

## Revisiting sociophonetic competence: Variable spectral moments in phrase-final fricative epithesis for L1 & L2 speakers of French

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Phrase-final fricative epithesis (PFFE; AKA Phrase-Final Vowel Devoicing) is a phenomenon in Continental French (CF) in which utterance-final vowels lose their voicing and produce intense fricative-like whistles, e.g. *mais oui\_hhh*. Fónagy (1989) speculated that PFFE's phrase-final whistles weren't uniform in nature but rather corresponded to the identity of their host vowel. A subsequent center of gravity (COG) analysis of devoiced /i,y,u/ corroborated this assertion by reporting significant differences in each vowel's spectral energy during the first half of the segment (Author1, 2015). Although first examined in the speech of native French speakers, PFFE is also well attested in the speech of L2 French speakers (Author1, 2014; Author1 et al., 2017), and differences between L1 and advanced L2 French PFFE have been documented for both production and perception. Author1 (2014) reported production differences across speaker groups in vowel-fricative ratio (VFR), while Author et al. (2017) found speaker group differences in vowel type, speech rate, register and constituent location. Authors (2019) provided the first spectral (COG) analysis documenting L1/L2 sociophonetic differences, reporting an L2 preference for PFFEs with high levels of articulatory energy at low VFRs, compared to an L1 preference for PFFEs with predominantly flat-low energy profiles. It is the goal of the present study to enhance what is known about L1/L2 sociophonetic differences by extending the current line of inquiry on PFFE to include the full set of spectral moments relevant to fricatives: measures of COG, standard deviation, skewness, kurtosis and intensity.

40 CF speakers completed a reading task targeting 98 tokens of /i,y,u/ in phrase-final position. 4565 PFFE segments were examined via 7 frames of 8 ms in length, with 2 ms of overlap, across their full trajectory (Toda, 2007; 2009). Spectra were then averaged across time and measured for COG (average frequency attained), standard deviation (average amount of variation in that attained frequency), skewness (spectral tilt; slant of energy distribution), kurtosis (peakedness or clear definition among peaks) and intensity (segment loudness). Measures of COG were normalized (Toda, 2007; Shadle & Mair, 1996). Each of the five measures was then submitted to a separate mixed-effects linear regression with vowel (/i,y,u/), speaker group (L1, L2 French) and categorical measures of VFR (0-50%, 50-75%, 75-100%) as fixed effects and speaker as a random effect. Results for COG corroborated previous findings (Authors, 2019): not only did L2 speakers show higher COGs at lower VFRs than L1s ( $p < .001$ : see Figure 1), but they also showed significantly lower intensities ( $p < .05$ ; see Figure 2), larger standard deviations ( $p < .05$ ), less positive skewness ( $p < .01$ ) and lower kurtosis ( $p < .0001$ ). This suggests that although advanced L2 speakers produce PFFE in native-like ways, the segments they produce are spectrally different:

characterized by higher overall frequencies, less overall volume, a higher concentration of lower-frequency energies, less clearly defined spectral peaks and a higher degree of variation, as compared to L1 speakers. These findings have implications for L2 sociophonetic competence because they demonstrate the extent to which L1/L2 sociophonetic realisations contain nuanced spectral differences far beyond the durational and presence/absence paradigms still common to many variationist inquiries.

Figure 1. Notched boxplots of COG (Hz) by VFR, vowel type and speaker group

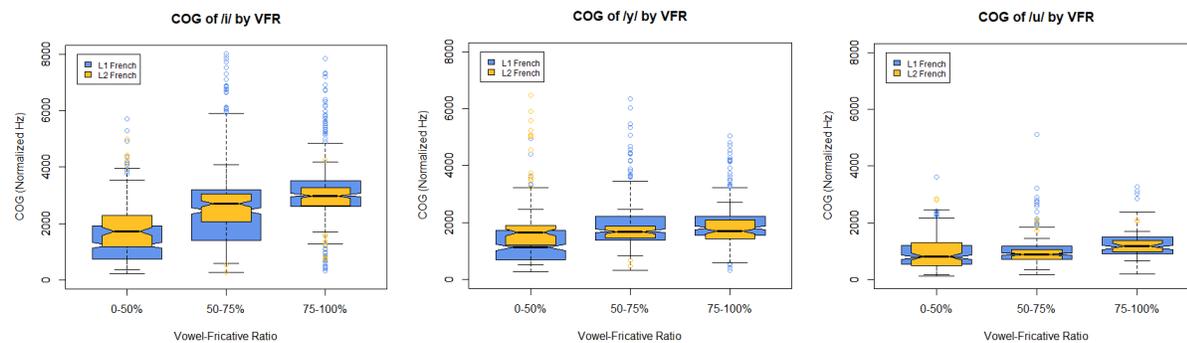
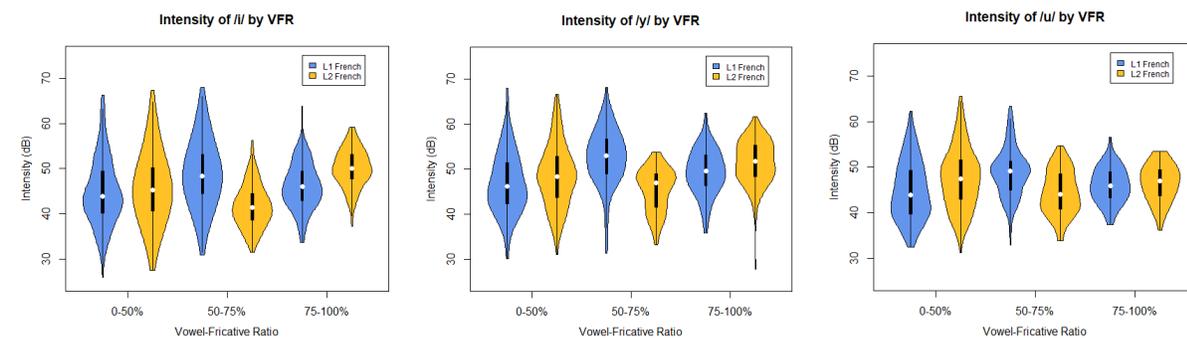


Figure 2. Violin plots of intensity (dB) by VFR, vowel type and speaker group



### Works Cited

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