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Spanish Spelling Errors of Emerging Bilingual Writers in Middle School

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
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Spanish Spelling Errors of Emerging Bilingual Writers in Middle School

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ABSTRACT

In spite of the significant growth in the Spanish-English bilingual population, there has not been sufficient research on cross-language effects, or how language transfer may affect important components of literacy, such as spelling. Many studies have focused on the influence of Spanish on the acquisition of English spelling skills; however, few studies have focused on how the acquisition of English influences Spanish spelling. The purpose of this investigation was to study the spelling errors of bilingual adolescents as they learn English.

A total of 20 bilingual Spanish-English students in grades 6 through 8 (ages 11 to 14 years) were selected from a larger mixed methods study (Danzak, 2009) not concerned with spelling. These students were enrolled in English as a Second Language (ESL) classes in a public middle school located on the west coast of Florida. The students completed four writing samples in each language (evenly divided between narrative and expository genres). All samples were analyzed using the Phonological Orthographic Morphological Assessment of Spelling-Spanish (POMAS-S), a linguistically-based analysis system that qualitatively describes Spanish spelling errors and is sensitive to effects of cross-language transfer.

Misspellings were extracted from the students' writing samples and were examined by looking at the effects of linguistic category, genre, and gender. Results of the three-way ANOVA revealed that the greatest number of errors occurred in the orthographic category, accounting for over 70% of the errors. Errors attributed to the other linguistic categories occurred less than 10% of the time each. There were no effects attributed to genre or gender.

The qualitative analysis revealed that the most common linguistic feature error was OAT (orthographic tonic accents) comprising 37% of the total number of errors followed by OLS (letter sound) errors, which comprised 11% of the total number of errors. All other phonological, orthographic, morphological, and phonological-orthographic linguistic feature patterns occurred with a frequency of 5% or less. Knowledge of the English language had a minimal, but obvious, influence on their spelling. These findings would suggest that Spanish-English bilingual adolescents predominantly made spelling errors that did not follow the orthographic rules of Spanish. Educational implications are presented.

Chapter 1

Literature Review

According to the National Center for Education Statistics (NCES, 2007), 10.8 million children between 5-17 years of age speak a language other than English at home. Of these, 2.7 million spoke English with difficulty and the primary language of 75% (or 2.1 million) was Spanish. In fact, in 2005, Hispanics represented the largest minority group in the United States, making up 14% of the entire population and this number is projected to increase another 32% by 2020 (NCES, 2007). These patterns of growth bring attention to the potential challenge educators face when teaching English language and literacy skills to Spanish-English bilingual children. This is important, as recent studies have demonstrated a reading achievement gap that exists among English Language Learners (ELLs) of all ages when compared to their native English speaking peers (Goldenberg, Rueda, & August, 2006; Gutiérrez et al., 2002; Shanahan & Beck, 2006; U.S. Dept. of Education, 2008). Since spelling has been shown to be a critical component of literacy development and one of the purest indicators of lexical quality, the analysis of spelling is paramount as it can provide valuable information that could be used to implement adequate instruction and/or intervention (Bahr, Silliman, & Berninger, 2009, submitted; Ehri, 2000; Templeton, 2004). Therefore, the growing number of bilingual students in schools highlights the importance of analyzing their spelling in order to

identify potential difficulties they may face in a classroom as they gain proficiency in English language and literacy.

In spite of the significant growth in the Spanish-English bilingual population, there has not been sufficient research on cross-language effects, specifically in how language transfer may affect important components of literacy, such as spelling. An understanding of first language proficiency or language knowledge and skills is paramount, as it has been shown that knowledge of the child's primary language (e.g., L1 = Spanish) skills can facilitate second language (L2 = English) acquisition (Cummins, 1984; Dressler & Kamil, 2006; Fitzgerald, 2006; Francis, 2006; Lanauze & Snow, 1989; Medina & Escamilla, 1992). Many studies have focused on the influence Spanish has in the acquisition of spelling skills (Arteagottia, Howard, Loguit, Malabonga & Kenyon, 2005; Cronnell, 1985; Escamilla, 2006; Fashola et al., Drum, Mayer, & Kand, 1996; Howard, Arteagottia, Lougui, Malabonga, & Kenyon, 2006; Liow & Lau, 2006; Zutell & Allen, 1988); however, few studies have focused on L2 transfer effects or how the acquisition of the English language influences Spanish spelling.

The purpose of this investigation is to study the spelling errors of bilingual (Spanish-English) adolescents as they learn English. First, an overview of theories of spelling development will be described. Then, a description of characteristics specific to Spanish orthography and the types of errors that might be expected when a Spanish speaker spells in English will be discussed. Next, general findings of previous spelling studies involving Spanish-English bilinguals will be described and evaluated. These studies will be synthesized in regard to general findings regarding bilingual spelling, spelling tasks, and scoring systems utilized to assess the students' spelling errors. Finally,

an overview of the Phonological, Orthographic, Morphological Assessment of Spelling (POMAS; Bahr et al., 2009, submitted; Silliman, Bahr, & Peters, 2006) will be described as a tool to analyze spelling errors.

Two Theories of Spelling Development

Over the last three decades, various theories of spelling development have been proposed to account for how children learn the complex linguistic skill of spelling. The two most widely accepted theories are the late model and the early model. The late model focuses primarily on stages of development and proposes that children acquire certain skills (phonological, orthographic, or morphological) during discrete periods of time (Bear & Templeton, 1998; Ehri, 1989). On the other hand, the early model is more linguistically based and proposes that children coordinate and implement varieties of linguistic knowledge (phonological, orthographic, and morphological) at different points in spelling acquisition; from the onset of spelling and throughout development (e.g., Treiman & Bourassa, 2000). In fact, this model proposes that aspects of linguistic knowledge are used collectively and simultaneously throughout spelling development. These two models will be described below.

Late Model

The late model, also known as the stage theory (Bear & Templeton, 1998; Ehri, 1989; Gentry, 1982; Henderson, 1990; Henderson & Beers, 1980; Moats, 2000; Treiman 1991, 1994), postulates that underlying spelling knowledge is acquired in a specific order: phonological, orthographic, then morphological features are acquired. However, each type of knowledge predominates at a specific point in development. The late model

further proposes that more complex spelling knowledge, such as knowledge based on derivational morphology, is not available to early spellers.

Some disagreement exists, however, among stage theorists, on the number and timing of the stages. Earlier forms of the late model proposed three stages of development (Ehri, 1989), others highlighted five stages of spelling development (Gentry, 1982), and later research suggested that children's spelling develops in six stages (Bear & Templeton, 1998; Henderson, 1990, Wright & Ehri, 2007). These models are described next.

Prephonemic spelling. Prephonemic spelling typically occurs between 1 and 7 years of age (Bear & Templeton, 1998), a period that which includes preschoolers and kindergartners. During this stage, children create meaningful messages by scribbling and forming letters. They may even string letters together. However, during this period of time, they have not yet made the connection that graphemes (i.e., letters) can be mapped on to phonemes or can represent speech sounds. Therefore, they do not associate letters with words and when they read their written work, they may reread their writing differently each time. Also, at this stage, bilingual writers will write the same string of letters for both English and Spanish and will read them in both languages (Ferreiro & Teberosky, 1982).

Semiphonemic/Early letter name spelling. The semiphonemic stage, also known as early letter name spelling, typically occurs between ages 4 and 7 years (Bear & Templeton, 1998), or when children are in later kindergarten and early first grade. In addition, children demonstrate limited knowledge of sound to symbol correspondences. They predominantly use consonants to represent words and often omit vowels, although

some children may include vowels with their consonants (Bear & Templeton, 1998). During this stage, children learn to use “the alphabetic principle.” In other words, they begin to recognize relationships between letters and the spoken word by how the sound is articulated (Bear, Invernizzi, Templeton, & Johnston, 2004). The emergence of early reading is typically associated with this stage. However, due to the exclusion of vowels, their writing remains difficult to read.

Letter name spelling. Children between the ages of 5 to 9 years are typically in the letter name stage of spelling development (Bear & Templeton, 1998). Here, they begin to acquire knowledge of spelling patterns; however, spelling rules are not always correctly applied. These children also begin to build a sight word-based vocabulary. This is a time when children begin to use one grapheme to represent one phoneme and also begin to write vowels using their letter names (Bear et al., 2004; Treiman, 1993). For example, in the case of the long vowel *a*, children may write the word *take* as *tak* and they may also attempt to write short vowels. However, they will use letters that more closely represent the desired vowel sound. For example, in the case of the short vowel *o*, children may write the word *stop* as *stap*.

Within-word pattern spelling. The within-word pattern stage typically occurs between ages 6 and 12 years (Bear & Templeton, 1998), covering children in late kindergarten through late fourth and early fifth grade. During this stage, children begin to evolve from solely mapping one letter to one sound to creating more complex letter patterns, like digraphs (i.e., *sh*, *th*, *ch*) and vowel dependent spellings (i.e., *-ough*, as in *cough* and *through*). It is also during this stage of spelling development that children begin to understand vowel digraphs and consonant blends. Children are in the transitional

stage of reading and writing (Ehri & McCormick, 2004). This is where they begin to read more fluently and their writing clearly represents the language they speak (Bear et al., 2004).

Syllable juncture spelling. The syllable juncture stage of spelling development approximately covers ages 8 through 18 years (Bear & Templeton, 1998). During this stage, children learn the process of building multisyllabic words, by compounding and using prefixes, suffixes, and inflectional endings (e.g., *ed*, *s*, and *ing*; Bear et al., 2004). However, their writing may reflect misspellings that occur at the syllable juncture (e.g., *cryed* for *cried*, as well as in the unaccented syllable (e.g., *diffrent* for *different*) (Bear et al., 2004).

Derivational constancy spelling. The final stage of spelling development typically begins around 10 years of age and older (Bear & Templeton, 1998). At this stage, children are more proficient spellers and can spell almost all words correctly, although a few spelling errors, such as, consonant doubling, omission of silent consonants, and misspelling of schwa vowels, can still be found in their writing. These children also demonstrate more sophisticated writing skills and are able to create new words by adding affixes to basic root words (Bear et al., 2004). This spelling stage also correlates with a more advanced stage of reading and writing, where they read with more accuracy and automaticity and are also able to more easily write unfamiliar words (Ehri & McCormick, 2004; Kuhn & Stahl, 2004).

Phases. More recently, researchers proposed that a more accurate interpretation of spelling development would be to describe it as occurring in phases (Wright & Ehri, 2007). The concept of phases means that, during spelling development, specific spelling

patterns do not occur within distinct periods of time (i.e., stages); instead, they overlap (Ehri, 1995; 2002; Wright & Ehri, 2007). In other words, while phases still occur in a particular sequence, they do not have specific starting and ending points. Furthermore, children utilize all three types of linguistic information (i.e., phonological, orthographic, and morphological) as they learn to spell (Treiman & Cassar, 1996; 1997). Support for this model surfaced as evidence emerged that kindergartners and first graders were able to learn words more easily when double letters occurred in appropriate word positions (i.e., double letters typically occur in the middle or end of words in English, as in *different* or *discuss*) in contrast to when they occurred in an inappropriate word position (Wright & Ehri, 2007). These findings indicated that children demonstrated knowledge of orthographic conventions early on, even when they were relying mostly on their phonological knowledge to spell.

Early Model

In contrast to stage or phase models, more recent investigators have proposed that children do not move through discrete stages of spelling development; instead, children employ phonology, orthography, and morphology as they slowly become competent spellers. This model, also known as the early model (Pacton & Deacon, 2008; Treiman & Cassar, 1997), suggests that linguistic knowledge is increasing throughout spelling development.

The early model describes how children use linguistic information in the early spelling of monosyllabic words in order to access word meaning. Additionally, the early model indicates that morphology contributes to both early and later spelling development (Bahr et al., 2009, submitted). Hence, spelling is a linguistic function and specific aspects

of linguistic knowledge are not learned in isolation, but are used collectively and simultaneously throughout spelling development (Ehri, 2002; Pacton & Deacon, 2008; Treiman & Cassar, 1997). (For a comprehensive discussion of the two models, see Bahr et al., 2009.)

Both the late and early models provide insight into the importance of analyzing the spelling of children. Research has shown spelling to be a critical component of literacy development and one of the purest indicators of lexical quality (Ehri, 2000; Templeton, 2004). Although these models differ on their perspective regarding spelling development, both highlight how spelling analysis can provide valuable information that could be used to implement adequate instruction and/or intervention (Bahr et al., 2009, submitted)

Spelling in Spanish

Researchers have evaluated Spanish and English spelling development and found that while Spanish spelling development does not significantly differ from spelling development in English, discrepancies exist in the rate at which Spanish speaking children acquire spelling skills in comparison to English children (Defior, Jimenez-Fernandez, & Serrano, 2005). Studies have found that, not only do Spanish speaking children in the United States develop spelling skills faster than their same age English-speaking peers, but that it can take up to an additional two years for English-speaking children to reach the same level of skill (Defior et al., 2005; Marín, Carillo, & Alegría, 1999). This finding is likely related to the orthographic transparency of the Spanish language, which can affect the timing and ease of spelling acquisition because there is a more direct relationship between letters and the sounds they represent (Cossu, 1999). On

the other hand, opaque languages, such as English, demonstrate more inconsistency in the regularity of the relationships that exist between orthography and phonology (Moats, 2000; Sun-Alperin & Wang, 2008).

English and Spanish Phonology and Orthography.

In English, there are 26 graphemes and approximately 44 phonemes. On the other hand, in Spanish there are 29 phonemes and 29 graphemes. Spanish orthography shares all 26 English graphemes and adds three graphemes, *ch*, *ll*, and *ñ* that are not found in English. Of the 26 graphemes English and Spanish share, only 14 of the graphemes represent the same sound across both languages. While many of these differences involve vowels, there are some that affect consonants. In order to further illustrate the similarities and differences between Spanish and English, a comparison between English and Spanish phonemes and graphemes is depicted in Table 1 below.

Table 1. *Comparison between English & Spanish Orthographies (compiled from Moats, 2000; Real Academia Española, 2007; Sun-Alperin & Wang, 2008)*

	English	Spanish
# of phonemes	44	29
# of graphemes	26 (over 250 graphemes & combinations represent the 44 phonemes).	29 (all English graphemes + ch, ll, ñ)
Grapheme correspondences	3 correspond to 2 phonemes each: <i>c</i> = /k/ & /s/ <i>g</i> = /g/ & /dʒ/ <i>x</i> = /ks/ or /gz/ 8 digraphs (ch, th, sh, wh, ng, ph, gh, ck) 2 trigraphs (tch, dge)	5 correspond to 2 or more phonemes each: <i>c</i> = /k/ & /s/ <i>g</i> = /g/ & /h/ or /x/ <i>r</i> = /r/ & /R/ <i>y</i> = /i/ & /y/ <i>x</i> = /s/ & /ks/ & /h/ or /x/ 3 digraphs (ch, ll, rr) Some indicate the same sound <i>b</i> & <i>v</i> = /b/; <i>h</i> is silent.
Vowel graphemes	5 (a, e, i, o, u), each corresponds to several different spellings	5 (a, e, i, o, u), each corresponds to 1 grapheme

Similarities and differences. There are a few grapheme to phoneme correspondences that differ across English and Spanish. For example, the letters *z* and *v* exist in both alphabets but these sounds do not represent the same sounds in both languages. In English, the letters *z* and *v* are voiced fricatives with a direct grapheme to phoneme correspondence. On the other hand, in Spanish, the letters *z* and *s* both represent the voiceless fricative /s/. In addition, *c* can represent /s/. The rules are (Alboukrek, 2009; Garcia-Pelayo y Gross, Garcia-Pelayo y Gross, & Durand, 1982; Hualde, 2005; Lang, 1990; Real Academia Española, 1999):

- a) Words can be spelled with the letter *z* when preceded by the vowels *a*, *o*, and *u* in the final position of monosyllabic words, such as *luz* (*light*), and when preceding the consonants *g*, *n*, *c*.
- b) Words are spelled with the letter *s* at the end of syllables, when preceding consonants *b*, *d*, *f*, *g*, *l*, *m*, *q*, and in words ending in *-oso*, *-ese*, *-sion*, *-sible*, *-sivo*, *-erso*, *-ersa*, *-erse*, *-ismo*, *-isima*, *-isimo*, and *-erse*.
- c) Words are spelled with the letter *c* when preceding the vowels *e* or *i*, as in *cerradura* (*lock*) and *felicidad* (*happiness*), and when preceding vowels *e* or *i* in plural words, such as *luces* (*lights*).

It is important to note that all previously mentioned spelling rules have their exceptions.

An additional interest in Spanish is the phonetic representations of the letters *b* and *v*. Although the Spanish alphabet includes the letter *v*, it represents the voiced stop /b/, as both the letters *b* and *v* are allophonic variations of the same phoneme. Another unique aspect when comparing English and Spanish is diagraphs. For example, English has the diagraph *sh*, which represents the voiceless fricative /ʃ/ and *th* that represents both the voiced fricative /ð/ and voiceless fricative /θ/. It is important to note that these phonemes do not exist in the Spanish language. However, the voiced fricative *th* (i.e., /ð/) can be heard as an intervocalic variant of /d/, as in the word *dedo* (*finger*).

Ambiguous graphemes. English and Spanish also have ambiguous graphemes. For example, English and Spanish share the same letter-sound relationship for the *c* grapheme. For example, the /k/ sound is represented with the letter *c* in words such as *cat* in English and *camión* (*truck*) in Spanish, while the /s/ sound is represented with the letter *c* in words such as *decimal* in English and *sacerdote* (*priest*) in Spanish. This same

relationship does not hold for the letter *g*. In English, *g* represents both the /g/ and /dʒ/ sounds, as in the words *golf* and *giant*. In contrast, the letter *g* in Spanish represents the /g/, /h/, or /x/ sounds.

Another discrepancy across languages involves the letter *x*. In English, *x* represents both the /ks/ and /gz/ sounds, as in the words *axe* and *exit*, while in Spanish, the letter *x* represents the /s, ks, h or x/ sounds, as in the words *xenofobia*, *exacto*, and *México*, respectively.

Vowel relationships. Another area of notable difference between English and Spanish is depicted in the vowel relationships across both languages. In English, the spelling of the vowels can be represented by a single grapheme or a combination of graphemes. On the other hand, there is a direct relationship for Spanish vowels between the phoneme and the grapheme. For example, the vowel *a* in English varies in length, meaning it can be pronounced as a short (e.g., *apple*) or long (e.g., *ate*) vowel and can also be spelled in a variety of ways (e.g., *ay*, *eigh*, *ai*). In contrast, Spanish vowels do not vary in length; therefore, the vowel /a/ can only be pronounced one way, as in the words *zapato* (*shoe*), *casa* (*house*), and is always spelled with the grapheme *a*.

In summary, such differences between English and Spanish orthographies can pose difficulty for Spanish children who are learning to spell in English. Bilingual children must learn the differences among the phonology, orthography, and corresponding grammatical patterns of the two languages simultaneously. Additionally, as children become biliterate, the literacy skills required for academic success do not always easily transfer from the home language to the second language (Gort, 2004). However, limited research has considered how biliteracy affects spelling in Spanish-

English speaking children (Escamilla, 2006; Gildersleeve-Neumann, Peña, Davis & Kester, 2008; Rubin & Carlan, 2005).

English and Spanish morphology. Another important contrast between English and Spanish is the use of morphology. In comparison to English, Spanish is a morphologically rich language (Garcia-Pelayo y Gross et al., 1982; Lang, 1990; Ramirez, Chen, & Geva, 2009). Like English, new word formations in Spanish include compounding and derivations. Compounding is the conjoining of two individual morphemes (e.g. *fibra* + *vidrio* = *fibravidrio* (*fiberglass*). Furthermore, derivations cause a semantic and/or a syntactic change by combining free morphemes (i.e., root words that can stand alone) with bound morphemes (i.e., prefix or suffix that cannot stand alone). An example of a derivation would be combining *en* + *hebrar* (*into+thread*) to form the word *enhebrar* (*to thread*).

Most Spanish words are made by combining lexical morphemes (i.e., free morphemes which also carry grammatical information) with bound morphemes (Garcia-Pelayo y Gross et al., 1982). However, Spanish is also referred to as an inflectional language, which is comprised of a two gender system and over 50 verb conjugations per verb form (Lang, 1990; Ramirez et al., 2009). Additionally in Spanish, nouns and adjectives can also be inflected to signal a change in gender and number. Inflections often cause changes in pronunciation and spelling and are conjugated to reflect tense, aspect, person/number, mood, and voice (Garcia-Pelayo y Gross et al., 1982). It is important to note that Spanish inflections also involve rules of syntax.

Common Spelling Errors Found Across Spanish-English Bilingual Research

Previous research has shown that, as children develop their ability to spell, they are also applying their knowledge of phonology, orthography, morphology, and vocabulary (Becker, Dixon, & Anderson-Inman, 1980; Ehri, 2000; Joshi, Treiman, Carreker, & Moats, 2008; Treiman & Bourassa, 2000; Wasowicz, 2007). Therefore, it is not unexpected that children acquiring a second language try to implement the previously learned patterns from their L1 when spelling words in their L2. In fact, studies have shown that Spanish-speaking students who are learning English implement Spanish phonological and orthographic patterns in their English writing (Zutell & Allen, 1988). Considering this, several studies have analyzed the types of spelling errors that Spanish-English bilingual children might produce because of their knowledge of both languages (Arteagoitia et al., 2005; Chiappe, Glaesser, & Ferko, 2007; Cronnell, 1985; Dworin, 2006; Escamilla, 2006; Fashola et al., 1996; Gildersleeve-Neumann et al., 2008; Rubin & Carlan, 2005; Sun-Alperin & Wang, 2008). These types of errors are described as predicted errors because these misspellings would be expected to occur as a result of applying Spanish phonological and orthographic patterns to the spelling of English words. Of the predicted errors, seven patterns that frequently appear in the spelling of bilingual students are: 1) letter-sound confusions; 2) non-contrastive phonemes; 3) contrastive vowels; 4) Spanish allophones; 5) context-dependent spellings; 6) consonant doubles; and 7) code-switching and other common errors. Each of these spelling errors will be further described below.

Letter-sound confusions. Researchers have found that bilingual children produce many letter-sound errors; particularly when the target words contained the letter *c*

(Escamilla, 2006; Rubin & Carlan; 2005). This confusion occurs because the letter *c* represents more than one sound, as described above. The rule is that the letter *c* in Spanish is pronounced as the /s/ phoneme when it precedes the vowels *e* or *i*. When this rule is not applied, the following spelling errors have been observed: *carsel* for *cárcel* (*jail* in English) and *sinco* for *cinco* (*five* in English) (Escamilla, 2006). It should also be noted that English letter sound errors were also commonly noted in the English writing of bilingual students (Escamilla, 2006). For example, an emerging Spanish-speaking bilingual child could spell the English word *happy* as *japi*, because the letter *j* can represent the /h/ phoneme in Spanish.

The children also exhibited difficulty with mapping sounds to letters, specifically with spelling Spanish words that contained /x or h/, /s/, /k/, and /j/ (Escamilla, 2006; Rubin & Carlan, 2005). This source of confusion is related to the fact that these sounds may be represented with more than one grapheme. For example, /s/ can be represented with the letter *c*, *s*, or *z* in Spanish. It is not unexpected, therefore, that children spelled words containing /s/ with the letters *c*, *s*, or *z*, as *seño* for *ceño* (*frown* in English) and *sapato* for *zapato* (*shoe* in English). Similarly, words containing /h/ or /x/ sounds can be represented with the letters *j*, *g*, and *x*, as in the words *jinete* (*rider* in English), *gente* (*people* in English), and *México* (*Mexico* in English). While the rule in Spanish is that the letter *c* is used when preceding the vowels *e* or *i*, there is no specific rule to indicate when to use the letter *j* versus *g* (Hualde, 2005). Likewise, words containing the /j/ phoneme can be represented with the letters *ll* and *y*, as in the words *yeso* (*plaster* in English) and *llano* (*flat* in English). These findings are interesting to note, as Spanish is often referred to as a transparent language and such errors suggest otherwise.

Non-contrastive phonemes. Researchers have also found that phonemes that are not contrastive (i.e., do not signify a difference in meaning) in the native language pose greater difficulty for bilingual children (Chiappe et al., 2007; Hualde, 2005; Gildersleeve-Neumann et al., 2008). For example, Korean-English bilingual students had difficulty differentiating between /s/ and /z/, as these phonemes were not contrastive in Korean (Chiappe et al., 2007). This same type of error was also noted in the spellings of Spanish-English bilingual children (Escamilla, 2006; Gildersleeve-Neumann et al., 2008). For example, a Spanish-English bilingual child would likely spell the word *witch* for *wish* and *wash* for *watch* because the /ʃ/ phoneme is not represented in Spanish phonology; therefore, it can be supposed that the child produced the /tʃ/ phoneme since it most closely resembles this phoneme in his or her phonological repertoire (Cronell; 1985; Hualde, 2005; Gildersleeve-Neumann et al., 2008). However, it is interesting to note that other studies found that Spanish words containing contrastive phonemes, such as the *ñ* in *sueño*, were considered to be easy for the children to spell (Arteagoitia et al., 2005).

Contrastive vowels. The spelling of contrastive vowels was also difficult for Spanish-English bilingual children (Fashola et al., 1996; Gildersleeve-Neumann et al., 2008; Rubin & Carlan, 2005; Sun-Alperin & Wang, 2008). In Spanish, contrastive vowels are spelled differently in English. For example, in the previously mentioned spelling studies, children often used *i* to represent the long *e* vowel in English words (e.g., *si* for *see*, *it* for *eat*, *mit* for *meat*) because that is the sound-letter correspondence in Spanish, whereas in English, /i/ can be spelled with the letters *ee*, *ea*, and *e*. This was also true when Spanish-English bilingual children were asked to spell English words containing the long vowel *u* (e.g., *mun* for *moon*, *tun* for *tune*). In this case, the /u/ sound

in English can be represented by numerous letter combinations (e.g., *oo, ew, ue, eu, ie, ui, eau, ugh, ieu*, and *u* when there is a final *e* in the word). When these types of vowel errors were noted, researchers concluded that the spellings were phonologically legitimate in Spanish and also followed the rules of Spanish orthography.

Spanish allophones. Other spelling errors researchers commonly noted in the Spanish writing of bilingual children involved the Spanish allophones /b/ and /v/ (Escamilla, 2006; Rubin & Carlan, 2005). In English, /b/ and /v/ represent two separate phonemes, but in Spanish, they represent two phonetic variants (i.e., allophones) of the same /b/ phoneme. For example, students' writing samples evidenced spelling *povre* for *pobre* (*poor*), *biolensia* for *violencia* (*violence*), and *vriyando* for *brillando* (*shining*). Pronouncing these words with a /b/ or /v/ sound does not change their meaning as they are perceived as the same phoneme in Spanish.

Context-dependent spellings. Another category of words frequently misspelled in Spanish contained phonemes that were spelled in different ways depending on the context. For example, in Spanish when the letters *gu* precede the vowels *e* or *i*, the /g/ is represented and the *u* remains silent, as in the word *entregues* (*deliver*). However, in some cases, the /u/ is pronounced after the letter *g*, but when this occurs, a dieresis is placed above the *u* in order to signal the pronunciation of the letter as in the word *agüita* (*water*). Arteagoitia et al. (2005) found that students experienced difficulty spelling words in which they had to decide when to use the letter *g* versus *gu*, as in the verbs *llegar* (*to arrive*) versus *llegué* (*I arrived*). It was concluded that Spanish verbs requiring this orthographic change (e.g., adding suffixes, a grapheme, or diacritics) were the most difficult to spell. For example, in the case of *llegué*, the students had to add the letter *u* in

between the *g* and *e* in order to preserve the phoneme's original sound as well as to signal a change in the verb form (i.e., infinitive to a preterit indicative). However, it is unclear if the spelling errors were truly due to an orthographic effect (i.e., letter knowledge) or a morphosyntactic effect (i.e. knowledge of the grammatical rules of the language).

Consonant doubles. Other spelling errors included English consonant doubles, such as *pp*, *tt*, and *ff* (Escamilla, 2006). Children often spelled these words with a single consonant, as illustrated by *japi* for *happy*, *prety* for *pretty*, and *grofitey* for *graffiti*, because consonant doubling does not commonly occur in Spanish (Escamilla, 2006). In fact, double *cc*, as in the word *accidente* (accident), is the only true double consonant that appears in the Spanish language. Therefore, when writing English words containing double consonants, it may be concluded that the children wrote the words using a single consonant, as that spelling form matches their knowledge of Spanish orthography.

Code-switching and other common errors. Another type of error commonly found in the writing of Spanish-English bilingual children was categorized as code-switching. In other words, Spanish-English bilingual children used Spanish words or, at times, even invented Spanish words to represent English vocabulary. For example, Rubin and Carlan (2005) found that, when instructed to produce an English writing sample, participants intermittently switched between writing in their L2 to their L1. To illustrate, a participant wrote Spanish words, as in *peseq un caro*, in their English writing samples in order to express *follow or chase a car*. Additionally, invented words such as *traila* (instead of *caravan* or *casa rodante*) to represent the English word *trailer* were also found in the Spanish spellings of bilingual children (Dworin, 2006). Both examples appear to support

the conclusion that participants concurrently used their L1 and L2 to express themselves in their writing.

Other errors frequently noted in the spelling of Spanish-English bilinguals included failure to separate words (e.g. *alos* for *a los*) and a lack of knowledge of when to use accent marks (e.g., *ayudara* for *ayudará*) (Escamilla, 2006). Omission of silent *h*, as in spelling *ermano* for *hermano* (*brother* in English), was also common across the spelling errors found in the writing of Spanish-English bilingual children (Escamilla, 2006).

Research Limitations

There are two limitations to the previous studies. First, prior studies assessed children in only one of their languages (Arteagoitia et al., 2005; Chiappe et al., 2007; Escamilla, 2006; Fashola et al., 1996; Gildersleeve-Neumann et al., 2008; Rubin & Carlan, 2005; Sun-Alperin & Wang, 2008). This is a limitation because it does not facilitate a comparison of spelling development in both languages in order to assess if students are having spelling difficulty in one language versus the other. Therefore, further investigation of the spelling patterns exhibited in bilingual children in both languages is paramount as it can provide valuable information regarding the instructional practices that will benefit this population (Berninger, Garcia, & Abbott, 2008). However, an important question is what method will allow for detailed analysis of the linguistic features present in children's spelling.

A second limitation concerns the absence of a conceptual framework through which the spelling development of Spanish-English children could be interpreted. A key issue is the extent to which the early model of spelling fits the Spanish spelling

development of bilingual children (Pacton & Deacon, 2008; Treiman & Cassar, 1997). Therefore, further investigation of bilingual Spanish spelling development is important as it can help determine to what extent Spanish spelling is related to English spelling and consequently, the development of spelling skills in both languages (Arteagoitia et al., 2005)

Issues in Spelling Research

Spelling Tasks

While several studies have analyzed the spelling of bilingual children, the methods employed to elicit spelling samples have varied across investigations (Chiappe et al., 2007; Cronnell, 1985; Escamilla, 2006; Gildersleeve-Neumann et al., 2008; Rubin & Carlan, 2005; Sun-Alperin & Wang, 2008). Some studies utilized a dictation approach to elicit real word and non-word spellings (Arteagoitia et al., 2005; Fashola et al., 1996; Sun-Alperin & Wang, 2008; Zutell & Allen, 1988). Others used writing prompts in order to obtain spelling samples in a more naturalistic manner (Cronnell, 1985; Escamilla, 2006; Rubin & Carlan, 2005). Benefits and limitations to using both approaches are discussed next.

Dictation approach. An advantage of using a dictation approach is that it is designed to elicit specific spelling features (e.g., silent letter *h*, silent letter *e*, long versus short vowels, etc.). This approach can be useful when the intent is to assess specific language features. For example, a word list might be employed that contains embedded vowels that children would misspell as a result of Spanish language influence. However, employing a dictation approach also limits the type of errors that can occur because the focus is only on target phonemes.

Writing prompts. A method that may possibly yield a greater variety of error types is a writing sample, as this expands the vocabulary children use in their writing. However, it is important to note that, when utilizing writing samples, children may avoid using words they are not sure how to spell, which in turn limits the type of errors produced. Furthermore, writing samples can also pose a limitation if the topic necessitates the use of specific types of words and syntactic structures. For example, the writing prompts used to elicit spelling samples in Escamilla's (2006) study influenced the variety of vocabulary, but also required the use of specific syntactic structures. In analyzing the results of this study, it was noted that the English narrative sample entitled "My best birthday ever", elicited the past tense *-ed*, but the same narrative in Spanish elicited the use of past tense words (e.g., preterit and imperfect), which required the use of accent marks. For example, the child wrote *golpeo* (present tense *I hit*) for *golpeó* (past tense *he hit*). While the spelling of the word included the correct graphemes, the omission of the accent mark placed the word in its present tense form. When this occurred, the writing rubric indicated that words with accent marks omitted were to be scored as misspelled words. The effect of this action was that the students' percentage of spelling accuracy was decreased. However, upon further investigation, it was found that accent mark omission was typical of 4th and 5th grade Spanish writers, as usage of accent mark rules is not typically mastered until around the 6th grade. Therefore, the authors concluded that this was not a spelling error, but rather a lack of knowledge of Spanish grammatical rules.

A similar study conducted in English also found that the nature of a prompt elicited specific syntactic structures (Cronnell, 1985). For example, the prompt used for

the 3rd graders in this study elicited more frequent use of past-tense forms (writing about a picture/event that previously occurred), while the prompt for the 6th graders was more persuasive involving present and future events (i.e., persuade a friend to watch a T.V. show). Therefore, it was not unexpected when 15% of the 3rd graders' spelling errors were due to the omission of the past tense for *-ed*, with the 6th graders only producing 5% of this error type (Cronnell, 1985). Therefore, when analyzing students' spelling, it is important to consider the goal of the experiment, so that the spelling task can be developed according to the purpose of the study.

Scoring of Spelling Errors

Another major limitation among the spelling studies conducted on bilingual children is the manner in which the spelling errors are scored and analyzed. The majority of the spelling studies have used rating scales to analyze misspellings (Arteagottia et al., 2005; Chiappe et al., 2007; Fashola et al., 1996; Sun-Alperin & Wang, 2008; Zutell & Allen, 1988). However, the types of rating scales used have varied across studies. To illustrate, some rating scales categorized spelling errors into developmental versus non-developmental mistakes, but did not base their errors on a specific model of spelling development nor was an in-depth description of the types of spelling errors provided. For example, in the Arteagoitia et al. (2005) study, spelling errors were identified and then categorized into two separate categories: 1) Spanish developmental errors (i.e., errors attributed to the learning of a language) and 2) contrastive errors (i.e., errors due to cross-linguistic influence). Scores determining the percentage of errors for each category were then calculated. The problem with this type of classification system is that, while it does

separate spellings into correct and errors influenced by a second language, it did not describe the errors as being related to specific linguistic features.

Other rating scales did not only identify targeted spelling errors, but described them according to how bilingual children applied or did not apply the phonological and orthographic rules of Spanish to the spelling of English words (i.e., cross-linguistic influence; Chiappe et al., 2007; Escamilla, 2006; Fashola et al., 1996; Sun-Alperin & Wang, 2008). For example, the Fashola et al., (1996) study used a rating system that scored the students' spelling errors as correct, predicted, not predicted, or missing (i.e., omitted responses), but did not provide a description of the errors produced. Similarly, Sun-Alperin and Wang (2008) used a five point rating scale that was based on five categories with the addition of descriptors (examples for each category were provided using the target word *meat*): Category 1: incorrect; phonologically inappropriate *and* orthographically illegal in Spanish and English (e.g., *maat*); Category 2: incorrect; either phonologically inappropriate *or* orthographically illegal in Spanish or English (e.g., *mat*, *meate*); Category 3: incorrect; phonologically appropriate in English and orthographically legal in English (e.g., *meet*); Category 4: phonologically appropriate in Spanish (e.g., *mit*); and Category 5: correct in the target language (e.g., *meat*). This type of categorization provides a limited description of the types of spelling errors produced and tend to focus only on cross-language issues.

In summary, previous studies have relied primarily on rating scales which provide a description of students' spelling errors. However, a limitation is that rating scales lack the depth that a linguistic description of the spellings can provide. In other words, in order to get a comprehensive picture of the linguistic (e.g., phonological, orthographic,

and morphological) features that bilingual children use, it is imperative to use a linguistically-based analysis system that specifies the nature of the error.

The Phonological, Orthographic, Morphological Assessment of Spelling (POMAS)

An analysis system that would qualitatively analyze misspellings is the Phonological, Orthographic, and Morphological Assessment of Spelling (POMAS; Bahr et al., 2009; submitted; Silliman et al., 2006). The POMAS is a linguistically-based approach that qualitatively analyzes misspelled words by linguistic category (phonological, orthographic, and morphological), and then further analyzes each word by identifying the particular linguistic features in error within each category. For example, in a writing sample, where a child spelled the word *junp* for *jump*, this error would be categorized as a phonological error because all of the sounds in the word were not represented phonologically. After the major linguistic category is identified, then the misspelling is further analyzed into its specific linguistic feature. In the *junp* example, the phonological error would be categorized under the linguistic feature of nasal error (PNE), because the child made a phonological error in which he or she implemented the use of the /n/ (a nasal) for the /m/ sound (another nasal; Bahr et al., 2009).

On the other hand, if the child misspelled the word *triped* for *tripped*, it would be categorized as an orthographic error because all of the sounds in the word were appropriately represented, but the orthography was not correctly executed. After establishing that this is an orthographic error, it then would be sub-categorized under the linguistic feature of consonant doubling (OCD), because the child made an orthographic error in which he or she failed to double the consonants following a short vowel (Bahr et al., 2009). Similarly, if the child misspelled the same word “tripped” as “tripp”, this

would be categorized under the linguistic category representing a morphological error. The feature error would be further sub-categorized as difficulty with the regular verb tense (MRVT). The POMAS also is sensitive to errors that children make in their spellings that reflect an overlap in two areas of development. For example, if the child misspells the word *tis* for *its*, this would be categorized as a phonological-orthographic error. The linguistic feature in error would be coded as a letter reversal (POLR), as the child transposed the letters and therefore did not correctly represent the phonological or orthographic structure of the word.

The POMAS was first developed by Silliman et al. (2006) in order to assess the spelling errors of children ages 6 through 11 with language learning disabilities (LLD). Results of the study indicated that children with LLD displayed a developmentally delayed pattern of spelling errors when compared to the error rates of the chronologically-matched age (CA) peers and a spelling age-matched group. The error rates of the LLD group and the spelling age-matched (SA) group significantly differed from the CA group. A qualitative analysis of the results further indicated that the spellings of the LLD group demonstrated more difficulty in representing the basic phonological structures of words when compared to the SA group. Furthermore, the spelling errors of the LLD group also demonstrated more difficulty with inflectional and derivational morphology. Overall, the qualitative analysis revealed that the LLD and SA groups were similar in terms of the number of errors produced; however, they differed in the types of spelling errors produced.

The POMAS has also been used to analyze the expository and narrative writing samples taken from typically developing students in grades 1-9 (Bahr et al., submitted).

Misspelled words were extracted from the writing samples (one narrative and one expository prompt) and analyzed using the POMAS. Results indicated that orthographic errors were the most common, followed by phonological and morphological errors. A grade effect was also found, with students in grades 1-4 making more errors than those in grades 5-9. Results further indicated that spelling errors in children grades 1-4 were predominantly orthographic in nature, with a significant number of phonological errors noted. However, some early developing morphological endings (e.g., -ing) and suffixes were also found in error. On the other hand, children in grades 5-9 continued to produce orthographic errors predominantly and more morphological errors than phonological errors were noted. These findings support the early model in that children combined their knowledge of phonology, orthography, and morphology throughout their spelling development (Bahr et al., 2009; submitted; Beech, 2005; Ehri, 2002; Pacton & Deacon, 2008; Treiman & Cassar, 1997). However, this pattern of spelling development has not been fully investigated in bilingual children.

Statement of the Purpose and Research Questions

In summary, the limited spelling research with emerging (Spanish-English) bilinguals has concentrated only on how Spanish may influence the English spelling of elementary-age students (Arteagottia et al., 2005; Cronnell, 1985; Escamilla, 2006; Fashola et al., 1996; Sun-Alperin & Wang, 2008; Zutell & Allen, 1988). However, results from these studies have provided strong evidence that bilingual children apply the phonological and orthographic rules of Spanish to spell English words. An additional finding indicated that cross-language interference also influenced bilingual children's

spellings (Chiappe et al., 2007; Cronnell, 1985; Escamilla, 2006; Rubin & Carlan, 2005). Little is known about the morphological errors in this population.

Given that research strongly suggests that cross-language interference influences the spelling of bilingual children, it would be beneficial to utilize a linguistic spelling analysis system, like the POMAS, that would qualitatively analyze the spellings in order to provide an in-depth understanding of the types (phonological, orthographic, and/or morphological) of errors bilingual children produce in their native language. A system, such as the POMAS should also be sensitive to identifying possible cross-language effects. This system contrasts with the more commonly used, but more superficial, percent accuracy approach (Leedy & Ormrod, 2005). The POMAS has also been used to differentiate the spelling patterns in English speaking children with language impairment (Silliman et al., 2006). Additionally, the POMAS has been applied to a normative database of typically developing children in grades 1-9 (Bahr et al., 2009; submitted). The normative information is important as it establishes a baseline for how linguistic categories interact in typically developing children when spelling words. The goal of this study is to apply the POMAS to a language other than English and to the writing samples of Spanish-English bilingual children. Two specific purposes are to:

- 1) Identify: a) the phonological, orthographic, and morphological spelling patterns that are produced in the misspellings of Spanish-English bilingual adolescents when assessed in writing samples gathered in English and Spanish and b) the linguistic features in error.
- 2) Specify the extent of cross-language transfer evidenced in the spelling errors produced by Spanish-English students.

Chapter 2

Methods

Participants

A total of 20 Spanish-English bilingual students attending a public middle school (grades 6-8; ages 11-14 years) located in west central Florida took part in this project. All of the participants came from families who originated from Mexico and the Caribbean (specifically from Puerto Rico and the Dominican Republic). Six of the twenty students were born in the United States. However, all of the students spoke Spanish at home. Additionally, all students received grade level literacy instruction in their home countries and varying amounts of schooling in the United States.

These participants were part of a larger study that evaluated the writing skills of English Language Learners (ELLs) (Danzak, 2009). Spelling data were obtained with the permission of the previous researcher. The current investigator analyzed the Spanish misspellings in these writing samples, as they were not included as part of the initial investigation. (For a comprehensive discussion of the participants, see Danzak, 2009.)

A total of six criteria were applied during participant selection. Each participant:

- 1) spoke Spanish and their families originated from Mexico or the Caribbean, as confirmed by teacher and self-report, and later reconfirmed via a student questionnaire;
- 2) had received up to grade level literacy instruction in their home countries until moving to the United States; confirmed by school records and student questionnaires;
- 3) were not

from migrant families; confirmed by teacher report and school attendance records; 4) qualified for ESL services and had received a qualifying test score on the school administered *Language Assessment Scales* (Duncan & De Avila, 1988); 5) were able to write in Spanish and English; confirmed by student writing and teacher report; and 6) were not receiving services for a disability or special education (e.g., speech/language, behavioral services, etc.), as documented by school records.

Materials

Writing samples. Each student produced eight formal writing samples. Of those eight, four writing samples were in English, and the other four in Spanish. Two of the four samples were elicited via an expository prompt, while the other two were elicited with a narrative prompt in each of the languages. The formal samples were controlled for genre and language, and prompts were repeated so that students wrote on the same topic in both languages. The language of the writing sample was alternated so that students wrote the same topic in each language approximately a week apart. The topics for the formal writing samples are illustrated in Table 2 below. This process resulted in a total of 160 writing samples, 80 samples in Spanish and 80 samples in English.

Table 2: *Genre and Topics Used to Elicit Writing Samples (Danzak, 2009)*

Formal Writing Sample (Genre)	Topic
Expository 1	Family: A person I admire
Expository 2	School: Letter to a new student
Narrative 1	Family: Special or funny memory
Narrative 2	School: First day of school in U.S.

Scoring system. The POMAS was originally developed in order to highlight spelling errors unique to the English language. In an effort to expand the use of the POMAS to Spanish, modifications were made in order to identify spelling errors unique to Spanish, as well as to capture instances of cross-language interference. Additionally, given that the study was designed to identify patterns that are characteristics of both languages, codes to identify the influence of English and dialectical variation were also added. A more comprehensive description of the codes added to Spanish version of the POMAS (POMAS-S) will be discussed below.

- 1) Accent marks. Codes were added to the POMAS-S in order to highlight the two types of graphic (or written) accent marks in Spanish which are the *acento tonico* and the *tilde diacrítica*, also known as *acento desinencial* (Alboukrek, 2009; Real Academia Española, 1999, 2007). The use of these two types of accent marks follow three basic rules which dictate accent mark use for almost every word based on: a) how the words are pronounced (i.e. *aguda*, *graves*, *esdrújulas*); b) how they serve to break up diphthongs; and c) how they signal change in

grammatical function and distinguish between meanings of homonyms and homographs (Erichsen, n.d.; Real Academia Española, 2007; Wiczorek, 1991).

The tonic accent, as the name implies, is determined by the stress patterns found in Spanish words. That is, when the stressed syllable of a word does not follow the expected pattern, a graphic accent is required. For example, the word *aquí* (*here*) has stress on its final syllable. The graphic accent is included to assist the reader in identifying which syllable is stressed (see explanation that follows). Since this type of accent does not impact word meaning, its omission would be categorized as an orthographic (O) error and further coded as an error with accent tonic (OAT).

First, tonic accent marks are placed according to where the stress occurs in the word. For example, agudas are words in which the stress falls on the final syllable. If a word is an aguda and ends in a vowel, *n* or *s*, the accent mark is placed on the final vowel, such as in *canción*, *aquí*, and *detrás*. It is important to note that if a word is an aguda but the word ends in a consonant other than *n* or *s*, it is written without an accent mark as stress naturally falls on the final syllable; for example, *hotel*, *ciudad*, and *reloj*. Graves are words in which the stress is placed on the penultimate (i.e., next to last) syllable. This is the case for all words ending in a vowel, *n* or *s*. If a grave ends in a consonant other than *n* or *s*, it carries a graphic accent. For example, in words like *huésped*, *lápiz*, and *débil*, the accent mark is placed over the vowel in the next to last syllable. However, if a word is categorized as a grave but ends in a vowel, *n* or *s*, it does not carry a written accent mark, as noted in the words *computadora*, *joven*, and *zapatos*

(Erichsen, n.d.; Wiczorek, 1991). Esdrújulas are words that carry stress in the third to the last syllable. All words categorized as esdrújulas carry a written accent. An example of these types of words would be *estómago* (*stomach*), *artículo* (*article*), and *aéreo* (*aerial*) (Erichsen, n.d.; Real Academia Española, 2007; Wiczorek, 1991).

Second, tonic accent marks are also used to segment diphthongs. Spanish diphthongs are made by pairing a strong vowel (*a, o, u*) with a weak vowel (*i* and *e*) or combining two weak vowels. If either combination appears in a single syllable, as in *ciudad* (*city*), *Junio* (*June*), and *seis* (*six*), no written accent mark is needed. However, when a strong and a weak vowel are combined and do not form a single syllable, the written accent mark is placed over the weak vowel as in *día* (*day*), *maíz* (*corn*), and *baúl* (*trunk*) in order to break up the diphthong (Erichsen, n.d.; Real Academia Española, 1999, 2007; Wiczorek, 1991).

Third, Spanish also has the *tilde diacrítica* also known as the *acento desinencial*, which is used to signal a change in a word's grammatical function (i.e., changes from a pronoun to a noun) or distinguish between the meaning of homonyms (*aun* and *aún*) and homographs (*papa* and *papá*) (Erichsen, n.d.; Real Academia Española, 2007; Wiczorek, 1991). The rule is that in both cases, the written accent is placed over the strong vowel in the stressed syllable. It is important to note that many pronouns are also homonyms. For example, the word *te* (*you*) is a pronoun but when it changes its function to that of a noun, it becomes *té* (*tea*) and so an accent is placed to signal a change in grammatical function as well as a change in word meaning. Furthermore, accent rules dictate that

interrogative pronouns such as *qué* (*what*) always have an accent mark placed on the vowel in the stressed syllable. Therefore, since the tilde diacrítica affects the grammatical function or meanings of words, they are considered to be morphological in nature. For example, if a child spells the word *solo* (*alone*, adjective) for *sólo* (*lonely*, *adverb*), the category in error would be morphological (M) in nature and further coded as tilde diacrítica (MTD). This is because this word is a homonym and looks orthographically similar when the accent mark is not included. The same would apply to homographs which share the same spelling, but have different meanings (i.e., *papa* and *papá*).

- 2) Allophones. Allophones are phoneme variations that change the phonetic structure of a word, but do not change word meaning. For instance in Spanish, the phonemes /b/ and /v/ occur as allophones. It is important to note, that Spanish has specific orthographic rules that distinguish when to spell *b* versus *v* in words (Real Academia Española, 2007). However, research has found that Spanish speaking people do not often distinguish between these in their pronunciation, as both *b* and *v* are phonetically identical in Spanish and represent a voiced bilabial (Hualde, 2005). Moreover, the pronunciation of these letters may vary depending on where they appear in relation to other sounds (Erichsen, 2009). For example, when the *b* or *v* is found in the initial position of words or after the consonants *m* and *n*, it is pronounced like the English /b/, except it is softer. As a result, words like *beso* (*kiss*), *vaso* (*glass*), *envío* (*delivery*) may be pronounced like /beso/, /baso/, and /enbio/ respectively. In contrast, when *b* or *v* is found in the medial position of words or between word boundaries, it is pronounced more like a

bilabial fricative and transcribed as /β/ (Erichsen, 2009; Real Academia Española, 2007). In other words, it is pronounced like a sound that falls somewhere between the English /b/ and /v/ sound except the lips do not really touch; therefore, words like *cebo* (*bait*), *llevar* (*to take*), and *a veces* (*sometimes*), would be pronounced as /ceβo/, /lleβar/, and /a βeces/, respectively. The pattern previously described is also characteristic of certain dialects of Spanish. If a student made the misspellings indicated above, the words would be coded as phonological-orthographic allophones (POA) errors as they involve both the phonology and orthography of Spanish. However, it is important to note that the difference in pronunciation did not change the meaning of the word.

- 3) English influence. In order to capture patterns of cross-language influence (how Spanish spelling errors may be influenced by English), the Orthographic English Influence (OEI) code was added. This was vital, for the reason that one of the main focuses of the study was to highlight spelling patterns evidencing English influence. Analysis of these spelling patterns serves as a window into how the two language systems (i.e., Spanish and English) interact in emerging bilinguals. In fact, previous research has shown that 4th and 5th grade Spanish-English bilingual students evidence English influences in their Spanish writing (Escamilla, 2006). This is comparable to findings of younger Spanish-English bilinguals, whom also evidenced effects of English on their first language (i.e., Spanish; Peña et al., 2008). These “influenced” words are coded in this way because Spanish phonology is accurately represented, but the orthography matches the English language. An example of English influence can be seen in the misspelling of the

word *quida* (take care) for *cuida*. In Spanish, the “kw” sound, as in the English word *queen*, is represented with the letters *cu* and cannot be represented with *qu* as it occurs in English. In fact, when the *qu* letters occur in Spanish spellings, they only come before the letters *e* and *i* and can only represent the English *k* sound, as in the words *queso* (cheese) and *tequila*. Therefore, it can be presumed that English influence affected the spelling of this word.

Another example of English influence can be seen in the students’ spelling of the Spanish word *lonche* as *lunche* because it appears to be influenced by the English word *lunch*. In this example, it is evident that knowledge of the English language has resulted in a word that reflects a vocabulary merger between two languages (Escamilla, 2006). It is important to note that the proper word to express the word *lunch* in Spanish would be *almuerzo*, which differs from code switching. Code switching occurs when an English word is substituted in its entirety for a Spanish word or vice versa. When this occurs, the words are coded as morphological code switching (MCS). An example of code switching would be saying the English word *lunch* for the Spanish word *almuerzo* or saying the Spanish word *escuela* for the English word *school*.

- 4) Dialectal variation. Research has shown that when children are beginning to develop their spelling skills, they rely heavily on the phonetic qualities of their language (Ehri, 1989, 2000). Consequently, it is not unexpected that emerging bilingual children evidence spellings that reflect the influence of the phonological repertoire that is specific to the dialect they speak. Therefore, a code that would highlight dialectal variations evidenced in the spellings of bilingual children was

added to the POMAS. For example, in some Mexican dialects, the voiced stop /g/ is often substituted, when speaking, by the voiceless fricative /h/ (represented orthographically as the letter *j* in Spanish). As a result, children who demonstrate this dialectal variance may spell the word *preguntar* (to ask) as *prejuntar*. An example for Puerto Rican Spanish would be the *r* to *l* variation. As a result of this dialect, children would write *borsa* for *bolsa* (*bag*). Misspellings that reflected dialectal influence were coded as an error under orthographic dialectal variation (ODV). This is because the word is represented as phonologically correct but not orthographically correct. (See Appendix A for a complete list of features).

Procedures

The collection of writing samples took place in the students' ESL classroom over a period of five weeks. The students' writing samples were part of a larger bilingual autobiography project in which all of the bilingual students in two classes at the middle school participated. However, only the Spanish-speaking participants' writing samples were collected for analysis. The writing samples were collected in a quasi-random order. In other words, the first writing prompt for a topic was administered in Spanish then English and then the second one in English and then Spanish. The counter-balance was done in order to reduce the advantage of administering the writing prompts in a specific order. The bilingual biography project also served as a means to engage the students in the writing process utilizing a unified theme, as well as to provide a specific goal and purpose for their writing (Danzak, 2009).

A 50 minute time block was allotted to the production of each writing sample. Upon arrival, the researcher greeted each student, and ensured that they had all of the

materials they needed in order to produce their writing sample. Once the students had settled down and were ready to start, the researcher presented the prompt via a projector, in both English and Spanish, and asked a student volunteer to read the prompt aloud in both languages to the class. The ESL teacher and the researcher informally shared some personal experiences that would help model the types of information that could be used while responding to the prompt and also encouraged students to share suggestions regarding what they would write about. The participants' writing received additional scaffolding by the researcher, who reminded them to include eventive (telling what happened, a chain of events), descriptive (writing about the state of affairs, facts, or background information), and interpretive information (attitudes, feelings, writer's evaluation) in their writing (Ravid & Berman, 2006).

After discussing the prompt for about 10 minutes, the students were given 30 minutes to produce a writing sample. Students wrote the samples by hand and worked individually. For the duration of this time, classical music was played in the classroom while the researcher, teacher, and aide circled the room to encourage and monitor the students. They were allowed to sit anywhere in the room --including cushions on the floor and writing on clipboards -- as long as they remained focused on their task. When the students were done writing, the researcher made sure that all aspects of the sample were addressed. If not, the students were encouraged to continue writing. At the end of the 30 minutes, the writing samples were collected by the researcher. This same prompt was repeated a week later in the other language. During the following session with this prompt, students were allowed to briefly review their previous writing sample in order to refresh their memory as to what they wrote earlier. This sample was then taken away and

the student composed a new sample in the other language. The current study will only focus on the Spanish written samples collected. (For an in-depth description of the writing assessment conducted, see Danzak, 2009).

Data Analysis

Error identification criteria. Two fluent Spanish-English bilingual, one master's level student, and the other a senior enrolled in the Department of Communication Sciences and Disorders at the University of South Florida, obtained the original writing samples, identified the spellings errors in the Spanish samples, and analyzed them using the POMAS-S. An important first step in identifying spelling errors involved an extensive discussion and subsequent consensus of what was to be classified as a spelling error. It was determined that, for the purposes of this study, only the words with misspellings would be identified and included for analysis. Errors involving syntax, such as gender, punctuation, and capitalization, were not considered to be spelling errors.

To illustrate, Spanish is marked by gender. Spellings, in which there was a lack of gender agreement between the article and the noun, were not considered errors if the student spelled each word correctly. For example, if a child spelled the word *casado* (married male) for *casada* (married female), the spelling of the word would not be considered to be in error because the word was spelled correctly, just gender was not appropriately marked. Hence, this type of error was considered to be more of an error involving syntax, instead of spelling. However, proper names that were not capitalized (e.g., florida for Florida) were considered to be misspelled words and therefore, were coded as an orthographic proper name (OPN) error. In the case of the Spanish writing

samples, words in which the students omitted accents, both tonic and diacritical, were also considered to be spelling errors, as done by Escamilla (2006).

Consistency of identification. Each misspelling was entered into an Excel spreadsheet. Subsequently, the two coders compared their total number of incorrect words and incorrect word selections to see if they had identified the same misspelled words. If there was a disagreement on a word, both extensively discussed the word, the possible category, and features in error. After extensive discussion, agreement was reached regarding whether the word was to be included for analysis or excluded. In this way, all words to be included in the misspelling analysis were identified and agreed upon.

Scoring agreement was established next. Four writing samples were initially coded by each coder in order to establish agreement between them. Each coder scored the samples individually and then met to review the errors and their feature classifications. If there was a disagreement in the way that a word was to be coded, the differences were resolved by looking at the word in various perspectives until they could agree. For example, if the word *habla* (to talk) was spelled as *abla*, the first step would be to establish the linguistic category in error. In this case, the coders would first agree that the linguistic category in error was orthographic in nature because, although the student omitted the initial letter *h*, the phonological structure of the word remained intact (i.e., all the sounds of the word were represented).

The second step established the linguistic feature in error. In the case of *habla*, the student omitted the initial silent letter *h*, therefore, the coders agreed that this spelling error was an orthographic silent letter (OSL) error. Simple agreement was determined by counting the number of agreements among misspelled words, subtracting that number

from the total number of error words in the writing sample, and then dividing that number by the total number of words. Agreement for coding misspellings was established at 99% accuracy.

After the researchers had established agreement and gained experience coding the words using the POMAS-S, they divided the remaining samples and coded the misspellings from each sample separately. Prior to independently identifying and coding the misspelled words derived from the individual samples, the coders counted the total number of words in each sample and entered them into an Excel spreadsheet. All words in the writing sample were considered, including the title of the narrative and expository sample and closing signature (e.g., the end).

Once the coders had counted the total number of words, they each compared their total word count and total number of words identified as being misspelled. If they differed, they recounted the words in their sample until their total number of words and total numbers of words in error were equal. For example, if the coders were uncertain about a spelling, they consulted a Spanish dictionary to ensure that they were identifying the same incorrect spellings from each writing sample. Using a Spanish dictionary also was necessary to verify some of the spelling of words that were dialectal, as in the use of *chavo* (boy), which is found in some dialects of Mexican Spanish.

After all the spelling errors for each student were identified in the linguistic context of their formal Spanish writing samples, the misspellings were entered into an Excel spreadsheet. Then, the overall percentage of correct spelling was calculated for each writing sample. This was obtained by dividing the total number of correct spellings by the total number of words produced for that individual writing sample. Subsequently,

the misspellings were analyzed utilizing the *POMAS-S* (Bahr et al., 2009; submitted; Silliman et al., 2006). The categorizations of misspelled words were entered into a spreadsheet that listed all POMAS-S codes as individual columns. The coders then marked the appropriate columns for each sound in error in the misspelled word. For statistical analyses, the number of errors in each linguistic category (i.e., phonology, orthography, morphology, and phonological-orthographic) were totaled for each participant. This value was normed by the number of total errors produced by the participants. The frequency of specific linguistic features within each of the three categories then was calculated by first totaling the number of errors within each feature at the bottom of the spreadsheet. These values were totaled across all participants and then, the linguistic features were ranked by the most frequent to the least frequently occurring within each linguistic category (phonological, orthographic and morphological).

Agreement. Once the coders completed coding the spelling errors from their respective samples, inter-judge and intra-judge agreement were conducted. Inter-judge agreement involved the consistency in coding between the two coders. This was checked by analyzing 10% of each other's samples. Samples were randomly selected by a third party (the research mentor) with an equal number of narrative and expository samples selected. The second trained coder recoded the narrative and expository writing samples. Inter-judge agreement was computed at 99%.

Intra-judge agreement was defined as the consistency in coding by each coder. The samples used to check intra-judge agreement were also randomly selected by a third party with an equal number of narrative and expository samples chosen. Each coder recoded 10% of the narrative and expository samples they had already coded. Intra-judge

agreement was computed at 98%. Overall, the coders demonstrated a high degree of accuracy in their coding with the POMAS-S.

Statistical Analysis. A three -way ANOVA was used to compare and analyze the quantitative data. The independent variables were: gender (female or male), category (phonology, orthography, morphology, phonological/orthographic), and genre (narrative or expository). The dependent variable was percentage of errors within each category. Post hoc tests were run when appropriate. Effect sizes were calculated and presented in a chart showing percentages of error by linguistic category.

Qualitative Analysis. A qualitative analysis was completed in order to determine the frequency and types of errors that occurred in the data. The first analysis assessed the frequency of occurrence for each linguistic feature by linguistic category. Then the total number of errors for each linguistic feature in the three main error categories (phonological, orthographic, and morphological) were totaled and analyzed. The misspellings that occurred with the most frequency were identified and the most frequently occurring spelling patterns were noted for each linguistic category. The second analysis assessed the frequency and type of words that evidenced English language influence and code switching.

Chapter 3

Results

The primary objective of this study was to use the POMAS (Silliman et al., 2006) as a tool to qualitatively analyze the type of Spanish spelling errors exhibited in the narrative and expository writing samples produced by emerging Spanish-English bilinguals in middle school. The secondary focus was to identify the extent of cross-language interference in the students' spelling errors. However, some quantitative data will also be presented. The findings from the analysis of the 20 students' Spanish spelling errors will be discussed in detail below. The two specific purposes were to:

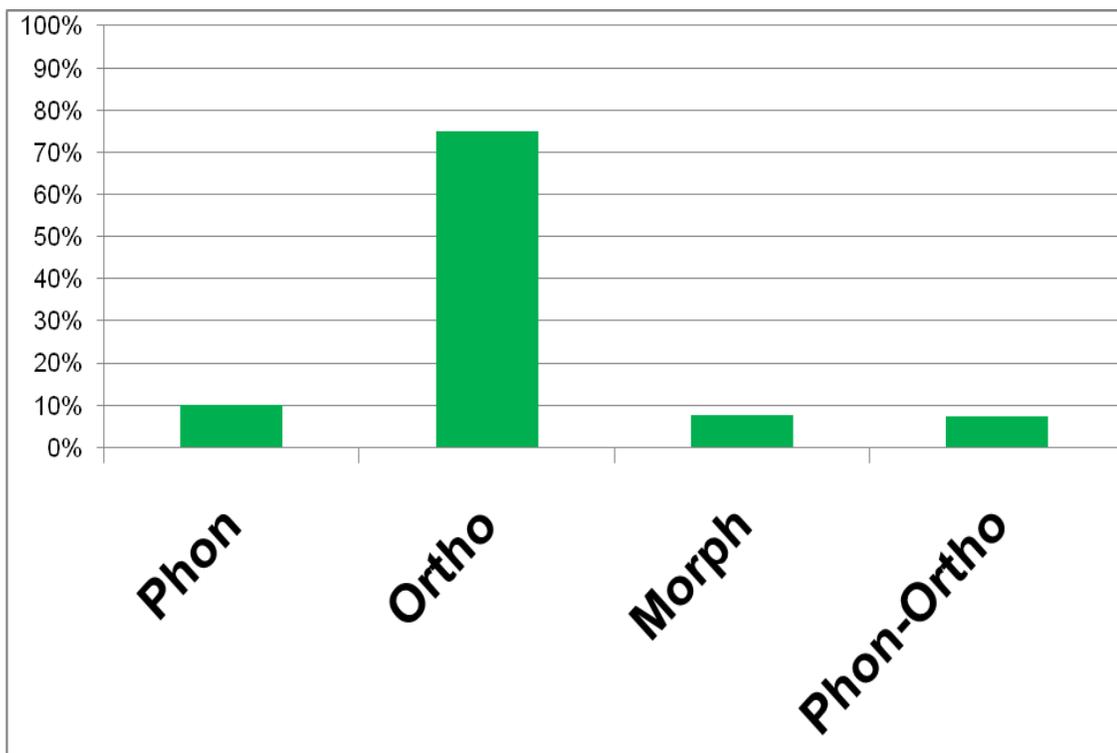
- 1) Identify the phonological, orthographic, and morphological spelling patterns that are produced in the misspellings of Spanish-English bilingual adolescents when assessed in writing samples gathered in English and Spanish.
- 2) Specify the extent of cross-language transfer evidenced in the spelling errors produced by Spanish-English students.

Descriptive Data

The students produced a total of 80 writing samples with an average of 148 words per sample. Of the total of 12,304 words, 82% of the words were spelled correctly and 18% of the words were misspelled. It is important to note that some words contained more than one error. For example, if a student spelled *enpesamos* for *empezamos* (*began*), the word would be coded as a nasal error as the student substituted the *n* for the *m*. The

word would also be coded as a letter-sound error, as the student spelled *s* for *z*. Since words could have more than one phoneme in error, this brought the total number of errors produced to 2,445, with an average of 27 linguistic errors per student. The normed data indicated that the most frequently produced spelling errors were orthographic in nature (75%), followed by phonological (10%), then morphological (8%), and lastly, phonological-orthographic (7%) (see Figure 1). The quantitative analysis and qualitative description of the frequency of linguistic category and linguistic feature error types will be discussed in more detail next.

Figure 1. *Percentage of Errors by Linguistic Category*



Quantitative Analysis

A three-way ANOVA with a Greenhouse-Geiser correction was conducted to analyze whether emerging bilingual adolescents in grades 6-8 differed in the number of spelling errors they produced as a function of linguistic category. The independent

variables were: gender (female or male), category (phonology, orthography, morphology, phonological/orthographic), and genre (narrative or expository). The dependent variable was percentage of errors within each category.

Results revealed a significant main effect for linguistic category, $F(1.27, 22.865) = 167.295, p < .001, \eta^2_p = .903$. Post hoc testing with paired sample t-tests and a Bonferroni correction was completed. This analysis revealed that students made significantly more orthographic errors than errors in any other linguistic category, a finding also supported by the large effect size (.90). There were no significant interactions or main effects for gender or genre. These findings suggested that orthographic errors occurred with the greatest frequency in the writing of bilingual adolescents when writing in Spanish.

Qualitative Analysis

Frequency of error type by linguistic category/feature. Although there was much individual variability in the type of errors produced, the investigators were interested in determining if there were any error patterns that frequently occurred within the students' spellings. For this analysis, the total number of errors for each linguistic feature in the three main error categories (phonological, orthographic, and morphological) were totaled and analyzed. The phonological-orthographic category was not included as the number of errors produced within this category was relatively small.

1) The most frequent linguistic category in error was orthographic. This error type accounted for 75% of the total number of errors, as shown in Table 3. Out of the 1,879 orthographic errors, 903 (48%) involved the omission of tonic accents (OAT). These are accents that represent stress patterns in a word, but do not change its meaning. The next

most frequently occurring error was letter sound correspondences (OLS), which accounted for 15% of the orthographic errors. This type of error occurs when a sound can be represented with more than one orthographic representation. For example, words containing the /s/ sound can be represented with both letters *s* and *c*, as in the word *conocer*, which may be spelled incorrectly as *conoser*. The next most frequently occurring orthographic error involved omission of the orthographic silent letter *h* (OSL), e.g., spelling *abla* for *habla* (talk). This error type (OSL) was produced in 127 of the 1,879 orthographic errors (7%). Next to follow was the orthographic error involving word boundaries (OWB), as in spelling *ami* for *a mi* (to my). The OWB error was produced in 122 of the 1,879 orthographic errors (6%). Next was the orthographic one word boundary (OOW) error type, with frequency of occurrence calculated in 100 of the 1,879 orthographic errors (5%). An example of this error type would be spelling *a aconsejar* for *aconsejar* (counsel). Of the 1,879 orthographic errors produced, 78 (4%) were proper name errors (OPN), as in spelling *méxico* for *México*. The following most frequent error was in the orthographic linguistic feature of dialectal variation (ODV), which occurred in 69 of the total 1,879 (4%) orthographic errors produced across the samples. An example of this type of error would be a child spelling *juimos* for *fuimos* (*we go*). The next linguistic feature in line would be orthographic English influence (OEI), as in spelling *elephantas* for *elefantas* (elephant). This linguistic feature error, occurred in 55 (3%) of the orthographic errors, while the frequency of orthographic errors involving these misspellings of an abbreviation (OAB), as in *3* for *tres*, occurred only 33 (2%) times. Finally, all other orthographic linguistic feature error types (i.e., OUD, OLD, OGA, ODI,

OLP, OLC, OVDI, OGA, OLR, OCL, OLN, OLI, and OCE) were produced 1% or less of time (see Appendix A for POMAS examples of linguistic features).

These results support previous research which has found that Spanish spelling errors in bilingual students are mostly orthographic in nature (Arteagoitia et al., 2005; Fashola et al., 1996; Sun-Alperin & Wang, 2008). This finding is interesting to note as Spanish is often referred to as a transparent language and such errors may suggest otherwise.

Table 3. *Percentage of Errors in the Orthographic Category*

Code	# of Errors	% of Total Orthographic Errors	% of Total # of Errors	Description	Example
OAT	903	48%	37%	Tonic Accent	aqui/aquí
OLS	276	15%	11%	Letter Sound (s/z, s/c, y/l)	empesamos/ empezamos, conoser/ conocer, eya/ella
OSL	127	7%	5%	Silent Letter	abla/ habla
OWB	122	6%	5%	Word Boundary	ami/ a mi
OOW	100	5%	4%	One Word	a aconsejar/ aconsejar
OPN	78	4%	3%	Proper Name	<i>méxico</i> / <i>México</i>
ODV	69	4%	3%	Dialectal Variation	juimos/fuimos
OEI	55	3%	2%	English Influence	<i>elephantés</i> / <i>elefantés</i>
OAB	33	2%	1%	Abbreviation	3/tres

2) Phonological errors, as displayed in Table 4, comprised 10% of the total misspelled words in the writing samples. The most frequent phonological error was phoneme additions (PPA), which occurred in 13% of the 204 phonological errors

produced. An example of this would be *carron* for *carro* (car). The next frequently occurring linguistic feature in error involved nasals (PNE). Nasal errors occurred in 25 (12%) of the 204 phonological errors produced, like in the word *tanbien* for *también* (also). In this example, the nasal /n/ was substituted for another nasal /m/. Words that were coded as acceptable letter strings (PALS), occurred in 22 (11%) of the phonological errors. These are words that were determined to be misspelled. However, they followed an acceptable phonological sequence in Spanish and could not be categorized as any other linguistic feature. Of the 204 phonological errors, 21 (10%) of them involved syllable reduction (PSR), as in spelling *regan* for *regalan* (gift). Phonological consonant deletions (PCD) occurred in 19 (9%) of the phonological errors. Phonological errors involving vocalic *r* (PVOCR), final consonant deletion (PFCD), and consonant errors (PCE) occurred 8% each (i.e., 17, 16, and 16 instances respectively) of the total number of phonological errors. Sonorant consonant sequence reduction (PSON) occurred in 9 (4%) of the phonological errors. An example of this error type would be a case in which participants would write *tedriamos* for *tendriamos* (*would have*). Phonological errors which comprised 3% of the total number of phonological errors included: a) writing single vowels to represent diphthongs (PDIP), as in *empiza* for *empieza* (start); and b) cluster reduction (PCR), as in writing *tae* for *trae* (bring). Two percent of the phonological errors included voicing errors, where an unvoiced sound was voiced (PVO), as in *baleta* for *paleta* (lollipop) and devoicing a voiced sound (PDV), as in *acuerdo* for *acuerdo* (agreement). All other errors (PSYN, PFR, PST, and PUNLS) occurred in 1% or less of the phonological errors (see Appendix A for POMAS examples of linguistic features).

Table 4. *Percentage of Errors in the Phonological Category*

Code	# of Errors	% of Total Phonological Errors	% of Total # of Errors	Description	Example
PPA	26	13%	1%	Phoneme Addition	carron/ carro
PNE	25	12%	1%	Nasal Error	<i>tambien / también</i>
PALS	22	11%	<1%	Acceptable Letter String	toribino/ tormenta
PSR	21	10%	<1%	Syllable Reduction	regan/ regalan
PCD	19	9%	<1%	Consonant Deletion	halar/ hablar
PVOCR	17	8%	<1%	Vocalic /ɪ/	sivieron/ sirvieron
PFCD	16	8%	<1%	Final Consonant Deletion	hiciero/ hicieron
PCE	16	8%	<1%	Consonant Error	agudaron/ ayudaron
PERSON	9	4%	<1%	Sonorant Cluster	tedríamos/ tendríamos

3) Morphological errors comprised 141 (8%) of the total number of errors. The most frequent type involved errors in graphic accents, called tilde diacrítico (MTD).

These types of accents are used to signal a change in grammatical function or

differentiate word meanings in homonyms and homographs, as in the word *mí* (object pronoun, *me*) and *mi* (possessive adjective, *my*). This error type, made up 78 (53%) of the total number of morphological errors. The second most frequent error type involved noun plurality (MNP), which occurred 48 times (32%), as in *uniforme* for *uniformes*. The next frequently occurring error type involved regular verb tense (MRVT), which occurred 13 (9%) times. An example would be writing *hablando* (talking) for *hablaban* (talked). Next, 6% of the morphological errors involved non-word synonyms (MNSY), in other words, substituting a word known in the language for an invented word which assimilates both English and Spanish. An example of this would be when the participant writes the word *esquipiar* to represent the Spanish words *cortar clase* (*cut class* in English). Although the word is not formally recognized in the Spanish dictionary, it follows an acceptable letter string in Spanish. Additionally, it represents a non-word synonym for the English word *skip*, which it appears to have been derived from.

Table 5. *Percentage of Errors in the Morphological Category*

Code	# of Errors	% of Total Morphological Errors	% of Total # of Errors	Description	Example
MTD	78	53%	3%	Tilde Diacrítica	solo/solo
MNP	48	32%	2%	Noun Plural	<i>uniforme / uniforme s</i>
MRVT	13	9%	<1%	Regular Verb Tense	hablando/. Hablaban
MNSY	9	6%	<1%	Non-word Synonym	esquipie/ cortar

4) Phonological-orthographic (PO) errors occurred the least frequently, comprising 7% of the total number of errors (see Table 6). The most frequently occurring PO error included Spanish allophones (POA). In Spanish, /b/ and /v/ are phonetic variants of the /b/ sound and are perceived as the same phoneme. Allophones, as in the words *llebar* for *llevar* (*take*) or *valon* for *balon* (*ball*), made up 115 (54%) of the student's total number of errors in this linguistic category. The next most frequently occurring error was vowel substitutions (POVS), as in *jagamos* for *jugamos* (*to play*), which occurred in 68 (32%) of the PO errors. Errors of vowel dependent spellings (POVDS) comprised 5% of the errors, as in spelling *jugetes* for *juguetes*. Letter reversals (POLR), such as spelling *Maimi* for *Miami*, also supplied 5% of the errors. The least occurring error feature involved missing vowels (POVM), as in spelling *undos* for *unidos*. This error type occurred in 9 (4%), of the PO spelling errors.

Table 6. *Percentage of Errors in the Phonological-Orthographic Category*

Code	# of Errors	% of Total Phonologic-Orthographic Errors	% of Total # of Errors	Description	Example
POA	115	54%	5%	Allophones	valon/balon
POVS	68	32%	3%	Vowel Substitutions	<i>jagamos / jugamos</i>
POVDS	13	5%	<1%	Vowel Dependent Spellings	jugetes/juguetes
POLR	12	5%	<1%	Letter Reversal	Maimi/ Miami
POVM	9	4%	<1%	Missing Vowels	undos/unidos

Evidence of English Influence in Spanish Misspellings

English influence and code-switching. The secondary focus of this study was to identify the extent to which there was evidence of cross-language effects in the students' spellings. A qualitative analysis was conducted in order to assess the frequency and type of words that evidenced English language influence (see Table 7). It was found that errors coded as evidencing English influence (OEI), comprised 2% of the total number of misspellings identified in the writing sample and code switching (MCS) comprised less than 1% of the total number of misspellings. Nonetheless, 19 of 20 students produced these types of errors in their writing samples. For instance, several students spelled the word *mí* as *my*. This is not unexpected as the word *mi* in Spanish also means *my* in English, so the words are very similar in spelling and could be easily confused across

languages. Additionally, in Spanish, the letter *y* represents the /i/ sound and functions as a diphthong in words like *hay* (there are), *hoy* (today), and *muy* (very). However, in Spanish when the /i/ sound follows a consonant, it is rare for the *y* to represent the sound /i/. On the other hand, this is not as uncommon in English, in which the letter *y* functions as a monophthong and often represents the /i/ sound after a consonant, like in the words *baby* and *sky*. Therefore, these are clear indications that the child is using knowledge of English spelling patterns in their Spanish writing.

ph for f. Another clear example of English influence was in the spelling of *elephante* for *elefante*. In Spanish, the /f/ sound is never represented with the letters *ph*. However in English, *ph* often represents the /f/ sound, as in the words *phone*, *pharmacy*, and *diphthongs*. In fact, English words spelled with initial *ph* are spelled with the letter *f* in Spanish (e.g., *photograph* in English is spelled as *fotografía* in Spanish), as these words are borrowed from English, which also contributes to the confusion. Therefore, it is clear that the use of *ph* in the participants' Spanish writing samples indicate English influence.

Consonant doubling. Another example of English influence included words that contained consonant doubling, such as writing *hipopotamo* for *hipopótamo* (hippopotamus) and *grassias* for *gracias* (thank you). In English, same letter consonant doubles (e.g., pp, ff, ss, bb, and nn) are common, but not in Spanish. While consonant doubles (e.g., ll, rr, cc, and nn) do exist in Spanish, they represent a single letter of the Spanish alphabet and only one sound (i.e., *ll* and *rr*). For example, in the word *llave*, the double *ll* can be pronounced as the /dʒ/ sound, as in the initial sound of the word *judge*, or it can be pronounced as the /j/ sound, as in the initial sound in the word *yellow*.

Similarly, in the words *perro* and *carro*, the double *rr* represents the Spanish trilled r sound. Double *nn* on the other hand, only represents one sound, but is not represented as part of the Spanish alphabet. For example, in words like *innovador* (*innovator* in English) and *connotación* (*connotation* in English), the double *nn* represents the single /n/ sound. As for the double *cc*, it is the only true double consonant that appears in Spanish, as it is the only double consonant that represents two sounds. The double *cc* as in the words *accidente* (accident) and *diccionario* (dictionary) represents the English *ks* sound; therefore, when the participants selected consonant doubles in their Spanish writings, it likely attributable to the influence of English spelling conventions.

Morphological code-switching. English influence was also noted at the whole word level, as in the case of morphological code-switching. In fact, this spelling pattern occurred in the writing of 19 of 20 students, with a total of 105 occurrences. However, words coded as code switching were not calculated as part of the total number of morphological errors as these words were not misspelled. An example of code-switching is when students wrote the English word *lunch* to represent the Spanish word *almuerzo*, where *lunch* is spelled correctly, just that it was written in English. The students who substituted this English word (*lunch*) for the Spanish word *almuerzo* did so consistently. Although students did not have a significant number of words indicating English influence, there was evidence that the students combined the orthographic, phonological, and morphological rules of Spanish and English when producing their Spanish writing samples.

Table 7. *Evidence of Other Language Influence in Spanish Misspellings.*

Error Code	Spanish Target Word	Misspelling
OEI	Clase	Classes
OEI	Cuida	Quida
OEI	Llego	Gego
OEI	Elefantes	Elephantes
OEI	Hipopótamos	Hippopotamos
OEI	Gracias	Grassias
MCS	Mi	My
MCS	Escuela	School
MCS	Almuerzo	Lunch
MCS	E.E.U.U.	U.S.A

Summary of Results

The misspellings demonstrated by the Spanish-English bilingual students on the writing samples were examined by looking at the effects of linguistic category, genre, and gender. The error patterns featured the greatest number of errors in the orthographic category, accounting for over 70% of the errors. Errors attributed to the other linguistic categories occurred less than 10% of the time each. There were no effects attributed to genre or gender.

The most common error pattern in the orthographic category was OAT (orthographic tonic accents) comprising 37% of the total number of errors followed by OLS (letter sound) errors, which comprised 11% of the total number of errors. All other

orthographic, phonological, morphological, and phonological-orthographic linguistic feature patterns occurred with a frequency of 5% or less of the total number of errors. These findings would suggest that these Spanish-English bilingual adolescents predominantly made spelling errors that were orthographic in nature. In other words, their spellings were phonologically represented but did not follow the orthographic rules of Spanish.

Chapter 4

Discussion

The present study examined the spelling errors produced in expository and narrative writing samples in Spanish taken from 20 Spanish-English emerging bilingual adolescents. Quantitative and qualitative analyses were conducted to examine the error patterns noted in Spanish misspellings, as well as to identify words that represented influence of English on the Spanish misspellings. A three way ANOVA was used to analyze the influence of three independent variables (linguistic category, genre and gender) on the frequency of misspellings. Results of the ANOVA revealed that the orthographic error category evidenced the largest number of misspellings. Other categories (i.e., phonology, morphology, and phonology-orthography) each occurred with a frequency of 10% or less. Qualitative results revealed three main error patterns: 1) orthographic tonic accent; 2) orthographic letter sound; and 3) phonological-orthographic vowels substitutions.

The following discussion will describe how the results answered the individual research questions. The first research question addressed specific patterns of misspellings noted in the writing samples obtained and identified the most frequently occurring features within each linguistic category. The second research question focused on misspellings that indicated cross language influences, such as English influence and code-switching. The current findings then will be compared and contrasted with the

results of previous research. Clinical and educational implications, strengths and limitations of the study, and directions for future research will also be addressed.

Patterns of Misspellings (Question 1)

The first research question addressed the identification of the phonological, orthographic, and morphological spelling patterns, as well as noting frequently occurring linguistic feature errors within each category. Quantitative analyses indicated that the students made primarily orthographic errors. Phonological, morphological and combination errors each occurred less than 10% of the time (see Figure 1). The predominance of the orthographic error type was expected and is consistent with previous research, which found that Spanish-English bilinguals spelled English words according to the phonological and orthographic rules of their L1 (i.e., Spanish; Arteagoitia et al., 2005; Fashola et al., 1996; Sun-Alperin & Wang, 2008). For example, if a Spanish student spelled *driming* for *dreaming* and *jero* for *hero*, it would be concluded that these errors represented the correct application of Spanish phonological and orthographic rules when spelling English words (Fashola et al., 1996). The researchers attributed this finding to the transparency of the Spanish language, meaning that students can be successful if they rely on phoneme-grapheme correspondences when they spell. However, orthographic errors remained as these students demonstrated difficulty implementing some of the linguistic rules of Spanish in their spelling.

Tonic accents. In the current study, the linguistic error with the highest frequency of occurrence was the orthographic accent tonic (OAT), accounting for 48% of the orthographic errors and 37% of the total number of errors. This error type reflects the accents that signal stress patterns in a word, but do not change word meaning. This

finding was not unexpected, as Escamilla (2006) found that omission of accent marks frequently occurred in the spelling of 4th and 5th grade Spanish-English students. This finding was believed to be a factor in Spanish spelling development because mastery of accent mark usage is not generally acquired until the 6th grade (Escamilla, 2006). However, it is interesting to note that in Spanish-speaking countries and even in the United States, accent marks rarely appear in the spelling on billboards or in advertisements. This omission also suggests that accent marks are not given much importance perhaps because accent marks may be redundant, as readers can often figure out the word from the context of the sentence (Wieczorek, 1991). In fact, research has shown that the written accent mark use is not expressly important for communication, as students are able to pronounce words according to the rules of the Spanish language without the presence of written accent marks (Escamilla, 2006; Erichsen, n.d.; Wieczorek, 1991). Nevertheless, it is not clear why accent mark usage is often omitted in the writings of Spanish-speaking students because conventional Spanish rules for accent use are clear-cut (Erichsen, n.d.; Real Academia Española, 2007; Wieczorek, 1991).

Tilde diacrítica. Another accent error which frequently occurred was the tilde diacrítica. These accents signal a change in grammatical function and are also used to distinguish between homonyms, such as *aun* (*even*) and *aún* (*yet*) or homographs, such as *papa* (*potato*) and *papá* (*father*). These accent marks are especially important because when omitted in spelling, they can cause miscommunication. For example, if a Spanish person writes the homograph *¿Te gusto?* (*Do you like me?*), but really meant *¿Te gustó?* (*Did you like it?*), there would be a miscommunication as a result of the accent being omitted. However, students again are often able to derive the correct meaning from the

context. This type of error (i.e. MTD), while comprising 53% of the morphological errors, only comprised 3% of the total number of errors. While previous researchers have not differentiated tonic accents from tilde diacrítica (Escamilla, 2006; Wiczorek, 1991), future investigations should differentiate between these types of accent marks in order to identify problems in accent use that may signify a morphological problem.

Letter sound correspondences. The second most frequently occurring linguistic feature error was letter-sound correspondence (OLS), comprising 15% of the orthographic errors and 11% of the total number of errors. These are spelling errors due to ambiguous letter-sound relationships. This finding was expected and consistent with previous research indicating that Spanish-English bilinguals exhibit difficulty in spelling words containing the /h/, /s/, /k/, and /j/ phonemes because each of these sounds can correspond to more than one letter in the alphabet (Escamilla, 2006; Hualde, 2005; Rubin & Carlan, 2005). This finding is especially significant, as Spanish is often referred to as a transparent language (Arteagoitia et al., 2005; Fashola et al., 1996; Sun-Alperin & Wang, 2008). However, it appears that these ambiguous phonemes occur fairly frequently in Spanish writing and students did not have the necessary knowledge of Spanish orthographic rules to override their tendency to spell words phonologically. Other researchers have found that these types of errors were common in younger monolingual English-speaking children (grades 1-4) and less predominant in grades 5-9, as students shifted from phonological dependence to building an orthographic lexicon (Bahr et al., 2009; submitted). When these types of errors did occur in older students, it was typically in the context of increased word complexity. Bahr et al, (2009; submitted) attributed this type of error in English-speaking children to a nonlinearity in development, where

students rely on earlier developing spelling skills to assist them in spelling more complex words.

Vowel substitutions. Another interesting pattern of misspelling involved the frequency of vowel substitution errors. The current students produced vowel substitutions in only 2.78% of the total errors. This finding supports previous research that found that Spanish students had minimal difficulty spelling Spanish words containing vowels (Arteagoitia et al., 2005; Fashola et al., 1996; Sun-Alperin & Wang, 2008). However, it is interesting to note that previous research has also shown that, as Spanish children acquire a second language, which is not as transparent, such as English, they may have increased difficulty with spelling vowels, especially those that are contrastive (Fashola et al., 1996; Gildersleeve-Neumann et al., 2008; Rubin & Carlan, 2005; Sun-Alperin & Wang, 2008). In other words, they have difficulty spelling Spanish vowels (e.g., *i* and *u*), which are spelled differently in English. This is because the /i/ in English can be spelled with various letter combinations, whereas in Spanish, there is a direct sound to letter correspondence. This pattern has instructional implications in that teachers can use contrastive analyses of these sounds to increase word consciousness in their students.

Influence of Cross-Language Transfer (Question 2)

The second research question addressed the extent to which cross-language transfer was evident in the spelling errors produced by Spanish-English students. A qualitative analysis found that English influence (OEI) on the spelling of Spanish words occurred in 2% of the total number of misspellings identified in the writing samples. A possible cause is that certain writing prompts may bias the student to select specific types of words or syntactic structures; hence, they may have not selected words more

susceptible to English influence (Escamilla, 2006; Cronnell, 1985). It is also possible that students avoided using words that they were not sure how to spell, which is a limitation of natural writing prompts (Bahr et al., submitted). Another possibility is that students produced words that shared properties across languages, which could result in this linguistic feature not occurring as frequently. Given the fact that these students were ELLs, it was surprising that this error occurred infrequently, as previous research has shown that both younger (pre-k and kindergarten) and older (4th and 5th grade) bilingual students tend to evidence cross-language transfer in their spellings (Escamilla, 2006; Rubin & Carlan, 2005).

Context dependent influences. The analysis also found that English influenced features (OEI) were noted in certain patterns of spelling. Error types included representing the /i/ sound with the letter y as in spelling *my* for *mi* (me), *ph* to represent /f/ (e.g., *elephante* for *elefante*), and double consonants (e.g., spelling *hipopotamo* for *hipopótamo* (hippopotamus). These were clear indications of English influence, as these context dependent error patterns occurred in English-like words and were characteristic of the rules of English spellings. A conclusion is that, while infrequent, the students did evidence spellings that were indicative of English language influence.

Code-switching influences. Another error type evident in the writing samples which indicated English influence was code switching (MCS). This type of pattern differed from the words coded as being influenced by English, as these errors involved word substitutions that were spelled correctly. In other words, students often substituted entire English words to represent Spanish words (e.g., spelling *lunch* for the Spanish word *almuerzo*). While these types of errors comprised only 4% of the total number of

errors, several studies have found that Spanish-English bilinguals may sometimes produce writing according to the ease in which the information is processed and/or transferred (Dworin, 2006; Gildersleeve-Neumann et al., 2008; Rubin & Carlan, 2005). In other words, when writing in Spanish, the English form may be the best word choice or students' ideas do not translate easily into Spanish, forcing them to select the English form.

Dialectal influences. Dialectal variation is another error type considered in this study, but one that has not received much attention in the literature. This pattern of spelling is important to consider as research has shown that when children are beginning to develop their spelling skills, they rely heavily on the phonological aspects of their language (Ehri, 1989, 2000). So when relying on a phonological strategy to spell, one would expect to see dialectal errors creep in. This was true in the current study; however the frequency of this error type was relatively small, only noted in 3% of the total number of errors. An example in some Mexican and Caribbean Spanish dialects is the substitution of the /h/ sound for some consonants or to insert *h* in the initial position of some words, as this is the way that many individuals from Mexico and the Caribbean speak (Moreno & Mariño, 1998). These types of dialectal variations were noted in the current writing samples when students spelled *juimos* for *fuimos* (*we went*), where the *j* represents the /h/ sound and *horgullosa* (*proud*) for *orgullosa*.

Comparisons between Spanish and English Spelling

Orthographic errors. The similarities evidenced across both English and Spanish spelling development included the predominance of orthographic errors over other error types. Bilingual Spanish-English students' orthographic errors comprised 75% of the

total number of errors, while English-speaking students evidenced orthographic errors about 60% of the time (Bahr et al., submitted). The frequency of orthographic errors was greater in Spanish as a result of the difficulty with Spanish accents. However, if accent errors are removed from the total count of orthographic errors, it significantly reduces the frequency of occurrence of orthographic errors from 75% to 40% of the total number of errors in Spanish. Nonetheless, even when removing the accent errors, orthographic errors continue to predominate over other linguistic categories.

Another similarity found between Spanish and English students is that they both demonstrated difficulty with the orthographic silent letter *e*. These spelling patterns were considered to be errors due to typical spelling development for English children (Bahr et al., submitted) and this is the presumed cause in the current study.

Phonological errors. Phonological errors occurred significantly less often than noted in the writing of typical monolingual English speakers (Bahr et al., submitted). This again may be attributed to Spanish having a more direct relationship between the letters and the sounds they represent (Fashola et al., 1996; Gildersleeve-Neumann et al., 2008; Rubin & Carlan, 2005; Sun-Alperin & Wang, 2008). However, similarities across Spanish and English phonological errors for this age group included words containing vocalic *r*, as in *sivieron* for *sirvieron* (*they served*), misrepresentation of diphthongs (i.e., writing single vowels to represent diphthongs), as in *empiza* for *empieza* (*it starts*), syllable reduction errors, as in *esban* for *estaban* (*they were*), and sonorant consonant sequence reduction, as in *tedriamos* for *tendriamos* (*we would have*). However, when compared to English-speaking, same age peers, some phonological errors were specific to Spanish, such as the use of allophones. For example, it was noted that Spanish-English

bilingual students often confused /b/ and /v/ in their misspellings because they are allophones in conversation speech (Erichsen, 2009; Hualde, 2005; Real Academia Española, 2007).

Morphological errors. Another important contrast between English and Spanish is the use of morphology. Spanish is a morphologically rich language, with inflections occurring with greater frequency than derivations (Garcia-Pelayo y Gross et al., 1982; Lang, 1990; Ramirez et al., 2009). Additionally, Spanish inflections are more complex than English, with verbs taking up to as many as 50 different inflections (Goldstein, 2004; Ramirez et al., 2009; Real Academia Española, 2007). However, despite Spanish being a morphologically rich language, morphological errors occurred with 13% less frequency when compared to the writing of 5th – 9th grade monolingual English students (Bahr et al., submitted). This may be attributed to the fact that, Spanish inflections are salient and are acquired early in language development (Goldstein 2004; Ramirez et al., 2009; Real Academia Española, 2007). Another reason may be that since the orthography of Spanish is more transparent, students may not have as much difficulty spelling these inflections.

Another interesting finding is that, derivation errors predominated in the English writing samples of 5th – 9th grade students, in contrast to the Spanish writing samples, where inflectional errors predominated (Bahr et al., submitted). In fact, Spanish inflectional errors involving noun plurals, as in *juego* (*game*) for *juegos* (*games*) and regular verb tenses, as in *hablando* (*talking*) for *hablaban* (*they talked*), comprised 41% of the total number of morphological errors. This is an interesting finding, but it is consistent with known differences between the two languages. One other caveat that

affected the determination of morphological errors was gender agreement. In this study, correctly spelled morphosyntactic errors relating to gender agreement were not counted as misspellings, as these were considered to be related more to syntax than to spelling. Further investigation is needed in order to quantify the extent of morphological errors in the spelling of Spanish-English bilinguals.

Value of the POMAS-S

The POMAS was originally developed in order to linguistically analyze misspellings of monolingual English students by linguistic category (phonological, orthographic, and morphological) and linguistic feature (Silliman et al., 2006). Since research has shown that cross-language interference influences the spelling of Spanish-English bilinguals (Cummins, 1984; Dressler & Kamil, 2006; Escamilla, 2006; Fitzgerald, 2006; Francis, 2006; Lanauze & Snow, 1989; Medina & Escamilla, 1992), the application of the POMAS was expanded in order to highlight spelling errors distinctive of this population.

Utilizing the POMAS-S added strength to the current study, as it was sensitive to spelling errors unique to Spanish (i.e., tonic accents, diacritical accents, dialectal variations, and allophones *b* and *v*). The POMAS-S also was able to capture instances of cross language interference, such as English influence on Spanish spellings and code-switching. As a result, this linguistic analysis system provided valuable information regarding the linguistic repertoire that students were using in their spelling. Future use of the POMAS-S should include an expansion of codes in order to provide detailed linguistic information regarding misspellings. For example, an addition of codes may include separating dialectal variation between those that are specific to Mexicans and

those specific to Puerto Ricans. Another addition may include codes which capture misspellings resulting from different aspects of inflectional morphology such as lack of gender agreement, as this would provide a more complete picture of the students' linguistic repertoire.

Nature of the Spelling Sample

In the current study, the use of writing samples allowed for detailed analysis of spelling errors. This point is important to consider, as researchers have found that writing samples when combined with linguistic feature analysis can be superior to the more commonly used rating systems that score misspellings as correct or incorrect (Leedy & Ormrod, 2005). Rating systems are less informative because they lack the depth that a linguistic analysis system, such as the POMAS-S can provide. On the other hand, writing samples are also limited in that students may avoid using words they do not know how to spell. As a result, it may also be beneficial to add a word dictation task that would elicit specific linguistic features the researcher wishes to analyze. Combining both approaches may provide a more complete picture of the students' spelling knowledge.

Clinical and Educational Implications

The findings of the current study provide valuable information relevant to clinicians and educators working with Spanish-English bilinguals. This is because the development of spelling skills is among the strongest predictors of later reading proficiency (Ehri, 2000) and therefore, spelling has important academic implications for reading comprehension and new vocabulary learning. An understanding of what spelling skills children are implementing in their writing can provide valuable insights regarding

the specific spelling skills that need to be targeted in the classroom. This need is no different for biliterate children.

Researchers have found that first language proficiency or language knowledge and skills can facilitate second language acquisition (Cummins, 1984; Dressler & Kamil, 2006; Fitzgerald, 2006; Francis, 2006; Lanauze & Snow, 1989; Medina & Escamilla, 1992). As a result, teaching methods should actively instruct the students in the phonological, orthographic, and morphological patterns of both English and Spanish. Understanding the similarities and differences between the two languages using contrastive comparisons will likely give bilingual students the foundation they need in order to become more proficient spellers. To be specific, results of the current study indicated that Spanish accents, ambiguous sound-letter correspondences, consonant doubling, and vowel substitutions were some of the spelling patterns that posed difficulty for these students. With this knowledge, teachers can focus on systematic instruction regarding the unique patterns of these features in both Spanish and English (i.e., teaching the specific phonological and orthographic patterns for spelling in each language) in order to minimize difficulty in these areas. Spelling instruction should include activities that promote word consciousness, such as word study and word sort activities, combined with reading and writing that is relevant to students' current curriculum (Bear et al., 2004; 2008).

Strengths and Limitations

This study provided important information regarding the specific language-related spelling errors of Spanish-English bilingual children. One of the strengths of this study included the utilization of writing samples. This type of writing provided spelling errors

in a naturalistic context and allowed for an array of linguistic errors to be extracted relating to Spanish spelling development, spelling conventions, second language acquisition, English language influence, and dialectal variations. These areas provided information regarding how students spelled while engaging in a task that required them to regulate the multiple components of composing (Apel & Masterson, 2004).

On the other hand, use of only writing samples may have been a limitation of this study. Students were given writing prompts for two genres (expository and narrative) combined with the opportunity to produce writing naturally. However, utilizing two different genres may have elicited specific lexical selections associated with the given topics (Bahr et al., 2009). The different genres were employed in an attempt to control for task complexity, as it had been suggested that genre may affect vocabulary use and the number of misspellings produced (Bahr et al., 2009). This was a disadvantage in that the students may have selected words and spellings that they were more familiar with and therefore, avoided certain linguistic features that may have been more prone to error.

Another limitation of the study was the variability in the number of words produced among the writing samples. For example, some students wrote short samples and others wrote lengthier ones (Danzak, 2009). This may have occurred for several reasons. First, students may have felt insecure about their writing skills in Spanish. It may also be that students were avoiding words they did not know how to spell, thereby limiting the number of words produced in their writing samples. However, it should be noted that more words produced can also result in more errors to analyze. Therefore, it would continue to be beneficial to have students produce more than one writing sample in order to ensure an adequate number and variety of misspellings to analyze.

An additional challenge in using the writing samples is the use of incorrect sentence construction (i.e., syntax) and limited vocabularies. In the current study, it was decided to only identify and analyze words that were misspelled. For example, one of the features that posed a challenge was gender marking. Spellings in which there was a lack of gender agreement between the article and the noun were not considered errors if the student spelled the word correctly. For example, if the student spelled *la espera* (*wait for her*) for *lo espera* (*wait for him*) or *perro* (*male dog*) for *perra* (*female dog*), these forms were not considered as spelling errors because the words *la* and *perro* were spelled correctly, even though they were not grammatically correct. While gender marking is an important aspect of the Spanish inflectional system and should be considered as an error in future studies, the lack of gender agreement really did not affect overall error totals in this case since this type of error was infrequently occurring.

Two Directions for Future Research

First, future studies should incorporate a combination of approaches when analyzing the spelling of bilingual students. It would be beneficial to combine the use of writing samples, which potentially would allow for a variety of error types, with a word dictation task, which can control for specific types of linguistic features elicited. This type of writing sample would be important as it is possible that bilingual students are having difficulty with more linguistic features than those identified in this study.

Second, it would be valuable to further investigate the application of the POMAS-S in differentiating if individual children or adolescents are having difficulty in one language versus the other or if they are evidencing difficulty across both languages, which may be indicative of a language disorder. To achieve this aim, it would be

important to conduct a study of a larger sample of Spanish-English bilinguals that included multiple grades and proficiency levels as a way to establish a baseline for what were typical phonological, orthographic, and morphological patterns of spelling errors. Then, a study on children suspected to have a “developmental delay” can be conducted by analyzing their spelling errors and comparing their errors to those of typically developing bilingual children to note possible linguistic features that suggest language impairment.

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Appendix

Appendix A

POMAS-Spanish (POMAS-S)

Coding Categories for Grades 5-9

Category	Code	Description	Example Incorrect/Correct Form
PO	POA	Allophones	bestimos/vestimos
PO	POLR	Letter Reversal	Maimi/ Miami
PO	POVDS	Vowel Dependent Spellings	jugetes/juguetes
PO	POVM	Missing Vowels	enjague/enjuage
PO	POVS	Vowel Substitutions	podía/podía
P	PALS	Acceptable Letter String	toribino/ tormenta
P	PCD	Consonant Sequence Deletion	satrería/sastrería
P	PCE	Consonant Error	agudaron/ayudaron
P	PCR	Cluster Reduction	tae/ trae
P	PDIP	Vowel for True Diphthong	empiza/ empieza
P	PDV	Devoicing	acuerto/ acuerdo

P	PFCD	Final Consonant Deletion	hiciero/ hicieron
P	PFR	Fronting	somo/como
P	PNE	Nasal Error	imvita/ invita
P	PPA	Phonological Phoneme Addition	carron/ carro
P	PSON	Sonorant consonant sequence reduction	tedriamos/ tendríamos
P	PSR	Syllable reduction	regan/ regalan
P	PST	Stopping	trasco/ frasco
P	PSYN	Syncope	respetosa/ respetuosa
P	PVO	Voicing	baleta/ paleta
P	PVOCR	Vocalic /r/	sivieron/ sirvieron
P	PUNLS	Unacceptable Letter String	lhat
O	OAT	Tonic Accent	aqui/aquí
O	OAB	Abbreviation	3/ tres
O	OCE	Consonant Error	gerrelas/gemelas
O	OLD	Letter doubling	hippopótamo/hipopótamo

O	ODI	Digraphs	carera/ carrera
O	ODV	Dialectal variation	juimos/fuimos
O	OEI	English influence	classes/ clases
O	OGA	Grapheme addition	íba/híba
O	OLC	Letter Confusion (b/d, d/b)	sadía/sabía
O	OLI	Other Language Influence	parquen/parking
O	OLN	Letter Name	por k/porque
O	OLP	Letter part	nino/niño
O	OLR	Letter Reversal	probelma/problema
O	OLS	Letter sound (s/z, s/c, y/l)	empesamos/empezamos, conoser/conocer, eya/ella
O	OOW	one word	ha cer/ hacer
O	OPN	Proper name	méxico / México
O	OSL	Silent letter /h/ omitted	ablar/ hablar
O	OUD	Unnecessary Diacritic	resíbio / recibio

O	OVDI	Vowel Dependent Spelling	quieres/quieres
O	OWB	Word boundary	agustar a gustar
M	MTD	Diacritical accent (tilde diacrítica) (makes difference in grammatical function and/or word meaning)	que/qué solo/sólo
M	MCS	Code Switching	lunch/almuerzo
M	MNP	Noun plural	mi/ mis
M	MNSY	Non-word synonym	esquipie/ cortar
M	MRVT	Regular Verb Tense	hablando/hablaban