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ABSTRACT

A study investigated spelling error patterns in native Spanish-speaking students of English as a Second Language to determine the degree to which errors can be attributed to phonological patterns. Specifically, it examined (1) which spellings can be attributed to differences in voicedness of consonants, and (2) whether the voicedness can be used to identify a progression of spelling strategies that characterize Spanish-influenced English spelling. Subjects were 47 second- and third-grade children in a transitional bilingual education program just beginning to receive English instruction. Spelling proficiency in English and Spanish was pre-tested with 18-word developmental spelling tests, then weekly spelling samples were collected over 20 weeks. Five new words incorporating key spelling features were included with regular spelling words each week. Patterns of individual phonemes and corresponding spelling were analyzed. Results indicate that whatever conceptual knowledge children had of the spelling system in their native language was applied to English. The need to attend to voicedness in English spelling, not an issue in Spanish, remained problematic for students. A sequence of four spelling strategies was identified and implications for classroom spelling instruction are drawn. Analysis results are appended. (Contains 12 references.) (MSE)

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Voicing in Spanish to English Spelling Knowledge Transfer

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VOICING IN SPANISH TO ENGLISH SPELLING KNOWLEDGE TRANSFER

Early research into young children's spelling (Henderson, Estes, & Stonecash, 1972) suggested that misspellings reflect knowledge of word form. That work was advanced when Read (1971) documented the articulatory basis of children's misspellings. That was followed by research into the developmental sequence of spelling (Gentry, 1982). Research with speakers of languages other than English (Gill, 1979; Temple, 1978) has also found an articulatory basis for spelling.

Children in Bilingual Education programs who use Spanish-influenced English are likely to produce spellings that reflect differences in pronunciation because of cross-linguistic transfer. Investigations of primary graders (Zutell & Allen, 1988) and college freshmen (Terrebone, 1973) have shown that Spanish-speakers perceive English sounds as if they are Spanish and spell those sounds in Spanish-like ways. Many of the errors these students produced resulted from confusing voiced (sound uttered with vocal cord vibration) and unvoiced consonants.

Most English consonants are paired with another that differs only in voicedness, and this distinguishes a great many pairs of words. Distinguishing words based on voicedness occurs considerably less often in Spanish (Ching, 1976). Thus, consonants with similar articulation but different voicedness (p, and b, t and d, k and g, f and v, s and z, ch and j) should be confusing to primary grade Spanish children who are learning English as they have had less need to make this discrimination.

This study of two questions: 1) Which misspellings can be attributed to differences of voicedness? 2) Can the voicedness be used to identify a progression of spelling strategies that characterize Spanish-influenced English spelling?

Method

Subjects

Second and third grade children in a Transitional Bilingual Education program in a Chicago suburb were subjects if they had received reading and writing instruction solely in Spanish for at least one year and were just beginning to receive instruction in English at the time the study began. Forty-one second-graders and 6 others who were the lowest achievers in the third grade were selected.

The children resided in one subdivision populated almost entirely by Spanish-speakers. Almost half were born in Mexico (43%) and the rest were from the U.S. Most parents (98%) were born in Mexico with most emigrating from the state of Durango. Spanish is the primary language of these homes.

Measures

The study reported here is part of a larger project (Ferroli, 1990) concerned with the topic of cross-linguistic transfer of literacy skill. Reading achievement and oral language proficiency measures in English and Spanish were used in addition to the spelling variables below.

Spelling tests. Spelling proficiency in English and Spanish was determined through the use of 18-word developmental spelling tests (DSTs) in which each word is pronounced, used in a sentence

and repeated (e.g. "FUERTE. Mi papá es fuerte. FUERTE."). Words and scoring system for the English DST were taken from Morris & Perney (1984) and Ferroli & Shanahan (1987). A procedure for using a Spanish DST has been validated (Ferroli & Krajenta, in press) and was used in this study. Subjects were pre-tested with the two DSTs in November. The English DST was re-administered during the last week of April.

Spelling samples. Weekly spelling samples were collected over twenty weeks in order to determine how the children changed in their renderings of various spelling features. In addition to regular spelling words which the children could study and practice, five new words which incorporated key spelling features were added to the weekly spelling tests. The children were put at ease about being tested on words they had not studied. They were reminded frequently that the extra words did not affect their grades, but they were strongly encouraged to do the best that they could.

Results

To determine how sounds transferred from Spanish to English, individual phonemes were isolated within words. For example, /f/ occurred in the words stuff, flag, freeze, fork, roof, stuff, and half in weeks 1, 3, 5, 6, 15, 16, and 20 respectively. For each occurrence, the various spellings produced were tallied and then summed. Table 1 shows the results for the consonant phonemes emphasized.

Insert Table 1 about here

Consonant knowledge often transferred. What these children knew in Spanish helped them in English. However, some errors resulted from use of a letter that differed from the correct one only in voicedness. Use of a voiceless spelling where a voiced one is called for is interpreted as Spanish-influenced and provides the basis for the following analyses.

A Hierarchy of Spelling Strategies

The first analysis begins to point out a hierarchy of error types. The exemplar /ž/ as in measure and pleasure is difficult for English-speakers and does not exist in Spanish. Predictably, it had the lowest number of correct spellings of any feature. The most frequent misspellings, in order, were: CH, SH, H and J. The average DST scores of students who produced misspellings for the word pleasure are shown in Table 2.

Insert Table 2 about here

There were small differences between mean scores, and with the small numbers of subjects these did not reach significance. However, rank order of DST mean scores for the groups of misspellings is the same in both languages, and it suggests a sequence of four spelling strategies compatible with the linguistic articulatory framework. The misspellings of /ž/ are explained in terms of place of articulation and voicing. The order

shows how each strategy is one step further removed from correctness: Strategy 4 -- the J users spelled a sound, /ǰ/, that is voiced (as is the target sound, /ž/) and produced in the same place of articulation; Strategy 3 -- the SH users spelled a sound that is voiceless but has the same place of articulation; Strategy 2 -- the CH users spelled a sound that is voiceless and near to the target sound in place of articulation; Strategy 1 -- the H users chose a letter whose name includes a sound, /č/, that is voiceless and near in place of articulation. If this hierarchy of strategies is confirmed by other analyses it can be concluded that, beyond moving from a letter-name to a letter-sound strategy, these children must also come to terms with voicing before arriving at correct English spellings.

A Letter-Sound Strategy Transfers

The second analysis examined how students attempted to represent a sound, /ǰ/, that does not occur in Spanish. The most frequent misspelling used Y. Use of Y cannot result from a letter-name strategy as the name of the letter y in English /waI/ or Spanish /igriega/ does not include /ǰ/. It seems likely that Y is chosen on a letter-sound basis because in Spanish it can represent a sound similar to /ǰ/ as in yo in some dialects. In contrast, using H for /ǰ/ must be a letter-name strategy. In both languages the letter-name (English /eč/ and Spanish /ače/) includes /č/, an unvoiced alveolar fricative while /ǰ/ is a voiced alveolar fricative. Although H was used to spell /ǰ/ only 6% of the time, it provided a useful comparison as it must be a letter name spelling while Y must be a letter sound strategy.

The comparison was made from week two where the word jaw elicited six H spellings and six Y spellings. The Y-spellers were superior to the H-spellers on the Spanish DST pre-test, t = 2.48, $p < .05$. The difference on the English DST with this small sample was not significant, t = 2.11, p = .06, although the mean English DST pre-test score of the Y-spellers far surpassed that of the H-spellers (43.3 versus 24.7). The child who used the more advanced strategy seemed to have done so in both languages -- first in Spanish and then in English.

A Voicing Error Is Nearly Correct

Another illustration shows that a Spanish-like spelling that differs only in voicedness is nearer to correct than spelling by letter-names in English. In the attempts at words that began with dr which, when pronounced, is /ǰr/, correct spellings were produced 57% of the time across weeks 2 (dropped), 8 (draw), and 18 (dropped). The most frequent misspelling was TR, pronounced /čr/ in English. It differs from /ǰr/ solely in voicing and is interpreted as a Spanish-like spelling of dr. Spelling dr with G or J is viewed as an English-like spelling. In English one can arrive at /ǰ/ by using the names or the sounds of G or J. In Spanish, neither the names nor the sounds would yield /ǰ/. Therefore, while some children might have been using a letter name strategy and others a letter sound strategy, all were using English spelling.

Each use of G, J, or TR for dr was tracked across weeks to determine which of these immediately preceded correct spelling. Nine students used G or J for dr. The next time a dr word was

presented these students spelled with J or G four times, TR twice, DR twice, and one other. Overall, there was little movement toward correctness.

A sign test was used to determine if there was progressive movement toward correctness among students who used TR. Later spellings of J or G were assigned a minus; repeating TR or using some other spelling was assigned zero and indicated no change; and a later spelling of DR was assigned a plus. On the next dr word one of the TR-users spelled with G, four repeated TR, 15 correctly used DR following their use of TR, and there were four others. There was clear movement from a TR spelling to a correct spelling at the next opportunity, $z = 2.46$, $p < .01$. Dr is a late emerging speech sound. Students who spelled it with correct English voicing but a letter name strategy made little progress. Students who spelled it with the more sophisticated letter sound strategy in Spanish, but who made errors of voicing, progressed rapidly.

Discussion

Spelling by letter names (e.g. empty = MT) is one of the first strategies that monolingual English speakers employ. By the end of second-grade most children abandon this in favor of more informed strategies based on letter sounds and patterns of letters. These analyses lead to the conclusion that children do not regress in their understanding of spelling when they begin to spell in a second language. The opposite seems to be the case. Whatever conceptual understanding they had of the spelling system in their native language seems to be applied to the new language.

Some of the errors they produced can be attributed to the fact that in Spanish it is not necessary to attend to differences in voicing. In English it is, and this dimension of spelling appears to have remained problematic.

Two decades of research have used a linguistic articulatory framework for interpreting children's invented spellings. This study shows the importance of expanding that framework to include both place of articulation and voicing together to help us understand Spanish-influenced English misspellings.

A sequence of four spelling strategies was identified. The importance of this sequence is twofold. First, a learner can move from a letter name to a letter sound to a correct place of articulation strategy while still spelling in Spanish. Thus, students in Bilingual Education programs that employ a Native Literacy Approach might profit more from first learning to spell well in Spanish than from acquiring only a moderate degree of English spelling skill. Second, the most sophisticated strategy involves learners' being sensitive to the importance of voicing in discriminating between pairs of phonemes. Acquiring this strategy is not likely to occur when instruction is in Spanish. English spelling instruction could begin with those items that most readily transfer from Spanish to English. From there attention can go to studying how to spell sounds that are alike in terms of place of articulation and different in voicedness. Thus, /b/ versus /v/ is not the important contrast; rather /b/ versus /p/ and /v/ versus /f/ are sounds that differ in voicedness. In like fashion, /s/ versus /z/, /č/ versus /ǰ/, /k/

versus /g/, and /š/ versus /ž/ differ in voicedness, also. Such an approach might help Spanish speaking students to learn how words are distinguished in English.

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Table 1

Percent of Correct Spellings and Common Substitutions

Feature	Example	%	Common Substitutions
S final as /z/	years	98	
F initial	flag	98	
S final as /s/	pass	94	
P medial	zipper	94	
B initial	bug	88	V = 2, D = 6
S blends	stuff	86	vowel + D = 7
F final	stuff	70	V = 12
K final	took	63	
DR /ǰr/	draw	57	TR = 13
J initial	jaw	49	Y = 15, G = 12
V initial	voice	44	B = 38
B medial	grabbed	28	omit = 50
Z	freeze	24	S = 68
V medial	serves	24	omit = 24, B = 13, F = 29
V final	save	13	F = 71
CH	church	49	SH = 19, H = 8
SH	shirts	44	CH = 32, H = 15
TH as /ð/	this	42	D = 42
TH as /θ/	third	22	D = 22, F = 9, T = 20
S as /ž/	measure	2	CH = 36, SH = 34, H = 12, J = 7

Table 2

Mean DST Scores for Four Types of Errors on /ž/ in Pleasure

		Pretests	
Spellers	n	Eng	Span
J Users	4	39.0	75.0
SH Users	12	36.3	74.3
CH Users	15	35.9	73.7
H Users	5	31.6	67.4