Van Thanh Le

Cross-Language Transfer of Phonemic Awareness in Spanish and English Bilinguals

Key Terms:

- Phoneme
- Grapheme
- Mixed Factorial Design
- Metalinguistic
- Bilingualism
- Mann Phoneme Segmentation Task (PST)
- Yopp-Singer Phoneme Segmentation Test (PST)

Author

Van Le

Van Le first got involved in research through the Psychology Honors Program. This project attracted her because it gave her the opportunity to interact with children, whose eagerness to participate made this project a very "personal experience." Van hopes to pursue a Ph.D., focusing on computer languages that are similar to natural languages. She advises other students to do their homework and find a professor who has expertise and resources in the student's field of interest.

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Abstract

Phoneme awareness, the ability to count or otherwise manipulate consonants and vowels, has been documented as predictive of reading ability. The study's concern with phoneme awareness was threefold: 1) to confirm its relatedness to reading ability, 2) to compare its extent among monolinguals and bilinguals, and 3) to examine its transfer between languages. The participants were 52 first graders who were either English or Spanish monolingual or Spanish-English bilingual. As predicted, there was an association between phoneme awareness and English reading ability. This also held true for both English and Spanish tests of phoneme awareness. Contrary to the predictions, there was no overall advantage of either bilingualism or monolingualism. However, there was consistent evidence of cross-language transfer. While English speakers did better on English versions, and Spanish speakers on Spanish versions, a correlation was also found between performance between the two languages.

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Faculty Mentor

Van Le's research concerns one of the most essential determinants of early reading skill. That skill, referred to as "phoneme awareness" allows children to realize that spoken words can be broken down into the consonant- and vowel-sized units that the letters of the alphabet "stand for." Van made two important discoveries about phoneme awareness: 1) that Spanish-speaking children's awareness of phonemes in Spanish words can promote their awareness of phonemes in English words, and 2) that bilingualism has neither a positive nor a negative impact on the development of phoneme awareness. It was a pleasure to see her research

project develop from office hour discussions about the literature to a mature and polished contribution to the field.◇

Virginia Mann
School of Social Sciences

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Introduction

Phoneme awareness is the ability to manipulate consonants and vowels mentally. It is fundamental in the development of English reading competency because the English alphabet represents phonemes. Measure-ment of this capacity has enabled researchers to successfully predict early reading achievement. For instance, V. A. Mann (1993) found that in kindergarten, awareness of the initial phonemes in spoken words predicts reading competency in the first grade. Metalinguistic awareness of phonemes and syllables has been a stable predictor of reading performance across numerous longitudinal studies (McBride-Chang 1995).

In the present study, we explored phoneme awareness in a Spanish-English bilingual population. The aim of our study was threefold: 1) to confirm previous findings of relatedness between reading ability and phoneme awareness, 2) to evaluate monolingual versus bilingual performance, and 3) to examine if phoneme awareness transfers between languages.

H. A. Yopp (1988) found that a combination of two tests—one testing Compound Phonemic Awareness, and the other testing Simple Phonemic Awareness—would be most predictive of reading acquisition. Compound Phonemic Awareness tasks require that phonemes be held in memory while performing secondary operations. This study also examines two Simple Phonemic Awareness tasks that involve the manipulation of individual phonemes. One is the Yopp-Singer Phoneme Segmentation Task (PST). In Yopp's study, this test was the purest measure of Simple Phonemic Awareness. The other measure is the Mann Phoneme Segmentation Test (PST) (Mann 1993). A benefit of this task, as opposed to the Yopp-Singer task, is that it requires little formal instruction, and children do not need to access "school skills" such as their knowledge of letter sounds like "buh" and "ess." The recognition that stimuli such as "cat" consists of "cuh" "ah" "tuh" is critical to performance on the Yopp-Singer task, which makes that task more dependent on educational exposure. The Mann test only requires children to decode which words start with the same sound.

Phonological tasks like those employed by Yopp and Mann have been used primarily with monolingual speakers of English. Many Spanish-speaking children do not succeed in learning to read well; deficient phonological two groups. The reading-disabled group performed poorer overall on the phoneme segmentation tests. The present concern is with Spanish- or English-speaking monolingual and bilingual subjects and how they perform on such tasks. Thus, we adopted the Yopp-Singer and Mann tests into Spanish for the present study.

Considering the impact of bilingualism on phonological awareness, Walley (Bruck and Genesee 1995) suggested that bilinguals, in order to differentiate between their two languages, must routinely pay closer attention to speech and therefore, must be advantaged over monolinguals in their heightened sensitivity to individual phonemes. Furthermore, it has been asserted that instruction gives bilingual children an advantage over monolingual children in tasks in which children are to analyze the structural aspects of language.

M. Bruck and F. Genesee (1995), however, question Walley's assertion that bilingualism improves phonological awareness in general. Instead, Bruck and Genesee (1995) have asserted, instead, that monolinguals can outperform bilinguals in phoneme awareness tasks, especially when the effect of instruction is taken into account. They suggest that phonological awareness in monolinguals learning to read English would be more influenced by literacy instruction than in bilinguals learning to read French. They based this on reading acquisition models that indicate greater ease in distinguishing and identifying phonemes if orthographic representations of the alphabet are stored in memory. For instance, the three co-articulated phonemes, /s/-/u/-/n/, are more easily recognized as such, once subjects understand that "sun" is spelled with three letters (Bruck and Genesee 1995). Bruck and Genesee expected that monolingual subjects will have more practice with individual orthographic patterns and the words they transcribe, and therefore will develop stronger grapheme-phoneme associations than their bilingual counterparts.

Unlike Bruck and Genesee (1995), A. Y. Durgunoglu, W. E. Nagy, and B. J. Hancin-Bhatt (1993) did not look for, find, or compare specific phonological awareness skills among bilinguals versus monolinguals. Instead, they found a general transfer of phonological awareness in one direction, from Spanish to English. Their study included first grade students who were taught in Spanish. They were

awareness could be a factor. This is confirmed by J. E. Jimenez's (1997) study comparing Spanish-speaking normal and reading-disabled children that found differences in the phonological awareness of the

administered tests of letter naming, Spanish phonological awareness, Spanish and English word recognition, and Spanish and English oral proficiency. Levels of Spanish word recognition and phonological awareness predicted subjects' scores on English word and pseudoword recognition tests.

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The present study, like that of Bruck and Genesee (1995), compared bilinguals (Spanish and English) to monolingual speakers to determine if bilinguals show an advantage. Like Durgunoglu et al. (1993), this study further asked if beginning readers' performance on phonological awareness tasks in one language would be indicative of the level of performance on these same tasks in the present language. The innovation in this study was that, unlike Durgunoglu et al. (1993) who only tested for transfer effects in one direction, we tested for transfer effects in both directions between English and Spanish. The English and Spanish tests were given not only to bilinguals, but also to monolinguals who were either taught in English or Spanish. Both language versions were administered to all the children, regardless of language dominance or knowledge of the "foreign" language. Overall, the purpose then was to investigate general phonological awareness and its implications for reading ability and its possible transfer between languages within monolingual and bilingual subjects.

Different predictions followed from each of the studies discussed above. First, we predicted that results could be replicated such that reading ability and performance on the phoneme awareness tests were related. Second, taking into account Durgunoglu et al.'s (1993) assertions of language transfer, we predicted a general transfer of phoneme awareness between languages for bilinguals. Consistent with predictions by Walley (Bruck and Genesee 1995) of a bilingual advantage, we expected bilinguals to outperform monolinguals. In addition, based upon Bruck and Genesee's (1995) findings of instructional influences in grapheme-phoneme associations (and acknowledging that students had been formally introduced to these concepts by the time that testing began), we expected that language of instruction would facilitate better performance in that language when compared to the other.

In order to investigate the relationship between phoneme awareness and reading, to examine how bilingual versus monolingual language background may affect its development, and to demonstrate transfer of this ability between Spanish and English, we employed the Yopp-Singer PST, the Mann PST and their Spanish-language adaptations in this study. The Peabody Picture Vocabulary Test (Spanish and English) and the Woodcock Reading Mastery Tests (English) measured vocabulary and reading development. Teacher judgments of the

Method

Subjects:

Subjects were 52 first grade students from a public elementary school in the Garden Grove (CA) Unified School District. The children came from predominantly low-income backgrounds, and a majority were of Mexican heritage. The children ranged in age from six years, three months to seven years, five months. Only students who returned signed parental permission slips participated in this study.

Subjects were classified into groups according to: a) teacher ratings of language competency and b) language spoken at home. The teachers ranked the children according to the following rating scale: 1) English only (E.O.); 2) bilingual with English dominance (E.D.); 3) bilingual with equal dominance (Eq.D.); 4) bilingual with Spanish dominance (S.D.) and; 5) Spanish-only (S.O.). Nine students were E.O.; nine were E.D.; 12 were Eq.D.; 20 subjects were S.D.; three were S.O. Teachers also rated the children's English reading ability on a five point scale, low (1) to high (5). These children came from bilingual English-instruction and Spanish-instruction classrooms.

Materials:

The children were assessed for language competency and reading ability using the following standard instruments and their Spanish-language, examiner-generated adaptations: a) the Peabody Picture Vocabulary Test-Revised (PPVT-R), a measure of receptive (heard) vocabulary (Dunn and Dunn 1981); b) a Spanish-language adaptation of the PPVT-R prepared by the author; c) the Word Identification subtest of the Woodcock Reading Mastery Tests, which measures skill in word naming (Woodcock 1973), and; d) the Word Attack subtest of the Woodcock Reading Mastery Tests, which measures subjects' ability to decode nonsense words (Woodcock 1973).

The tests of phoneme awareness that were administered to the children are as follows: a) the Mann PST, which involves the presentation of four illustrations of four words, three of which start with the same sound: the child is to identify the picture that

reading ability and language background of the students were considered as well.

represents the word that starts with a different sound; b) a Spanish adaptation of the Mann PST prepared by the author; c) the Yopp-Singer PST in which the children are presented with a one-syllable word and are asked to say the individual sounds and letters that comprise the word, and; d) a Spanish adaptation of the Yopp-Singer PST prepared by the author.

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Design:
We used a mixed factorial design with the between-subjects variables of: a) language background of the students based on teacher ratings (E.O., E.D., Eq.D., S.D., S.O.) and b) reading stage based on teacher ratings on a scale of 1 to 5, from low to high ability. The with-in subjects variables were a) Mann PST (English or Spanish adaptation); b) Yopp-Singer PST (English or Spanish adaptation); c) Peabody Picture Vocabulary Test (English or Spanish adaptation), and; d) the Woodcock Reading Mastery Tests (Word Identification or WordAttack). All subjects, whether English- or Spanish-speaking, were given both the English and Spanish versions of all the tests, with the exception of the E.O. subjects, who were administered only the English PPVT-R. The dependent variables were student performance. Half the children received first, the PPVT-R (either in Spanish or English), second, the Woodcock measures, third, the Mann PST (either the Spanish or English version), fourth, the Yopp-Singer PST (either in Spanish or English), and fifth, the PPVT-R (in whichever language was not used to administer the test previously). The other half of the children received the tests in the same order, except that the Yopp-Singer and Mann PST order was interchanged. The language of test administration, both Spanish and English, was counterbalanced for all tests.

Procedure:
Between February and April 1998, the participants were tested individually, either in the library storage/computer room or in a room off of the teacher's lounge at the school. Within one testing session, the students were administered the PPVT-R (in English or both Spanish and English), the Woodcock subtests (in English), and the phoneme awareness measures (in both Spanish and English). While administering the English versions of all tests, the examiner read the test items orally. In all Spanish versions of the tests, the target words were read by a native speaker of Spanish (reproduced on a tape player). A break of approximately three to five minutes was given to the children in mid-session. The one-time assessment took approximately 45 minutes to administer per child.

Results

Table 1 presents the descriptive data on all language, vocabulary, and phonological awareness measures as well as age, language background and reading stage

Table 1
Number, Minimum, Maximum, Means and Standard Deviations of All Phoneme Awareness Measures, Age, Language Background and Reading Stage Values

	N	Minimum	Maximum	Mean	Std. Deviation
Age	52	6.30	7.30	6.8788	.3533
LANG	52	1.80	5.00	3.0000	1.2207
MANNE	52	1.80	10.00	6.2308	3.3350
MANNS	52	1.80	10.00	4.3846	2.2765
PPVTE	51	52.80	87.00	72.1569	8.6703
PPVTS	44	50.80	90.00	70.1818	8.7345
RESTAGE	52	2.80	5.00	4.1346	.9081
WORDATTK	52	.80	43.00	11.2500	10.7208
WORDID	52	.80	94.00	27.1538	2[illegible]
YSENG	52	2.80	19.00	9.8462	4[illegible]
YSSPAN	52	1.80	19.00	8.8654	4[illegible]

Note. LANG = language background rating; MANNE = English Mann Phoneme Segmentation Test; MANNS = Spanish adaptation of Mann Phoneme Segmentation Test; PPVTE = English Peabody Picture Vocabulary Test; PPVTS = Spanish adaptation of Peabody Picture Vocabulary Test; RESTAGE = reading stage rating; WORDATTK = Woodcock Word Attack nonsense word decoding subtest in English; WORDID = Woodcock Word Identification subtest in English; YSENG = English Yopp-Singer Phoneme Segmentation Test; YSSPAN = Spanish Yopp-Singer Phoneme Segmentation Test.

The Analysis of variance showed a significant effect for reading group, $F(3,39) = 9.182$, $p < .0001$. Figure 1 shows mean performance on the phoneme awareness tests as a function of reading stage. Overall, the children who differed in the reading ability did differ in level of performance on the phoneme awareness tasks. There was a significant difference for reading group and the Mann English test, $F(3,48) = 6.932$, $p < .001$ as well as for the Spanish version, $F(3,48) = 5.147$, $p < .004$. Significant differences were also found for the Yopp-Singer tests, English, $F(3,48) = 9.267$, $p < .0001$, and Spanish, $F(3,48) = 7.913$, $p < .0001$. This replicates previous studies' results that showed that phoneme awareness is highly related to reading ability. No other significant differences were found for reading stage and any other variable.

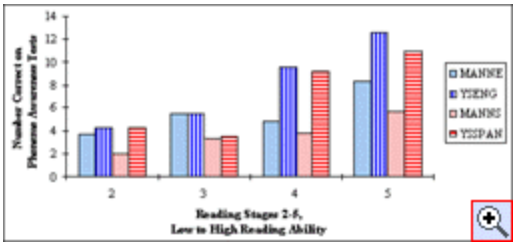

Figure 1
Mean scores on phoneme awareness tests as a function of reading ability.

There were no significant differences for

values. All significant effects are $p < .01$ unless otherwise specified.

English and Spanish versions of the phoneme awareness tests. On the average, language of presentation did not affect the students' overall level of performance, $p>.01$. Additionally, no overall differences were found for language background of the children such that children who differ in language control of Spanish and English differed in overall performance. Thus, monolinguals did not perform better than bilinguals or vice versa, in general.

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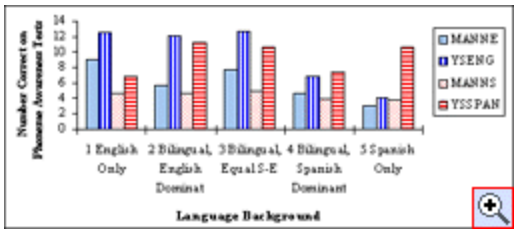

Figure 2
Means of phoneme awareness scores as a function of monolingual versus bilingual language background.

Although, no overall differences were found between the English and Spanish versions of the tests, a significant interaction was found between language background and performance on the English versus Spanish phoneme awareness tests, F (4,39) = 7.681, p < .0001. As shown in Figure 2, English-dominant speakers score higher on the English tests than Spanish-dominant speakers do on the Spanish tests.

A significant difference was found for the specific type of phoneme segmentation test presented, whether Mann or Yopp-Singer, F (1,39) = 32.749, p < .0001. In general, the Yopp-Singer PSTs were easier than the Mann PSTs. No significant interactions were found between the two language versions of these tests and the type of test. The Mann is more difficult than the Yopp, regardless of whether the test language is Spanish or English. Further, no interactions were found between test type and any other variable.

Correlational Analysis:
Correlations between all of the variables appear in Table 2. Both Spanish and English versions of the phoneme segmentation tasks correlated with reading ability. Here we focus on the transfer between tests.

For the Mann tests, the results showed a significant correlation between the Spanish and English versions of the test, r (52) = .492, p < .0001. Children who did better on one version of the test tended to do better on the other. A significant correlation was found between the Mann tests for the control group, but also for the English-only children, r (9) = .710, p < .032 (p < .05). Spanish-speaking students performed better on the Spanish task than on its English equivalent. However, once again, there was a significant correlation for both versions of the Mann test for this Spanish-only group, r (10) = .843, p < .002.

For the Yopp-Singer tests, the results also showed a significant correlation between the Children who did better on one version of the test tended to do better on the other. English-dominant children performed better on the English task. No significant correlation was found between the Yopp-Singer tests for the English-only children, r(52) = .367, p >.05. Spanish-speaking students performed better on the Spanish task than on its English equivalent. A significant correlation for both versions of the Yopp-Singer test for this Spanish-only group, r (10) = .734, p < .016.

Table 2
Correlations Among Phoneme Awareness Measures, Language Background, and Reading Stage Values

	1	2	3	4	5	6	7	8	9	10
1. LANG	---	-.336*	-.181	-.242	.078	-.291*	-.401*	-.405*	-.256*	-.230
2. MANNE		---		.288	.188			.365*	.364*	.149
3. MANNS			---		.107			.404*	.330*	
4. PPVTE				---	.276		.316	.408*	.360*	.259
5. PPVTS					---	.063	-.035	-.148	-.162	.064
6. RESTAGE						---		.326*		
7. WORDATTK							---	.417*		
8. WORDID								---	---	
9. YSENG									---	
10. YSSPAN										

*p < .01
Note. LANG = language background rating; MANNE = English Mann Phoneme Segmentation Test; MANNS = Spanish adaptation of Mann Phoneme Segmentation Test; PPVTE = English Peabody Picture Vocabulary Test; PPVTS = Spanish adaptation of Peabody Picture Vocabulary Test; RESTAGE = reading stage rating; WORDATTK = Woodcock Word Attack nonsense word decoding subtest in English; WORDID = Woodcock Word Identification subtest in English; YSENG = English Yopp-Singer Phoneme Segmentation Test; YSSPAN = Spanish Yopp-Singer Phoneme Segmentation Test.

Discussion

The current study investigated previous findings that a) related reading ability and performance on phoneme awareness tests, b) concluded that neither bilinguals (Walley in Bruck and Genesee 1995) or monolinguals (Bruck and Genesee 1995) were advantaged in these tasks, and c) found general transfer of phoneme awareness between languages, as suggested by Durgunoglu et al. (1993). Our discussion of the results is organized around these main issues.

As described in the literature and as demonstrated in the present study, reading ability and performance on phoneme awareness tests are related. Our data show that reading ability is related to phoneme awareness in the English version of the Mann PST, r (52) = .431, p < .002, on the Spanish version of the Mann test, r (52) = .475, p < .001, on the English version of the

Spanish and English versions of the test, r (52) = .334, p < .003.

Yopp-Singer PST, r (52) = .578, p < .0001, and on the Spanish version of the Yopp-Singer test, r (52) = .604, p < .0001. In the original literature, Yopp (1988) found the Yopp-Singer PST predicted subsequent learning of new words, r (104) = .67, p < .01. Mann (1993), as well, found phoneme awareness and reading to be related, r (100) = .5786, p < .01. Thus we show that our analyses yield very similar correlation values. There is an association in the level of development or impairment of subjects' awareness of associations between phonemes reading ability.

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Contrary to assertions by Walley (Bruck and Genesee 1995) that bilinguals have heightened sensitivity to individual phonemes and are therefore better able to analyze language, our results do not indicate a significant overall difference between monolingual and bilingual performance on the phoneme tests. The data does not support the assertion that bilinguals are more advantaged than monolinguals in phoneme awareness. The data also does not support Bruck and Genesee's (1995) finding that monolinguals had an advantage. In short, in this study, monolinguals and bilinguals seem equivalent.

Durgunoglu et al. (1993) found general transfer of phoneme awareness in one direction, from Spanish to English. We also found a general phoneme awareness transfer between languages; however, according to our data, transfer is in both directions from Spanish to English and vice versa. The transfer was significant amongst the bilinguals. Transfer also tended to be evident for the monolingual, English-only and Spanish-only groups. Even though these children knew only one language, they were aware of the phonemes in words from another language, implying that one need not know meaning to support sound structure. Thus, level of performance in one language was predictive of performance in the other. Upon closer inspection of the data, some subjects who a) were monolingual and thus had little or no exposure to the second language tested and b) had high phonological awareness in their native language, scored highly on phoneme awareness tasks in the other language. This suggests a language independent effect of the linguistic units involved in phoneme awareness: individuals scoring high in the phoneme awareness tests of one language did not necessarily need to have any experience with the other language to score high in that second language.

Bruck and Genesee (1995) contended that reading instruction in a language does affect the phoneme awareness of that language, thus facilitating stronger grapheme-phoneme associations within the language. The data in this study shows language of instruction and performance on corresponding language versions of the tests are related. Children taught in Spanish performed better on Spanish versions of the test; children taught in English performed better on English versions.

However, upon closer inspection of the data, it appears that transfer occurs regardless of

The implications for the education of bilingual children are varied. The data indicates that in either language of instruction, English or Spanish, the children who perform the best on phoneme awareness tasks in the language of instruction also tend to perform well on phoneme awareness tasks in the other language. Furthermore, the data in this study suggests that regardless of language of instruction, phoneme awareness transfer occurs. Therefore, in principal, regardless of the language of instruction, the children who develop high phonological awareness will acquire reading with greater facility. Phonological awareness in both languages should be equivalent.

In practice, however, this does not appear to be the case. The data also shows that the children taught in Spanish-instruction classrooms do not attain as much phoneme awareness as the monolingual and bilingual children taught in English-instruction classrooms. The children in English-instruction classrooms perform better on the Spanish versions of the test than the Spanish-instruction students do on the English versions of the test.

A number of factors may contribute to this performance disparity between the children taught in English- and Spanish-language instruction classrooms. This un-equal transfer between languages may be caused by outdated curricula or methodology in the Spanish-only classrooms, which are not as effective as those in the English-only classrooms at promoting phoneme awareness. In addition, the author noted that not all teachers in the Spanish-language instruction classrooms were native speakers of Spanish. Two teachers, in particular, did appear to speak heavily accented Spanish and did not appear to have firm command of Spanish grammar or vocabulary.

Our results indicate that, because reading ability and phoneme awareness are so heavily correlated, of central concern is the facilitation of the development of phoneme awareness, regardless of language of instruction. Only when phoneme awareness is nurtured will children develop reading competency in alphabetic language (McBride-Chang 1995; Yopp 1988). It appears that the current debate in the media about how to most effectively educate bilingual children, whether in English or in Spanish, is a political one. In the case of reading, it appears that children

the language of instruction. This finding is consistent with a very recent study by J. F. Carlisle, M. Beemen, C. H. Davis, and G. Sphraim (1998), who also found cross-language transfer of metalinguistic skills between Spanish and English, independent of language of instruction.

will develop phoneme awareness regardless of the language of instruction. However, the literature states that most children, especially those children who are likely to have reading problems, need some instruction in order to develop phoneme awareness (Mann and Liberman 1984).

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