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DO EARLY SIMULTANEOUS BILINGUALS HAVE A "FOREIGN ACCENT" IN ONE OR BOTH OF THEIR LANGUAGES?

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Early bilingualism--growing up in two language communities from birth--conveys membership in those two communities. In order to be fully accepted by both groups, bilingual children can't sound like an outsider to either of them. They have to get the details of both groups' speech patterns right--and they generally do. Still, occasional borrowings of a sound from one language in the environment of the other, have been observed in early bilinguals in the process of acquisition (Leopold 1949; Quay, 1993; Schnitzer & Krasinski, 1994; Vogel, 1975). Our goal here is to investigate whether some of these borrowings at the level of the word or segment could be called systematic intrusions which could be considered accent, what Crystal (1991) calls "the cumulative auditory effect of ...features of pronunciation" (p.2).

Flege & Munro (1994, p. 382) suggest "that divergences from L2 phonetic norms for both segmental articulation and prosody contribute to foreign accent." Exploring the perception of foreign accent in speech by French speakers of English, Flege (1984) found that listeners could most reliably identify non-native tokens from whole phrases--at about 95% accuracy--but

they still did significantly better than chance with just a 30-millisecond segment of the onset. Therefore, while utterance-level prosody is, no doubt, implicated in accent, an investigation focused on the levels of the word and the segment should also be capable of showing at least some of the accent-producing "divergences from phonetic norms"--to the extent that criteria for such norms in the population being studied can be established.

It is not obvious, though, at what age one can establish the presence of potential accent-producing features in young child speech. Effects of the ambient language in children's babbling and first words have been established, perhaps as early as 16 months (Boysson-Bardies & Vihman, 1991; Konypczynski, 1993; Vihman, 1992). However, the differences are at the level of the individuals' or even the groups' total output, measured in the statistical properties of a whole corpus. They are not generally characteristic of individual utterances and are not always obvious to the naked ear. Tests of adults' ability to identify the language background of infants before they are using words (Olney & Scholnick, 1976, following Atkinson, MacWhinney & Stoel, 1968) reported that listeners did not accurately distinguish passages from 12- or even 16-month-olds by the language of their communities. Boysson-Bardies, Sagart and Durand (1984), claimed to demonstrate "discernible differences in the babbling of children from different language backgrounds" (p. 11), but even they report mixed results.

It would be easier to point to accent phenomena if one actually heard language-specific elements being produced. But many of the segments that would definitively distinguish between utterances of different languages, (Spanish trilled /r/, English retroflex /ɻ/, prevoiced consonants, etc.) are late acquisitions. Even for those features that come in earlier, like aspiration in English which has been observed around 24 months, the developing feature may not be very consistent (Major, 1977) or audible without acoustic

instrumentation. Deuchar and Clark, (1996), Eilers, Oller and Benito-Garcia (1984), Kewley-Port and Preston (1974), and Macken and Barton (1980a, 1980b), for example, all show 24-month children's contrast between aspirated and unaspirated stops differentiated on spectrographs, but not necessarily consistently by the ears of listeners. Similarly, Stoel-Gammon et al. (1994), looking for when children distinguish dental and alveolar articulation of /t/ in Swedish versus English, found exemplars from Swedish and American 30-month-olds barely discriminable.

So while accent is theoretically possible at around 24 months, it would be difficult to perceive or establish it as accent at that age. A case in point is the subject studied by Vogel (1975). This child, at age 2, is reported to have aspirated and unaspirated stops in both English and Romanian (whereas they are appropriate only in English), and she has both dental and alveolar stops in both her languages, instead of only dental in Romanian and only alveolar in English. But there are no distributional data to suggest whether the intrusions were frequent and consistent or just isolated cases, or whether there was a tendency to use the (appropriate) aspiration more in English than in Romanian. Nor are there statistical data to indicate to what extent monolinguals acquiring those two languages make similar errors at that age. Without those two important pieces of information, one cannot be sure that such output from the child is not age-appropriate immaturity, which observers may interpret as accent because of the child's language background. In fact, to our knowledge, no such reports exist, which would permit an adequate assessment of accent phenomena in young bilinguals at age 2 or 3.

Therefore, for this study, we look at bilingual AND monolingual children's production of the same series of sounds, those which represent the total segmental inventories of the two languages, with special reference to a subset of phonemic, allophonic, and word-shape differences which

distinguish the languages being learned. We have chosen to study the children at age 3 so that there will be a range of potential distinguishing features present in the children's speech on which to evaluate the question. If elements of one language not found in the other were seen to intrude on the other language, we asked how widespread the phenomenon was. Was it general--across phonemes and across children--or was the interference more restricted in scope? If the "accent" consisted of the omission of a segment (or a feature of a segment), is that element reliably present in the speech of monolingual-learning children of that age? That is, could general phonological immaturity be ruled out as an explanation for the omission?

Methods

Participants. Subjects were 11 36-month-old Spanish-English bilinguals (BLS and BLE), with 13 monolingual English-learning children (MLE) and 7 monolingual Spanish-learning children (MLS) as controls. All 31 children were participating in a 5-year infant vocalizations study at the University of Miami and visited the speech lab at least monthly from shortly after birth to age 3 for observation and recording. At the time of the sessions used for this study, the mean age was 35 months for the MLS, 34 months for the MLE, and 36 months for the BLs. All were typically developing, in the average range on a series of language and psychometric measures. The bilinguals had varying amounts of exposure to the two languages, but most spent between 60 and 65% of their time in one language background and 35 to 40% in the other. (See Pearson, Fernández, Lewedag, & Oller, 1997, for further information about the languages of their households.) Most had bilingual parents, who spoke both languages to the children; (no family in the study used the "one-parent-one-language" strategy).

Procedure. Each child was administered an articulation evaluation, the Hodson (1985, 1986), in English and/or Spanish. In about a half-hour session for each language (sessions were designated as English OR Spanish), the children and the examiner, with the parents' help, went through a box of toys and other objects chosen to encourage the children to use all the phones of each language in each relevant position in a word. There were about 50 words on the English version, and about 40 on the Spanish, about 250 "segments" in each. We tried to get the child to say the word spontaneously, but if she did not, we would have her imitate it.

All 42 sessions (two each for the 11 bilingual children, one each for the 20 monolingual children) were audiotaped and transcribed by a Spanish-L1 bilingual (AMN) using LIPP, phonological analysis software designed by Oller and Delgado (Oller, 1991). The level of transcription was narrow enough to allow analysis of allophonic segmental variants. As a reliability measure, an English-L1 bilingual re-transcribed 35% of the articulation tests. Segment-to-segment agreements averaged 96% for the 12 files. The transcriptions used in the LIPP analyses were those of the first transcriber.

Analysis procedures. LIPP programs were written to tally for each subject and each monolingual group the percent of correct vowel and consonant segments on the Hodson tests to use as a baseline against which to evaluate the individual children's performance. (The monolingual-bilingual group comparisons are explored in Navarro, Pearson, Cobo-Lewis & Oller, 1995, and in submission.) A second set of programs focused on the child's progress in language-specific segments. These include the phones and allophones that occur in one language, but not in the other (Stockwell & Bowen, 1965). In English, the consonant phones analyzed were / v /, / z /, /θ/, /ʃ/, /ʤ / and /ɻ/, as well as the allophonic aspiration of syllable-initial voiceless stops. For the vowel segments, a separate count was made of "non-point" vowels, which represent the subset of English vowels that do not also occur in Spanish. These are the vowels, /I/, / ɛ /, /æ/, /ə/, / ɑ /, / ɔ/, or /ʊ/, that fall inside or outside a figure connecting the five "points" of the vowel space, [i], [e], [a], [o], and [u]. In Spanish, the language-specific phonemes considered were the tap (/ɾ/) and the trill (/ r /), and the allophones were intervocalic voiced (underlying) stops realized as spirants ([β], [ð], and [ɣ]). (The English vowel diphthongs were counted in a different tally, described below; the Spanish phoneme / ñ / and the [ɾ] allophone in English were not included because of the small number of tokens in the corpus.)

A third LIPP analysis isolated the intrusion errors that contribute to foreign accent in Spanish adults (Stockwell & Bowen, 1965), concentrating on 7 of the more salient distinctions between the languages. For example, "r"-error was counted for the use of the [r] or [ɾ] for /ɻ/ in English or the use of the [ɻ] for /r/ or /ɾ/ in Spanish. "ə"-error was the failure to reduce a full vowel to [ə] when required in English, or in Spanish it was the use of [ə] in place of a full vowel. Similarly, the other errors shown in the figures, glide-error, point-vowel error, aspiration error, or intervocalic spirant error, count the occurrence of a Spanish sound in English and vice versa. (Final-consonant deletion was characterized the same in both languages.) A value for each variable was derived from each child's file. Then the values for the children in the two monolingual groups were averaged to provide a baseline in each language against which to evaluate the performance on those measures of the individual bilingual children.

Results

The figures present the average percentages for correct segments, correct language-specific segments, and for 7 potential accent-producing errors in the two languages, shown in the bars for the monolingual groups. One can see that the monolinguals' values on the error measures are quite low, but

it is interesting to note that several of these errors are in fact made by monolinguals at this age. There is considerable individual variation: the standard deviations are high, approximately equal to the mean for 18 of the 21 non-zero error means represented on the graph. Further, the bilingual average values are similar to the monolingual averages. The two exceptions are 1) in the allophonic processes in both languages, aspiration and spirantization, where the bilinguals appear to make slightly more errors than the monolinguals, and 2) in the greater tendency of the bilinguals to produce final consonants when the target calls for them. (See Navarro et al., 1995 and in submission for a statistical analysis of those differences.)

The values in the bars, then, provide the background against which we can look at the output of individual bilingual children to see what features might be causing the impression of accent in their speech. First, we present the graph a child whose parents felt he spoke with an accent (CHI1); a second, who illustrates what a foreign accent might look like under this analysis (CHI3), especially in contrast to the profile of the third and final child presented (CHI4), who we believe illustrates not accent, but general phonological immaturity.

CHI1, in Figure 1 below, is a child about whom the parents raised the question of accent. As can be seen from the background measures in the leftmost bars of the chart, he appears quite balanced in his phonetic development in the two languages, and in fact, while he heard mostly Spanish up to age 2, he was hearing about equal amounts of the two languages when this evaluation was made at age 3. With respect to language-specific elements, he appears to be making more progress in English, although his Spanish value, while low, is still within one standard error of the mean of the Spanish monolinguals. He made no errors on aspiration, spirantization, and glides, and he articulated final consonants on the test words more than 90% of the time in both languages. One

accent-producing culprit might be his "r" production, which was relatively weak in both languages, 47% correct (of 15 opportunities) in English, but no trill and only 1 correct /ɾ/ of 16 in Spanish. From the error analysis, we see that about 1 in 15 times he makes a Spanish-r in English and an English-r in Spanish. Likewise, he occasionally used a [ə] in Spanish and also a point-vowel in English when a non-point vowel was called for. These might be considered intrusions then in both languages. In both cases, though, his values for the error are about equal to the mean error rate for monolingual learners, and so the intrusions are probably not a cue for accent. In any event, it is ironic that, despite equal evidence in either direction, the parents were not complaining about an English accent in the child's Spanish, but only a Spanish accent in his English.

Figure 1. Potential Accent Features for CHI1

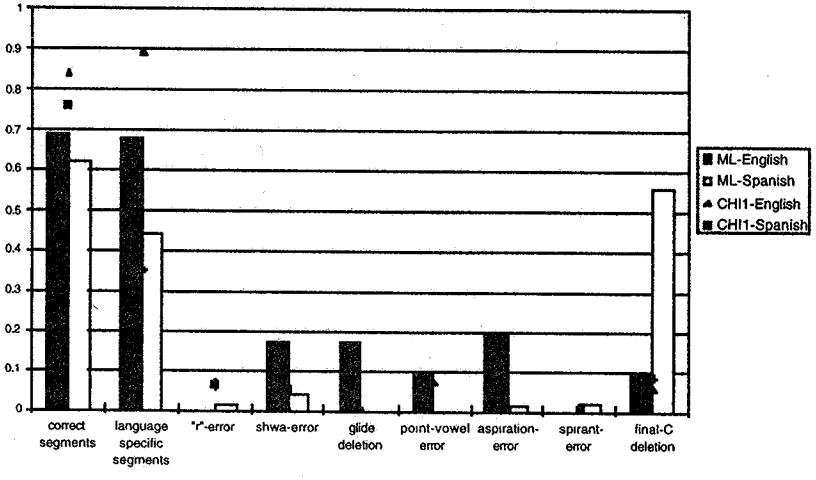


Figure 2. Potential Accent Features for CHI3 (Candidate for Accented English

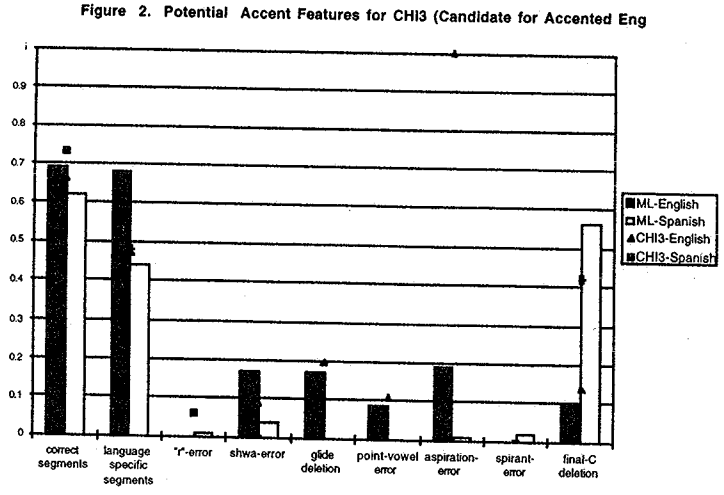
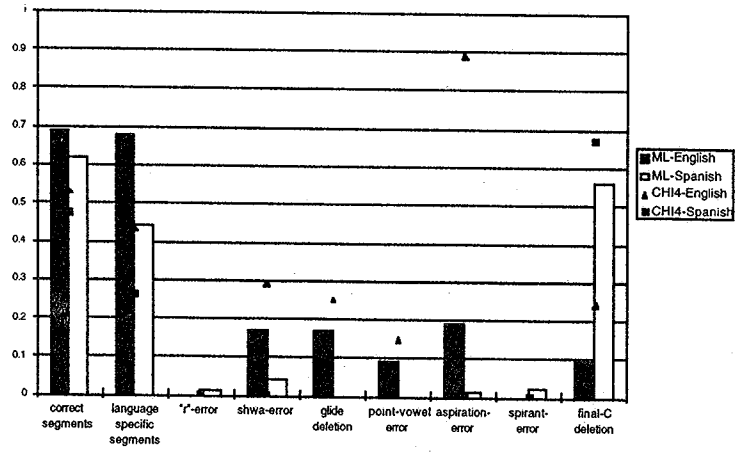


Figure 3. Potential Accent Features for CHI4 (Phonological Immaturity)



CHI3, in Figure 2, presents a profile which may indicate an accent in English. She is quite on target vis-a-vis the monolingual groups for all measures except one, aspiration, which is completely absent. CHI4, in Figure 3, also appears very slow in acquiring aspiration, producing it in only 1 of 10 obligatory environments at age 3, a full year after it is generally thought to appear. But unlike CHI3, where aspiration is an isolated gap, CHI4 is slow in a range of areas in both languages. He makes no r-errors in Spanish because he gets only 1 in 4 /ɻ /'s right in English, and even fewer / r / and /ɾ/ in Spanish. He does not make "schwa"-errors in Spanish because he is failing to reduce full vowels to [ə] most of the time even in English, where it is called for. In other words, CHI4's failure to use aspiration appears to be part of a general phonological immaturity, whereas the absence of aspiration of similar magnitude in CHI3 may indicate an accent for her. It is her only immaturity on these measures compared to the other children in the study.

With too few children and too much individual variation to establish an implicational hierarchy, nonetheless, these data may suggest more convincingly than a case study that overall immaturity and foreign accent can be distinguished and that in fact, although rarely and perhaps briefly, one might observe isolated accent phenomena in developing bilinguals.

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