

## Perception of consonantal and vocalic contrasts in heritage and native Spanish speakers

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Research shows a strong correlation between L2 native-like attainment and early age of onset of bilingualism (Abrahamsson & Hyltenstam, 2009; Flege *et al.*, 2006). The argument is that after a certain age L2 learners are unable to fully acquire L2 speech patterns not present in their L1 due to cognitive impairments (Hyltenstam & Abrahamsson, 2003). However, recent research documents comparable patterns of morphosyntactic and phonetic divergence between near-native L2 learners and long-term immigrants undergoing L1 attrition (Hopp & Schmid, 2011; Major, 2009), casting doubts on maturational constraints in language learning. We expand on this previous research by examining the production and perception of vowels and consonants among Spanish heritage speakers (early bilinguals) and long-term Spanish immigrants (late bilinguals). Specifically, we tested the perception and production of Spanish voiceless and voiced stops in all five vocalic contexts and initial and medial positions in the word (1a-1c) and [e] vs. [i] and [o] vs. [u] (2) in stressed and unstressed syllables:

<p><b>(1) Initial Position</b></p> <p>a. [b]ata vs. [p]ata (“robe” vs. “foot”)</p> <p>b. [g]iso vs. [k]iso (“stew” vs. “s/he wanted”)</p> <p>c. [d]una vs. [t]una (“dune” vs. “prickly pear”)</p>	<p><b>Medial Position</b></p> <p>a. su[β]e vs. su[p]e (“go up” vs. “I knew”)</p> <p>b. pe[ɣ]ar vs. pe[k]ar (“to hit” vs. “to sin”)</p> <p>c. me[ð]í vs. me[t]í (“I measured” vs. “I put”)</p>
<p><b>(2) Stressed syllable</b></p> <p>a. qu[e]so vs. qu[i]so (“cheese” vs. “s/he wanted”)</p> <p>b. p[o]zo vs. p[u]so (“hole” vs. “s/he put”)</p>	<p><b>Unstressed syllable</b></p> <p>a. p[e]sar vs. p[i]sar (“to weight” vs. “to step on”)</p> <p>b. d[o]rar vs. d[u]rar (“to tan” vs. “to last”)</p>

If maturational approaches to final L2 attainment are correct, early bilinguals are expected to behave as long-term immigrants, since both acquired Spanish before puberty. If exposure to a second language affects perception, then Spanish heritage speakers exposed to English (L2) before puberty will have difficulties in the discrimination of Spanish native contrasts due to their reduced Spanish input and to their intense contact with English. In particular, it should prove difficult for these speakers to discriminate Spanish voiced and voiceless stops because they map into one English phonetic category (i.e. voiced stops); these participants are also expected to confuse mid-vowels (front-vowels in particular) because the Spanish [e] overlaps with the English [I] (Bradlow, 1995). On the other hand, long-term immigrants who acquired the L2 past puberty should behave closer to the attested monolingual patterns (MacKay *et al.*, 2001).

A total of 14 participants took part in the study, which involved an AX discrimination task. Eight participants were Spanish heritage speakers; half of them were born and raised in the US and half immigrated before the age of 15 (mean age of arrival, 10; mean length of residence, 12). The remaining 6 participants were long-term immigrants from Mexico (mean age, 32; mean length of residence, 14). All participants were university educated or were enrolled at a major research university at time of testing.

An independent sample T-test comparing the number of perception errors by group (heritage speakers vs. long-term immigrants) indicates that heritage speakers outperformed long-term immigrants ( $M=28.4$ ,  $SD=10.4$  and  $M=36.5$ ,  $SD=16.3$ , respectively), albeit the differences were not significant [ $t(7) = -1.08$ ,  $p = 0.32$ ]. These results indicate first that early exposure to the target language results in similar abilities to discriminate phonological contrasts. Yet, if specific contrasts are analyzed, evidence of attrition was observed in long-term immigrants, who found the discrimination between voiced and voiceless labial and coronal stops significantly more difficult than heritage speakers (Figure 1). The fact that long-term immigrants found such contrasts more difficult to discriminate is puzzling. Finally, a comparison of the

two groups of heritage speakers (those born in the US vs. those who arrived before puberty), revealed a negative correlation between age of onset of bilingualism and percentage of errors ( $r=0.66$ ), which supports the idea of perceptual attrition in early bilinguals. These preliminary results will be further explored with more subjects.

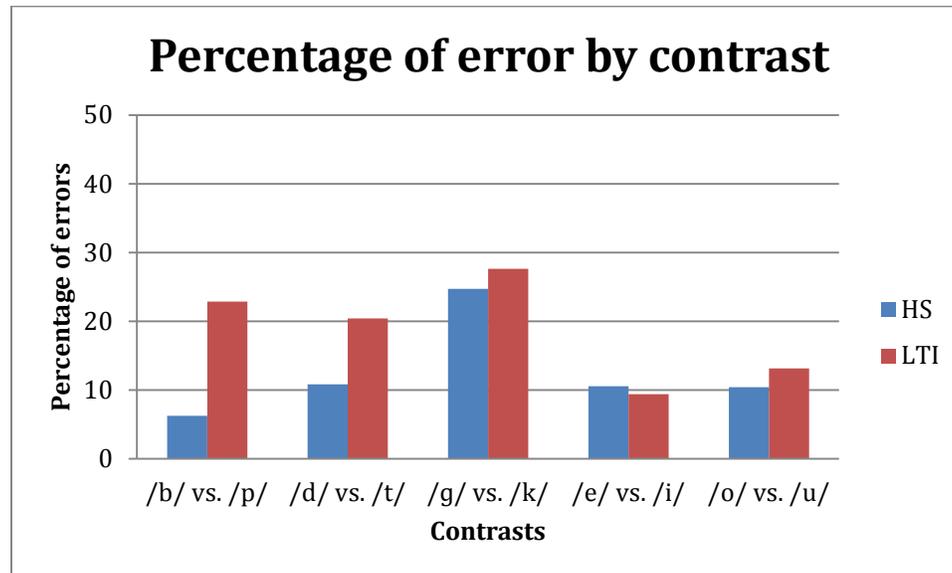


Figure 1: Percentage of discrimination errors by contrast for heritage speakers and long-term immigrants

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