

Gender marking under disguise: phonetics and grammar in Spanish-English bilinguals

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Spanish gender is encoded by three vowels (/a e o/) which appear in unstressed final position. This is the same position in which vocalic contrasts are neutralized in English. Word final vowels are often followed by other vowels in word initial position yielding a vocalic sequence that contrast in realization in English and Spanish. Whereas Spanish tends to diphthongize vowels across words (Aguilar 2010), English realizes such sequences as hiatuses (insertion of glottal stops and pauses; Davidson & Erker 2014). Is it possible, then, that the realization of Spanish vowels in absolute final position and in sequences introduces a particular challenge for the acquisition of gender marking in Spanish? Is it also possible that linguists working on morpho-syntax may have overlooked differences in the realization of these vowels when coding bilinguals' speech? We hypothesize that this clash of characteristics may lead to over-reporting accuracy rates in the studies of bilingual acquisition of gender. Our goal is to provide evidence that would allow us to answer these two questions and to test what we have dubbed the *modular interaction hypothesis*, which claims that language contact-related variability in one domain (phonetics-phonology) has consequences for other domains (grammar).

To test our hypothesis, we analyzed reading data from “The North Wind and the Sun” and an elicited narrative in two groups of bilinguals (N=26) and controls (N=13). These groups of bilinguals differed in their age of onset of exposure to English (AoA) (Early bilinguals (EB): AoA= 2.5; Late bilinguals (LB): AoA= 23.5). The data obtained was subject to two analyses. To analyze the vowels phonetically, we extracted the three final vowels in stressed and unstressed position in nouns and adjectives as well as all the unstressed vowel sequences from the reading text and the narrative and obtained quality (F1 and F2 at five points) and duration measures. All the noun phrases (N=3194) extracted from the narrative were coded for lexical class of noun and for contextual parameters, such as presence of articles and adjectives.

Results from the reading task (N=758) showed that EB (Figure 1(a)) centralized vowels, particularly /e/; had a higher rate of hiatuses than the other two groups ($X^2= 18.5$; $p<0.0001$), and even when vowels were realized as diphthongs, sequences produced by EBs were longer than those produced by the other two groups. Moreover, SS-Anovas revealed significant differences in the F2 trajectories for the sequences /ae, ea/. Results from the narrative task (N=4064) showed that EB (Figure 1 (b)) centralized the vowel [o] and had significantly longer vowel sequences. In spite of the differences obtained in the phonetic analyses, the morphological analyses yielded very low error rates, both in the initial transcription and the subsequent verification. The two analyses were combined to further assess accuracy rates. The post-hoc analysis of accuracy against phonetic realization revealed (a) a lower accuracy rate than originally observed, and (b) that 40% of the data lacks contextual information (for instance, as resulting from the absence of definite determiners) that provide alternative cues as to whether gender is marked (Figure 2). We propose then, that in those cases, accuracy was over-reported because transcribers perceived schwa-like realizations as the target Spanish vowels. Thus, our results confirm previous reports of vowel centralization in Spanish-English early bilinguals (Gildersleeve-Neumann et al.2009; Menke 2010) and reveal that integrating phonetic analysis with the study of acquisition of gender agreement and concord in bilinguals offers an alternative approach to understanding the bilingual vulnerability of Spanish gender. Difficulties in producing (and possibly perceiving) Spanish

agreement vowels can explain delays in the bilingual acquisition of a grammatical marker that monolingual children learn early and robustly (Snyder et al. 2001).

Figure 1: (a) F1 and F2 of /a, e, o/ measured at vowel mid-point (reading task); (b) F1 and F2 of /a e o/ measured at mid-point (narratives)

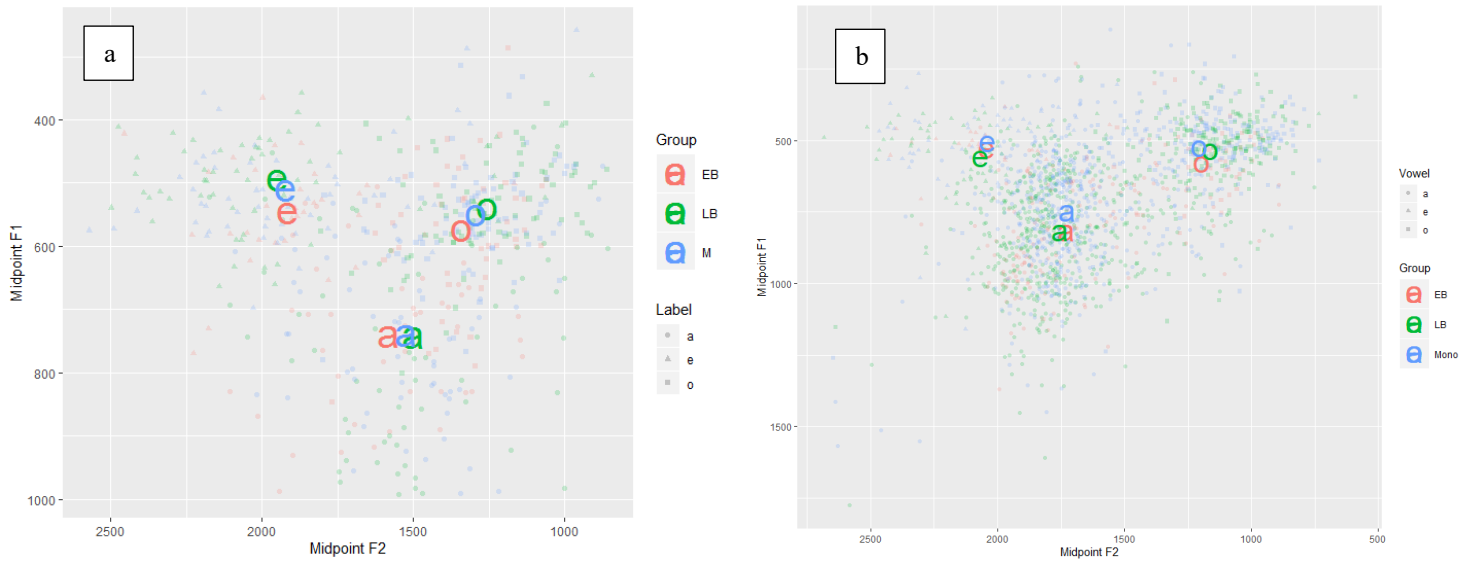
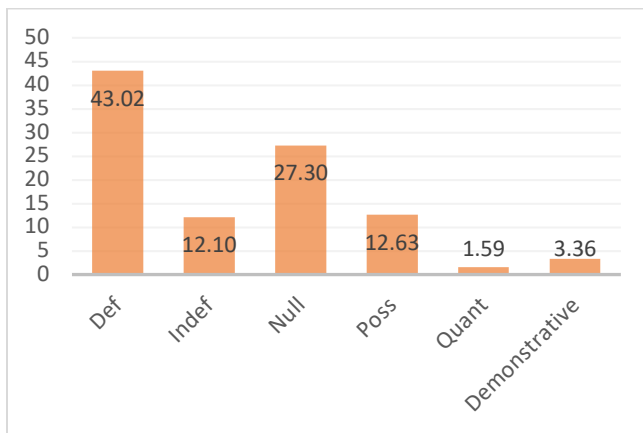


Figure 2: Percentage of type of determiners obtained from the narratives



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