

Phonological vowel reduction in Central Catalan: Effects of language dominance in Catalan-Spanish bilingual children

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This study investigated the effect of language dominance on phonological vowel reduction (vowel reduction) in Central Catalan (hereafter referred to as Catalan) by Spanish-Catalan bilingual children living in Catalonia. In Catalan, the inventory of seven vowels in stressed syllables [i, e, ε, a, u, o, ɔ] is reduced to 3 vowels appearing in unstressed syllables following the pattern [e, ε, a] to schwa [ə] and [u, o, ɔ] to [u] with [i] not reducing (Wheeler, 2005). This is in contrast to Spanish, which has 5 vowels and no vowel reduction (Hualde, 2005). Due to widespread societal bilingualism in Catalonia, there is a bilingualism continuum between strong Catalan dominance, strong Spanish dominance, and speakers that fall in between (Perpiñán, 2017).

Language dominance has been shown to have an effect on cross-linguistic interference (Yip and Matthews, 2007). Specifically, for phonology, dominance has been shown to have an effect on the vowel systems of Spanish-Catalan bilinguals, with adult Spanish-dominant speakers not producing a vowel distinction in Catalan (e, ε) that does not exist in Spanish (Simonet, 2011). While there are documented effects on the vowel system, nothing is known about vowel reduction in these bilinguals. The present study was guided by these questions: 1) Does language dominance have an effect on the process of phonological vowel reduction in Catalan while during acquisition? And 2) Are both patterns of vowel reduction effected equally according to language dominance?

The participants were Spanish-Catalan bilinguals ($N=30$) ranging in age from 6;0-9;0 and divided into groups based on dominance: Spanish-dominant ($n=10$), Catalan-dominant ($n=10$), and Balanced-bilinguals ($n=10$). Language dominance was operationalized using a complex measure that factored in input quantity and quality, ages of onset, and language proficiency (Perpiñán & Soto-Corominas, submitted). The children's speech was elicited using an Elicited Narration Task (ENT) in which a series of pictures were presented to the children and they created a story to match them.

Formant values (f_1 , f_2) of all monophthongs produced during the ENT were extracted using Praat (Boersma & Weenink, 2008) normalized using Lobanov's (1971) z-score procedure, and analyzed to determine which vowel was produced. The vowels were coded as target if they fell within the normal ranges of vowels in Catalan (Herrick, 2003).

Dominance was found to have an effect on vowel reduction in Catalan, with Catalan-dominant speakers reducing in virtually all appropriate contexts, balanced-bilinguals reducing most of the time, and Spanish-dominant speakers reducing markedly less. This effect of dominance was only found for the reduction pattern [e, ε, a] to [ə], and not for [u, o, ɔ] to [u], an expected result conforming to the predictions of Flege's SLM (Speech Learning Model) (1995; 2007).

While the acquisition of segments has been widely studied, the acquisition of phonological processes such as vowel reduction have not been. These results contribute to our understanding of the phonological systems of early bilinguals. It also shows how language dominance can help explain differences in the process of language acquisition in bilinguals (Meisel, 2007).

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