



Research Article

Asymmetrical interlingual influence in the production of Spanish and English laterals as a result of competing activation in bilingual language processing



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ABSTRACT

This study examines the phonetic and phonological knowledge of Spanish and English /l/ by early and late Spanish-English bilinguals along a continuum of language dominance. Forty early Spanish-English bilinguals, divided into groups as a function of their immigrant generation (G1.5, G2, G3), and twenty L2 Spanish learners produced word-initial and word-final laterals in three separate sessions: monolingual Spanish session, monolingual English session, and bilingual Spanish/English session. Results indicate that all participants acquired the phonetic and allophonic characteristics of the lateral variants in each language, and that language dominance strongly predicts these bilinguals' acoustic realization of Spanish and English laterals. The acoustic analyses reveal phonetic convergence as a result of language mode, but it is especially the laterals in the non-dominant language that are altered in bilingual mode. This study provides evidence of language dominance effects on the acoustic realization of Spanish and English laterals, and demonstrates the impact of language mode on the phonetic abilities of early and late bilinguals. It is proposed that a model of bilingual processing based on the principles of episodic frameworks, in which exemplars in a bilingual lexicon develop connections across languages and lexical processing activates the words of both languages non-selectively, can explain these findings.

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1. Introduction

Bilingual individuals must have the ability to produce language-specific acoustic targets accurately and consistently, and the challenges in reducing cross-linguistic phonological influence will largely depend on the L1–L2 acoustic relationship of the speech sound that is going to be articulated in the target language. For instance, a Spanish-English bilingual individual will have to realize (i) phonological contrasts that exist in only one of their languages (e.g., Spanish trill or the English /ɹ-/i:/ contrast), (ii) language-specific contextual/distributional phonological processes (e.g., Spanish spirantization), and (iii) phonological categories that exist in both languages but are slightly different, either at the acoustic level or in terms of the temporal coordination of articulatory gestures (e.g., VOT in word-initial voiceless stops). In addition to articulating these language-specific speech sounds when producing each language, the bilingual individual will necessarily have to produce them while inhibiting or deactivating the other language (Green, 1998).

The most influential theoretical models in the area of L2 phonological acquisition (Perceptual Assimilation Model, PAM, Best, 1995; Perceptual Assimilation Model of Second Language Speech Learning, PAM-L2, Best & Tyler, 2007; the Speech Learning Model, SLM, Flege, 1995; and the Second Language Perception Model, L2LP, Escudero, 2005) assume that the learnability of new speech sounds in the L2 is perceptual in nature and depends on the perceived phonetic distance between the sounds in the L2 and the most similar sounds in the L1 phonetic inventory. For instance, the SLM (Flege, 1995) emphasizes the close link between speech perception and production by assuming that accurate perception of the phonetic differences between two L2 phones can eventually lead to the correct production of these differences. In particular, the SLM presents two possibilities: (1) if the learner identifies the foreign stimulus as a similar phone, then an L1 category will be used to represent that phone in production, or (2) if the L2 speaker considers that the foreign speech sound is a new phone, then the L2 learner will eventually create a new category different from the categories already existing in the L1. In the first case, the model hypothesizes that L2 phones that are similar to the L1 phonological categories will

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be assimilated to an equivalent speech sound preventing learners from establishing a separate phonetic category. In the second case, the hypothesis is that a new category will be formed because it cannot assimilate to an L1 category. Finally, the SLM postulates that early learners, as opposed to adult L2 learners, are capable of establishing additional phonetic categories for similar L2 speech sounds, as early learners' L1 phonetic categories are malleable while late learners' L1 categories are already fully developed. Thus, the SLM's interaction hypothesis predicts that the speech sounds of the L1 and L2 are less likely to interact in early bilinguals than in late bilinguals (Flege, 1992).

While most studies have shown that early learners outperform late learners in various production and perception tasks (Baker & Trofimovich, 2005; Darcy & Krüger, 2012; Flege, Yeni-Komshian, & Liu, 1999), the source of age effects still remains controversial (Flege & MacKay, 2004). Several studies on bilingual speech production have observed that early bilinguals produce and perceive L1 and L2 speech sounds free of interlingual interference (Flege, MacKay, & Meador, 1999; Guion, Harada, & Clark, 2004; Mack, 1989; Piske, Flege, MacKay, & Meador, 2002), suggesting that early exposure helps to develop and maintain independent or separate phonetic systems. However, a number of studies suggest that these bilinguals do not necessarily realize target-like speech sounds in the L2; rather, the bilinguals' combined or interrelated systems influence each other at a fine-grained acoustic level (Flege, Munro, & MacKay, 1995; Flege et al., 1999; Fowler, Sramko, Ostry, Rowland, & Hallé, 2008; Piske et al., 2002), and early and extensive exposure to a second language may not be sufficient to attain target-like phonetic abilities in the language (Bosch, Costa, & Sebastián-Gallés, 2000; Pallier, Bosch, & Sebastián-Gallés, 1997; Sebastián-Gallés, Echeverría, & Bosch, 2005; Sebastián-Gallés & Soto-Faraco, 1999). In order to better understand the phonological/phonetic systems of early bilinguals, researchers necessarily have to consider many variables in addition to the age of acquisition, such as language proficiency, language dominance, language use and other non-linguistic variables that are particular to the experiences of the bilingual community under investigation (Amengual, 2012, 2016a, 2016b, 2016c; Amengual & Chamorro, 2015; Flege, Frieda, & Nozawa, 1997; Flege, Schirru, & MacKay, 2003; Guion, 2003; Simonet, 2014, 2015).

The present study examines the acoustic realization of a phonemic category that exists in both languages of a Spanish-English bilingual but that differs in its phonetic realization and allophonic patterning in the two languages. Specifically, this study analyzes the acoustics of the Spanish and English voiced lateral approximant (i.e., /l/) as produced by four groups of Spanish-English bilinguals with markedly different linguistic backgrounds: three groups of early Spanish-English bilinguals divided as a function of their immigrant generation (G1.5, G2, and G3), and a group of late-onset L2 Spanish learners (L1 English) who learned Spanish in a classroom setting. This experiment investigates factors not previously addressed simultaneously on heritage speakers and L2 Spanish speakers, such as language dominance (three groups of heritage Spanish speakers varying in degree of language dominance and a group of L2 learners) and language mode (L1, L2, bilingual). It specifically examines the production of

context-specific allophonic patterning in Spanish and English, which in these bilingual groups, involves the inhibition of an allophonic distinction in English, as opposed to the acquisition of a new phonemic category.

2. Background

2.1. Heritage language phonetic and phonological acquisition

Benmamoun, Montrul, and Polinsky (2013) characterize *heritage speakers* as asymmetrical bilinguals who learned the heritage language as an L1 in childhood, but who, as adults, are dominant in a different language. In the context of the United States, the term *heritage speaker* has been used to refer to an individual who is raised in a home where a non-English language is spoken, who speaks or merely understands the heritage language, and who is to some degree bilingual in English and the heritage language (Valdés, 2000, 2005). In other words, heritage speakers are early bilinguals who have been exposed to the minority (heritage) language and the majority language early in life, either by growing up speaking both languages since birth or having been brought up in a monolingual setting in early childhood and becoming bilingual after starting school in the majority language at around ages 5 or 6. The linguistic abilities of heritage speakers have been compared in recent years to both monolingual speakers and to second language (L2) learners showing that heritage language acquisition typically results in a non-target-like competence and use of the language, with transfer from the dominant language, a better ability with receptive than productive language, and linguistic gaps that resemble the patterns attested in second language acquisition (Montrul, 2011; Montrul, Bhatt, Bhatia, & Girju, 2012; O'Grady, Kwak, Lee, & Lee, 2011; Polinsky, 2006; Rothman, 2007).

Although in the last few decades there has been an increase in the number of studies investigating the linguistic abilities of Spanish heritage speakers, heritage Spanish phonetics and phonology has received considerably less attention than other linguistic subfields, especially in comparison to research focusing on heritage language morphosyntactic knowledge or studies aimed at devising pedagogy tailored to meet heritage language learners' linguistic needs (Potowski, 2013; Rao & Ronquest, 2015). The general assumption has been that Spanish heritage speakers have a benefit in pronunciation as a result of early exposure to the minority language (Au, Oh, Knightly, Jun, & Romo, 2008; Chang, Haynes, Rhodes, & Yao, 2008; Knightly, Jun, Oh, & Au, 2003), but recent studies have also shown differences between the pronunciation of heritage speakers and monolingual speakers of the minority language (Au, Knightly, Jun, & Oh, 2002; Bullock, 2009; Chang, Haynes, Yao, & Rhodes, 2009; Ronquest, 2012). Since there are still relatively few studies in the phonological/phonetic domain that have empirically investigated the Spanish pronunciation of these early bilinguals (Amengual, 2012, 2016c, 2017; Henriksen, 2015; Rao, 2014, 2015; Ronquest, 2012), at this point we cannot claim that we clearly understand the phenomenon of Spanish heritage language phonological acquisition.

This study goes a step further by incorporating the variable of immigrant generation to investigate the phonetic abilities of a

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