

Re-evaluating the role of duration in Laurentian French high vowel laxing

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INTRODUCTION: In languages with both tense and lax vowels, tense vowels have longer durations than their lax counterparts (Clopper et al., 2005). Whereas high vowel laxing in Laurentian French (e.g. /vit/ [vit] *vite* ‘fast’, Dumas, 1983) is categorical in all closed final syllables except those closed by voiced fricatives (e.g. Walker, 1984), recent work suggests smaller coarticulatory effects from codas may influence vowel tenseness (Redacted). Further, previous research on Laurentian French laxing has shown vowels which precede lengthening consonants (/v z ʒ ʁ vʁ/) have longer durations than those which precede other codas (Ouellet et al., 1999). We test whether duration alone explains variable high vowel laxing based on conditioning from the following coda because coarticulatory effects associated with phonological coda features influence the phonetic realization of the preceding vowel (e.g. Chen, 1970). We quantify laxing in terms of vowel height because previous research agrees that laxing in Laurentian French implies lowering (e.g. Burness et al., 2022), while the pattern for backness is variable (c.f. Dalton, 2011; Arnaud et al., 2011). We find (a) vowel height is conditioned based on the following coda and (b) duration alone does not condition tenseness.

METHODOLOGY: We analysed 2,222 high vowels which lax before non-lengthening codas in closed final syllables from 26 speakers of Laurentian French in a corpus of televised interviews (Villeneuve, 2017). Sound files were force aligned using the *Montreal Forced Aligner* (McAuliffe et al., 2017) and F1 was measured using *Praat* at 50% of the vowel’s duration. We use two mixed-effects linear regressions to predict both F1 and vowel duration based on coda voicing, place, and manner. Speaker, phoneme, and word are included as random intercepts.

RESULTS: We find high vowels that precede voiceless codas are associated with higher F1s and thereby are lower in height than those that precede voiced codas ($p=0.0088$). Additionally, high vowels that precede fricatives have lower F1s and are therefore higher than those that precede approximants ($p=0.0398$); all fricatives in the data are voiceless since lengthening codas consonants were excluded. We also find high vowels that precede nasals are associated with a shorter duration in comparison to approximants ($p=0.0026$), and high vowels that precede palatals have a longer duration than those that precede coronals ($p=0.0319$).

DISCUSSION: Our results demonstrate that duration alone is not sufficient motivation for laxing because palatals and nasals result in longer durations while neither condition tenseness. Additionally, our results are consistent with existing literature in that voiced codas condition greater preceding-vowel height than those before voiceless codas (Summers, 1987). Whereas both voiceless and voiced fricatives in French typically lengthen the vowel (O’Shaughnessy, 1981), our results do not reflect this increase in vowel duration before fricatives. We posit that voiceless fricatives in this dialect have small coarticulatory effects on the preceding vowel which render it higher than codas with different manners of articulation. We therefore propose that lack of laxing before voiced fricatives in Laurentian French may be described as an interaction of coarticulatory effects from both the voiced and fricative features associated with those consonants instead of due to duration alone.

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