high scores on phoneme deletion and substitution tasks tended to have high scores on non-word spelling. Negative correlations were found between phoneme deletion and substitution and total spelling errors for the ESL-learning group ($r = .78$) and the monolingual English-speaking group ($r = .72$), revealing that children with high phoneme deletion and substitution scores tended to have fewer total spelling errors.
DISCUSSION

The main goal of this study was to examine early spelling abilities of monolingual English-speaking children and ESL-learning children. To do this, several questions were posed at the beginning of this study, directing the research completed. We now return to these questions and how they can be examined in the context of the results from this study.

Question and Prediction 1

It was predicted that the ESL-learning children might produce more spelling errors than monolingual English-speaking children. In fact, the opposite result was found; the ESL-learning children spelled more real words correctly than the monolingual English-speaking children and also had fewer numbers of spelling errors. No differences were found between the groups for non-words and non-word spelling errors. These results are consistent with those found by Lesaux and Siegel (2003), in that ESL-learning children performed better on real word spelling than their monolingual English peers. In their study, the children were in grade two when advantages were found but the results from the present study indicate that even by the end of grade one, ESL-learning children are beginning to show an advantage in spelling skills. However, it must be remembered that this was a small sample of children and three of the monolingual English-speaking children were receiving SLP services, so the advantages could be due to differences between ESL-learning children and monolingual English-speaking children who may have concurrent speech and language issues. Although this could be true, when looking at the children's individual scores on real word spelling it was found that all of the ESL-learning children had scores higher than all of the English children (even those who were not receiving SLP services). Unlike in the previous study, ESL-learning children were not found to outperform their monolingual English peers on tasks of non-word spelling. Non-word spelling
by ESL-learning children was found to be similar to that of monolingual English students in grade one. This is consistent with findings by Chiappe, Siegel and Wade-Woolley (2002). If there are bilingual advantages in non-word spelling these may not be found until grade two, as previously indicated by the results from Lesaux and Siegel’s 2003 study.

The ESL-learning children in this study received schooling and exposure to literacy activities in their first language. Vietnamese, like English, is an alphabetic language that utilizes phoneme-grapheme correspondences. This exposure to literacy in their first language may be advantageous for learning English. They may be positively transferring aspects learned from exposure to Vietnamese to their English reading and spelling. Durgunoglu (in Durgunoglu & Verhoeven, 1998) found positive transfer of first language literacy abilities on skills in children’s second language. The study by Hvenekilde (in Durgunoglu & Verhoeven, 1998) indicated that Vietnamese reading instruction focused on letter introduction and letter combinations. This awareness in literacy has been shown to increase children’s spelling abilities (Chiappe, Siegel & Gottardo, 2002). This extra instruction provided by literacy activities in the ESL-learning children’s first language might explain further their better performance in real word spelling in English.

In terms of the types of errors on incorrectly spelled real words the monolingual English-speaking children had more total phonetic errors and consonant distortion errors than the ESL-learning children. The difference in the number of spelling errors could be explained by the fact that three of the monolingual English-speaking children were receiving SLP services and were at a lower stage in spelling development. These children made the greatest number of errors in their spelling. Clarke-Klein and Hodson (1995) found that children with histories of phonological disorders tended to make more errors in their spelling than children without disorders. It could be that the children receiving SLP services had more errors due to additional
phonological or language difficulties. This difference in number of spelling errors could also be explained by the fact that the ESL-learning children were found to have a more advanced level of spelling development. Phonetic errors and consonant distortions are common at earlier stages of spelling development (Gentry, 1984; Read, 1975). In spelling (and phonological development) children tend to substitute consonants that are made at the same place of articulation (e.g., ‘k’ for ‘g’). The ESL-learning children were possibly more aware of different consonants because they are learning a second language. The children had a larger phonemic repertoire because they are learning two languages. This could have made them more aware of the different sounds and which letters represent them. The ESL-learning children also attended additional classes focusing on English phonics skills, which might have made them more aware of letter sound correspondences and word patterns in English. Hvenekilde (in Durgunoglu & Verhoeven, 1998) found that the Vietnamese children in his study seemed to use a memorizing strategy in Vietnamese literacy. If the ESL-learning students are using this type of strategy in their spelling, it could result in more irregular words being spelled correctly, which would reduce the number of phonetic errors. Although this explanation is possible, the greater number of spelling errors by the monolingual-English children in this study is more likely due to the fact three of these children were receiving SLP services and may have additional speech and language difficulties.

The ESL-learning children were also found to be at more advanced stages in their level of spelling development as indicated by their average modal spelling score in the results section. Although the ESL-learning children had a higher modal spelling score, it is important to compare some individual scores. In further examining the modal spelling scores for participants 1 through 5 (stage IV), similarities in spelling ability can be seen. Participants 4 and 5, who are monolingual English-speaking children, both had modal spelling scores equal to those of
participants 1 to 3, who are ESL-learning children. Participants 6, 7 and 8 had lower modal spelling scores (stage III). These children had been receiving speech and language services. The explanation of these children’s lower scores could be due to more complicating factors involved in phonological and other language difficulties. As other studies have found, children who have early language difficulties and phonological disorders have been found to have later difficulties with literacy (Clarke-Klein & Hodson, 1995; Justice et al., 2002). Although this seems like the most likely explanation, the results could have possibly been due to a bilingual advantage. Bilingual or ESL-learning children may proceed through spelling stages earlier or more quickly then monolingual English-speaking children due to their earlier understanding between the form and function of written language. The earlier studies involving bilinguals and metalinguistic tasks have shown that bilingual children develop some metalinguistic abilities earlier than monolinguals (Bialystok, 1988). These abilities could be contributing to the ESL-learning children’s more advanced knowledge of spelling. A larger sample of children, including those who have and have not had histories of speech and language services, is needed to clarify this issue. It is also important to note that children in grade one tend to be in either stages III or IV of spelling development (Roper, 1991). So, although the children receiving SLP services are at a lower stage of development they seem to still be spelling at a level appropriate for their grade level.

Question and Prediction 2

In this sample of children, it was found that sounds that were unshared between Vietnamese and English did not cause spelling errors. Sounds within the children’s first language did not tend to cause errors in spelling in their second language. Although one child tended to dentalize the alveolars /s/ and /z/, which is how they are pronounced in Vietnamese, it cannot be determined whether this was an English developmental pronunciation error or an error
due to Vietnamese phonology of dentalized /s/ and /z/. Due to the fact that this child had no difficulty pronouncing other alveolar sounds, this child's pronunciation error may have been due to Vietnamese phonology. This child correctly represented the sounds /s/ and /z/ with the letters 's' and 'z.' Although this one child produced what could be an error due to first language phonology, it is suggested that the ESL-learning children for the most part did not make articulation errors that could have reflected the Vietnamese phonological system. These findings support research by Anderson (2004) and Wode (1993) that indicates that children exposed to a second language at an earlier age have an easier time acquiring the phonological system of the second language. These results contradict the study by Fashola et al. (1996), which indicated that Spanish ESL-learning students had English spelling errors consistent with Spanish phonology. This could be due to the Spanish students being less proficient in English than the Vietnamese students were in this study. The Vietnamese children in this study could produce all of the age appropriate English phonemes even though they may not have these in their first language.

When the ESL children made articulation errors, they were consistent with those made in English phonological development (e.g., /θ/ substituted with /f/). This articulation error was the only articulation error revealed in children's spelling. Not all children who made this error in articulation made it when spelling. As was shown in table 9 of the results section, four children (two ESL-learning and two monolingual English-speaking) substituted /θ/ with [f] in their speech. Only three of these children revealed this error in their spelling and only the two monolingual English-speaking children made the spelling error in real words. This suggests that the monolingual English-speaking children have more difficulty, or that the ESL-learning children are more aware of the sound they are hearing, even though they are pronouncing it incorrectly. For example, although they pronounce /θ/ as [f], they know the sound in the word is
really /θ/, and therefore represent it with the correct letters. It is possible that the ESL-learning child, as well as the monolingual English-speaking children, did not hear the sound as /θ/ but actually heard it as [f] when the words were presented. This is more likely in non-words than in real words due to the lack of sentence context. The two sounds, /θ/ and /f/, are very similar. They are both low-intensity fricative sounds that occur near the same frequency level. This explanation of not hearing the sounds correctly is questionable because the children were provided with visual cues by looking at the experimenter as the words were dictated. Since the two sounds can be differentiated by the visual cues (/f/ has contact with the teeth and lips), the child should have been able to ‘see’ and hear which sound was produced. Other articulation errors made were not present in the children’s spellings. This could be due to a better awareness of those sound letter combinations. The letters corresponding to the other articulation errors that were made are more often used in words (e.g., /b/ or /r/ occur more often in words then /θ/).

More exposure to these sounds in print could explain the fact that these errors were not present in the children’s spelling.

**Question and Prediction 3**

It was predicted that children with more exposure to print and literacy activities would produce fewer spelling errors. It was found that children who were read to at a younger age, and more often, tended to perform better on non-word spelling and had fewer spelling errors on non-words. No other relationships were found between literacy activities at home and task scores. It is suggested that this could be due to the nature of information and how it was collected. A more in-depth analysis and investigation of early literacy skills could have led to more relationships between early literacy, spelling and phonological awareness. Previous research (Dickinson & Tabors, 1991) has found that exposure to literacy and reading activities at a young age leads to early knowledge of print skills, which in turn leads to early spelling abilities. These results were
supported with the present study for non-words, which indicates that early exposure to literacy (book reading) could be related with spelling outcomes. Moreover, relationships between reading level (as measured by the PM Benchmark Kits (Nelley & Smith, 2001) reading assessment) and spelling ability were found with the real-word spelling tasks and real-word spelling errors. Children who had high reading levels were also found to have high scores in real-word spelling and fewer real-word spelling errors. This indicates that children who can read well and comprehend read information also have good spelling skills. The question is whether good spelling skills lead to better reading skills, or good reading skills lead to better spelling skills. As other researchers have indicated there seems to be a reciprocal relationship between these two skills (Ehri & Wilce, 1980; Goswami & Bryant, 1990; Perfetti et al, 1987; Vandervelden & Siegel, 1995). Further support for this can be seen in the later discussion of the special case of Charles.

Question and Prediction 4

It was predicted that children with higher phonological awareness would produce fewer spelling errors. This was found to be true, although results varied based on the phonological awareness tasks. As other studies have found (e.g., Adams, 1990; Bryant et al., 1990; Wimmer et al., 1994), rhyme and letter identification tasks were easy for these children and were already established by the time of testing at the end of grade one. These skills seemed to precede the later developing tasks of phoneme deletion and deletion and substitution. In the current study performance on phoneme deletion and real word spelling were related for both groups of children (ESL-learning and monolingual English-speaking). As others have found (e.g., Stahl & Murray, 1994; Vendervelden & Siegel, 1995) the ability to manipulate the sounds in English by deleting sounds and saying the remaining sounds was positively related to the ability to spell real words.
Unexpected relationships were found for the ESL-learning group on phoneme deletion and non-word spelling. Phoneme deletion ability had a negative relationship with non-word spelling for that group. The ESL-learning children with high scores on phoneme deletion had lower scores on non-word spelling. However, phoneme deletion and substitution had a positive relationship with non-word spelling; the children with high scores on phoneme deletion and substitution had higher scores on non-word spelling. It is possible that the observed difference is due to the small sample size of the study. Phoneme deletion scores have been found to positively correlate with spelling in real and non-words (Chiappe, Siegel & Gottardo, 2002; Chiappe, Siegel & Wade-Woolley, 2002; Lesaux & Siegel, 2003) so the finding from this study that phoneme deletion negatively correlated with spelling non-words is odd. For the monolingual English-speaking children, phoneme deletion and phoneme deletion and substitution both related positively with non-word spelling. This is also consistent with previous research by Chiappe, Siegel and Wade-Woolley (2002). Both groups of children exhibited a negative correlation between phoneme deletion and deletion and substitution, and total spelling errors, which indicates that the higher the phonological awareness, the fewer spelling errors made. As others have argued, the heightened phonological awareness revealed by these tasks may help children in their spelling development (Ball & Blachman, 1991; Chiappe, Siegel & Gottardo, 2002; Lundberg et al, 1988; Vandervelden & Siegel, 1995), and thus could be used as good assessment tools for predicting and diagnosing reading and spelling difficulties in young children (Justice et al., 2002; Yopp, 1995).

Individual Results of Interest

In order to provide a better explanation for some of the findings in this study, I will review the individual performance of three of the children in order to gain a better understanding of their performance on the different tests. These children had some unusual scores on the different tasks. These scores can be found in table 12. All children’s names have been changed
to provide confidentiality. Overall, child 2 (Justin) obtained high scores on most tasks, had 100% accuracy on 5 of the 8 tasks administered and had the least number of real word and total spelling errors. Child 4 (Charles) had a high reading level, obtained high scores on reading and phonological tasks, had the second lowest number of total spelling errors but his real word spelling scores were considerably low. Child 8 (Jamie) seemed to have the most trouble on all tasks except real word reading.

Table 12. Individual Results of Interest

<table>
<thead>
<tr>
<th>Child</th>
<th>Real Word Spelling (% Correct)</th>
<th>Phonetic Only Spelling (% Phonetic)</th>
<th>Non-Word Spelling (% Correct)</th>
<th>Total Number of Spelling Errors</th>
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<td>70</td>
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<tr>
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<td>20</td>
<td>59</td>
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Table 12 cont’d. Individual Results of Interest

<table>
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<tr>
<th>Child</th>
<th>Reading Level</th>
<th>Real Word Reading (% Correct)</th>
<th>Non-Word Reading (% Correct)</th>
<th>Phoneme Deletion (% Correct)</th>
<th>Phoneme Deletion and Substitution (% Correct)</th>
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</thead>
<tbody>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Charles</td>
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<td>100</td>
<td>80</td>
<td>95</td>
<td>94</td>
</tr>
<tr>
<td>Jamie</td>
<td>17</td>
<td>100</td>
<td>30</td>
<td>45</td>
<td>46</td>
</tr>
</tbody>
</table>

*Justin*

Justin, an ESL student, was 6;9 at the time of testing. The specifics of how long he has been speaking English and his literacy background were not available, because his parents did not return the background questionnaire. It was necessary to translate background questionnaires into Vietnamese for this family, which indicates that the dominant language spoken by his parents is Vietnamese. He did indicate that he attends Vietnamese school on Saturdays where he learns to read and write in Vietnamese. Due to his high results on the tasks,
it was important to examine these further.

Justin had the highest score on real word spelling compared to all other children (85% correct). This could be influenced by his well-established repertoire of orthographic rules indicated by his correctly spelled words. These words included ‘measure,’ ‘direction’ and ‘tough,’ all words that use orthographic rules in English. His errors resulted in real words (e.g., ‘pen’ became ‘pin’ and ‘jug’ became ‘jog’) and were likely due to difficulties with auditory discrimination or possibly effects of sound perception according to Vietnamese phonology. The spelling words were read alone and then in a sentence, but this child began to write the words as soon as they were spoken. This means that it is possible that he was only listening to the words alone and in the sentence context. His non-word spelling score did not stand out over the other students, but he continued to use orthographic rules in devising spellings for non-words. He correctly spelled words such as ‘beasure,’ ‘rutation’ and ‘nove’ (like the real word ‘love’), further revealing his reliance on orthographic rules or visual memory for patterns. During the non-word spelling task Justin was trying to spell as fast as he could to finish the task more quickly which could have led to his lower non-word spelling score. He had many added letters and consonant distortions in his non-word spelling. Even though some words were spelled incorrectly due to a consonant distortion they still showed Justin’s knowledge of orthographic rules (e.g., ‘juf’ became ‘jove’ - /ʌ/ was possibly heard as /v/ and he used orthographic rules as in the English word ‘love’ to spell the resulting word ‘jove’).

Justin’s scores on all other tasks (real word reading, non-word reading, phoneme deletion, phoneme deletion and substitution, rhyme and letter identification) were 100%, which confirms his strong literacy abilities. Justin also had the highest reading level score attainable on the standardized reading test administered by his teacher. Exposure to two languages does not seem to have had a detrimental effect on Justin’s literacy skills. His exposure to both Vietnamese and English literacy may have helped him in developing a more advanced
knowledge of literacy. However, it is equally possible that this child is just at a higher cognitive level than the other children and he is good at learning language in general. Bialystok (1988) found that full bilinguals performed better than partial bilinguals and monolinguals. Since Justin’s performance is higher than his other ESL-learning and monolingual English-speaking peers, it is possible that he has had more exposure to English at a younger age, but we cannot be certain about this. Justin was also the only child to score 100% on all phonological awareness tasks. His high awareness of language (phonological awareness) could explain why his scores on other tasks of reading and spelling are so high. As this study as well as others have found (Ball et al, 1991; Chiappe, Siegel & Gottardo, 2002; Lundberg et al., 1988; Vandervelden & Siegel, 1995) phonological awareness is highly correlated with reading and spelling ability.

Charles

Charles, an English student, was 7;4 at the time of testing. His parent reported that he spoke English just as well as other children of his age. Charles’ performance was interesting because he had a high reading level score, high scores on the reading tasks and phonological awareness tasks but low scores on the spelling tasks. Although Charles had these low scores on the spelling tasks, he only made a few errors per incorrectly spelled word. Most of his errors were “phonetic only” errors. He was able to make the connections between phonemes and graphemes but was not yet using orthographic rules on less familiar words. For example, ‘tough’ was spelled ‘tuf,’ where a letter represents each phoneme but orthographic rules have not been taken into consideration. This lack of orthographic rules led to poor spelling scores even though Charles was skilled at representing each sound of a word, which is not surprising considering his high phonological awareness scores. Charles’ ability to represent sounds with letters may also be helping him in reading. He may conversely be able to represent letters as sounds (decoding the text he reads). As Charles increases his exposure to words and the
orthographic rules of English he might become more accurate in his spelling skills and develop more orthographically correct spellings. Charles’ parent indicated that he was read to at home since he was approximately 6 months old and they continue to read together at least once a day. This early and continuous exposure to literacy is likely to play a role in Charles’ high reading abilities.

Jamie

Jamie, an English student, was 7;0 at the time of testing. Jamie’s performance was interesting because his scores were found to be the lowest of all the children (except for real word reading) and he had the most spelling errors on his incorrectly spelled words. Jamie also made a number of errors on the CAPES (Masterson & Bernhardt; 2001) evaluation. Non-word spelling was extremely difficult for Jamie; he was only able to spell 2 of the 20 words correctly, which was the lowest score of all the children. The next lowest score for non-word spelling was 8 out of 20 correct. During non-word spelling Jamie seemed to have difficulty keeping the target word in memory long enough to sound and spell out each letter. The first sound in each incorrectly spelled word was correct (except for articulation error /θ/ → [f], which was present in his spelling), which indicates that he could correctly match the beginning sounds to letters. The problem seemed to arise in the letters that followed, where he was sounding out different sounds than were presented in the target word. This difference between real-word spelling and non-word spelling could be explained by the fact that real words were read alone, then in a sentence, then alone again. In this task the child had the context of the sentence to help remember what the word was. In the non-word task there was no context for the target words making the child rely on memory of the word when spelling. The difference could also be because the child already knows how to spell the real word but has no prior knowledge of the non-word. This finding indicates the importance of including memory measures in design of
experiments similar to this study. Jamie’s 100% accuracy on real word reading may be explained by the frequency and familiarity of these words. Although other children also scored high (90 or 100%) on real word reading, Jamie scored much lower than all children on non-word reading. Jamie has probably learned the real words as sight words and is not using a decoding method to read the words. His accuracy on non-word reading was much lower, demonstrating his difficulty with reading novel words. In non-word reading Jamie seemed to sound out part of the word and guess at what it might say instead of trying to sound out the whole word. An indication of Jamie’s use of sight words was found in his reading of the word ‘vone.’ Jamie read this word as ‘v-one.’ He might have used his sight vocabulary of the word ‘one’ and combined that with the letter sound relationship of ‘v’ and /v/.

Jamie also had more difficulty than the other children with the phonological awareness tasks. During phoneme deletion he completed some deletions successfully and on others he would alter the word in some other way. For example, instead of deleting the ‘h’ from ‘hat’ to get ‘at,’ Jamie produced a rhyming word ‘mat.’ It is possible that as the task continued Jamie did not remember how to complete the task. Although his score was low on phoneme deletion of initial phonemes, it was better than his scores on final phoneme deletion. This is consistent with findings that final phoneme deletion is more difficult than initial phoneme deletion (Adams, 1990). Phoneme deletion and substitution were also difficult for Jamie. When he was able to make substitutions for the target sounds other parts of the word were compromised. For example, when asked to say ‘bite’ and change /t/ to /k/ Jamie produced that word ‘tike’ instead of ‘bike.’ The memory load seemed to be difficult for Jamie. Since phonological awareness skills have been found to correlate positively with early reading and writing skills (Lundberg et al., 1980; Perfetti et al., 1987; Stahl & Murray, 1994) it is not surprising that Jamie had low scores in these tasks.
Jamie's parent indicated that she began reading to him at the age of 5 years. This could be a reason for Jamie's difficulty with literacy skills. As previous research has indicated, early exposure to book reading contributes to later literacy development (Dickinson & Tabors, 1991). Without this early exposure, Jamie could have been missing out on developing early literacy knowledge, leading to difficulties later on. Jamie had also been seeing the Speech Language Pathologist in the school although we did not have information about the specific reason for this. He possibly could have had phonological difficulties earlier on. It has been found that children who have had phonological impairment when they were young have a tendency to develop later difficulties in literacy development (Hoffman, 1990; Justice et al., 2002). There seem to be a number of factors causing difficulties for Jamie, including, working memory, decoding, and lack of early literacy exposure as well as speech and language difficulties.

The three English children who had more errors on the CAPES evaluation were all seeing the Speech-Language Pathologist. Two of these children had considerably lower scores than the other children. These children had difficulty with phonological awareness skills and their reading levels and spelling abilities were poor. The results from these three children could have contributed to differences between monolingual English-speaking and ESL-learning children comparisons. Although these children are monolingual English-speaking children, they seem to have complicating factors that could have affected the results of this study. It is important in future research to include larger samples sizes and consider groups that include English students who do not have a history of language or speech impairment as well as students who do. The nature of their difficulties is also important to consider.

Implications

This study confirmed the importance of phonological awareness for spelling and reading abilities. This study as well as others (Chiappe, Siegel & Gottardo, 2002; Chiappe, Siegel &
Wade-Woolley, 2002; Lesaux & Siegel, 2003) found that phonological awareness abilities are highly correlated with spelling and reading scores. This study found this to be true for monolingual English-speakers as well as ESL-learning students at the end of grade one. Phonological awareness encompasses important skills and explicit instruction in these skills should be included in ESL and English education.

Results from previous studies indicated that the phonological system of the first language could negatively affect spelling in the second language (Fashola et al., 1996; Wang & Geva, 2003b). The present study did not find this negative effect with the small sample size. The ESL-learning children had few errors on the CAPES evaluation than the monolingual English-speaking children and these errors tended to be developmentally appropriate. No spelling errors made by the Vietnamese children seemed to be a result of first language phonological differences. In addition, early exposure to English seems to play a positive role in acquiring a second language phonology. The children were exposed to the phonemes of English during development, which led them to have more exposure to them and produce them correctly. This finding is consistent with previous research (Anderson, 2004; Wode, 1993) and leads to the belief that early language exposure in two languages leads to success in acquiring both language phonologies.

This study also leads to clinical implications for Speech and Language Pathologists (SLPs). The importance of early intervention and prevention is a common goal for SLPs. In particular, the importance of SLPs' involvement in early literacy screening and intervention with children has recently been discussed (ASHA, 2001; Justice et al., 2002;). It appears that with increased phonological awareness and early exposure to literacy, children could have a better chance at developing writing and reading abilities. SLPs then, could play an important role in educating parents, teachers and other care providers on how to develop these important phonological awareness skills by exposure to literacy and literacy activities. SLPs can work
together with school staff to implement screening of these early skills for all children entering kindergarten. These screening tools would reveal the children’s strengths and weaknesses and provide the SLP with the information needed to implement treatment. To increase spelling skills SLPs can play a part in direct treatment by including written information as part of therapy for phonological awareness skills, vocabulary, articulation and morphology. SLPs can also work with teachers and school administrators to implement school-wide phonological awareness programs to be taught in classrooms.

Limitations and Future Research

The present study consisted of a small number of children; only three ESL-learning children and five monolingual English-speaking children. Three of the five monolingual English-speaking children were receiving SLP services. Therefore, differences found could be due to the individual skill level of each child and not to differences between groups. Longitudinal studies involving larger numbers of children would provide more information into similarities and differences between these two groups. Studies involving this type of design have been implemented by a few researchers (Chiappe, Siegel & Gottardo, 2002; Chiappe, Siegel & Wade-Woolley, 2002; Lesaux & Siegel, 2003) but the first languages of children were not examined individually; all bilingual children were grouped together. It is also important to gain as much information as possible about ESL-learning children’s backgrounds and skills in their two languages. Future studies should include background information on the children’s skills in their first language so it is possible to examine language transfer effects. This research should include children from different first language backgrounds to provide more information regarding specific language transfer effects of literacy abilities. This information would provide the researcher with a more in-depth view of the children’s bilingualism and how it could be an advantage or a disadvantage to particular aspects of literacy.
In this study, only tasks that Adams (1990) identified as easiest (rhyme awareness) and most difficult (phoneme deletion and deletion substitution) were examined. These do not provide information on intermediate-level phonological awareness skills. Future research involving each level of phonological awareness would give a more comprehensive picture of how these skills relate to spelling ability. Examining segmentation and blending of phonemes as well as deletion would be a more inclusive design.

Another limitation of the study was the lack of information obtained in parent questionnaires. The lack of information was due to incompletion of questionnaires by parents as well as design limitations. Information from parents is crucial in understanding children's language and literacy backgrounds. The questions asked about the age the child was initially read to, but did not ask about other early literacy activities (e.g., sound play, 'writing,' nursery rhymes). Although questions regarding literacy activities at home were included, these were activities that the parents did with their children at the present time, not in the past. Information from both times would be more helpful. It would also be important to gather more information on the parent literacy skills as well as socio-economic status. These would provide further information about the literacy abilities of the parents, which could in turn affect the children.

Memory abilities were not examined in this study. Since memory does play a role in spelling and reading activities, as well as in phonological awareness activities, it would be important to include a verbal memory task such as the memory for sentences subtest from the Stanford Binet (Thorndike, Hagen, & Sattler, 1986). This task would involve repeating sentences of varying length.

As previously mentioned, three of the monolingual English-speaking children in this study were receiving SLP services, which may have affected the results of the study. Due to this
finding, future studies involving children with language, phonological and/or articulation problems and their spelling abilities would also be important. These studies could provide SLPs with important information needed about the relationship of these problems with later literacy development. These types of studies could include children with and without impairment, different levels or types of impairment and also ESL-learning children with impairments. Intervention studies would also be important to examine the impact and importance of direct SLP intervention (including written activities in therapy) on literacy development, since SLPs have specific knowledge about language processes and development they play a crucial role in literacy development.

Concluding Statement

Since literacy (including spelling and reading) plays a large and important role in our society, and to be successful academically and in life children require competency in literacy skills, it is important to know how we can help children to develop this competency. Whether these children are monolingual, bilingual, or ESL learning, they all require knowledge of literacy skills to be successful. Phonological awareness skills, first language phonology and early exposure to literacy have all been found in some way to contribute to literacy development and performance. It is therefore important for parents and professionals to be aware of these factors and acknowledge them when working with children on language and literacy development.
REFERENCES


APPENDIX A

Phonemic Inventories

### Vietnamese Consonants

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### Vietnamese Vowels

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Questionnaire

Phonological Awareness and Developmental Spelling: A Comparison of English and ESL Grade One Children

Language Use at Home
Please answer the following questions to give us a better idea of your grade one child's language experience.

Child's birthdate _____________ Age ______  Sex: M or F

1. What was your grade one child's first (native/home) language?

2. What language(s) does your grade one child speak and what percentage of the time is that language spoken at home?
   English____  Vietnamese____  Other(specify)________________________

3. What language(s) do you use when you talk to your grade one child at home and what percentage of the time is that language spoken?
   English____  Vietnamese____  Other(specify)________________________

4. If your grade one child has siblings what are their ages and what language(s) do they use when they speak to your grade one child at home?
   Sex:  Age:  Languages:
   ______  ______  ____________________________
   ______  ______  ____________________________
   ______  ______  ____________________________
   ______  ______  ____________________________

5. How well does your child speak his/her first (native/home) language?
   _______ Was later and slower than most children in learning to talk
   _______ Just as well as most children of the same age
   _______ Better than other children of the same age

6. At what age did your grade one child start to learn English? ______________________
   Where did he/she first learn English:  home____  babysitter____  
   preschool/daycare____  Kindergarten____  other (specify) ______________________
APPENDIX C

Letter Identification

Instructions

Examiner: I am going to show you letters one at a time. Tell me the name of each letter.

j

l

z

s

a

e

u

d

w

t

f

n

o

c

m

x

v

h

r

b

q

y

i

k

p

Score ______ / 26
## APPENDIX D

### Rhyme Detection

**Instructions**

Examiner: "Here is a picture of a cat. Down here are three more pictures..." (the examiner points to and names each of the 3 choice pictures). Now which of these three – fish, sun or hat - rhymes with cat?" Provide the correct answer (hat) if necessary and explain that hat rhymes with cat because they end with the same sound (at). Continue as above with the other 2 demonstration items, giving an explanation when necessary. The instructions from the 10 items are the same as for the demonstration items. Do not give feedback on the test items.

If the child fails the demonstration items and the first 5 test items, you may discontinue the test.

### Demonstration Items

<table>
<thead>
<tr>
<th>Stimulus Word</th>
<th>Response Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>cat</td>
<td>fish sun hat</td>
</tr>
<tr>
<td>ball</td>
<td>wall bell bag</td>
</tr>
<tr>
<td>spoon</td>
<td>cup moon ship</td>
</tr>
</tbody>
</table>

### Test Items

<table>
<thead>
<tr>
<th>Stimulus Word</th>
<th>Response Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>boat</td>
<td>foot bike coat</td>
</tr>
<tr>
<td>key</td>
<td>cow tree door</td>
</tr>
<tr>
<td>chair</td>
<td>car table bear</td>
</tr>
<tr>
<td>house</td>
<td>mouse horse window</td>
</tr>
<tr>
<td>head</td>
<td>hand bed eye</td>
</tr>
<tr>
<td>bell</td>
<td>bottle dress shell</td>
</tr>
<tr>
<td>sock</td>
<td>clown clock shoe</td>
</tr>
<tr>
<td>train</td>
<td>rain tractor spoon</td>
</tr>
<tr>
<td>egg</td>
<td>bag spoon leg</td>
</tr>
<tr>
<td>car</td>
<td>star bike cake</td>
</tr>
</tbody>
</table>
APPENDIX E

Date:____________________
NAME:____________________

Phoneme Deletion
Initial:
Pretrial- bus______ sad______ cow______

Test items
1. meat________
2. bear________
3. hat________
4. sit________
5. jam________
6. tin________
7. pie________
8. cup________
9. black________
10. stick________

Score_____/10

Final:
Pretrial- foot______ bag______ bell______

Test items
1. meat________
2. sad________
3. hat________
4. bus________
5. jam________
6. tin________
7. make________
8. cup________
9. bent________
10. jump________

Score_____/10

Total Score_____/20
APPENDIX F

Phoneme Deletion and Substitution

**Pretrial**

<table>
<thead>
<tr>
<th>Deletion</th>
<th>Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>goat (remove /g/)</td>
<td>goat (change /g/ to /b/)</td>
</tr>
<tr>
<td>done (remove /d/)</td>
<td>done (change /d/ to /f/)</td>
</tr>
</tbody>
</table>

**Initial**

<table>
<thead>
<tr>
<th>Deletion</th>
<th>Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>fill (remove /f/)</td>
<td>fill (change /f/ to /b/)</td>
</tr>
<tr>
<td>cup (remove /k/)</td>
<td>cup (change /k/ to /p/)</td>
</tr>
<tr>
<td>bat (remove /b/)</td>
<td>bat (change /b/ to /s/)</td>
</tr>
<tr>
<td>man (remove /m/)</td>
<td>man (change /m/ to /l/)</td>
</tr>
</tbody>
</table>

**Final**

**Pretrial Final:**

<table>
<thead>
<tr>
<th>Deletion</th>
<th>Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>fan (remove /n/)</td>
<td>fan (change /n/ to /d/)</td>
</tr>
<tr>
<td>race (remove /s/)</td>
<td>race (change /s/ to /k/)</td>
</tr>
<tr>
<td>goat (remove /t/)</td>
<td>goat (change /t/ to /l/)</td>
</tr>
<tr>
<td>make (remove /k/)</td>
<td>make (change /k/ to /d/)</td>
</tr>
<tr>
<td>seal (remove /l/)</td>
<td>seal (change /l/ to /m/)</td>
</tr>
<tr>
<td>bite (remove /t/)</td>
<td>bite (change /t/ to /k/)</td>
</tr>
</tbody>
</table>

**Blends**

**Pretrial Initial:**

<table>
<thead>
<tr>
<th>Deletion</th>
<th>Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>smock (remove /m/)</td>
<td>smock (change /m/ to /l/)</td>
</tr>
<tr>
<td>slip (remove /l/)</td>
<td>slip (change /l/ to /n/)</td>
</tr>
<tr>
<td>stick (remove /t/)</td>
<td>stick (change /t/ to /l/)</td>
</tr>
</tbody>
</table>

**Pretrial Final:**

<table>
<thead>
<tr>
<th>Deletion</th>
<th>Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>bunt (remove /n/)</td>
<td>bunt (change /n/ to /s/)</td>
</tr>
<tr>
<td>went (remove /n/)</td>
<td>went (change /n/ to /s/)</td>
</tr>
<tr>
<td>best (remove /s/)</td>
<td>best (change /s/ to /n/)</td>
</tr>
</tbody>
</table>

Deletion Score ___/12  Substitution Score ___/12
Real Word Reading

1. Did
2. Made
3. Good
4. One
5. Him
6. Can
7. Men
8. Said
9. Have
10. Would
APPENDIX H

Non-Word Reading

1. Fid
2. Pem
3. Pood
4. Lup
5. Yaid
6. Hon
7. Dit
8. Tave
9. Vone
10. Tive

Date:________________
Name:________________
APPENDIX I

Real Word Spelling

1. pen He writes with a pen. pen
2. hill They went down the hill. hill
3. sad The movie made me sad. sad
4. good The chocolate tasted good. good
5. love I love to ski. love
6. toy He played with his toy. toy
7. said She said ‘Good morning.’ said
8. bead My necklace lost a bead. bead
9. some Do you want some? some
10. jug He poured juice from the jug. jug
11. thick The pudding is thick. thick
12. head He has a sore head. head
13. calf The cow had a calf. calf
14. queen The lady was a queen. queen
15. tough The girl is very tough. tough
16. cherry I ate a cherry. cherry
17. shadow The boy chases his shadow. shadow
18. elephant The elephant was big. elephant
19. measure We measure flour. measure
20. direction Follow my direction. direction
APPENDIX J

Non-Word Spelling

1. het
2. sog (dog)
3. gead (head)
4. nove (love)
5. gan
6. coth (both)
7. chope (hope)
8. pem
9. vood (food)
10. tav (have)
11. vone (gone)
12. juf
13. fick
14. queb
15. ladow
16. therry
17. steez
18. okeephant
19. beasure (measure)
20. rotation