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Spelling Proficiency of Native Speakers of Spanish: A Look at the Influence of Morpheme Structures in Spelling Errors

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While tutoring Costa Mesa students who were native Spanish speakers, Camille Campion noticed that they had very poor spelling proficiency and that their errors stemmed from the phonological spellings of words. Camille discussed her observations with a professor, Dr. Mann, and her research project soon followed. For Camille the most stimulating part of the research process was analyzing her results to find information that would be helpful to educators of Latino students. After her graduation in the Spring of 2004, Camille travelled extensively through Europe and started a doctoral program in psychology.

Abstract

English orthography differs from the orthography of several other languages due to its use of grapheme-to-morpheme accordance and grapheme-to-phoneme accordance. Native speakers of Spanish, whose orthography is strictly phonetic, may encounter difficulties when spelling in English due to this difference. This study examined the spelling proficiency of sixth- to eighth-grade children who are native speakers of Spanish. Participants were assessed using a 75-word spelling test and a fill-in-the-blank derivational suffix test. The results yielded a significant effect of percent error, phonemes, *transparent* spelling, *deep* spelling, and *irregular* spelling on language. Overall, native speakers of Spanish are less proficient spellers than native speakers of English, presumably due to the difference between the orthographical rules found in the Spanish and English languages. This finding implies that the traditional spelling model does not adequately prepare this population to be proficient spellers of English, and that a new approach to teaching spelling may be beneficial.

Faculty Mentor



It was a pleasure to see Camille hone this study of spelling skills among Latino students. In it, she raised some very practical, ethnologically-valid questions that arose from her experiences as a bilingual individual and as a tutor of struggling students. She used these questions to sharpen her skills for inquiry, research design and analysis as she teased apart the spelling errors that native speakers of Spanish are especially prone to make. We are already thinking of ways to elaborate on her scoring of the data and of ways to extend her hypotheses to younger children. Doing a project like this is a perfect way to prepare for graduate school; I regard Camille's work as on a par with many of the first year graduate projects that I have supervised. It was an honor to work with her.

Key Terms

- ◆ Deep Alphabet
- ◆ Grapheme
- ◆ Morpheme
- ◆ Morphophonemic
- ◆ Phoneme
- ◆ Phonotactics
- ◆ Shallow Alphabet

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Introduction

The English language is considered to have a *deep* alphabetic representation, one where the written language does not always phonetically represent the spoken language. The deep alphabet of English is composed of morphemes, the smallest meaningful linguistic units of words, and phonemes, the smallest phonetic units of words. Other languages, such as Spanish, rely solely on phonemes and are considered to have *shallow* alphabets (Singson, Mahony and Mann, 2000). An example of this stems from the use of vowels in the English and Spanish languages. Vowel spellings in Spanish have constant values, whereas vowel spellings in English take on many different spelling patterns (Cuentos, 1993; Nash, 1977). In English, there exists a dichotomy between complex and simple vowel values that apply in specific orthographical environments. A vowel's location in a word determines how the word is pronounced and spelled.

Rather than relying solely on graphemes, the letters of the alphabet, English orthography has developed morpho-phonemic spelling rules due to increasing pronunciation changes over the past several centuries (Nobel, 1982). Graphemic words are divided into their morphemic constituents, and these are related to morpho-phonemic units by an ordered set of rules. In English orthography, one letter can represent more than one sound, and some sounds are spelled with more than one letter. For example, homophones (e.g. to, too and two) sound alike, but are spelled differently. Adding suffixes to words can also produce this effect. For instance, when the past tense <ed> pronounced /t/ (e.g. guessed-guest) or the third person <s> pronounced /s/ (e.g. locks-lox) is added to a word, a potential homophone results (Venezky, 1999).

Spanish orthography, on the other hand, has remained relatively constant and has encountered little change, consistently representing spoken language as a series of phonemes (Singson, et al., 2000). Each grapheme has only one possible pronunciation and irregular spellings are not as common as in English (Cuentos, 1993). This research examines the role of these orthographical differences in the spelling proficiency of bilingual native Spanish-speaking children.

By focusing on specific orthographical rules that affect native Spanish speakers' spelling proficiency in English, we may be able to address the issue of effective teaching methods for this population. In this way, these findings could be used towards enhancing score reports on statewide tests. Since 1999, the Academic Performance Index (API) has

measured the scores of public schools on a scale of 200 to 1,000 points (Barrietos, 2004). The federal No Child Left Behind Act of 2001 mandates that schools reach a score of 800 or better by 2014. API scores are calculated from the Standard Testing and Reporting program and include scores from all socioeconomic classes, ethnic groups, and races. In 2003, only 22% of California public schools reached the 800 mark (www.ocde.k12.ca.us), and according to the California Achievement Test (CAT/6) scores, approximately 50% of sixth to eighth graders scored at or above the 50th percentile in spelling. This indicates that less than half of sixth- and eighth- grade students are spelling at the appropriate level and that seventh graders are not much better. On average, the Latino population scores lower than native English speakers. Taking this into consideration, if the source of spelling errors can be found, we may be able to create a more useful spelling strategy for this population. This, in turn, may lead to higher API scores in the future.

When writing, many people spell words in the same manner as they are pronounced (Nobel, 1982). This strategy of spelling relies heavily on phonemes and works well in Spanish orthography, but leads to spelling errors in English. According to Sterling (1983), in the traditional spelling model, regularly-spelled words can be written in two ways: by applying phoneme-grapheme knowledge to the spelling of the words and by memorizing the sequence of letters associated with the word (Sterling, 1983). This model, however, does not take morphemes into account. Mann and Singson state that "English orthography involves a linguistically complex system of grapheme-to-phoneme rules[...]and also appears to transcribe morphological units as well as phonological ones" (Mann and Singson, in press). Sometimes English orthography will represent the morphemic structure of a word, which frequently denies the accuracy of the word's phonetic structure (Chomsky and Halle, 1968). Purely phonological strategies only apply to lower-frequency words (Seidenberg, 1985), which, by the fifth grade, become less prevalent such that a more complex system must be employed (Mann and Singson, in press). Thus, the complexity of English orthography curbs the singular use, phoneme-based rules.

Sterling (1983) has found that morphemic factors play a considerable role in the spelling of words. Therefore, accurate spelling reflects an ample understanding of the role of morphemes in orthography. Writers must understand both grapheme-to-morpheme, and grapheme-to-phoneme accordance (Mann and Singson, in press) to spell many English words accurately. This can cause difficulty for native

Spanish speakers due to the absence of such a morphemic structure in the Spanish language.

In association with this, Fischer *et al.* suggest that spelling proficiency depends on an individual's "linguistic sensitivity," or the user's ability to understand the appropriate language and writing system (1985). They conducted their study on "poor versus good" spellers (assessed using the spelling section of the Wide Range Achievement Test) and found that the two groups differed in their abilities to go beyond the phonetic structure of a word to the underlying morphemic components (1985). Although this study was conducted with native speakers of English, the same principles may be applied to bilingual individuals. If linguistic factors play an important role in spelling, varying degrees of exposure to the English language and its orthography may yield different levels of spelling proficiency by native speakers of Spanish.

Sterling, who does not consider morphology-based spellings, argues that poor spelling may sometimes result from improperly articulating the sounds in words (1983). Spelling "sandwich" as "samwich" and "probably" as "probally" are examples of such a phenomenon. These mispronunciations lead to the correct spelling of incorrect sounds, as opposed to the incorrect spelling of correct sounds (Sterling, 1983). Having English as a second language may lead to these kinds of spelling errors, especially in cases where English uses phonemes not present in the speaker's native language. For example, English has certain phonemes, such as /ee/ and /j/, that are not present in Spanish (Teschner, 1988). Also, in Spanish orthography, the graphemes "s" and "z" both denote the phoneme /s/, and "q" and "k" both denote the phoneme /k/. These grapheme-to-phoneme correspondences in Spanish do not equate to the grapheme-to-phoneme correspondences in English where "c" and "s" can both denote /s/ and "q," "k" and "c" can each denote /k/. The Spanish alphabet also includes three digraphs (graphemes containing two letters) which are "ch," "ll" and "rr." For instance, "ll" and "y" both denote the phoneme /y/, and "rr" denotes the phoneme /r/. Digraphs, for example "ch" and "sh," also exist in English orthography, but they are much different from Spanish digraphs. These different ways of transcribing sounds between the two languages cause problems for speakers of Spanish when spelling in English.

Another source of spelling problems for this population are the differences in syllable structures between Spanish and English. Dealing with syllables is part of a speaker's competence in his/her native language (Harris, 1983). Syllables contribute to phonotactics, that is, generalizations concern-

ing the sequential distribution of phonemes. Some phonological rules are sensitive to syllable structure. Harris states that "in certain classes of words in many dialects, the selection of the allomorph of the diminutive suffix depends on the number of syllables in the base word" (1983). For example, the diminutive of the disyllabic *madre* is *madrecita*, while that of the trisyllabic *comadre* is *comadrita*. Spanish words' syllable divisions usually fall between the vowel and consonant in the word (Teschner, 1988). In Spanish then, it is important to recognize which syllables are stressed in a word. In English, the stress usually occurs towards the beginning of the word, but in Spanish the stress usually occurs near the middle or end of the word.

For this study it was hypothesized that the Spanish speakers would have inordinate trouble spelling morphologically-driven words. It was also hypothesized that the spelling errors of the native Spanish speakers would mainly be phonological and would further stem from the poor articulation of words in association with phonetically-derived spelling. This study was conducted on sixth- to eighth-grade bilingual native speakers of Spanish and native speakers of English. A spelling test was given along with an oral language test to assess the degree of morphological skill acquired at these ages and grade levels.

Materials and Methods

Participants

There were 212 intermediate-aged native speakers of Spanish and native speakers of English who participated in this study. The students were sixth, seventh and eighth graders from the following schools, all in Orange County, California: Ensign Intermediate School and Eastbluff Middle School in Newport Beach, Spurgeon Intermediate in Santa Ana, and Costa Mesa Middle School. The pool of native speakers of Spanish was composed of 57 sixth graders, 18 seventh graders, and 36 eighth graders. The pool of native speakers of English was composed of 20 sixth graders, 28 seventh graders, and 42 eighth graders.

Materials

A 75-word spelling test, taken from a study by Fischer *et al.* (1985), was given to all of the students. The test was composed of three types of words, 3-13 letters long: 1) *transparent* words whose phonetic realization is close to its orthographic representation, 2) *deep* words containing an ambiguous segment that require a greater knowledge of morphologically-based orthographic conventions and 3) *irregular* words containing one or more segments that can only be partially derived through morphophonemic knowledge. The

students were also given an additional 19-question oral fill-in-the-blank (cloze) test taken from a study (Singson *et al.*, 2000). This test would determine how well they understood the derivational suffixes of English. All students were provided a packet with an answer sheet for both the spelling test and the oral cloze test. The spelling test answer sheet had 75 lines divided into three columns. The cloze test answer sheet had the sentences, each with an answer space and four possible answers to fill the blank.

Procedure

The students were read 36 of the 75 words from the spelling test. Each word was repeated twice and the students were given ten seconds to record their answers. Once the first half of the spelling test was given, the students turned to the cloze test attached in their packets. The experimenter read the sentences out loud, and the students were asked to circle the answer they felt best fit the sentence. The students were given seven seconds to record each answer. Once they had completed this portion of the test, they could return to the second half of the spelling test.

First, the total percent error was recorded for the entirety of the test to get an overall sense of how well the participants in both groups, native speakers of Spanish and native speakers of English, spelled. Second, the percentage of errors for each category of spelling type (i.e. transparent, deep, and irregular) was recorded. Third, the percentage of morphemic errors was analyzed in the *deep* word category. These errors were derived from the improper use of morphemes in a word (e.g. spelling “unperceived” as “unpercieved”). Finally, the percentage of phonetic errors—words spelled incorrectly but sounding phonetically correct (e.g. spelling “slaughter” as “sloter”)—was recorded for the entire test.

Results

All of the participants were tested on the 75-word spelling test, and 174 of the participants were also given the suffix test. Table 1 shows the mean scores for the percent of errors, *transparent* errors, *deep* errors, *irregular* errors, morphemic errors, phonetic errors, and the percent of errors for the suffix test. As shown in Table 1, the native speakers of Spanish performed at lower levels in all areas except that of morphemic error—both groups performed at relatively equal levels in this category. Figure 1 shows the differences between the type of spelling errors made by the two groups. Here, the native speakers of

Spanish made more errors in all three spelling categories compared to the native English speakers.

Also, when examining these differences in terms of grade level (Figures 2 and 3), one sees that the Spanish speakers performed at lower levels compared to the native English speakers in all three spelling categories, yet there existed little variance of errors between grade levels for both native speakers of English and native speakers of Spanish.

Figure 4 represents the average morphemic and phonetic errors made between the two groups. The graph shows that although the two groups did not differ greatly in regards to morphemic errors, native speakers of Spanish made more phonetic errors than did native speakers of English. Figures 5 and 6 show the differences in morphemic and phonetic errors by grade level for both native speakers of Spanish and native speakers of English. One can see that while morphemic errors remain relatively steady throughout the years, phonetic errors steadily decline.

A between-subject univariate test was conducted using percent error, morpheme error, phoneme error, and spelling type as the dependent variables, and language and grade as the independent variables. The p values were determined through the univariate test and signify the possible margin of error, by percent, for the resulting calculations. The test showed a significant main effect for phoneme error and language [F(1, 5) = 20.96, p < 0.01]. The main effect of the percent error and language was also found to be significant [F(1, 5) = 141.69, p < 0.01]. The effect of spelling type and language was found to be significant [F(2, 5) = 21.52, p < .01], as was the interaction between the spelling type, language, and grade [F(2, 5) = 2.46, p < 0.05]. In addition, spelling type and grade were marginally significant [F(2, 5) = 3.83, p < 0.05]. Although the main effect for error type (morpheme and phoneme) was significant [F(1, 192) =

Table 1
Mean Scores from the Spelling and Suffix Tests

	Percent of Errors	Transparent Spelling % Errors	Deep Spelling % Errors	Irregular Spelling % Errors	Morphemic Percent Error	Phonetic Percent Error	Suffix Test Percent Error
Overall Scores	0.53 0.014*	0.30 0.271	0.69 0.551	0.42 0.307	0.79 0.007	0.28 0.012	0.18 0.021
Native Spanish-Speaker Scores	0.66 0.014	0.45 0.378	0.84 0.457	0.60 0.332	0.79 0.009	0.35 0.017	0.28 0.021
Native English-Speaker Scores	0.37 0.047	0.17 0.229	0.55 0.702	0.21 0.278	0.79 0.011	0.20 0.015	0.04 0.009

* The second line in each cell is the standard deviation.

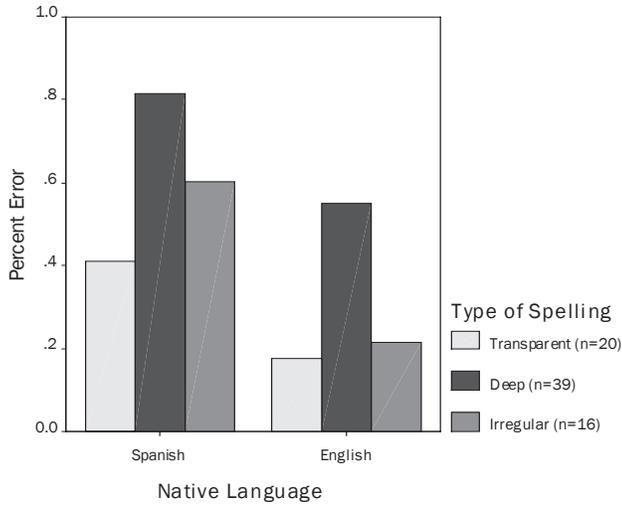


Figure 1
Type of Spelling

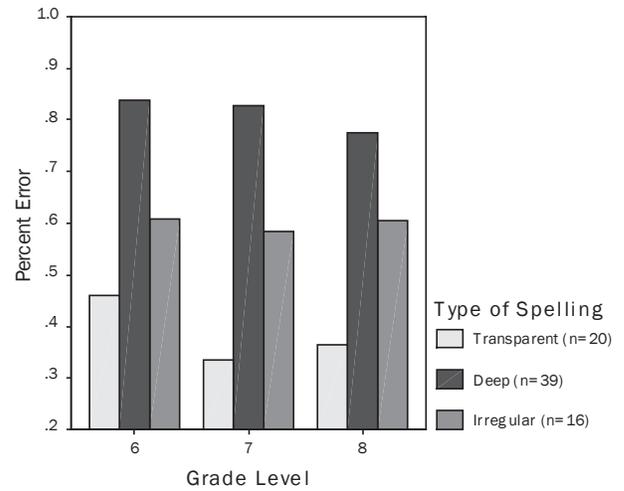


Figure 2
Native Speakers of Spanish

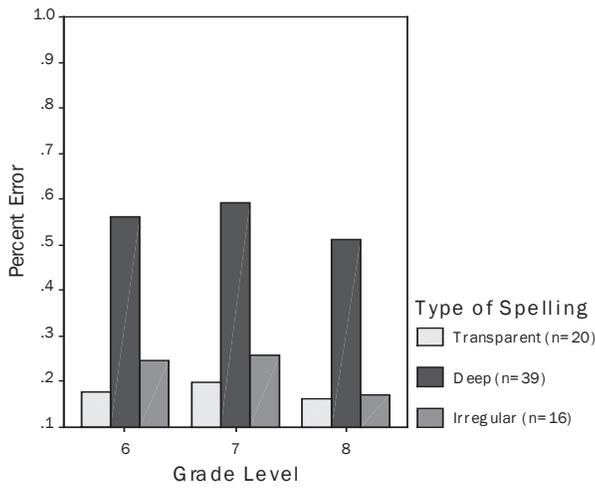


Figure 3
Native Speakers of English

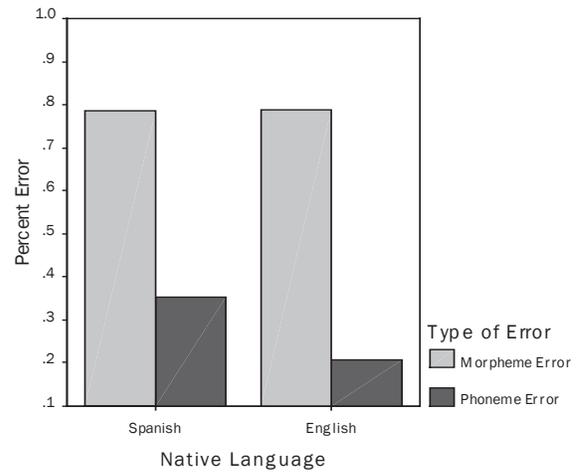


Figure 4
Type of Spelling Error by Language

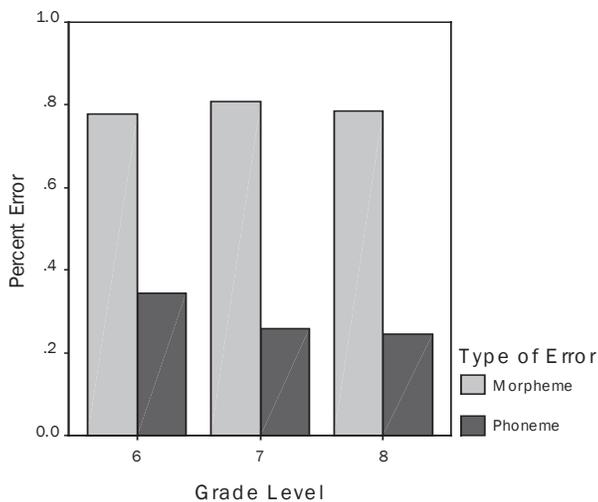


Figure 5
Native Speakers of Spanish

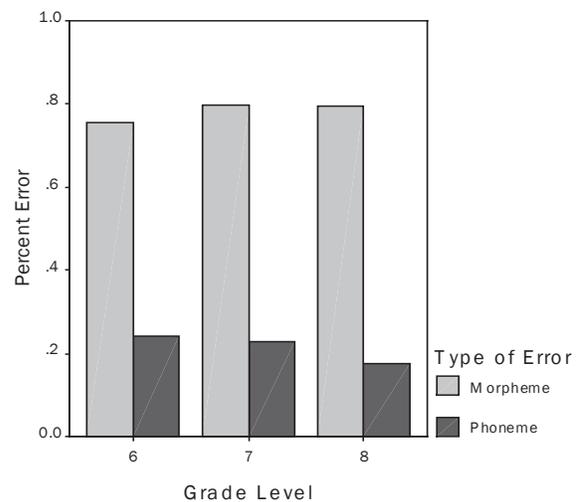


Figure 6
Native Speakers of English

2980, $p < 0.01$], the main effect for morphemes was not found to be significant [$F(1, 5) = 0.534, p > 0.05$].

Using the suffix test as the dependent variable, with language and grade as the independent variables, the test showed a significant main effect for the suffix test [$F(1, 5) = 2.62, p < 0.01$] and between the suffix test and language [$F(1, 5) = 66.95, p < 0.01$]. Also, an interaction between the suffix test, language, and grade was found to be significant [$F(2, 5) = 3.32, p < 0.05$]. Lastly, the relationship between the suffix test and spelling type was found to be significant [$F(2, 5) = 4.36, p < 0.05$].

A separate ANOVA was conducted to examine the effects of the three categories of spelling type on the native speakers of Spanish and native speakers of English. The test yielded a significant effect of *transparent* spellings [$F(11, 206) = 10.62, p < 0.01$]. The effect of *deep* spellings was also found to be significant [$F(12, 206) = 12.42, p < 0.01$]. Lastly, there existed a significant effect of *irregular* spellings [$F(14, 206) = 14.10, p < 0.01$]. Again, this test revealed a significant effect of total percent error [$F(12, 206) = 10.62, p < 0.01$] and the suffix test error [$F(12, 170) = 9.38, p < 0.01$].

A positive correlation was found between percent error and *transparent* spellings ($r = 0.87$); between percent error and *deep* spellings ($r = 0.95$); between percent error and *irregular* spellings ($r = 0.88$); and between the suffix test and the percent error ($r = 0.72$) (Figure 7), but this last correlation was not as strong as the others.

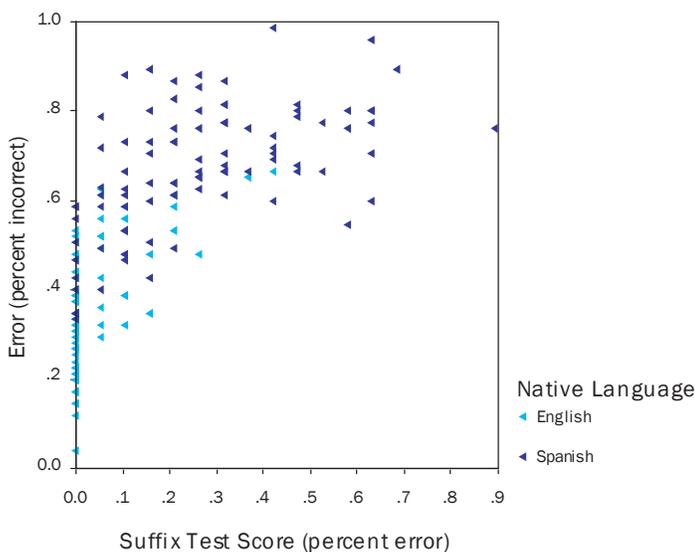


Figure 7
Correlation between percent error and suffix test.

Discussion

The data suggest that, on average, native speakers of Spanish have lower spelling proficiency in English than do native speakers of English. The descriptive statistics further show that the native speakers of Spanish performed at lower levels in all three categories of spelling words: *transparent*, *deep* and *irregular*. In all three categories, these differences are shown to be significant between the two language groups. Therefore, native speakers of Spanish are performing at significantly lower levels than their native English-speaking counterparts on both morphological and phonetic spellings.

Interestingly, morphemic errors were not found to be statistically significant. Native speakers of Spanish and English had similar levels of difficulty in incorporating morphemes into their spellings. However, while the English speakers had close representations to the correct use of morphemes in a given word, many of the native speakers of Spanish spelled in a more divergent manner. For example, a native English speaker from Ensign Intermediate School spelled “clanish” as “clanish.” This spelling preserves the morpheme and signifies a correct usage of the suffix and base of the word. In comparison, a native speaker of Spanish from Ensign spelled “clannish” as “clanech.” Here, the base (clan) is correct, but the suffix (ech) is wrong. The “ch” grouping represents a digraph in Spanish orthography and denotes a /sh/ sound (Techner, 1988). Therefore this spelling error is both phonetic and morphemic. The “ll” in Spanish orthography denoting a /y/ sound in English is another digraph that does not correspond well with English orthography. For example, one native Spanish-speaking participant from Spurgeon Intermediate School spelled “yam” as “llam.” Again, this type of error uses both the wrong morpheme and the wrong phoneme. Errors such as these demonstrate the possibility of applying improper grapheme-to-phoneme rules for English orthography by Spanish speakers.

These findings support those of Fashola et al. (1996). As in the current study, these researchers examined the nature of predicted orthographical mistakes made by native speakers of Spanish spelling in English. Predictable errors were those in which the participants spelled English words in accordance with Spanish orthographic rules, not English orthographic rules. An example of this would be spelling “soccer” as “soker.” The latter spelling accords with Spanish spelling rules. Fashola et al. postulated that the native speakers of Spanish would have a harder time spelling in English due to a lack of Spanish-to-English transitioning (1996). Lacking this knowledge would result in Spanish-speakers having no plan for correctly applying English orthographical rules to spelling, especially concerning morphemes. Thus, although

native speakers of English and native speakers of Spanish were not found to differ in terms of morphemic errors, the two groups differed in their abilities to apply phonological and orthographic rules to spelling. This suggests that instructors should spend extra time with native Spanish-speaking children learning English. Increasing verbal abilities and reading comprehension could lead to better spelling abilities.

Although morphemes tend to pose a problem even for native speakers of English, these people still have a better understanding of orthographical rules and better spelling proficiency overall than native speakers of Spanish. Poor spellers are less able than good spellers to abstract the orthographic regularities at the phonetic level in addition to not being able to penetrate below the phonetic level to the underlying morphemic components of the word in its written form. Whereas spelling is mainly taught through rote spelling tests and remote memorization until the sixth grade, more attention should be paid to teaching phonological and morphological spelling rules in order for these students to better understand English orthographical rules. Teaching these rules at an earlier age could be beneficial for long-term spelling proficiency.

Native speakers of Spanish seem to apply Spanish phonological sounds to the spelling of English words. The ANOVA showed that language had a significant effect on all three spelling types. In terms of *deep* spellings, which have certain morphemic rules, this statistic tells us that native speakers of Spanish make more spelling errors in this category, yet interestingly they also miss transparent spellings. Many of their mistakes are not specifically morpheme related, so much as they are source related. They tend to apply Spanish orthographical rules to the spellings of English. Thus, native speakers of Spanish make significantly more phonetic errors compared to native speakers of English. Hence, their spelling errors are not morphologically driven, but phonetically derived from Spanish.

These findings support those of Sterling, who attributes spelling errors to incorrect pronunciations (1983). Many Latinos, who constitute the fastest growing minority in the United States (Reyes and Valencia, 1993; DeBlassie and DeBlassie, 1996), are bilingual, often with a native language other than English. So, they enunciate English words differently than native speakers of English. Many Latino children live in low socioeconomic conditions and have parents with low educational levels; it is often difficult for them to meet their children's educational needs (DeBlassie and DeBlassie, 1996). In many cases, these children's parents speak limited, often fragmented, English. These children speak Spanish in

their homes, with their friends, and in their neighborhoods. School is often the main place in which these children speak English. Consequently, they may develop unusual pronunciations of words and thus correctly spell incorrect sounds. Again, increasing oral presentations or encouraging oral participation could help with spelling proficiency.

Also, it seems that the native speakers of Spanish have a hard time recognizing divergent spellings that exist in English orthography. Indeed, when examining the morpheme errors in light of the irregular spelling errors it was seen that the native Spanish speakers made more errors in both categories compared to the native speakers of English. It appears that the former have not grasped the concept of "rule breakers," words whose spellings do not conform to the conventional spelling rules. This could be attributed to the greater degree of exposure native speakers of English have to these unconventional spellings. For instance, having more exposure to irregular words, such as "Wednesday," "talker" and "folk," leads to native speakers of English having an advantage over native speakers of Spanish.

This also relates to the results found from the oral cloze test (suffix test). The positive correlation between the suffix test and the percent of errors indicates that the more familiar the students were with derivational suffixes, the better spellers they were. Having a better understanding of the spoken rules of English and the manner in which suffixes change spellings according to sentence structure correlates with being a good speller. As found in the Mann and Singson study (in press), the data suggest that suffix knowledge is helpful in decoding words. Their study further suggests that parsing words into their base and suffix components aids in understanding a word's pronunciation. Native speakers of Spanish have a disadvantage since they have less exposure to the English language than native speakers of English and, therefore, may pronounce words differently. This, in turn, will affect their understanding of the bases and suffixes of words. Not fully comprehending how these rules function results in poorer spelling proficiency.

Further research should incorporate a reading analysis in the study to compare the level of reading proficiency of native speakers of Spanish with native speakers of English, and then examine how this relates to spelling proficiency. Considering the results from the current study, one can see that reading proficiency and spelling proficiency seem to be highly correlated. The suffix test example provides one glimpse of what possible outcomes might look like. Also, controlling for or examining the effects of socioeconomic status would be beneficial.

Conclusion

Although morphemes were not found to be at the root of incorrect spelling by native speakers of Spanish, this study shows that this population performs at significantly lower levels than native speakers of English, and is only half as accurate. Approximately 34.5% of Latinos living in the United States reside in California (DeBlassie and DeBlassie, 1993; Winsler et al., 1999). The U.S. Census reports that in 2000, 32.4% of California's population was of Latino origins and that the numbers are rising (www.census.gov). Faced with increasing state and federal standards, California public schools must take into account the specific language issues of this large population when developing their teaching plans and styles. By doing so, standardized test scores could rise and schools could more closely approach the goal, set by the federal No Child Left Behind Act, of an API score of 800 or better. As addressed in this study, increasing phonological accuracy and teaching basic orthographic rules as opposed to rote memorization to young children could also help improve writing skills.

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