

## The status of /f/ in Mayan-accented Spanish

One of the more debated features of Spanish in contact with Mayan languages is the different realizations of /f/, which has been stated to undergo both lenition [h] and fortition [p] in these varieties of contact Spanish as /f/ does not exist in any Mayan language (Author, 2017). Perhaps the first documented observation of these phenomena was Lentzer, who stated that a common occurrence among the Maya that speak Spanish as an L2 was to replace /f/ with [p], i.e., *pamilia* ‘family’ (1893: 42). Conversely, this claim was refuted by Alvar (1980), and later Utgård (2010), who stated that the only possible realization aside from the canonical [f] was lenition. However, fortition has also been confirmed among different populations of Spanish-Mayan bilinguals (García Tesoro 2008; Aleza Izquierdo, 2010). In terms of perception, the fortition of /f/ is socially stigmatized in Guatemalan Spanish, and is commonly seen as a marker of Mayan-accented Spanish (Author, 2020). Regardless of their stance towards /f/ fortition, all of the aforementioned authors confirm the presence of /f/ lenition in Spanish in contact with Mayan languages. However, none of these previous studies provides a detailed analysis of different phonetic realizations of /f/ in Spanish in contact with Mayan languages. Thus, the present study provides one of the first in depth sociophonetic analyses of this phoneme among bilingual speakers of Spanish and K’iche’, a Mayan language from western Guatemala.

Based on 1,430 /f/ tokens produced by 40 speakers (17 men, 23 women) aged 18-67 (*M*: 31.3, *SD*: 13.02), the aim of the study was twofold: (i) to document the frequency of /f/ allophonic variation including [p] and [h] in Mayan-accented Spanish (K’iche’-Spanish bilinguals); (ii) to analyze the social and linguistic factors that govern these allophonic realizations. The data comes from informal semi-directed sociolinguistic interviews (Labov, 1972). Tokens were segmented in Praat (Boersma & Weenink, 2021) and coded as [f], [p], or [h] based on visual cues in the waveform and the spectrogram combined with an auditory analysis. Independent variables included sex, age, Bilingual Language Profile (BLP) score (Birdsong et al., 2012), educational attainment, previous sound, following sound, sentence position, and syllabic stress. A frequency count revealed only 71 realizations of [p] and 71 realizations of [h]. Thus, two separate mixed effects logistic regression models were constructed based on [f] versus [p] and also [f] versus [h] using the *lmer* function (Bates et al., 2015) in R (R Team, 2021) with speaker as a random factor. A random forest analysis using the *cforest* function in the *party* package (Hothorn et al., 2020) determined the order of independent variables in the models. To further explore the relationship between the independent variables in the regressions, a conditional inference tree was conducted.

Regressions found that [p] as compared to [f] was favored by a preceding nasal segment (Figure 1A), atonic syllables (Figure 1B), and by those with more K’iche’-dominant BLP scores (Figure 1C) while [h] as compared to [f] was favored by those with (or less than) secondary educational attainment (Figure 1D), tonic syllables (Figure 1E), and those with more K’iche’-dominant BLP scores (Figure 1F). Thus, [p] realizations appear to be promoted by language-internal factors in which a post-nasal position favors fortition, a common cross-linguistic pattern (Sheer & Ségéral, 2008). While [p] and [h] allophones are favored by those who are more K’iche’-dominant, the conditional inference trees demonstrate a more nuanced relationship between these independent variables. For example, in the [h]-[f] model there is an interaction between education and BLP score in which [h] is almost exclusively realized in tonic syllables, and among those of secondary or less education with more K’iche’-dominant BLP scores.

Overall, the results demonstrate that both language-internal and -external factors promote these non-canonical variations of /f/. Furthermore, these findings indicate that although lenition and

fortition of /f/ do exist among this population, their occurrences are rare, which may in part help explain their debated existence in the previous literature.

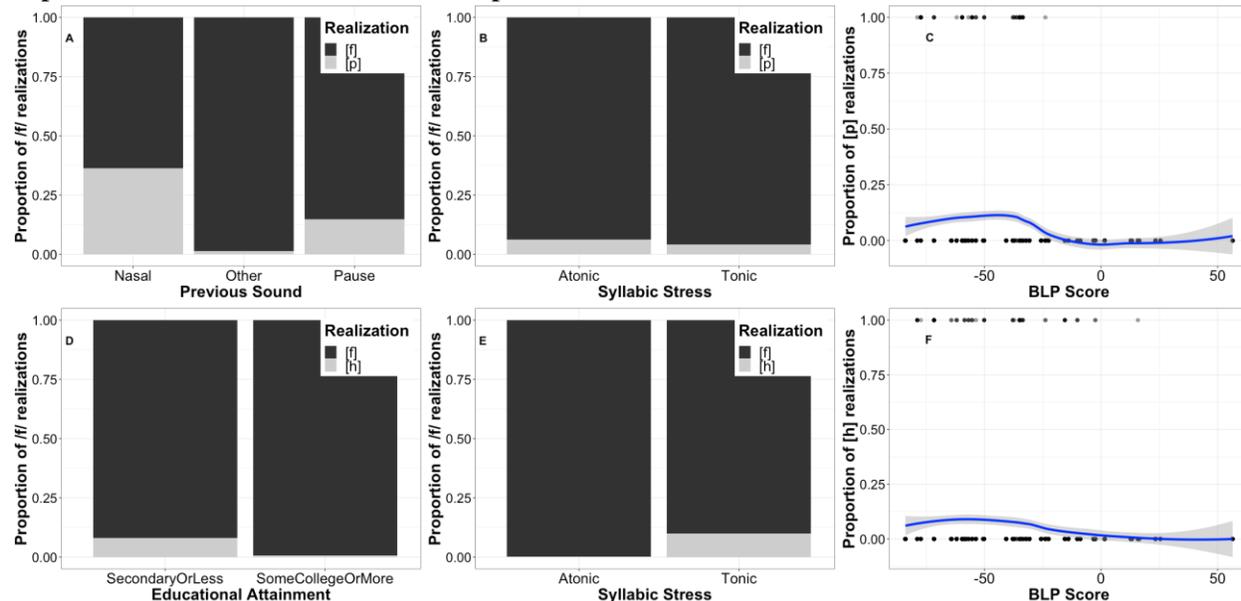


FIGURE 1: Main effects of previous sound (A), syllabic stress (B), and BLP score (C) for [p]-[f] regression model; Main effects of educational attainment (D), syllabic stress (E), and BLP score (F) for [h]-[f] regression model.

#### References

- Aleza Izquierdo, M. (2010). Fonética y fonología. In M. Aleza Izquierdo & J.M. Enguita Utrilla (eds.), *La Lengua Española en América: Normas y Usos Actuales*, 51-94. Universitat de València.
- Alvar, M. (1980). Encuestas fonéticas en el suroccidente de Guatemala. *Lingüística Española Actual*, 2, 245-287.
- Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1-48.
- Birdsong, D., Gertken, L.M., & Amengual, M. (2012). Bilingual Language Profile: An Easy-to-Use Instrument to Assess Bilingualism. COERLL, University of Texas at Austin. <<https://sites.la.utexas.edu/bilingual/>>.
- Boersma, P. & Weenink, D. (2020). Praat: A system for doing phonetics by computer.
- García Tesoro, A. I. (2008). Guatemala. In A. Palacios (ed.), *El español en América: contactos lingüísticos en Hispanoamérica*, 97-117. Ariel Letras.
- Hothorn, T., Hornik, K., Strobl, C., & Zeileis, A. (2020). *Party: A Laboratory for Recursive Partytioning*, R package ver. 1.3-4, <https://cran.r-project.org/web/packages/party/index.html>.
- Labov, W. (1972). *Sociolinguistic patterns*. University of Pennsylvania Press.
- Lentzer, K. (1893). Observations on the Spanish language in Guatemala. *Modern Language Notes*, 8(2). 41-43.
- Sheer, T. & Ségéral, P. (2008). Positional factors in Lenition and Fortition. In J. Brandão de Carvalho, T. Scheer & P. Ségéral (eds.), *Lenition and Fortition*, 131-172. De Gruyter Mouton.
- R Core Team (2021). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. <[www.R-project.org](http://www.R-project.org)>.
- Utgård, K. (2010). El español de Guatemala. In M.Á. Quesada Pacheco (ed.), *El español hablado en América Central: Nivel fonético*, 49-82. Iberoamericana Vervuert.