

Phonological Acquisition of English and Spanish in Bilingual Preschool Children

Lisa M. López[†] and Adele W. Miccio^{†‡}

[†] Harvard University Graduate School of Education, Cambridge, MA, USA

[‡] The Pennsylvania State University, University Park, PA, USA

E-mail: lopezli@gse.harvard.edu

ABSTRACT

The population of school-aged children who are English language learners in the United States is rapidly increasing. The current study focused on the Spanish and English phonological acquisition of a group of bilingual preschool children in the United States who are either English or Spanish dominant. The children were asked to repeat a series of phrases in both English and Spanish at two time periods, six months apart. Results indicate gains in accuracy for both groups in English. The Spanish-dominant group performed similarly to the English dominant group in English at Time 2. The English-dominant group gained accuracy in the pronunciation of Spanish vowels at Time 2. However, no significant differences in accuracy of Spanish pronunciation were found across groups at Time 2. Additionally, phonological error types of the two groups are discussed.

1. INTRODUCTION

Between 1990 and 2000 the number of school children in the United States who were English language learners doubled [1]. These children make up close to 10% of the school-aged population. Seventy-seven percent of this group speaks Spanish at home. In 2000 26% of children attending Head Start programs for low-income children were considered dominant in a language other than English. Of these children, 83% spoke Spanish at home. Section 2 contains the specific research questions to be addressed. Section 3 includes participant recruitment and description information. In section 4 results are provided.

2. RESEARCH QUESTIONS

The current study involves two groups of children assessed near the beginning (October) and end (April) of the school year. The following questions were addressed: (1) Do children mimic the prosody and intonation of the assessor in their weaker language? (2) Are errors due to language dominance evident for the two groups? and (3) Does one year of schooling influence the development of accuracy in pronunciation?

3. METHOD

3.1 Participants.

3.1.1 Recruitment. Participants are part of a larger ongoing study, The Early Childhood Study of Language and Literacy Development in Spanish-speaking Children (ECS), that traces the development of language and literacy skills in bilingual children. The data being used was collected during the first two testing periods, the beginning of the child's preschool year (the children were four-years-old) and the end of the child's preschool year (the children were 5-years-old) Children within the larger study were divided into four groups based on their performance on the Picture Vocabulary subtest from the Woodcock Language Proficiency Battery- Revised Edition (WLPB-R) [2, 3] during their first assessment. Groups were formed by comparing a child's individual performance on the task in each language (Spanish and English) to the group mean on the task. Children were chosen to participate in this part of the study based on their category assignment in the larger investigation. The first category (Group 1) includes those children who performed above the mean of the ECS sample on the English version of the subtest, and performed below the ECS sample mean on the Spanish version of the subtest. The second category (Group 2) includes those children who performed above the mean of the ECS sample in the Spanish version of the Picture Vocabulary subtest, and below the mean of the ECS sample in the English version of the subtest. Group 1 consisted of 20 children (11 females, 9 males) and Group 2 consisted of 20 children (9 females, 11 males).

3.1.2 Demographic Information. A phone interview was conducted with the mother of each child in order to collect demographic information. The children all live in the United States, with 20% born outside of the United States or in Puerto Rico. Overall, the children represent 11 Spanish-speaking countries or territories. All children were attending a preschool program during the assessments, with 93% attending a Head Start preschool program and the remaining 7% attending a public school preschool program. Additionally 60% of the children had attended a preschool program the previous year. All the children heard some Spanish in the home, with 85% of the mothers reporting speaking only Spanish or mostly Spanish to the child.

3.2 Language samples. The memory for sentences subtest of the WLPB-R was used to elicit the language samples for this study. Ten 2 to 5 word phrases were chosen from this subtest for the children to repeat (see Table 1 for the phrases). These phrases consist of questions 6 through 15 on the subtest. Both the English and Spanish versions of the subtest were used. An assessor assessed each child individually. The child was assessed once in English and once in Spanish at the beginning and end of their preschool year. Spanish assessors spoke only Spanish with the child, while English assessors spoke only English with the child. All assessors were trained on the task by the first author. Small microphones, connected to a tape recorder operated by the assessor, were attached to the child's lapel in order to record the child's pronunciation of each word in the phrase for later transcription and analysis.

Good dog	Niño alto
Cold milk	Casa pequeña
Little bed	Hombre bueno
Good candy	Silla grande
Big house	Buena comida
Down the hill	En la escuela
Come with me	La flor silvestre
I sit in my chair	La bebida fresca
The girl runs fast	La niña camina despacio
I feed the cat	La plantación de maíz

Table 1. Phrases elicited from each child.

4. RESULTS

4.1 Prosody and intonation. Based on perceptual judgments made by the first author, each child's prosody and intonation was compared with that of the assessor who provided the child with each phrase. Each child strictly followed the rhythmic pattern of the spoken phrase. While this was true for all children, participants who were less familiar with the test language were more likely to mumble or produce jargon while mimicking the prosody and intonation of the assessor. Additionally two non-native Spanish assessors produced the incorrect Spanish intonation on certain words, also affecting the prosody of the phrase. This resulted in children, regardless of their strength in the language, mimicking the assessor's errors in the intonation of words, once again affecting the prosody of the phrase. Finally, most children produced segmental

errors within at least some words. These errors however, did not alter the correct prosody of the sentence and while the intonation within a single word may have been marred, the overall intonation within the phrase was unaffected.

4.2 Error types.

4.2.1 English dominant bilingual speakers

4.2.1.1 English vowels. At Time 1 the English vowels were heavily influenced by the Spanish phonological system. Forty percent of children produced [u] for [ʊ] compared to 10% at Time 2. The vowel [ɑ] was produced as a diphthong [ɑ.ʊ] by 50% of children compared to 15% of children at Time 2. Other vowel errors produced by less than 40% of children included [ɛ] to [a], [ɪ] to [i], [ʌ] to [a] and [aɪ] to [a] or [a.ɪ].

4.2.1.2 English consonants. All English dominant children tended to produce an alveolar [l] postvocally rather than the velarized lateral of American English. At Time 1 50% of children reduced coda clusters in "cold" and "fast"; whereas, only 15% of children reduced the cluster in "cold" at Time 2. On the other hand, 50% of children continued to produce "fast" as [fæs] at Time 2 as is common in the dialect spoken by adults in the children's environment. Fifty percent of children omitted [t] in [kæt] compared to 15% at Time 2. At Time 1 25% of children omitted [θ] in the coda position. At Time 2 most children produced [t] for [θ] or produced it correctly. The vast majority of children produced [d] for [ð] in "the." In fact, more children produced [d] than [ð] at the second assessment. This is common among Latino speakers of English as well as many American English dialects. Few children confused [tʃ] and [ʃ]. Obstruent voicing errors seldom occurred in either onset or coda positions. Other errors were common developmental errors not related to either Spanish interference or dialect.

4.2.1.3 Spanish vowels and consonants. Spanish vowels were produced correctly most of the time. Most changes in Spanish production were common dialectal variations produced by adults in the children's school. Fifty-five percent of children produced "bueno" as [weno] at Time 1 but this number increased to 65% by Time 2. Similarly, 65% of children reduced "escuela" to [skwela] at Time 1 compared to 75% at Time 2. Developmental errors such as [ekwela] or [kwela] did not occur at the second assessment. At Time 1 50% of children produced [komida] for "comida" compared to 30% at Time 2 with the number of children using intervocalic [ð] increasing. All children had most difficulty producing three syllable words. English dominant speakers tended to reduce three syllable words to two syllable words. "Despacio", for example, was produced as [pasio]. Infrequent errors included reduction of onset liquid clusters and production of [n] in place of the palatal nasal.

4.2.2 Spanish dominant bilingual speakers

4.2.2.1 English vowels. Frequently occurring vowel errors included the production of [u] for [ʊ] by 75% of speakers at Time 1 compared to 40% of speakers at Time 2. The vowel [ɑ] was produced as [æ] by 75% of speakers at Time 1 compared to 50% of speakers at Time 2. Fifty-five percent of children produced the diphthong [au] as two vowels [a.u] at Time 1 but all but one child produced the diphthong at Time 2. Other less frequently occurring vowel errors included [i] for [ɪ]. The presence of a postvocalic lateral triggered more problems with the vowel [ɪ] including production of [ɛ] and [aʊ] in addition to [i].

4.2.2.2 English consonants. Ninety percent of children reduced the coda cluster in “cold” at Time 1 compared to 35% of children at Time 2. Children maintained production of the lateral and omitted the [d]. In the word “milk”, however, children omitted the lateral and produced the [k]. In the word “fast” 85% of children said [fæs]. Fifty percent of children continued to reduce the final cluster at Time 2 as is common in their neighborhoods. In the word “with”, 85% of children omitted the coda [θ] at Time 1 and 50% continued to do so at Time 2 or produced [t]. The affricate [tʃ] was produced as [ʃ] by 35% of children at Time 1 but only 10% at Time 2. Infrequent errors included omission of [h] in onset position and omission of [s] in coda position. In addition, few voicing errors occurred. Typical developmental errors occurred that were not attributed to Spanish dominance.

4.2.2.3 Spanish vowels and consonants. Target Spanish vowels were produced correctly. A number of productions were likely due to differences in the Spanish dialect of the home and the dialect of the school. The word “silla” was pronounced [sidʒa] by 20% of children at Time 1 but all children said [sija] by Time 2. Sixty percent of children produced [d] for intervocalic [ð] at Time 1 but only 10% produced [d] for [ð] at Time 2 in both “comida” and “bebida.” Forty-five percent of children pronounced “escuela” as [skwela] and continued to do so at Time 2. Similarly, 35% of children omitted the final [s] on “maíz” at both assessments. These productions were common among the adults in the school. Like their English dominant peers, Spanish dominant children had the most difficulty producing three syllable words. These children, however, did not reduce the number of syllables but rather, simplified the syllable structure. “Despasio”, for example, was pronounced [espaθio]. Infrequent errors included production of [l] for [r] in [flor].

It is important to note that this analysis did not sample all phonemes in either the English or Spanish phonological systems. Analysis was limited to those phrases attempted by all children in the sample. Consequently, most consonants were sampled in limited syllable positions and some fricatives were omitted from the analysis. In addition, some diphthongs and consonant clusters were not included.

4.3 Accuracy of pronunciation. Three indices were calculated for each child at each time point for each language, Spanish and English. The indices include the Percent Consonant Correct (PCC) [4], Percent Vowel Correct (PVC) [5], and the Percent Phoneme Correct (PPC) [5]. Once these indices were calculated at the four levels for each child, statistical analyses were conducted. Groups were defined based on their language proficiency as described earlier. Analyses by group were done using paired-samples T-tests in that compared change in performance from Time 1 to Time 2 for each child. Additionally the groups were compared on performance at each time point and in each language by using independent samples T-tests. Table 2 provides the ranges per group for each language and time point on each of the three indices.

Group*	Time 1			Time 2		
	PCC	PVC	PPC	PCC	PVC	PPC
1						
English	60-100	57-97	62-98	77-100	69-100	75-100
Spanish	62-99	73-98	69-98	74-93	81-98	80-95
2						
English	35-93	26-94	33-91	60-100	61-100	60-100
Spanish	70-97	78-100	73-98	71-97	82-100	77-98

Table 2. Ranges for indices by category and language.

*Group 1 refers to the English dominant group.

Group 2 refers to the Spanish dominant group.

Paired samples T-tests indicated that the English dominant group (Group 1) made significant gains in their ability to accurately pronounce vowel sounds in both English ($t(19) = -3.480, p < .01$) and Spanish ($t(19) = -3.526, p < .01$) from Time 1 to Time 2. This group also made significant gains in the accuracy of their overall pronunciation of phonemes in both English ($t(19) = -3.275, p < .01$) and in Spanish ($t(19) = -2.106, p < .05$). No differences were found across time periods in the accuracy of pronunciation of consonant sounds in either language. Additionally, paired samples T-tests indicated significant gains for the Spanish dominant group (Group 2) in English from Time 1 to Time 2 for each of the three indices, PCC ($t(19) = -6.615, p < .001$), PVC ($t(19) = -5.899, p < .001$), and PPC ($t(19) = -6.756, p < .001$). No significant gains in Spanish pronunciation were found for this group.

Independent samples T-tests used in comparing the performance of the groups resulted in several important findings. At Time 1, Group 1 more accurately pronounced consonants in English as indicated by the PCC index than Group 2 ($t(38) = 3.679, p < .01$). By Time 2, there was no significant difference in the accuracy of pronunciation of the consonants for these two groups. Additionally there was no significant difference between the two groups in consonant pronunciation in Spanish at either time point. Group 1 also pronounced vowel sounds in English

significantly better than Group 2 during Time 1 ($t(38) = 3.906, p < .001$) and Time 2 ($t(38) = 2.299, p < .05$). Group 2, however, performed significantly better on Spanish vowel pronunciation than Group 1 during Time 1 ($t(38) = -2.846, p < .01$) and Time 2 ($t(37) = -2.174, p < .05$). When comparing pronunciation for all phonemes at Time 1, Group 1 accurately produced a significantly greater number of phonemes in English than Group 2 ($t(38) = 3.851, p < .001$) and Group 2 accurately produced a significantly greater number of phonemes in Spanish than Group 1 ($t(38) = -2.235, p < .05$). At Time 2 there were no significant differences across groups in either language.

5. CONCLUSIONS

The population of children in schools within the United States for whom their first language is not English is growing quickly. It is important to determine common phonological errors due to the transfer of knowledge from the child's first language into English. It is also important to understand that these children live in neighborhoods where Latino-influenced English is spoken, rather than standard American English. In addition, the English they speak is based on the pronunciation modeled by their parents, neighbors, and peers.

The children in this study were first assessed at the beginning of their preschool year, after spending the summer at home with their family and neighbors. They were then assessed again after being in a predominantly English-speaking preschool classroom for six months, although a large percent of the children in those classrooms were also Latino. As the task called for the children to repeat what an assessor said, many of the children were able to perform this task in both languages. This is a strategy commonly used by teachers to help the children learn.

The majority of the children mimicked in great detail both the prosody and the intonation of the assessor. Consequently, it is therefore important to ensure that the assessors are native speakers of the language in question so that mimicking errors are avoided. Mimicking was most apparent in the child's less dominant language with the child mimicking the rhythm of the assessor without actually producing the target phrases. This often threw off the assessor who at first believed the child had actually completed the task, when in fact the child mumbled or produced jargon. All children clearly were able to skillfully mimic the rhythm and intonation of the target language.

For these children the six-month time period in school substantially influenced the accuracy with which they pronounced consonants and vowels in both their dominant and non-dominant languages. Children who were considered English dominant mastered the pronunciation of vowels in both English and Spanish by the end of the school year. Vowel sounds are often the first phonemes taught to young children in school. These children were able to learn the sounds and differentiate the English vowel sounds from

the Spanish vowel sounds they hear at home. Children who were Spanish-dominant benefited from their experience in an English classroom by improving their accuracy in pronouncing both consonant and vowel sounds. Their accuracy of English production increased significantly after six months. Unfortunately because of the predominant exposure to English, no significant increase in the correctness of Spanish pronunciation occurred.

The effects of being in an English classroom were most apparent when looking at the performance of the two groups and comparing the accuracy of phonemes in each language. The Spanish-dominant children learned to accurately pronounce English phonemes, and caught up to their English-dominant peers. Both groups performed similarly with Spanish consonants although the Spanish-dominant group more accurately pronounced target Spanish vowels.

These results indicate that Latino children growing up in the United States and attending English-speaking classrooms show Spanish loss as they improve their English. It is important to note that the English spoken by many of these children is not always Standard American English. Instead these children are speaking Latino-influenced English or the regional dialects to which they are exposed in their neighborhoods and oftentimes spoken by their teachers. This information is important for those professionals working with these children and responsible for diagnosing these children. Therefore, more information with regard to common errors based on Spanish influenced English to accurately evaluate a child's language development.

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