

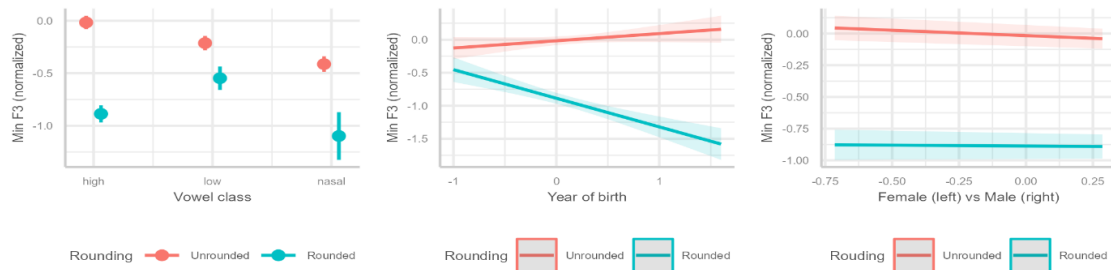
Formant trajectories of three rhotic vowels in Quebec French

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Introduction: Rhotic-sounding realizations of the front mid rounded vowel phonemes in Quebec French (QF) /ø, œ, œ̃/ have been periodically noted in the literature. However, the only systematic investigation of the phenomenon is due to Mielke (2013), a corpus and articulatory study which confirmed a change in progress whereby speakers exhibit varying degrees of tongue bunching in these vowels, resulting in a marked drop in average F3 for speakers born after 1960. No significant effect of gender or socioeconomic class was found, leading to the hypothesis of a change from below—that is, one which speakers are not conscious of as it progresses. Mielke suggests a perceptual motivation for the change: rhotacization serves to enhance the inherent acoustic cues of these vowels due to lip rounding (like low F3)—although not fully spelled out, this presumably serves to increase perceptual distance between them and their unrounded counterparts /e, ε, ẽ/. However, the F3 trajectories of the unrounded vowels are not included in the study, precluding a direct evaluation of this hypothesis. Moreover, the Mielke study examines only static formants (F3 minimum), whereas in recent years there has been a movement in sociophonetics towards modelling entire formant trajectories. The present study aims to remedy these two limitations.

Data: 26,603 tokens across 55 speakers of the 6 phonemes, extracted from a force-aligned corpus of parliamentary proceedings (Milne 2014). F3 was measured at 5% intervals between 20% and 80% of duration using *PolyglotDB* (McAuliffe et al. 2019), and Lobanov-normalized.

Methods: Initially, for direct comparison with Mielke’s study, a linear mixed effects regression (LMER) model of minimum F3 ~ rounding, height, nasality, year of birth, gender, and the interactions between these variables will be fit. Ultimately, a generalized additive mixed model (GAMM) of F3 ~ time and the aforementioned variables will be fit to directly investigate variation on the level of the formant trajectories.



Results: Model fitting and validation are still underway. Preliminary results from a random intercepts-only LMER model of minimum F3, however, are available, and are shown in the above figures. F3 is predicted to be markedly and significantly lower in the rounded vowels than in the unrounded vowels across all three phoneme pairs: this effect is greatest for /ø/ and smallest for /œ/ (left plot). Over time, F3 is predicted to be decreasing significantly in the rounded vowels; it may also be increasing slightly in the unrounded vowels, although this is effect is marginally not significant (centre plot). No significant effect for gender is found, as the overall rounded-unrounded difference is almost exactly the same in women and men (right plot). It should be noted, however, that in the models fitted so far, the year of birth effect becomes much less clear once by-speaker random slopes are included. Updated results on this issue and on the other findings will be reported once the final models have been fitted; results from GAMMs will also be presented.

References

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