

Language-internal context and VOT in bilingualism: A view from Spanish and English

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One of the most challenging aspects of learning a second language (L2) is acquiring a “native-like” accent. Flege’s (1995) Speech Learning Model proposes that in order for a new phonetic category to be established, L2 speakers must be able to discern some phonetic difference between the L1 and L2 sound; if the L2 sound is heard as an allophone of the L1 phoneme, a new phonetic category will not be formed, causing the L1 and L2 categories to assimilate. This may result in a compromised L1-L2 feature. In addition to language internal factors, language external factors, such as age of first exposure to bilingualism, may affect how successful a learner can be in acquiring L2 sounds in a native-like way (Oyama, 1976).

One area that has been studied quite extensively in the area of sound acquisition in a bilingual context is the perception and production of voiced and voiceless stops ([b,d,g] and [p,t,k] respectively) in languages like Spanish with relatively short voice-onset times (VOT) and languages like English with relatively longer VOTs (see Zampini, 2014). Two aspects of this research stand out: 1) early bilinguals (simultaneous/early child L2) have an advantage over late bilinguals (adult L2) in acquiring VOT values in the “monolingual-like” range (Thornburgh & Ryalls, 1998); and 2) bilinguals may exhibit variability in VOT values for a stop not only in their later-acquired language, but also in their L1 (Bullock et al, 2006). Following evidence that the VOT value of a given stop is different not only according to place of articulation of the stop, but also in terms of the following vocalic segment (e.g. vowel height, Yavas, 2007), we sought to examine if variability in VOT values for voiceless stops were uniform across all phonetic contexts (e.g. pa, pe, pi), or if bilinguals exhibit differential variation on VOT values according to the phonetic context (i.e. vowel height). Following the SLM, we predicted that both Spanish speakers of L2 English and English speakers of L2 Spanish would exhibit more variability (i.e. compromise VOT values) on low vowels than on high (front) vowels, given that low vowels are less congruent cross-linguistically, but not distant enough to establish new phonetic categories.

To date we have tested 16 bilingual speakers of Spanish and English, 9 high intermediate speakers of late L2 Spanish and 7 advanced speakers of L2 English. Further, we have tested 5 heritage speakers of high intermediate Spanish to determine if SLM is a model that can cover a full range of bilingual effects, not simply those related to late contexts of exposure. In addition to completing both linguistic and non-linguistic measures (lexical/syntactic measures and self-rating) of their relative proficiency in Spanish and English, participants read (non-cognate) words in a carrier phrase (Say ___ again; Diga ___ otra vez) with labial and velar stops in three different phonetic contexts in language-specific tasks: pa/pæ, pe/pɛ, pi, ka/kæ, ke/ke, ki. Results partially support the prediction made above. Overall, late L2 speakers of both Spanish and English are able to acquire the phonetic distinction of English and Spanish /p/ and /k/, and use place of articulation to constrain the VOT for this domain. Further, all groups appear to be sensitive to the use of vowel height as a means by which to constrain VOT. However, these preliminary results point to the following: i) English speakers of L2 Spanish produce noticeable and consistent compromise values on their Spanish VOT values, and in neither case (/p/ or /k/) are more accurate when the voiceless stop is followed by a high vowels (congruent cross-linguistically) as compared to mid- and low front vowels; and ii) Spanish speakers of L2 English exhibit native-like VOTs for /k/, but not for /p/. In the latter case, these speakers do exhibit more accuracy in VOT when the high (congruent cross-linguistically) vowel /i/ follows the stop than when followed by the lower vowels /e/ and /a/. Interestingly, when speaking English, heritage speakers of Spanish have noticeably longer VOT values for all variants as compared to native English speakers. We will discuss these results in terms of the methodology employed (bilingual vs. monolingual mode of communication), models of phonological development and bilingual models (age- vs. proficiency-based) of sound processing.

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