ISSN 1798-4769
Journal of Language Teaching and Research, Vol. 2, No. 6, pp. 1193-1203, November 2011

doi:10.4304/jltr.2.6.1193-1203

The Impact of Perception Training on ELL Spelling: Preventing L1 Phonetic Transfer

Manuela González-Bueno
University of Kansas, 1122 W. Campus Rd. Lawrence, KS 66045, USA
Email: mgbueno@ku.edu

Donita J. Massengill Shaw
University of Kansas, 1122 W. Campus Rd. Lawrence, KS 66045, USA
Email: donita@ku.edu

***Abstract*—The purpose of this study was to investigate whether teaching English unfamiliar phonetic distinctions to Spanish-speaking English Language Learners (ELL) would impact their spelling of the corresponding graphemes. Eleven third graders in a Midwestern inner city school who were Spanish-speakers participated in 20 training sessions. The 20-lesson intervention treatment focused on auditory discrimination, word and sentence identification, and grapheme training of minimal pairs of words containing "d" and "th" (when representing the phoneme /ð/). The treatment consisted of exposing learners to strategically controlled listening exercises that required their *active* attention to the aural input and its assigned meaning (e.g., the concept of "wordy" versus that of "worthy,") so they could differentiate between phonemes and learn the associated graphemes "d/th". Analysis of the pre-post test data showed a significant improvement in students' ability to spell words with the targeted sounds after 20 lessons. When the targeted sound was in initial position, students improved in all tasks, but minimal improvement was found when the targeted sound was in medial or final position. Recommendations for classroom teachers to incorporate similar interventions are included.**

***Index Terms*—spelling, phonology, ELL, L2 transfer**

According to a quantitative meta-analysis evaluating the effects of phonemic awareness instruction on learning to read and spell, conducted by the National Reading Panel (Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh & Shanahan, 2001), the effect of such instruction was large and statistically significant, with a moderate, statistically significant impact on reading and spelling. However, Ehri *et al.* (2001) recognized that the factors of whether English was the first or second language of students was neglected in their analysis. This is important, since the non-English-speaking population is an ever-growing one in American schools, and faces its own language-specific challenges in reading and spelling in English.

For example, Spanish-speaking children who are learning English as a second language have difficulty discriminating between similar sounds in English that do not have counterparts in their native language (Ehri et al, 2001, Helman, 2004). The English phonemes /ð/ (represented by the diagraph "th" as in "they"), /ʃ/, (as in "she"), or /Z/ (as in "measure") present challenges to Spanish speakers because these sounds are not found in their language. Research has shown that students use graphemes from their native language which most closely resemble the English sounds (Bear, Helman, Templeton, Invernizzi & Johnston, 2007). For example, they would write the word "together" as "*togeder" since the sound represented by the "th" ([ð]) is just an allophonic variation of the phoneme /d/ in Spanish that occurs in specific phonetic contexts but it is still spelled "d" (see Appendix I). In addition, there are linguistic contexts in which the mispronunciation or misspelling of such sound might lead to miscommunication. For example, in the case of the minimal pair "breed/breathe," the phrase "my dog is having problems breathing" could be interpreted as "my dog is having problems breeding." Even when the situational context might help dismiss this type of confusion, the mere similarity between the two sounds will interfere with correct spelling.

The purpose of this study, thus, was to investigate whether teaching the English unfamiliar phonetic distinction /d/-/ð/ to Spanish-speaking ELL students would impact their spelling of the corresponding graphemes "d/th".

I. Literature Review

To understand the background of this study, two topics will be presented. The intervention is founded on three theories that will be discussed first. Next, orthography, also known as written language, is how student learning was measured. We looked at research on orthographic errors, spelling instruction, and intervention studies.

A. Theoretical Framework

There are three theoretical models that consider the learners' particular way of processing the second language (L2) phonological features, which is influenced by their own native language. The models are Speech Learning Model (Flege, 1995), Perceptual Assimilation Model (Best, 1995), and Native Language Magnet Model (Kuhl & Inverson, 1995).

Flege's (1995) *Speech Learning Model* (SLM) says that the greater the perceived distance is on an L2 sound, the more likely a separate category will be established for the L2 sound, therefore it will be acquired more easily, whereas those sounds that are similar (the perceived distance is minimal) will cause the most problems because L2 learners will not be able to discriminate the subtle difference and establish separate categories. Another model is Best's (1995) *Perceptual Assimilation Model* (PAM), according to which learners are likely to assimilate unfamiliar L2 sounds to the most familiar L1 sounds, and will categorize them depending on the degree of similarity, which will have a direct effect on the degree of difficulty in acquisition. A third model is Kuhl's and Inverson's (1995) *Native Language Magnet Model* (NLM). In this model, "prototypes" or best exemplars of phonetic L1 categories function as perceptual "magnets." The nearer an L2 sound is to a magnet, the more it will be assimilated to the native language category, making it hard to distinguish from the native language sound.

All three models are based on the premise that learners perceive the L2 phonetic features filtered through their own first language (L1) phonological system. The present study locates its approach within this premise, which accounts for L1 and L2 sounds that are relatively more or less difficult to acquire by L2 learners depending on the degree of difference and/or similarity between the two. Given that Spanish speakers consider the sound [ð] under the same phonemic category as [d], and that Spanish [ð] is similar to the English phoneme [ð], it follows that Spanish speakers learning English as a second language will categorize English [ð] as just an allophonic variation of [d], and therefore will spell with a "d" words containing the sound [ð] (e.g., "together" > *"togeder").

A first step for educators of ELL students is to compare oral languages. English can be compared to Spanish through semantics (meaning of words), syntax (order of words in sentence), morphology (how words are structured) and orthography (how words are written or spelled) (Bear et al, 2007), and phonology, which is the sound of the language. The present study compares English and Spanish through primarily through phonology with the orthography of the two targeted sounds. It investigates how the difference between the two phonological systems affects the orthography of ELLs and how this can be prevented through intervention/teaching.

B. Orthography

The orthography, or written language, may be classified as shallow/transparent or deep/opaque. Spanish is a highly consistent language with regular correspondence between letters and sounds, which makes for easier decoding and more transparency (Bear, Helman, Templeton, Invernizzi, & Johnston, 2007). In contrast, English offers numerous combinations of letters with sounds making it more complex, deep or opaque (Bear, et al., 2007). Both English and Spanish orthographies deviate from the universal phonemic or alphabetic system in the same way (Fashola, Drum, Mayer & Kang, 1996; Pérez Cañado, 2005), meaning they do not always match one grapheme to one phoneme. However, there are notable differences between the two orthographies. For example, there are symbols that exist in one language but not the other (e.g., ñ, á, é…). Additionally, there are symbols that exist in both languages but represent two different sounds, such as "j" which represents the sound [j] in English but [h] in Spanish (Fashola, et al., 1996) and "a" which represents [o] in English but [a] in Spanish (Bear et al., 2007). English orthography has 26 letters that represent at least 44 phonemes. Spanish has 30 graphemes, each representing its own sound.

Orthographic Errors Made by Spanish Speakers

In studies conducted on orthographic errors made by Spanish speakers it has been found that motivation, intelligence, and academic performance in subject areas have minimal impact and do not account for the misspellings that occur (Pérez González, 1978; Pérez Cañado, 2003). Pérez Cañado (2000) asserted that the psychological processes involved in acquiring and producing English and Spanish are equivalent; thus, misspellings in either English or Spanish may be connected to a psychological process. When a child tries to spell an unknown word, s/he will first strategize using the dominant language. For example, a student who speaks Spanish will not naturally spell the sound [ð] with the digraph *th* because there is no *th* in Spanish (Bear, Invernizzi, Templeton & Johnston, 2004). Student errors are logical and will make sense when teachers understand the impact of a student's knowledge of spoken Spanish on his/her written English (Bear et al., 2004; Bear, et al., 2007; Howard & Snow, 2000).

Researchers investigated the 'errors' students make as they transition between Spanish to English (Fashola, Drum, Mayer & Kang, 1996). A total of 72 second, third, fifth and sixth grade students were classified into two groups: those who spoke Spanish at home and those who spoke English at home. All students were given a spelling test of 40 common English words such as *baseball, basket, soccer, tall, beanbag* and *vase*. The researchers developed a list of 'predicted' errors, or errors that Spanish-speaking child would naturally apply to the spelling of English words. For each of the 40 words, students' papers were scored as correct, predicted error, non-predicted error, or missing. Sixteen analyses of variance were conducted with language and grade as variables. Fashola et al. (1996) found that students who spoke Spanish produced more than four times as many predicted errors than their English counterparts. Predicted errors included using "j" for the /h/ sound and "i" for /ee/ sound. Both groups produced a similar number of non-predicted errors. There was no significant interaction between language status and grade level for the predicted errors, but there was a significant interaction among language and grade for non-predicted errors. Students, when learning English, need "to be able to *hear* and produce sounds in the same way as the native speakers of the language" (Fashola, et al, 1996, p. 831). Students who have fully transitioned to English literacy understand, consciously or unconsciously, both the orthographic and phonemic systems in both languages. The authors support a cognitive model for transitioning from Spanish to English. They also state that few studies have addressed *how* to teach transitional orthography.

Spelling instruction

Spelling taking into consideration both native and target (English) languages has received little emphasis in research or teaching (Hughes & Searle, 1997; Pérez González, 1996). Further, when spelling instruction is given, too often it is done with an inadequate focus on rote memorization of isolated word lists and rules (Heald-Taylor, 1998; Invernizzi, Abouzeid & Gill, 1994). Several researchers advocate for the explicit teaching of spelling (Bear, et al., 2004; Helman, 2004; Pérez Cañado, 2005). It is best if the approach is multisensory and combines visual, auditory, and kinesthetic activities (Bear, et al., 2004; Pérez Cañado, 2005). The idea that both visual and phonological procedures should be used is supported by a number of researchers in multiple countries (Cramer, 1998; McCracken & McCracken, 1996; Pinnell & Fountas, 1998; Smith, Hinson & Smith, 1998). Students who struggle in learning English will most benefit from an explicit cross-linguistic literacy intervention; that is, an intervention that involves both students' native language, Spanish, and the target language, English. This type of intervention will help students make connections across languages and understand similarities and differences in orthography (Jimenez, García & Pearson, 1996). Spelling should not be isolated but seen as a tool for writing and one that will strengthen the reading/writing relationship (Bloodgood, 1991; Pérez Cañado, 2005; Schlagal, 2002).

Intervention studies

Studies aimed to improve the perception of unfamiliar foreign language sounds exist, for example, those targeting the perception of the distinction between [l] and [r] by Japanese speakers learning English (Lively, Yamada, Tohkura & Yamada, 1994). However, the main objective of these studies were the improvement of English pronunciation. By implementing the perception training used in this study, not only the perception of L2 sounds is facilitated, but also its transfer to spelling. The strategy we used consists of exposing learners to strategically controlled listening exercises that require their *active* attention to the aural input and its assigned meaning (e.g., the concept of "wordy" versus that of "worthy,") so they can differentiate between phonemes and learn the associated graphemes. Unlike the old mechanical drills of behaviorist approaches believed to help learners internalize correct forms by meaningless repetition, the listening exercises used in this study are meaning-based, so input is processed by attaching meaning to form at deeper levels of language processing (Lee & VanPatten, 2003). Thus, students must process the target language phonology system so they become capable of accurately perceiving the foreign sounds. The term "process" is used to refer to the development of the ability to perceive and identify foreign sounds that do not exist in the learners' first language phonological system.

The intervention given to the participants in the present study aimed to help them develop the ability to discriminate and identify the two English sounds [d] and [ð] in an attempt to improve the spelling of words containing those two sounds.

The research questions for this study are:

1. How much improvement in the spelling of words containing either one of the two graphemes "d/th" occurred after the intervention?

2. How much improvement in the discrimination and identification of the two English sounds /d/-/ð/ occurred after the intervention?

II. Methodology

A. Participants

This study took place at one elementary school located in a Midwestern inner-city district. The district hosts 49 schools: five high schools, eight middle schools, 30 elementary schools, and two preschools as well as three alternative and adult learning sites. The total student enrollment at the time of intervention among these 49 sites was 19,750 students. Of the 30 elementary schools, 18 schools are designated as English as Second Language sites. This means they have ESL certified teachers and provide programs and interventions for the ELL students. When ELL students enroll in the district, they attend one of the ESL sites even if another school is closer to their home.

This particular elementary school was selected because of the professional development connection to the university. The total school enrollment during the intervention was 359 students. One hundred ninety (190) students received ESL services (53%) and 316 of the total student body received free/reduced lunch (88%).

The research intervention took place with third graders at this elementary school. This grade was selected by the principal and approved by the researchers. There were a total of 65 third graders, 55 who received free/reduced lunch. Of the total 65 students, 36 students who received ESL services (55%) as designated by school personnel were the ones we targeted.

B. Pre-test

All 36 ESL-serviced third graders were administered a spelling pre-test by school personnel. The personnel was a certified ESL teacher who worked with the third graders on a daily basis. The spelling pre-test consisted of ten sentences that contained a total of 48 instances of the target sound /ð/ as represented by the grapheme "th". This sound and its grapheme, contrasted in minimal pair with the sound /d/ and grapheme "d", was selected as representative of the various phonological differences between Spanish and English. This minimal pair is also found in numerous instances of English vocabulary (68 minimal pairs according to http://myweb.tiscali.co.uk/wordscape/wordlist/). This study's pre-

post-spelling test was adapted from another test available online (http://international.ouc.bc.ca/pronunciation) (See Appendix II). The researchers scored the papers to determine which of the 36 third graders needed training in the aforementioned sounds and graphemes. Participants who incorrectly spelled 50% or more of the targeted sound (/ð/) in the pre-test were selected to participate in the intervention (see Appendix II for examples of participants' misspelling). A total of eleven students, 5 boys and 6 girls, were identified as needing treatment. All were Spanish-speaking.

C. Treatment

Prior to the intervention, a list of 12 pairs of words containing the target sounds in phonemic contrast was created by the researchers. The twelve pairs were selected from http://myweb.tiscali.co.uk/wordscape/wordlist/ using the criteria of ease to create minimal pairs of sentences in which to embed the words. The two members of all twelve pairs had the potential for appearing in the same context, therefore increasing the potential for confusion. Table I contains the twelve pairs of words:

TABLE I:
MINIMAL PAIRS

day	they
breed	breathe
dale	they'll
Dan	than
dare	there
dave	they've
den	then
doe	though
doze	those
header	heather
odes	oaths
wordy	worthy

Each pair of words was then embedded in identical sentences, except for the word carrying the target sound (e.g., "He is so wordy!"/"He is so worthy!")[1]. In addition, pictures were selected to make clear the meaning of the intended sentence[2]. See below for an example (Refer to Appendix III for a complete list of sentences).


He is so wordy!


He is so worthy!

The researchers at the university were also the instructors. One researcher (first author) specializes in Foreign Language/ESL and pronunciation teaching and learning, and the second researcher specializes in orthography. Both researchers train pre-service and in-service teachers on teaching methods in their respective areas. The researchers taught the 11 participants two days a week for a total of 20 sessions. The students were taken from their classrooms for a 15-minute intervention for each of the 20 sessions. During these 20 sessions, the researchers provided three aspects of instruction: auditory training, grapheme training, and phonics/spelling practice.

a. Auditory training

The first 6 of the 20 sessions focused on the auditory training of pairs of words containing the target sounds (/d/-/ð/) in phonemic contrast. During the 15-minute lesson, the students listened to a recorded voice and looked at picture clues for the 12 pairs of words containing the target sounds. The input, therefore, was both aural and visual. Students did not see the words in print during the auditory training sessions. Auditory training had three parts: word discrimination, word identification, and sentence identification (See Appendix IV for sample tasks).

For the word discrimination task, students listened to ten pairs of the same two words (e.g., worthy/wordy) which sometimes consisted of the same word repeated (e.g., wordy – wordy), and other times the words were different (e.g., wordy – worthy). Subjects marked on their worksheet the correct columns labeled "same" or "different," depending on whether they perceived the two words as being the same (e.g., "wordy-wordy" or "worthy-worthy") or as two different words (e.g. "wordy-worthy" or "worthy-wordy").

The second part of auditory training was word identification. Participants received a worksheet that had two columns and one picture clue at the top of each column. For example, one column had the picture clue for 'wordy' and the other

[1] We recognize that at times it was difficult to find sentences in exact minimal pairs. Some require different inflections and some have an additional word (See Appendix III). However, they were minimal pairs at the word level. The sentences, despite limitations, still provided a natural context in which to contrast the two target sounds.

[2] Although the vocabulary might not appear to be grade level appropriate, our focus was on phonemic awareness rather than on vocabulary. The chosen sentences with pictures clues offered enough context for immediate recognition of the different sounds. The focus was, thus, on awareness of target phonemic distinction, and not meaning of the words.

column label was the picture clue for 'worthy' (see above for pictures). As they listened, the students checked the correct column according to whether they heard one word or the other.

The third part of the auditory training was sentence identification. Again, they received a worksheet identical to that of the word identification with two columns headed by picture clues (e.g. wordy/worthy), but this time, instead of listening to individual pairs of words, they heard complete sentences containing these words. As students listened to the complete sentence carrying the target sound embedded in one word, they checked the correct column based on the sentence they heard (e.g., "He is so wordy!" or "He is so worthy!").

The same procedures for word discrimination, word identification and sentence identification described above were followed with the other eleven minimal pairs of words.

b. Grapheme training

The next 6 of the 20 sessions introduced the graphemes, or printed letter/s in the minimal pairs. The two graphemes "d" and "th" were printed on cardstock and stapled to a wooden stick. Students were given two card sticks, one for each grapheme. The students listened to the same words/sentences created for the auditory training, but instead of marking columns on paper, they held a card for the teacher to see. In this case, the input was aural and students responded kinesthetically. The teacher then held the card containing the target grapheme so students could see if they were correct or incorrect in their auditory/grapheme identification.

c. Phonics/spelling training

The final 8 of the 20 sessions focused on students' writing of the graphemes. After students could successfully match the grapheme with the phoneme by manipulating the cards, the next step consisted in guiding participants towards the actual spelling. This was done by scaffolding the task through three phases. The first phase consisted of circling the word containing the correct grapheme after giving them the same auditory clues as before. For example, they listened to the sentence "He is so wordy!" and they circled the correct word on the paper containing the sentence "He is so (wordy)/ worthy!" In the second phase, students completed the blank by writing the dictated word. (e.g., He is so wordy!) In the third phase, they wrote the entire sentence. Some words were more difficult than others (e.g. *heather* was more difficult than *day*) and spelling mistakes non-related to the targeted grapheme were made, but not counted. For example, students were not penalized if they spelled *heather* as **hether*.

D. Post-test

A post-test to determine the impact of the training was administered by the same school personnel who administered the pre-test. This post-test was identical to the pre-test (see Appendix II). Given that the words in this test were unfamiliar to the students, there was no threat to internal validity of the test, since the focus was on the perception of the sounds rather than on the meaning of the words. Both researchers independently scored the pre- and post-test for inter-rater reliability, which was 98%.

E. Data Analysis

The first research question asked how much students improved in writing the two targeted graphemes when hearing dictated words containing the corresponding phonemes. This was measured by the 48 instances of the sounds in the words on the pre- and post-test. Students were deducted points if the "th" grapheme was not written correctly; however, no penalization occurred if other aspects of the word were misspelled because those features of words had not been taught. We created a spreadsheet with a number/row for each child. Each student received a pre-test score and a post-test score out of the 48 total points. Since we had a repeated measures design with an intervention, we conducted a paired-samples t-test, which evaluated whether the mean difference between the two variables (pre-post test) was significant. A paired samples t-test was run for the total number of words containing the grapheme "th" spelled correctly out of a total of 48 target words.

The second research question asked how much improvement occurred when students differentiated between the two targeted sounds ([d] and [ð]) as measured by the number of errors found in participants' answer sheets after each of the 20 sessions. Since the different distribution of the phonemes within a word in English and Spanish poses difficulties to learners (Eckman, 1977), descriptive analyses were run to examine if the position of the /d/-/ð/ sounds made a difference in students ability to discriminate and identify them. For example, the sound /ð/ never occurs in final position in Spanish, but it does in English (e.g., "oath").

III. Results

Due to the Spanish language interference, it was thought that making these learners aware of English phonetic distinctions that do not occur in their native language (Spanish) would solve this problem. In an attempt to do this, participants in this study received auditory training with the expectation that once they perceived the difference between the sounds, they would be able to correctly write the targeted sounds within words. To test this hypothesis, the sound /ð/ (represented in English by the diagraph "th") was chosen. The results will be presented by the research questions.

1. How much improvement in the spelling of words containing either one of the two graphemes "d/th" occurred after the intervention?

This question was answered by administering a pre-post test (see Appendix II) with 48 points possible on each test. A pre-test score and a post-test score were entered into a spreadsheet. We used a repeated measures design with an intervention and conducted a paired sample t-test to measure whether there was an improvement in students' ability to spell words over time. The results indicated that the mean post-test (M = 33.36, SD = 10.14) was significantly greater than the mean pre-test (M = 26.64, SD = 8.82), t (10) = 6.97, p. 000.

2. How much improvement in the discrimination and identification of the two English sounds /d/-/ð/ occurred after the intervention?

This question was answered by conducting descriptive analyses for the position of the sound. The part of the intervention focusing on auditory training consisted of six sessions targeting the word pairs listed in Table II.

TABLE II:
WORD PAIRS IN THE AUDITORY TRAINING

Session	Word pair
1	day/they
2	Dale/they'll
3	Dan/than
4	Dave/they've
5	dare/there
6	den/then
7	doze/those
8	doze/those

Graphs were created for ease of interpretation (see Figures I to III)

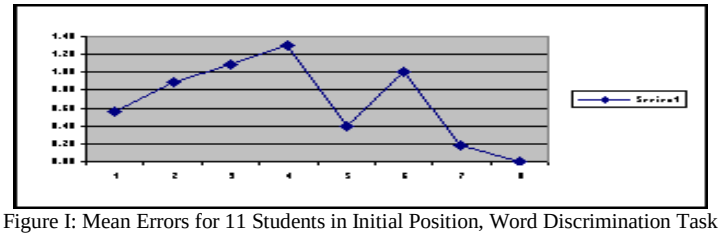


Figure I: Mean Errors for 11 Students in Initial Position, Word Discrimination Task

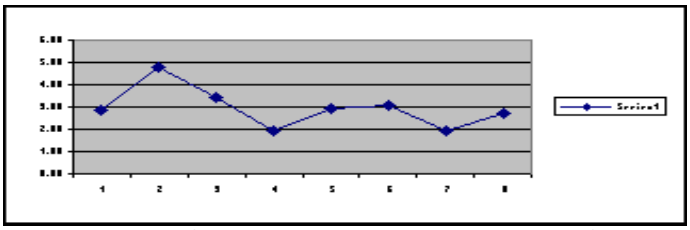


Figure II: Mean Errors for 11 Students in Initial Position, Word Identification Task

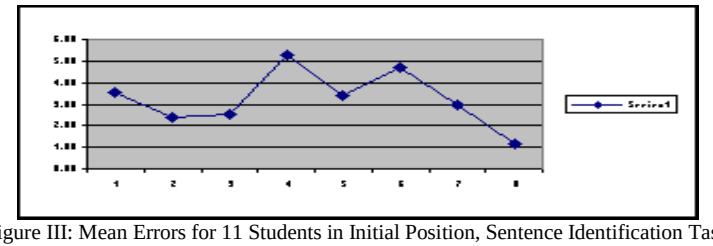


Figure III: Mean Errors for 11 Students in Initial Position, Sentence Identification Task

Table III shows the 12 pairs of words; 8 words had the target sound d/th in the initial position, 2 words had the target sound in the medial position and 2 words had the target sound in the final position. When /ð/ was in initial position, there was improvement between the first and last session in all three tasks: word discrimination (WD), word identification (WI), and sentence identification (SI).

In medial position, there was improvement only in word discrimination. And when /ð/ was in final position, no improvement was observed in any of the tasks (see Table II for a summary of these results).

TABLE III:
IMPROVEMENT OBSERVED IN TASKS AND POSITIONS FOR 11 STUDENTS*

Tasks ↓	**Position →**	*Initial*	*Medial*	*Final*
Word discrimination		Yes	Yes	No
Word Identification		Yes	No	No
Sentence Identification		Yes	No	No

*Improvement is defined as an increase in scores after 6 sessions of intervention

It should be noted that of the 12 pairs of words, eight had the target sound in initial position, whereas only two were in each medial and final positions. The low number of instances in medial and final positions might not have offered enough opportunities for processing the distinction between the two target sounds (/d/ versus /ð/), resulting in a lack of improvement in these two positions.

In addition to the amount of input being responsible for the difference in improvement in the three different positions, Spanish phonological transfer processes might have been a factor. As indicated earlier, the sound [ð] does exist in Spanish, not as a phoneme in itself, but as a variation (or allophone) of /d/ that occurs only in intervocalic position (and between a vowel and a liquid /r/, as in "arder" [arðér] *to burn*). Thus, the contrast between the two sounds does not occur in absolute initial position. This makes the processing of the distinction between the two sounds easier when the sound appears in initial position, since it is new, and therefore more salient, to Spanish speakers. Similarly, a cause for the total lack of improvement in final position might be the fact that, in Spanish, consonantal sounds in word-final position lose their distinctive features. Therefore, faced with the task of processing a new phonological contrast (/d/ versus /ð/), non-existing in their first language in any position, subjects had more difficulty processing this distinction in final position.

After comparing the mean of errors across tasks and word positions, we determined that there was no observable pattern indicating that some word pairs were more difficult than others. Sometimes specific word pairs would be difficult in word discrimination and sentence identification tasks, but easy in word identification task (e.g., Dave/they've); other times they would be difficult in word discrimination and word identification, but easy in sentence identification (e.g., Dan/than). Factors contributing to this lack of homogeneity might be random, or the entropy guiding it might be too complex to be discovered and reported in this article.

IV. Discussion

This study was a 20-training session intervention posed to help ELL students become aurally aware of the differences between two phonemes that do not exist in their native language, and incorporate the correct grapheme in their writing of words. Results of this study indicate positive changes in the students' discrimination, identification and production of the grapheme.

There are reasons to support why these students were able to become proficient. Most importantly, students were trained to perceive the difference between two similar sounds and to associate them with the correct grapheme. This pull-out 15-minute intervention occurred consistently two times per week during the course of the semester. The students knew when they came to the classroom that they were learning the differences between their languages (Spanish) and English. This awareness alone had a positive impact (Helman, 2004). Acquiring literacy in English is tied to and builds upon literacy in Spanish (Fashola, et al., 1996). Also, the intervention was strategically planned to scaffold students learning of the sounds by first focusing on perception, then assigning the correct grapheme to the sound, and finally producing the correct grapheme. This gradual release of information allowed for the appropriate processing of the English phonemic system. This study aimed to specifically build on how to teach transitional orthography so bilingual students can understand the orthographic principles in both languages (Fashola, et al.1996; Jimenez, Garc á, & Pearson, 1996; P érez Ca ñado, 2005).

V. Conclusion

Students become successful when teachers provide explicit instruction through auditory and grapheme training. Moats (2009) outlined how particularly important this is for second language learners who "are most dependent on good instruction to overcome their disadvantages" (p. 380.) She also stressed the importance of teachers' expertise in phonology and graphemes correspondence if they are to help their students become better spellers.

The findings of this study underscore the importance of Moats' (2009) point. Teachers should train ELL students of Spanish language background in the perception of pairs of English phonemes that do not contrast in Spanish, such as /d/ and /ð/, which result in spelling errors.

This training should start with discrimination and identification of sounds in initial position, since this position seems to offer more opportunities for success, and then continue with medial and final position, giving greater attention to the latter, which might be the one that presents more obstacles for Spanish speakers. Other pairs of sounds that are distinct phonemes in English but not in Spanish are /b/-/v/ (as in *bat/vat*), /s/-/z/ (as in *sip/zip*), /t/-/}/ (as in *clot/cloth*), /ʃ/-/ʧ/ (as in *share/chair*), and /j/-/ʧ/ (as in *joke/choke*), among others. It is recommended that the training described here be replicated with these other pairs of sounds.

In addition, this training could also be applied to ELLs with native languages other than Spanish. For example, Arabic speakers cannot perceive the difference between the two phonemes in the pair /p/-/b/ (e.g., park/bark); Korean speakers have trouble with /p/-/f/ (e.g., pork/fork); Japanese speakers, with /ɹ-/l/ (e.g., rake/lake); … etc. An intervention to help these learners could be designed to target the problematic phonemes by following the same steps presented in this study.

A. Limitations

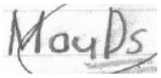
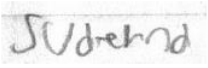
Several limitations of the study need to be addressed. First, this study included a small sample size which limits the ability to generalize to other populations. Second, while the gains showed that students improved significantly in their ability to produce the correct grapheme when listening to a dictated sentence, little instruction was given to more holistic literacy experiences. The regular classroom teachers were expected to fulfill this responsibility, but there was minimal connection between this intervention and classroom literacy practices. Third, one test was given for the pre and post assessments. We must recognize that this one-time assessment does not document success over the course of time to determine the true impact on change and if this learning will be maintained. Fourth, a confounding factor is that of maturation, in which children are expected to make progress as a result of instruction over a period of time. Fifth, we served dual roles as instructors and researchers, which are both a strength and a limitation. Our beliefs, viewpoints and bias may have indirectly impacted our teaching and perception of our learners.

B. Future Research

There are several possibilities for future research. It would be worthwhile to conduct a similar study of a short intervention with a control group to determine differences in achievement. Another study should take place in second to fifth grade classrooms during the course of a school year with control and experimental groups. Standardized assessments could be used to determine the amount of growth and whether it is significant. Ideally, conducting a long-term study, following the students through consequent grades, would provide information about the long-term effects on students' literacy development.

In sum, it was the goal of this intervention to provide students with the ability to discriminate English sounds and be able to correctly spell words containing those sounds. The ELL students in this study were able to master this knowledge in a relatively short amount of time. In conclusion, this study supports the teaching of English phonemes not found in native languages of ELL students. This provides students with the ability to be successful in their English writing (Bloodgood, 1991; Pérez Cañado, 2005; Schlagel, 2002).

APPENDIX I SAMPLES OF PRE-TEST MISSPELLING

- "together" >*togeder 
- "mouths" > *mouds 
- "Southern" > *Soudern 

González-Bueno & Massengill,
University of Kansas, 2006

APPENDIX II PRE-POST-TEST

Directions: "I am going to read you a sentence. Please spell the words as best as you can. Write down all the sounds that you hear. I will say the sentence several times."

Words containing targeted sound (/ð/ are italicize).

1. Those of the southern and northern areas are still writhing and seething.
2. Breathe the breeze, loathe the lows, and soothe the Sues.
3. *Rather than loathing their mothers, soothe their fathers.*
4. Bathing in the bays is soothing to those teething brothers.
5. Dan would rather scythe in wetter weather.
6. Their dare was to Dan rather than those dozing northerners.
7. Ether either makes Thor writhe and seethe.
8. Though dough is worthy, it is worthier with their father's tithe.
9. That thatch there on their thighs, although sheathed, is weathered.
10. Breeding breathing southern otters in the north is worth thousands to them.

Appendix III

COMPLETE LIST OF SENTENCES USED IN THIS STUDY

Sentence Identification Answer Sheet	
Day passed quickly.	They passed quickly.
They couldn't breed.	They couldn't breathe.
Dale, say the words.	They'll say the words.
It's easier done, Dan said.	It's easier done than said.
She does dare at her house.	She does it there, at her house.
Dave said the sentence.	They've said the sentence.
A bear came out of a den.	A bear came out of it, then.
I got one doe.	I got one, though.
I want to doze.	I want two of those.
That header would look nice in my room.	That heather would look nice in my room.
Those were nice odes.	Those were nice oaths.
He is so wordy!	He is so worthy!

*Targeted words are underlined

APPENDIX IV

Auditory Training
Answer Sheets Samples
Word Discrimination Task

1.

Igual	Diferente

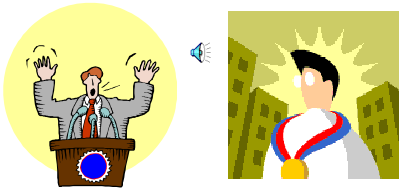
2.

Igual	Diferente

Word and Sentences Identification Tasks

¿Cuál?

A B



6wib

1	✔	
2		
3		
4		
5		
6		
7		
8		
9		
10		

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Manuela González-Bueno is originally from Seville, Spain but lives in Olathe, Kansas. She holds a Ph.D. degree in Spanish (1995) with specialization in applied linguistics by The Pennsylvania State University, and a *Licenciatura* in Hispanic Philology, concentration in Linguistics, from the University of Seville, Spain.

She is currently an Associate Professor of Foreign Language Education at the University of Kansas in Lawrence, Kansas. Some of her published works include: "Text Messaging in a Foreign Language" *The Language Educator, 4*, 5 (2009): 45-49. "The Use of Periodicals in the Foreign Language Classroom from the Perspective of the Standards for Foreign Language Learning." *NECTFL Review*, 60, 2007, and "Articulatory Difficulties in the Acquisition of Spanish /r/ in a Bilingual Context." In Cohen, J., McAlister, K., Rolstad, K. & MacSwan, J. (Eds.) *ISB4*. Somerville, MA: Cascadilla Press. (2005): 914-934. Her research interests are in the application of second language acquisition theories to the teaching of foreign languages, the acquisition and teaching of foreign language pronunciation, and technology use in the foreign language classroom.

Dr. González-Bueno is a member of the American Council for the Teaching of Foreign Language (ACTFL) and the American Association of Teachers of Spanish and Portuguese (AATSP). She serves as a member of the World Language Advisory Council for KSDE.

Donita J. Massengill Shaw is from Olathe, Kansas. She holds a Ph.D. degree (2002) in Curriculum & Instruction with specialization in reading by the University of Kansas, Lawrence, Kansas; M.A. in Reading Education (1994) from Andrews University, Berrien Springs, Michigan; B.S. in Elementary Education (1993) also from Andrews University.

She is currently an Associate Professor of literacy education at the University of Kansas in Lawrence, Kansas. Some of her published works include 1) Massengill Shaw, D. (2011). The effect of two handwriting approaches, D'Nealian and Sunwrite on kindergartners' letter formations. *Early Childhood Education Journal*. Published online February 18, 2011. DOI 10.1007/s10643-011-0444-2. 2) Massengill Shaw, D., & Mahlios, M. (2011). Literacy metaphors of pre-service elementary teachers: Do they change after instruction? Which metaphors are stable? How do they connect to theories? *Journal of Education for Teaching, 37*(1), 77-92. 3) Massengill Shaw, D., & Berg, M. (2008). Effects of a Word Study intervention on spelling accuracy among low-literate adults. *Adult Basic Education and Literacy Journal, 2*(3), 131-139. Her research interests are in the area of adult literacy, teacher education for pre-service and in-service educators, and early literacy.

Dr. Shaw is a member of the Literacy Research Association and the International Reading Association. She serves on the J. Michael Parker Award Committee for the Literacy Research Association and the Studies and Research: Grants Subcommittee for the International Reading Association.