Variability in the French Mid Vowels: Vowel Harmony, Syllable Structure, and the Creation and Effects of Phonological Representations
Jeffrey Lamontagne (McGill University)  
jeffrey.lamontagne@mcgill.ca

Introduction. The French mid-high and mid-low vowels (/e/ ø and /ɛ/ o, respectively) are described as being distinguished by height not by laxing (Nguyen et al. 2004). Canadian French (CF), however, has the potential to generate a laxness contrast due to the feature being phonologically active in laxing alternations triggered by syllable structure (ex. vie ‘life’ [vi] but vite ‘quick’ [vɪ] and in optional high vowel laxing harmony (ex. limite ‘limit’ [limɪt]–[limɪt]). Additionally, in examining laxing harmony, Poliquin (2006) observed an effect of vowels being phonologically similar, suggesting harmonic effects may be modulated by the similarity of vowels’ representations.

Two main processes have been proposed to affect the mid vowels’ realisations. The loi de position (‘law of position’, LDP) is a trend for the mid-low vowels to surface in closed syllables and for the mid-high vowels to surface in open syllables, a change in progress in European varieties and a robust lexical tendency in final syllables (fée [fe], faite [fet] and fait [fet] are expected, but fait [fet] is not, eg. Morin 1988). Secondly, vowel harmony (VH) is a proposal that the vowels’ heights will be influenced by the phonological identity of the following syllable’s vowel (eg. Nguyen et al. 2004).

The interaction between two processes has never been examined and large-scale research on the LDP focuses on final syllables, where CF shows little to no effect (Lamontagne 2014). Non-final syllables may also show the greatest effect of the LDP since suffixation (particularly for verbal inflexion) leads to the mid-vowel contrast having a large functional load in final syllables and laxing in high vowels may suggest the LDP is active in the dialect where contrasts aren’t threatened (Morin 1988). Furthermore, VH may be more robust in CF given optional harmony in high vowel laxing.

Mixed-effect linear regression analyses reveal that the LDP does not significantly predict mid-vowels’ first formants, whereas VH effects were significant both at phonetic (following vowel’s F1) and phonological (following vowel’s underlying height) levels. More similar following vowels (rounding, backness) had greater harmonic effects, which was for true laxness for younger speakers, suggesting laxness may be an emerging phonological category in CF. This study illustrates that gradient phonetic processes may be used as suggestive evidence for the featural specifications of vowels where the rarity or absence of minimal pairs, as is the case of laxing in the CF high vowels.

Methods. Over 25 000 mid vowels in non-final syllables from 67 Canadian French speakers from Ontario and Quebec spanning three generations (young, middle-aged and senior adults) were extracted from the Phonologie du français contemporain corpus (Durand et al., 2002, 2009; www.projet-pfc.net). The vowel’s F1 was measured at the mid-point by script in Praat (Boersma and Weenink 2015) and taken as the dependent variable in mixed-effect linear regression models with random intercepts and slopes for both words and speakers. We here focus on the roles of the syllable structure (open or closed), the following vowel’s F1, and the correspondence between the target and following vowels’ features (backness, laxing, height and rounding). This allows us to get a glimpse of how phonological representations might modulate the two processes.

Results and discussion. This study found that neither mid-low nor mid-high vowels showed a significant effect of syllable structure (p=0.1877), suggesting that the LDP may not playing an active role in the dialect. Figure 1 illustrates that in mid-low vowels there is a slight trend for the vowel to be lower in closed syllables. In mid-high vowels, however, the trend is reversed, likely due to the effects of the off-glide when diphthongisation occurs.

Figures 2 and 3 illustrate that the following vowel’s height is positively correlated with the mid vowels’, even when considering both the phonetic and phonological measures of height (both p<0.0001). This appears to influence the surface vowel in a way that asymmetrically affects the mid-high series, with the mid-high series effectively being realised as mid-low. The lowering of mid-low vowels followed by a low vowel is only significant when the vowels have the same underlying backness and applies to a greater extent in penults (both p<0.0001). Figure 4 shows that young speakers have a significant effect of the laxing even with following high vowels (p=0.0012): lax vowels raise the mid-low vowels more, just as tense vowels raise the mid-high vowels more.

In summation, we find that the loi de position has a small effect if any at all even in young speakers, while harmonic tendencies appear to be strong both based on phonetic and phonological measures of vowel heights and may affect the surface vowel categorically. Additionally, these effects are enhanced by increased featural similarity, which is particularly interesting because the effect of similarity in laxing increasing in apparent time may indicate that laxness is becoming an element of
phonological representations. This work could be suggestive that, where there are few or no clear minimal pairs, gradient phonetic processes could be used to support the proposal that there is an underlying contrast between sounds through the interaction between contrastively specified vowels and vowels where feature specifications might be uncertain (here the mid and high vowels, respectively, both with respect to underlying laxing).

Figure 1: The normalised F1 according to the syllable structure. Henceforth the broken horizontal lines indicate the mean F1 by underlying height (marked ‘i’, ‘e’, ‘ɛ’ and ‘a’, respectively, from high to low).

Figure 2: The normalised F1 according to the underlying height of the following vowel.

Figure 3: The predicted normalised first formant according to both the underlying height of the following vowel and that vowel’s first formant.

Figure 4: The predicted normalised first formant by age and laxing of the next vowel when that vowel is high.

References