B O R E A L I S
An International Journal of Hispanic Linguistics

# BILABIAL FRICATIVES IN MEXICAN SPANISH: A SOCIOPHONETIC ANALYSIS*

Sergio Robles-Puente[a] & José Jesús Vilches-Aguado[b]
*West Virginia University[a] & Miami University[b]*

ABSTRACT. Voiceless bilabial fricative productions ([ɸ]) have been widely reported for several Spanish dialects especially in America (Lenz 1940; Predmore 1945; Navarro Tomás 1943; Flórez 1951; Boyd-Bowman 1960; Canfield 1981; among others). Most of these sources posit that the bilabial variant [ɸ] is more likely to be found in rural areas, that it is normally produced by speakers with a low educational level and that is generally followed by back (and rounded) vowels. Nevertheless, there is a need to formalize such observations with recent data and to check to what extent these external and internal factors or others may be impacting the choice of this fricative over the more common [f]. In order to do so, twenty-four speakers of Spanish from Guanajuato (Mexico), an area that has been reported to present both variants (Boyd-Bowman 1960), were recorded producing words with 'f'. The analysis of 632 productions yielded the following results: a) speakers with a lower educational level (primary or secondary education) show more instances of the bilabial fricative [ɸ] than those that have attained higher degrees (university); b) older speakers and males tend to produce the vernacular variant [ɸ] more than younger speakers and females; and c) back rounded vowels (/o/, /u/) are more likely to trigger the use of the bilabial fricative due to their articulatory similarities.

**Key words.** bilabial fricative; Mexico; Spanish; sociophonetics

RESUMEN. Las producciones de la bilabial fricativa ([ɸ]) han sido reportadas en múltiples ocasiones en diferentes variedades de español, especialmente en América (Lenz 1940; Predmore 1945; Navarro Tomás 1943; Flórez 1951; Boyd-Bowman 1960; Canfield 1981; entre otros). La mayoría de estas fuentes coinciden en que la variante bilabial [ɸ] es más dada a producirse en áreas rurales, por parte de sujetos con un nivel educativo bajo y que generalmente está seguida por vocales posteriores (y redondeadas). Sin embargo, es necesario formalizar dichas observaciones con datos más recientes y analizar hasta qué punto estos factores internos y externos u otros pueden tener consecuencias en la elección de esta fricativa en vez de [f]. Para ello, veinticuatro hablantes de español de Guanajuato (México), un área en la que se ha notado el uso de ambas variantes (Boyd-Bowman 1960), fueron grabados produciendo palabras con 'f'. El análisis de 632 producciones arrojó los siguientes resultados: a) los hablantes con un nivel educativo bajo (educación primaria o secundaria) presentan más ejemplos de la variante fricativa bilabial que aquellos con niveles educativos altos (universidad); b) los hablantes más mayores y los hombres, tienden a producir la variante vernácula [ɸ] más que los jóvenes y las mujeres; y c) las vocales posteriores redondeadas (/o/, /u/) son más dadas a provocar el uso de la fricativa bilabial por sus similitudes articulatorias.

**Palabras clave**. fricativa bilabial; español; México; sociofonética

* We would like to thank all the members of the Guanajuato community that made this study possible, with special gratitude to Daniel Antonio Vilches-Aguado for his endless help. We would also like to thank Dr. Kenneth Wireback for his valuable feedback in previous versions of this manuscript as well as the anonymous reviewers of Borealis for their insightful comments and suggestions.

© Sergio Robles-Puente & José Jesús Vilches-Aguado. *Borealis: An International Journal of Hispanic Linguistics*, 2019, 8 / 1. pp. 143-161. http://dx.doi.org/10.7557/1.8.1.4561

This is an Open Access Article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/legalcode) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## 1. Introduction

### *1.1. [f] and [ɸ]*

The *Diccionario de la Lengua Española* (RAE 2014) cites only the voiceless labiodental fricative [f] as the sound for the grapheme 'f'. Nevertheless, the *Nueva Gramática de la Lengua Española* (RAE & AALE 2011: 186) posits that bilabial realizations ([ɸ]) are attested in multiples areas of Spain (Andalusia, Extremadura, Castilla la Mancha, Madrid, La Rioja, Navarre, Aragon, Palencia, Burgos, Soria, Segovia and Cantabria) and America (The Antilles, Mexico, Central America, Colombia, Ecuador, Peru, Chile and Argentina). Hualde (2005: 150) gives a similar description and says that although the voiceless labiodental fricative [f] is the normative variant for Spanish, bilabial fricatives are widely attested in multiple varieties both in America and Spain. Boyd-Bowman (1960) lists various early works that document instances of [ɸ]. These include Flórez (1951: 171) for Colombia, Navarro Tomás (1943: 61) for Puerto Rico, Lenz (1940: 138) for Chile and Predmore (1945: 278) for Guatemala, among others. Resnick (1975) also reports productions of [ɸ] in Argentina, Bolivia, Colombia, Chile, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Peru and Puerto Rico. Similarly, Canfield (1981) finds instances of bilabial fricatives in Panama, Nicaragua, Honduras, El Salvador and Chile. Finally, in a more recent study, Renaud (2014) reports speakers with the bilabial allophone in Chilean Spanish and Mexican Spanish.

Descriptions of the distributions of these fricatives are in some cases complemented with phonetic observations. For example, Boyd-Bowman (1960) states that in Guanajuato and the Distrito Federal (Mexico), like in Standard Spanish, 'f' is labiodental but highlights that before 'e' and 'i' bilabial realizations are common even in upper-class speakers. This is particularly interesting given that due to their lack of lip rounding these two vowels are a priori less likely to trigger a bilabialization process with the fricative. As already discussed in Renaud (2014: 7-8), this has been an ongoing debate in the literature. While authors like Perissinotto (1975) and Sanicky (1988) argue that bilabial variants can occur regardless of the roundness of the following vowel; others like Lipski (1995) and Piñeros (2009) argue that back and rounded vowels are the only ones likely to trigger the bilabialization process. After studying the productions of two Chilean Spanish speakers and two Mexican Spanish speakers, Renaud (2014) finds statistical evidence to assure that [ɸ] emerges more frequently with [o] and [u].

Although the geographical distribution and the phonetic environment of the bilabial fricative [ɸ] is relatively well documented, observations at the sociolinguistic level are relatively scarce and general. Boyd-Bowman (1960) remarks that only uneducated speakers produce bilabial fricatives in Guanajuato, Mexico D.F. and el Valle de Mexico. Similarly, Calvo Shadid (1996) concludes that instances of bilabial fricatives in Costa Rica are more likely to be found in uneducated speakers. Resnick (1975) states that non-labiodental variants are generally found in older speakers. Canfield (1981: 11) reports that labiodental [f] is normally found in careful speech, but that [ɸ] is widely produced in much of America. Finally, Hualde (2005) states that [ɸ] is restricted to rural areas while the *Nueva Gramática de la Lengua Española* (RAE & AALE 2011) mentions that it is more normal in informal and uneducated speech.

Given the lack of recent and detailed sociophonetic data and the existence of contradictory observations, the current paper has at least three different goals. The first one is to confirm that bilabial fricative productions are still a characteristic of the Mexican Spanish dialect spoken in Guanajuato. If that is the case, the second goal is to determine if the nature of the vowel following the fricative has an impact on the lip

rounding of the consonant. Finally, our goal is to examine which external factors may impact the choice of a bilabial fricative over a labiodental one.

*1.2. The Guanajuato community*

Boyd-Bowman (1960) is one of the early works that reports uses of bilabial fricatives in Mexico and subdivides Mexican dialects into five different regions: "El Valle de México" (including Mexico City and Mexico state), "El Oriente" (Puebla, Tlaxcala and the highlands of Veracruz), "El Bajío" (Querétaro, Guanajuato, Michoacán and part of Jalisco), "El Norte" (Zacatecas, Aguascalientes, San Luis Potosí and part of Hidalgo) and "El Occidente" (Colima, Nayarit, and most of Jalisco). In the current study we concentrate on "El Bajío" region, more precisely on an urban area of the city of León de los Aldama called "el Coecillo". This neighborhood, founded in 1578, is one of the oldest in the city.

The city of León de los Aldama, also known as "the world capital of shoes", is 22 miles from Guanajuato City (the state capital of Guanajuato) and 240 miles from Mexico City. The center of León rests on an extensive plateau that is mainly used for cultivating corn, potato, barley, and other crops. The northern part of the city is surrounded by several mountains that adjoin other cities such as Ocampo, San Felipe, and Guanajuato City. Politically, León was an active city during the 20's and 30's since several political groups formed there during the Cristero conflict between the Federal Government and civil religious groups (Rodríguez 2011). Nevertheless, the economic and cultural development of the city has taken place mainly in the last two decades: university campuses have opened, housing has extended to rural areas, and national and international companies have invested in the city and in the wider state of Guanajuato. For example, in the last few years, numerous Japanese companies have settled in León and Guanajuato City, bringing new jobs and investments to the community (Vila Freyer 2017).

According to the Instituto Nacional de Estadística y Geografía (INEG 2015) Guanajuato has a total of 5,853,677 inhabitants, 51.7% of which are women and 48.3% men. 70% of the population lives in urban areas and 30% live in rural areas. Despite the aforementioned economic boom, Guanajuato still has a mean educational level below the national norm. The state places 10th in illiteracy out of 32 federal entities in Mexico. Based on INEG (2015), 7.7 % of the population does not have any formal education, 60.6 % has finished '*educación primaria'* (primary education), 18.4 % has completed *'educación secundaria'* (secondary education), and 13.2 % has completed *'educación universitaria'* (university level studies).[1] As explained in the following section, this potential contrast in level of educational attainment was considered a relevant external factor when analyzing participants' fricative productions.

## 2. Methodology

*2.1. Participants*

A total of twenty-four Spanish speakers from the Guanajuato area took part in the current study.[2] Boyd-Bowman (1960) for Guanajuato and other areas in Mexico and Calvo Shadid (1996) for Costa Rica, point out that speakers with a low educational level are typically the ones that favor the bilabial variant [ɸ]. Based on these observations and on the characteristics of the Guanajuato community described in the

[1] 0.1% did not specify the attained educational level in the Census.
[2] See Table A1 in the Appendix for individual descriptions.

previous section, we consider it appropriate to include education rather than socioeconomic class as one of the potential factors that may be correlated with the frequency of the [ɸ] variant. For this reason, participants with different educational backgrounds were included in the study. Eight participants had completed *'educación primaria'* (primary education; typically, ages 6-12/13), eight '*educación secundaria'* (secondary education; typically, ages 12/13-15) and eight *'educación universitaria'* (university level; typically, people over 18). Participants' backgrounds and professions varied from bicycle technicians, to plumbers, housewives, shoemakers, business people, designers, and office workers.

Previous studies that have analyzed the alternation between [f] and [ɸ] in Spanish have not focused on gender differences. Nevertheless, Calvo Shadid (1996) and Renaud (2014) provide evidence that both allophones are present in men and women. Gender has always been considered one of the most relevant external factors in sociolinguistic studies and a general observation is that while women tend to use more standard variants, men are more likely to use vernacular ones (Labov 1972, 1990; Trudgill 1992: 197; Tagliamonte 2012; among others). In order to test if such a trend is applicable to [f] and [ɸ], out of the twenty-four participants twelve were males and twelve females.

One last external factor that we considered to be potentially relevant based on variation studies and previous observations was age. For example, Resnick (1975) states that the [ɸ] variant is generally found in older speakers. This finding would support the claim that linguistic variation is age-graded and that teenagers and older adults are more likely to produce non-standard forms (Sankoff & Laberge 1978; Downes 1984; Cameron 2005; Cheshire 2006). In order to test the relevance of age in the variation of fricatives, participants that took part in the study were selected from all relevant age groups. The youngest participant was 18, the oldest one 70 and the average age of all participants 37.1 (SD 16.4). Although the authors think that these gender, age and educational differences suffice to give at least an initial explanation for the variation in fricative productions, the paper also offers some insight on how these are perceived and evaluated by members in the Guanajuato community.

*2.2. Materials*

In order to elicit fricative productions, participants were presented with pictures that had items containing words with 'f'. These words were considered to be familiar to members of the Guanajuato community and contained combinations of the fricative or the sequence /fr-/ and the five Spanish vowels. Participants were asked to describe the pictures while their lips were video recorded.[3] A total of 632 analyzable productions were collected, although given the semi-directed nature of the task some participants produced more items than others. Moreover, word with initial 'f' may be preceded by a range of word-final vowels or consonants (e.g. ***el famoso*** vs. *hombr**e** famoso*) depending on the participant's description.[4] In order to capture the potential effect of

[3] In order to ensure that all subjects produced 'f' with each vowel at least once, they were asked to read sentences with words containing each combination as well. These words were *Fanta, enfermo* 'sick', *focas* 'seals', *fino* 'fine' and *'fuente* 'fountain'. Although the use of written elicitation materials could be argued to yield more standard variants (i.e. [f] instead of [ɸ]), bilabial fricatives were also attested in these productions. This finding agrees with Renaud (2014) since style differences (reading task vs. interview vs. picture description) did not have an effect on the kinds of fricatives produced in his study.

[4] Some examples of the words produced were *alfalfa, famoso, estufa, feliz, café, enfermo, feria, febrero, fino, alfombra, foto, fogata, semáforo, enfurecido, fumar, frágil, franela, refresco, azufre, fresa, frenar, fritos, frotar, fruta*. Some of these words were produced with minor morphological differences (masculine vs. feminine, singular vs. plural, present vs. past). The few glides ([w],[j]) produced were treated like vowels ([u], [i]) due to their articulatory similarities.

this variation, the nature of the sound preceding /f/ (C vs. V) was considered an internal factor together with the characteristics of the vowel following /f(r)/ and whether the syllable with the fricative was stressed or not.

According to Renaud (2014: 132) and as discussed in Maddieson (2005: 199, 214), the spectral properties of the fricatives under study ([f] vs. [ɸ]) may not always be enough to make them distinguishable since they frequently show acoustic overlap; Following Maddieson (2005: 213) and Renaud's (2014) methodology, the categorization into bilabial or labiodental productions relied on the articulatory differences captured in the video recordings.[5] It was observed that in bilabial productions lips were protruding and teeth were not visible (as exemplified in Figures 1a and 1b) while in labiodental productions the lower lip typically moved upward to make contact with the upper teeth (see Figures 1c and 1d).[6]

*Figure 1a: bilabial fricative Subject RI in* 'fuente' *(fountain).*

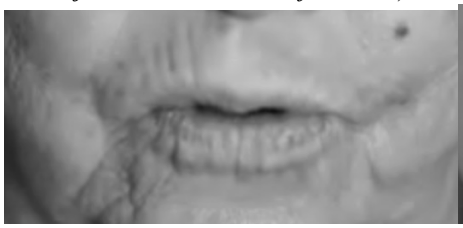


*Figure 1b: bilabial fricative Subject UL in* 'focas' *(seals).*

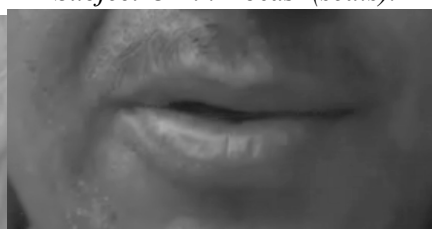


*Figure 1c: labiodental fricative Subject MA in* 'fruta' *(fruit).*

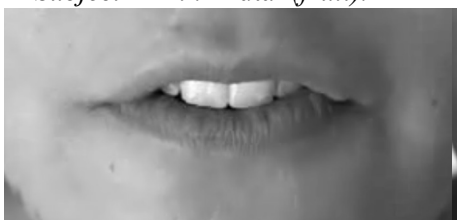
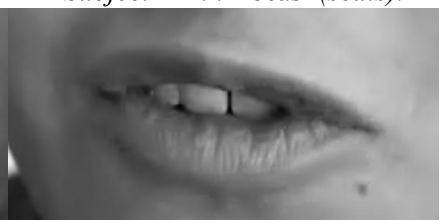


*Figure 1d: labiodental fricative Subject ER in* 'focas' *(seals).*



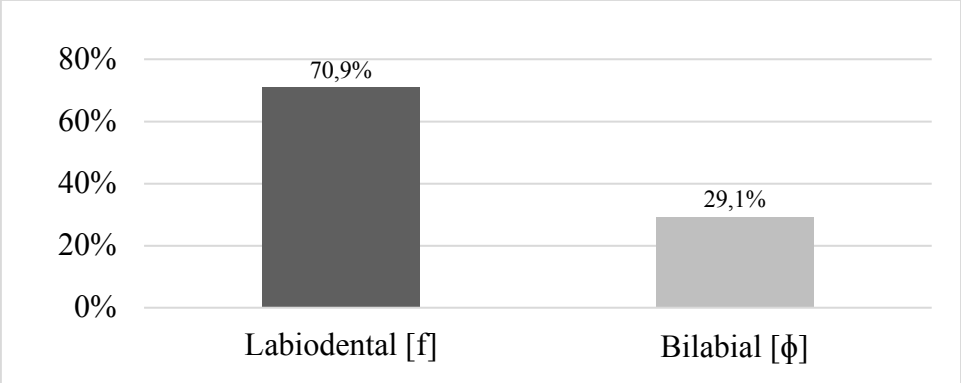
## 3. Results

Figure 2 shows the overall results for the 632 'f' productions. These confirm that early descriptions of the fricatives in the area still hold (Boyd-Bowman 1960) and further confirm that voiceless bilabial fricatives are a distinctive property of the Spanish spoken in Guanajuato. Although the more standard fricative variant [f] is still preferred (448/632 - 70.89%), bilabial [ɸ] has a noticeable presence (184/632 - 29.11%).

[5] Although it is outside the scope of this paper, a controlled perceptual experiment could determine to what extent the contrast is auditorily perceptible.

[6] According to Maddieson (2005: 203, 211, 213) the protrusion of the lips, especially the upper one, is enough to distinguish bilabial and labiodental fricatives in Ewe. The author points out that "visual distinctiveness of the lip configurations makes this difference not so difficult for listeners to recognize after all". Based on the data obtained in the personal interviews (section 3.7) we can confirm that this articulatory difference can be detected by the speakers in the Guanajuato community as well.

*Figure 2: Total number of fricative productions.*

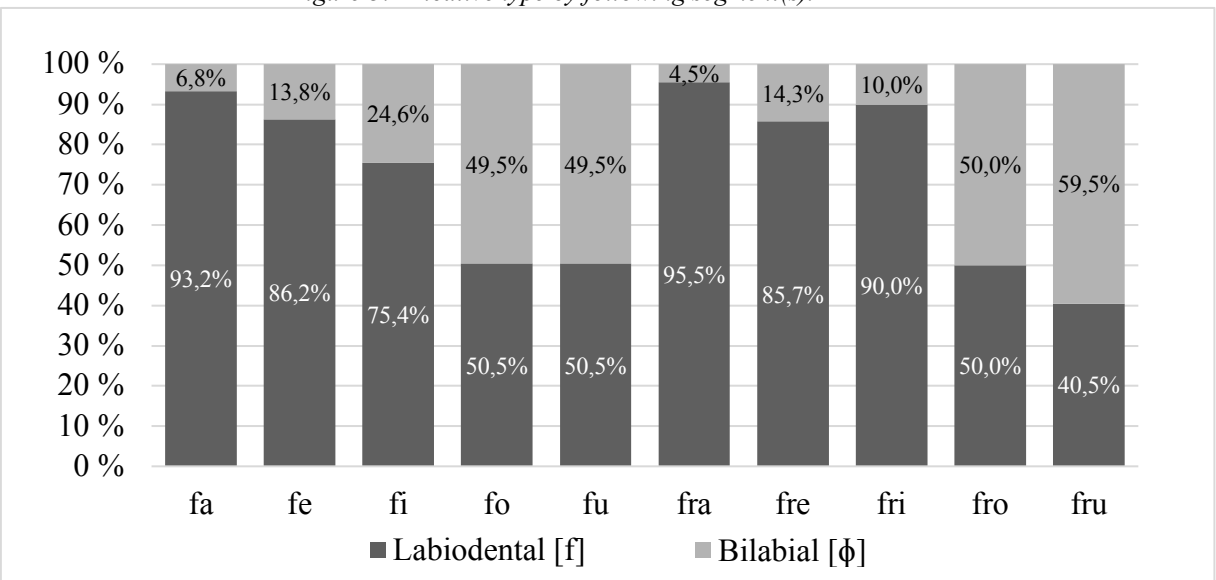



It must be highlighted that the use of each variant varied from subject to subject, with percentages of the bilabial production ranging from 0% (four subjects) to 69.23%; the following subsections will attempt to explain why such variation might be taking place. Sections 3.1 and 3.2 discuss the relevance of internal factors like the nature of the vowel following 'f', the prominence of the syllable and the type of sound preceding the fricative; sections 3.3, 3.4 and 3.5 focus on the external factors of gender, age and education respectively; Section 3.6 provides a more complete analysis by considering all factors simultaneously and 3.7 presents additional data based on some of the speakers' observations on the phenomenon.

*3.1. Vowel type*

This first subsection has the objective of accounting for variation based on the type of vowel that follows the fricative. Since participants produced words with 'f' followed by each of the five Spanish vowels (plus 'f' + rhotic sequences), we can determine if the articulatory properties of the vowel condition the choice of fricative variant. Figure 3 shows the results considering the segmental material following the fricative.

*Figure 3: Fricative type by following segment(s).*




With a few exceptions, results show that there is a clear preference for the labiodental fricative [f] to be produced with non-rounded vowels ([a] 124/133 - 93.23%, [e] 75/87 - 86.21%, [i] 43/57 - 75.44%). In contrast, when back rounded vowels or even [ɾo] or

[ɾu] follow, the bilabial [ɸ] variant emerges and [f] productions decrease ([o] 56/111 - 50.45%, [u] 53/105 - 50.48%, [ɾo] 8/8 - 50%, [ɾu] 17/42 - 40.48%). These results confirm Renaud's (2014) observations that back rounded vowels favor the bilabialization process.

*3.2 Stress and preceding sounds*

Two other internal factors that were considered to be potentially relevant in the choice of fricative variant were the nature of the preceding sound (vowel vs. consonant) and the prominence of the syllable (stressed vs. unstressed). Figures 4 and 5 present the percentages of [f] and [ɸ] based on these factors.

*Figure 4: Fricative type by preceding segment.*

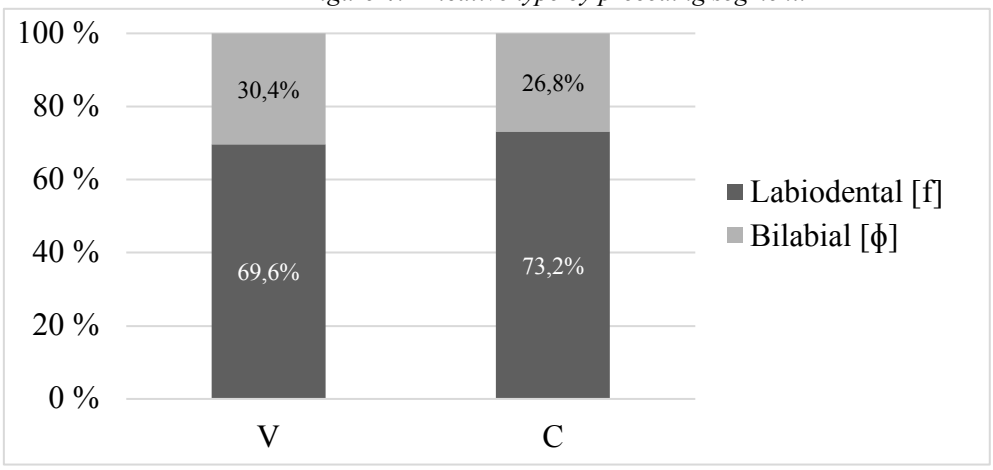
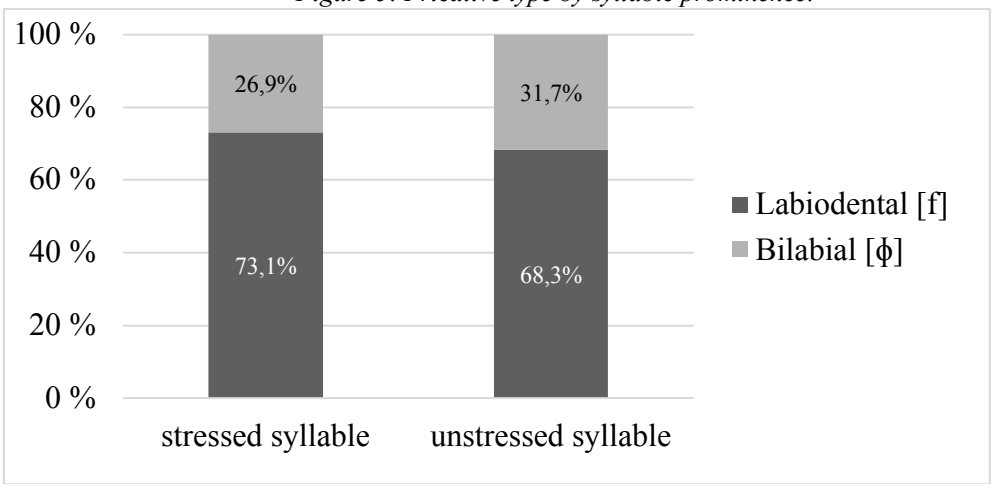



*Figure 5: Fricative type by syllable prominence.*




Percentages in Figure 4 and Figure 5 indicate that bilabial productions have a slight preference for postvocalic contexts (122/401 - 30.4% vs. 62/231 - 26.8%) and for unstressed syllables (85/268 - 31.72% vs. 98/364 - 26.9%). This latter result is coincides with that presented in Renaud (2014: 153), where the author concludes that stress decreases the chances of finding bilabialization. After looking at the internal factors that may impact the choice of fricative type, external factors are considered.

*3.3. Gender*

The first external factor that we take into consideration is gender. Out of the twenty-four participants, twelve were males and twelve females. Figure 6 shows the differences in fricative productions for each gender.

*Figure 6: Fricative productions by gender*

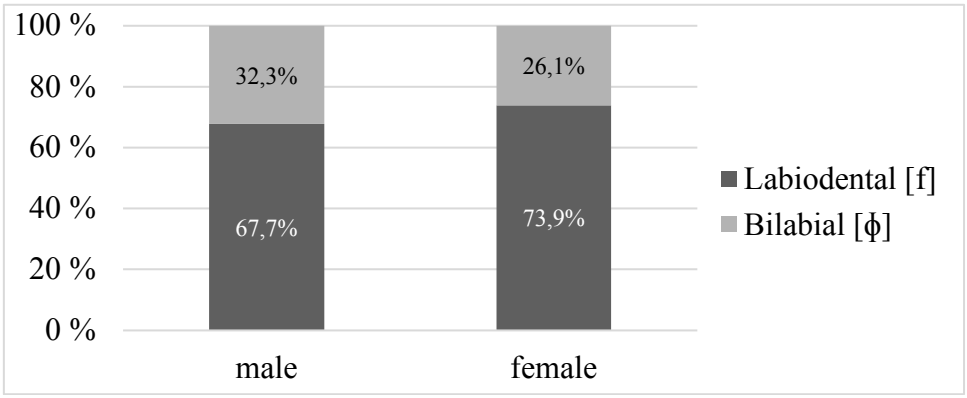
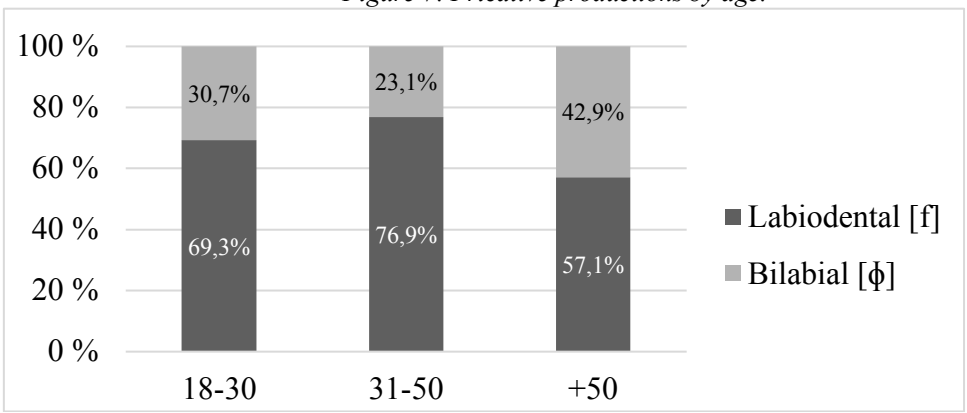



Figure 6 demonstrates that females show a slightly higher percentage of labiodental productions than males (238/322 - 73.91% vs. 210/310 - 67.74%). Although this is in accordance with general sociolinguistic patterns when it comes to stable variables, both genders still prefer the normative variant [f] to the bilabial one.

*3.4. Age*

The average age of the twenty-four participants was 37.1 (SD 16.4), the youngest participant being 18 and the oldest one 70. In order to determine if fricative productions vary depending on age, participants were divided into the following three emic groups: Participants with ages between 18 and 30 (teenagers and early adulthood - eleven participants), participants with ages between 31 and 50 (middle age - nine participants) and participants that were older than 50 (old age - four participants).[7] Figure 7 shows the differences in fricative productions for each age group.

*Figure 7: Fricative productions by age.*



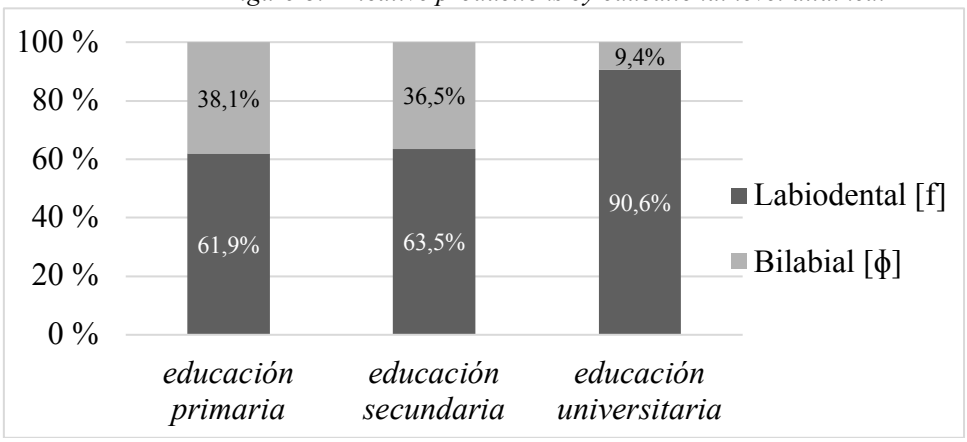

[7] The terminology 'early adulthood', 'middle age' and 'old age' is adopted from Eckert (1997). Participants in the first group were 18 (x2), 23 (x2), 24 (x2), 25 (x2), 26, 27 and 28. Participants in the second group were 32, 33, 35, 36, 41, 42, 45 (x2) and 49. Participants in the last group were 66, 68 (x2) and 70.

Based on Figure 7, none of the three age groups shows a preference for the bilabial fricative variant [ɸ]; nevertheless, the percentage of the third group indicates that older speakers use labiodental fricatives less frequently than the younger groups (36/63 - 57.14% vs. 232/335 - 69.25% and 180/234 - 76.92%). It has been proposed on several occasions that linguistic variation is age-graded and that linguistic features can change through the lifespan of speakers (Sankoff & Laberge 1978; Downes 1984; Cameron 2005; Cheshire 2006; among others). While middle-aged speakers have to conform to normative pressures, adolescents and older people do not feel the need to always follow the standard linguistic forms. Our results seem to be compatible with this proposal since the youngest group (18-30) and the oldest one (+50), show more instances of the variant [ɸ] than the intermediate group (31-50). Nevertheless, as Eckert (1997:159) proposes, there might be other factors that can explain age variation. We believe a potential explanation for this difference in the current data is that access to education may not have been the same for all participants. In fact, representing the general trend in the community, the four participants in the oldest group had completed only primary or secondary studies. Díaz-Campos et al. (2011) observe similar patterns for different variables in Caracas Spanish (Venezuela) and argue that the linguistic behavior of younger generations may have been affected by a greater access to education. We explore this possibility for the Guanajuato community in the next subsection.

*3.5. Educational level*

In order to check if the observations in the previous subsection are correct, fricative productions were analyzed based on the educational level of the participants. The twenty-four participants were divided into three different groups according to the highest educational level they had attained. Eight participants were grouped under *'educación primaria'* (primary education), eight under *'educación secundaria'* (secondary education) and eight under *'educación universitaria'* (university level). Figure 8 shows the differences in fricative productions for each group.

*Figure 8: Fricative productions by educational level attained.*




Participants with primary and secondary education show very similar percentages for each fricative. Although the labiodental variant is still the preferred one (86/139 - 61.87%, 198/312 - 63.46%), [ɸ] realizations were frequently attested (53/139 – 38.13%, 114/312 – 36.54%). In contrast, participants with university-level studies clearly favor the standard labiodental variant (164/181 - 90.61% vs. 17/181 - 9.39% for the bilabial fricative). This result indicates that education plays a crucial role in the preference of one variant over the other. A likely exposure to more standard forms, as well as a

potential pressure to follow linguistic standards in the academic setting, seem to raise speakers' awareness of the social value of each fricative variant.

*3.6. Overall results*

After considering all internal and external factors separately, a Goldvarb analysis was conducted to determine the weight of each factor (Table 1 – Sankoff et al. 2012). A factor weight above 0.5 indicates that the independent factor favors the variant, while those with a weight below 0.5 disfavor it. The analysis of the fricative productions is based on a total of 632 tokens, 29.11% (184/632) of which are produced as a bilabial [ɸ] and 70.89% (448/632) as a labiodental [f].

Weights for each variable confirm our initial observations. The educational level attained by the speakers as well as the nature of the following vowel were the most relevant factors in the choice between [ɸ] and [f]. Additionally, females, adult speakers (31-50) and stressed syllables slightly favor the use of the standard variant; Given the similarities in weight for gender, age, syllable type and preceding segment, a second analysis was performed with a binomial step-up/step-down analysis. This analysis determined that gender, whether the syllable was stressed or unstressed and the nature of the preceding segment were non-significant factors. The weights for the rest of the factors in the analysis are presented in Table 2 (Log likelihood = -278.454 Significance = 0.003).

*Table 1: Goldvarb binomial analysis of (f) as bilabial [ɸ] and labiodental [f].*

| | **[ɸ] Weight** | **[f] Weight** |
|---|---|---|
| **Gender** | | |
| Male | 0.509 | 0.491 |
| Female | 0.491 | 0.509 |
| | | |
| **Age** | | |
| 18-30 | 0.512 | 0.488 |
| 31-50 | 0.406 | 0.594 |
| +50 | 0.564 | 0.436 |
| | | |
| **Educational level** | | |
| *'Primaria'* | 0.644 | 0.356 |
| *'Secundaria'* | 0.651 | 0.349 |
| *'Universidad'* | 0.178 | 0.822 |
| | | |
| **Following segment(s)** | | |
| [a] | 0.170 | 0.830 |
| [e] | 0.308 | 0.692 |
| [i] | 0.492 | 0.508 |
| [o] | 0.784 | 0.216 |
| [u] | 0.761 | 0.239 |
| [ɾa] | 0.097 | 0.903 |
| [ɾe] | 0.361 | 0.639 |
| [ɾi] | 0.271 | 0.729 |
| [ɾo] | 0.769 | 0.231 |
| [ɾu] | 0.887 | 0.113 |
| | | |
| **Syllable type** | | |
| Stressed | 0.467 | 0.533 |
| Unstressed | 0.545 | 0.455 |

| | | |
|---|---|---|
| **Preceding segment** | | |
| Consonant | 0.503 | 0.497 |
| Vowel | 0.498 | 0.502 |

*Table 2: Goldvarb binomial step-up/step-down analysis.*

| | **[ɸ] Weight** | **%** | **[f] Weight** | **%** |
|---|---|---|---|---|
| **Age** | | | | |
| 18-30 | 0.509 | 30.7 | 0.491 | 69.3 |
| 31-50 | 0.410 | 23.1 | 0.590 | 76.9 |
| +50 | 0.562 | 42.9 | 0.438 | 57.1 |
| **Educational level** | | | | |
| *'Primaria'* | 0.648 | 38.1 | 0.352 | 61.9 |
| *'Secundaria'* | 0.650 | 36.5 | 0.350 | 63.5 |
| *'Universidad'* | 0.177 | 9.4 | 0.823 | 90.6 |
| **Following segment(s)** | | | | |
| [a] | 0.168 | 6.8 | 0.832 | 93.2 |
| [e] | 0.317 | 13.8 | 0.683 | 86.2 |
| [i] | 0.500 | 24.6 | 0.500 | 75.4 |
| [o] | 0.775 | 49.6 | 0225 | 50.4 |
| [u] | 0.787 | 49.5 | 0.213 | 50.5 |
| [ɾa] | 0.104 | 4.5 | 0.896 | 95.5 |
| [ɾe] | 0.354 | 14.3 | 0.646 | 85.7 |
| [ɾi] | 0.273 | 10 | 0.727 | 90 |
| [ɾo] | 0.767 | 50 | 0.233 | 50 |
| [ɾu] | 0.882 | 59.5 | 0.118 | 40.5 |

Table 2 indicates that there are four phonological environments and two educational levels that clearly favor bilabial fricative productions; namely [o], [u], [ɾo], [ɾu] and primary and secondary education. Although the contrast between age groups is not as clear, older speakers are the ones that favor the vernacular variant the most.

*3.7. Personal interviews*

Sections 3.1 through 3.6 have determined that the variation in the use of [f] and [ɸ] is the result of different phonetic environments and external factors like the age and the educational background of the speakers. Nonetheless, multiple studies have shown that linguistic features can carry social meanings and act as markers of group or local identity (see Labov 1963, Bucholtz 1998, Eckert 2000, 2005 for English; Broce & Torres Cacoullos 2002, Butragueño 2014 for Spanish; Zhang 2005 for Mandarin Chinese; Shousterman 2014 for English/Spanish bilinguals; among others). Thus, it is possible that speakers may use the bilabial fricative [ɸ] as an identity indicator in order to express their attachment and solidarity to the Guanajuato community. An alternative possibility is presented in the *Nueva Gramática de la Lengua Española* (RAE & AALE 2011: 187), which posits that even when [ɸ] y [f] can co-occur in the same place, speakers do not seem to be conscious of the difference or of the social stratification associated with their use.[8] In order to complement our initial findings and gain a better

[8] Aunque [ɸ] y [f] puedan alternar en un mismo lugar y estén parcialmente asociadas a la formalidad del estilo de habla, no parece que los hablantes sean conscientes de la diferencia ni de que exista una marcada estratificación social asociada a su uso.

understanding of why the [f]-[ɸ] variation may be taking place in Guanajuato, speakers were asked explicitly about this contrast and their dialect. Twelve participants volunteered to collaborate in this section of the study and were asked the following questions (and other follow-up questions added by the interviewer based on participants' responses): 'What do you think of the Spanish spoken in Guanajuato?'; 'Is it different from the Spanish spoken in other areas of Mexico? If so, why?'; 'Have you noticed any variation in the pronunciation of 'f'? If so, who produces it and what do you think about it? Examples (1) through (4) show the most relevant responses to these questions.

The first interesting finding is that all speakers think that the Spanish spoken in Guanajuato is different from that found in other areas of Mexico (examples in 1); some speakers also gave more specific evaluations of the dialect (examples in 2), but none of them mentioned the pronunciation of 'f' as a distinctive feature:

(1) a. "*En el norte su sonido es muy diferente* []. *También en el sur de México su sonido es diferente*" (In the north they sound very different []. In the south of Mexico they sound different as well) – subject CA.
b. *"Cada quien tiene el sonido de su voz, cada quien pronuncia las palabras diferente, no hablamos igual.* [] *pues casi todos hablamos español, pero el tono si es diferente"* (We all have different voices and pronounce words differently. We don't talk the same way. [] most of us speak Spanish but the tone is different) – subject MT.
c. *"Se diferencian uno al otro al hablar en los acentos y las palabras. [] por la cultura"* (They are different from each other in their accents and words. [] because of the culture) – subject AR.
d. *"Por ejemplo si tú vas al centro del país no hablan igual que el sur; hasta en el mismo centro, como una persona que es de Guanajuato no va hablar igual que una persona de Oaxaca"* (For example, if you go to the center of the country, they don't talk the same way as in the south; even in the center itself, somebody who is from Guanajuato is not going to talk the same way as someone from Oaxaca" – subject ER.
e. *"A mí se me hacía que hablaba neutral pero me han dicho [en Ciudad de México] que hablo muy cantadito"* (I thought my accent was neutral but [in Ciudad de Mexico] they tell me I talk as if I were singing) – subject MA.

(2) a. *"Hablamos como muy rancheritos"* (We talk very '*rancherito*' / from the country) – subject MT.
b. *"No hablamos correctamente*" (We don't speak correctly) – subject CA.
c. *"Las personas hablan bien. Les entiendo todo. [] pero a unas se les traba su vocabulario"* (People speak well. I always understand them. [] but some of them get their words mixed up) – subject LI.
d. *"Tenemos una forma de decir las cosas, como que siento que rápidas, como cuando hablamos 'teatro', ¿Cómo explicarlo? Hay personas que no hacen como el decir 'teatro' sino 'tiatro'. O sea como que rápido al ya hablar así, pienso.* (We have a way of saying things, I feel we say things fast. Like when we say *'teatro'*. How can I explain it? There are people that don't say *'teatro'* but *'tiatro'*. Like they are talking fast, I think) – subject PA.
e. *"Pues creo que es un habla normal"* (I think the way we talk is normal) – subject UL.

When asked specifically about the pronunciation of 'f', some speakers recognized that they had never noticed alternative pronunciations (examples in 3), while others said they had (examples in 4). In the latter case, some participants gave specific examples, tried to provide articulatory explanations and referred to specific groups that may show the variation:

(3) a. *"Nunca he escuchado a una persona pronunciando diferente a la f"* (I have never heard anyone pronouncing 'f' differently) – subject CA.
b. *"No, no he notado una diferencia"* (No, I haven't noticed a difference) – subject LI.
c. *"Pues si te soy bien honesto, la verdad, no he notado diferencia. A veces no me fijo las palabras, o sea, me fijo en las palabras que digo pero no la forma en que las pronuncio []. Pues para mí, sin ponerle atención, son dos palabras iguales. [] escuchándolo bien, si hay diferencia por la forma en como utilizan los dientes, pero así sin poner atención es normal (no notarlo)"* (Well, to be honest, the truth is that I haven't noticed a difference. Sometimes I don't pay attention to the words, I mean, I pay attention to the words but not to the way I pronounce them []. In my opinion, if I am not paying attention, both words are the same. [] after listening to it, there is a difference in the way you use your teeth, but it's normal not to pay attention to the difference) – subject AL.
d. *"No he notado ninguna pronunciación en especial de la letra 'f', igual sí en otras letras pero no en 'f'* " (I have not noticed any special pronunciation of letter 'f'. Maybe with other letters, but not 'f') – subject MA.

(4) a. *"Sí, la 'f' en fuego es diferente"* (Yes, the 'f' in *'fuego'*/fire is different) – subject MT.
b. *"En algunas se pronuncia más la 'f' que en otras palabras. Tienen un tono más fuerte que en otras"*. (In some words 'f' is pronounced more than in others. It has a stronger tone) – subject AR.
c. *"Algunos mochan 'f', otros no, []. A veces no sabemos cómo decir correctamente las cosas, o sea, no sabemos pronunciar las cosas y pues ya."*. (Some people cut 'f', others don't, []. Sometimes we don't know how to say things correctly, I mean we don't know how to pronounce things, that's it) – subject RA.
d. *"Oh sí, pues como 'fuente', [] los labios al frente. Pues mucha gente como que sí le pone más acento a la pronunciación. [] Como con gente de más de rancho, tienen un poco pues… descuidan un poco el acento de las palabras. [] Ándale, más bien de énfasis, que les falta un poco más…un poquito analfabeta, ¿no? Pero como quiera nos entendemos aunque se falten letras."* (Oh, yes, like in '*fuente*'/fountain, [] lips to the front. It is like a lot of people give more 'accent' to the pronunciation. More with people from the ranch/country, they have a little… they are not careful with the 'accent' of the words. [] Well, more like emphasis, they don't have…a little uneducated, no? But we still understand each other even if some letters are missing.) – subject UL.
e. *"Muchas de las veces como la 'f' es una…se pronuncia fuerte, como si va con una vocal, como si va 'fo', entonces, o sea la lengua se pega, y mucha gente no más la dice normal; o sea, si yo utilizo 'f' todo el tiempo está moviendo mi boca, presiono la lengua con el labio de abajo pero mucha gente no lo hace. Es igual como la 'r', que no la pronuncian bien. Yo pienso que es una particularidad del cuerpo. [] depende con que persona estés platicando. La*

*gente como que no va mucho a la escuela, no estudia, tienen un diferente de hablar. O sea, habla igual el español pero…* (Many times 'f' is like…it is pronounced strongly, like if it goes with a vowel, like if it goes with 'fo', then, I mean, the tongue gets closer and many people pronounce it normally; I mean, if I use 'f' I am moving my mouth the whole time, I press the tongue against the lower lip, but many people don't do it.[9] It is like 'r', they don't know how to pronounce it. I think it is something anatomical. [] it depends on who you are talking to. People that don't go to school or study talk differently. I mean, the speak Spanish but…) – subject ER.

f. *"Para mí la 'f' es una consonante fuerte. [] yo (la hago) con los dientes"* (For me 'f' is a strong consonant. I (do it) with my teeth) – subject MA.

g. *"Normalmente el labio inferior lo pego hacia los dientes de arriba y después saco el aire. [] en alguna conversación muy larga en la cual se trata de hablar lo más rápido posible entonces a lo mejor si me ha salido [ɸ]"* (Normally I move the lower lip to the upper teeth and then I breathe out. [] in long conversations, when I try to talk fast, maybe I have used [ɸ]) – subject SR.

Despite their exploratory nature, personal interviews provide valuable data on how fricative variants are perceived and evaluated by different members of the community. The most interesting finding is that although [ɸ] is widely attested, none of the speakers considered it a characteristic feature of the dialect of Guanajuato when compared to other dialects in Mexico. Additionally, when asked explicitly about the alternation between [f] and [ɸ], it seems to be the case that not all speakers have perceived the contrast in the community. Interestingly, those that had noticed the alternation, sometimes related it to uneducated people but they didn't think it was necessarily a negative feature. These observations agree with those reported in *Nueva Gramática de la Lengua Española* (RAE & AALE 2011: 187) and highlight that speakers may not be aware of the [f]-[ɸ] variation even when they produce it.

**4. Discussion and conclusions**

We believe that this study on the diastratic variation of fricatives in Guanajuato is a significant addition to the literature of Spanish sociophonetics. Results obtained from the current investigation have determined that, 55 years after Boyd-Bowman's observations (1960), the labiodental fricative [ɸ] is still part of the Spanish spoken by the Guanajuato community in Mexico. After analyzing 632 fricatives produced by twenty-four subjects and considering various internal and external factors, the present study has shown that the nature of the following vowel, the educational level of the speakers and their age have an effect on the choice between the normative variant ([f]) and the vernacular one ([ɸ]).

In agreement with Lipski (1995), Piñeros (2009) and Renaud (2014), results corroborate that the bilabialization of the fricative occurs more frequently with rounded vowels ([o,u]) than with non-rounded ones ([a,e,i]). Interestingly, co-articulation is also more common in [fɾo] and [fɾu] sequences than in other [fɾ] + vowel sequences. This finding suggests that since the articulatory properties of [ɾ] do not interfere with the rounding of the lips in [o] or [u] or [ɸ], the rhotic consonant does not block the labialization process. The same could be assumed for lateral [l] in [flu] or [flo] sequences; nevertheless, future studies are necessary to determine if the V to C

[9] Although the speaker said *'lengua'* (tongue) we believe he was referring to his teeth based on his explanation and gestures.

assimilation process also takes place in these cases. Although unstressed syllables (vs. stressed ones) and preceding consonants (vs. vowels) also seemed to slightly favor the emergence of the vernacular variant over the standard one, the statistical analysis did not consider them relevant factors. Something similar can be said about the gender of the participants. Although females show a slightly higher numbers of labiodental productions than males, the statistical analysis did not find a significant effect with this factor either. In contrast, the analysis confirmed that the choice of the fricative variants did depend on the other two external factors; namely the age of the participants and their educational level.

According to the results, older speakers are more likely to produce bilabial variants than the other two groups, the intermediate group being the one that disfavors the vernacular variant the most. Although this observation agrees with Resnick (1975) and also supports the idea that variation is age-graded and that linguistic features can change through the lifespan of speakers (Sankoff & Laberge 1978; Downes 1984; Cameron 2005; Cheshire 2006), we believe it has to be viewed with caution. Díaz-Campos et al. (2011), after their analysis of syllable final /ɾ/, intervocalic /ɾ/ and intervocalic /d/ in Caracas (Venezuela), conclude that a rise in the use of normative variants in younger generations can be the result of a recent opportunity to access higher educational levels. By looking at the profiles of the participants and the history of Guanajuato, we believe that this could be the case for the community under study as well. The educational level of the speakers turned out to have a strong effect on fricative variation and while speakers that had attained primary or secondary education favor the use of [ɸ], those with university degrees clearly prefer the normative fricative [f]. In our study, the four speakers that form the oldest group are over 65 and all of them had completed primary or secondary education. This is a good representation of the current situation in the area since pursuing higher degrees in the past was not a common option for members of the Guanajuato community. Nevertheless, it is likely that the academic profile of speakers in this group may change in the future since younger members of the community are starting to pursue university-level studies.

Finally, based on the data gathered in the personal interviews, [ɸ] does not seem to be salient to all member of the community nor a linguistic feature used consciously for identity purposes. Nevertheless, we think a longitudinal study with a more detailed ethnographic analysis should be carried out in the future in order to complement current results and follow the evolution of [ɸ]. Special emphasis should be given to the social networks of these speakers due to the aforementioned effect education and age have on the choice of fricatives. Networks and audiences can play a crucial role in the diffusion and use of certain variants over others (see Milroy & Milroy 1978, 1992; Bucholtz 1998; Eckert 2005; Meyerhoff 2015; Vietti et al. 2016; among others) and the recent development Guanajuato is undergoing may have an impact on the social practices of the members of the community. As mentioned in the introduction, the area is experiencing rapid educational and economic changes due to the opening of new university campuses and the establishment of national and international companies in the area. The extended contact with speakers of Spanish that use the standard variant in an academic setting or the workplace could favor the use of [f] over [ɸ]. This behavior would depend on the social evaluations of the speakers and how they perceive the [f]-[ɸ] contrast (if perceived at all), but only a longitudinal study will be able to describe accurately the evolution of the status of bilabial fricatives in the Guanajuato community.

Sergio Robles-Puente
West Virginia University
Department of World Languages, Literatures and Linguistics
Chitwood Hall, PO Box 6298.
Morgantown, West Virginia. 26506.
seroblespuente@mail.wvu.edu

José Jesús Vilches-Aguado
Miami University
Department of Spanish and Portuguese
Irvin Hall, 400 E. Spring Street.
Oxford, Ohio. 45056.
vilchejj@miamioh.edu

**References**

Boyd-Bowman, P. (1960). *El habla de Guanajuato*. Universidad Nacional Autónoma de México: Imprenta Universitaria. México.

Broce, M. & R. Torres Cacoullos (2002). Dialectología urbana rural: la estratificación social de (r) y (l) en Coclé, Panama. *Hispania* 85(2): 382-395. https://doi.org/10.2307/4141096

Bucholtz, M. (1998). *Social categories and local identities in the California vowel shift*. Paper presented at NWAVE 27 (October 1998), Athens, Georgia.

Butragueño, P. M. (2016). Inmigración y reconstrucción de la identidad lingüística: el caso de Ecatepec. *Cuadernos AISPI. Associazione Ispanisti Italiani* 8:145-170.

Calvo Shadid, A. (1996). Variación del fonema /f/ en dos sociolectos costarricenses. *Revista de Filología y Lingüística de la Universidad de Costa Rica* 22 (1): 199-127. https://doi.org/10.15517/rfl.v22i1.21006

Cameron, R. (2005). Aging and gendering. *Language in Society* 34: 23-61. https://doi.org/10.1017/S0047404505050025

Canfield, L. D. (1981). *Spanish pronunciation in the Americas*. Chicago and London: University of Chicago Press.

Cheshire, J. (2005). Age and generation-specific use of language. Revised version of the 1987 paper. In U. Ammon, N. Dittmar, K. Mattheier, & P. Trudgill (eds.), *Sociolinguistics: an introductory handbook of the science of language and society,* 2nd. edition, 1552-1563. Berlin: Mouton de Gruyter.

Díaz-Campos, M., S. Fafulas & M. Gradoville (2011). Going Retro: An Analysis of the Interplay between Socioeconomic Class and Age in Caracas Spanish. In J. Michnowicz & R. Dodsworth (eds.), *Selected Proceedings of the 5th Workshop on Spanish Sociolinguistics*, 65-78. Somerville, MA: Cascadilla Proceedings Project.

Downes, W. (1984). *Language and Society*. London: Fontana Press.

Eckert, P. (1997). Age as a sociolinguistic variable. In F. Coulmas (ed.), *The Handbook of Sociolinguistics*, 151-167. Oxford: Blackwell.

Eckert, P. (2000). *Linguistic Variation as Social Practice*. Oxford, U.K.: Blackwell

Eckert, P. (2005). *Variation, convention, and social meaning*. Paper presented at the 34th Annual Meeting of the Linguistic Society of America (January 2005), Oakland, California.

Flórez, L. (1951). *La pronunciación del español de Bogotá*. Bogotá: Publicaciones del Instituto Caro y Cuervo, 8.

Instituto Nacional de Estadística y Geografía. (2015). Available at: http://www.beta.inegi.org.mx/app/areasgeograficas/?ag=11 [January 2018]

Hualde, J.I. (2005). *The Sounds of Spanish.* Cambridge: Cambridge University Press.

Labov, W. (1963). The social motivation of a sound change. *Word* 18:1-42.

Labov, W. (1972). *Sociolinguistic Patterns*. Philadelphia: University of Pennsylvania Press.

Labov, W. (1990). The intersection of sex and social class in the course of linguistic change. *Language Variation and Change* 2(2): 205-254. https://doi.org/10.1017/S0954394500000338

Lenz, R. [translated by Alonso, A. & R. Lida]. (1940). Para el conocimiento del español en América. *Biblioteca de Dilectología Hispanoamericana* IV: 209-258.

Lipski, J. (1995). [Round] and [labial] in Spanish and the "free-form" syllable. *Linguistics* 33: 283-304. https://doi.org/10.1515/ling.1995.33.2.283

Maddieson, I. (2005). Bilabial and Labio-dental Fricatives in Ewe. *UC Berkeley PhonLab Annual Report*, 1. Available at: https://escholarship.org/uc/item/4r49g6qx [January 2019]

Milroy, J. & L. Milroy (1978). Belfast: Change and Variation in an urban vernacular. In P. Trudgill (ed.), *Sociolinguistic patterns in British English*, 19-36. London: Arnold.

Milroy, J. & L. Milroy (1992). Social network and social class: Toward an integrated sociolinguistic model. *Language in Society*, 21(1): 1-26. https://doi.org/10.1017/S0047404500015013

Meyerhoff, M. (2015). *Introducing Sociolinguistics.* New York, New York: Routledge (Taylor & Francis). https://doi.org/10.4324/9780203874196

Navarro Tomás, T. (1943). *El español en Puerto Rico. Contribución a la geografía lingüística hispanoamericana.* Río Piedras: Editorial Universitaria de la Universidad de Puerto Rico.

Perissinotto, G. S. A. [translated by R. Ávila] (1975). *Fonología del español hablado en la ciudad de México*: *Ensayo de un método sociolingüístico*. Mexico: El Colegio de México.

Piñeros, C. (2009). *Estructura de los sonidos del español*. Upper Saddle River, New Jersey: Pearson Prentice Hall.

Predmore, R. L. (1945). Pronunciación de varias consonantes en el español de Guatemala. *Revista de Filología Hispánica* VII: 227-280.

Real Academia Española (2014). *Diccionario de la lengua española* (23ª ed.). Available at: https://dle.rae.es/?id=HR2Z6MX [December 2018]

Real Academia Española & Asociación de Academias de la Lengua Española. (2011). *Nueva gramática de la lengua española. Fonética y Fonología.* Madrid: Espasa Libros.

Renaud, J.B. (2014). *An optimality theoretic typology of three fricative-vowel assimilations in Latin American Spanish*. Ph.D. Dissertation, University of Iowa.

Resnick, M. C. (1975). *Phonological variants and dialect identification in Latin American Spanish*. The Hague: Mouton.

Rodríguez, O. (2011). Las luchas de la Iglesia católica contra la laicidad y el comunismo en México. *Estudios Políticos* 22: 11-26.

Sanicky, C. A. (1988). El comportamiento de /f/ en el habla misionera. *Bulletin of Hispanic Studies* 65 (3): 273-278. https://doi.org/10.1080/1475382882000365273

Sankoff, D. & S. Laberge (1978). The Linguistic Market and the Statistical Explanation of Variability. In D. Sankoff, *Linguistic Variation: Models and Methods*, 239-250. New York: Academic Press.

Sankoff, D., S. A. Tagliamonte & E. Smith. (2012). Goldvarb Lion: A variable rule application for Macintosh. Department of Linguistics, University of Toronto.

Shousterman, Cara. 2014. Speaking English in Spanish Harlem: The Role of Rhythm. *University of Pennsylvania Working Papers in Linguistics,* 20 (2): 157-168.

Tagliamonte, S. A. (2012). *Variationist Sociolinguistics. Change, Observation, Interpretation*. UK: Wiley-Blackwell.

Trudgill, P. (1972). *The social differentiation of English in Norwich*. Cambridge: Cambridge University Press.

Vietti, A. & L. Spreafico (2016). The sociophonetic variation of /r/ in Bozen: Modelling linguistic and social variation. *International Journal of Linguistics* 8(5): 72-88. https://doi.org/10.5296/ijl.v8i5.9849

Vila Freyer, A. (2017). La historia y el presente de la inmigración japonesa en México: hacia una agenda para el estudio de esta comunidad inmigrante en Guanajuato. *Acta Universitaria* 27 (3): 78-90.

Zhang, Q. (2005). A Chinese yuppie in Beijing: Phonological variation and the construction of a new professional identity. *Language in Society* 34: 431-466. https://doi.org/10.1017/S0047404505050153

## Appendix

Table A1: List of subjects that collaborated in the study.

| Subject | Gender | Age | Education |
|---|---|---|---|
| GE | M | 36 | *universidad* |
| UL | M | 27 | *primaria* |
| SU | F | 32 | *secundaria* |
| EL | F | 68 | *primaria* |
| SA | M | 66 | *primaria* |
| SR | F | 24 | *universidad* |
| ER | M | 25 | *universidad* |
| MA | F | 25 | *universidad* |
| JU | M | 70 | *primaria* |
| JL | F | 35 | *primaria* |
| RI | F | 68 | *secundaria* |
| MR | M | 33 | *primaria* |
| OC | M | 23 | *universidad* |
| BL | F | 28 | *primaria* |
| MT | M | 49 | *primaria* |
| AL | M | 42 | *secundaria* |
| LU | F | 45 | *universidad* |
| AA | F | 41 | *universidad* |
| CA | F | 18 | *universidad* |
| MI | M | 18 | *secundaria* |
| RA | M | 23 | *secundaria* |
| AR | F | 26 | *secundaria* |
| LI | M | 45 | *secundaria* |
| PA | F | 24 | *secundaria* |