When oui becomes ou[j]: The role of vowel type, preceding consonant and lexical frequency on total final vowel devoicing in Continental French

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Phrase-final vowel devoicing (PFVD), e.g. mais oui_hhh, is a phenomenon in Continental French (CF) in which utterance-final vowels partially or completely devoice to yield fricative-like whistles. To date, most of the scholarly attention on PFVD has focused on its phonological or pragmatic conditioning. Several studies have examined read and free speech data from native CF speakers, and emerged with the finding that high vowels /i,y,u/ in phrase-final position (where intonation in CF canonically falls) exhibit the highest degree of devoicing (Fagyal & Moisset, 1999; Smith, 2003; Martin, 2004). Among the high vowels, Fagyal & Moisset (1999) report the highest rates of devoicing in /i/ (80% of the time: n = 10, 6 target words = 60 total vowels), while Martin (2004) reports the highest rates for /u/ (78.3% of the time: n = 55, 60 target words = 3,300 vowels) and Author (2015) reports maximum rates for both /y/ and /u/ (47% and 45% of the time, respectively: n = 71, 72 target words = 5,112 vowels). At the lexical level, Author (2015) found that the higher the lexical frequency score of a word, the more likely it would be to manifest PFVD. At the segmental level, few investigations have been done on the role of the immediately preceding consonant: Martin (2004) found evidence to suggest that preceding stops favor it over other manners of articulation, however, the findings were marginal, since preceding environments in the study were limited to voiceless obstruents (/p,t,k,f,s,ʃ/). Author (2015) furthered this investigation by examining both the role of voicing and manner of the preceding consonant, to find that stops conditioned PFVD at significantly higher rates than fricatives and sonorants, and that voicing played no significant role.

Common to all of these studies was the treatment of the PFVD variable as binary—present or absent—in a given target word. Such analyses, while revealing of the overall trend, fail to distinguish between vowels that are partially devoiced and vowels that are totally devoiced, grouping them together and holding them to the same predictions. This is problematic because total vowel devoicing (TVD) is attested outside of phrase-final position in varieties other than CF, and has been found to show different segmental conditioning than that reported for the combined PFVD group in CF (Author 2015). In Japanese and Quebec French (QF), TVD primarily occurs in high, unstressed vowels between voiceless consonants (Tsuchida 2001, Cedergren & Simoneau 1985), or, in QF, if the vowel is adjacent to at least one voiceless consonant (Cedergren & Simoneau 1985). See (1) below.

   b. QF: /depye/ > [dépye] député ‘deputy’
   c. QF: /debite/ > [debite] débiter ‘to debit’

This study seeks to refine pre-existing claims on combined PFVD in CF by isolating occurrences of TVD and studying their segmental and structural preferences, as compared to the larger phenomenon in CF and the larger TVD phenomenon appearing crosslinguistically. In particular, vowel type, voice and manner of the preceding consonant and lexical frequency are the focus of this examination.

Devoiced vowels were elicted from 71 native CF speakers in a two-part reading and roleplaying task. Each task was performed twice and targeted 18 phrase-final tokens of /i/, /y/ and /u/, in environments with preceding consonants that were both voiced and voiceless and of different manners of articulation: stops, fricatives, nasals and liquids (72 vowels per participant: 5,112 total). Each target vowel was measured for overall duration (A), then inspected for the presence of a devoiced portion, determined by a drop in intensity and a lack of voicing bar in the spectrogram. The devoiced portion was measured (B), and a “percent devoicing” score for each vowel was calculated by dividing: B/A. Only vowels that measured 100% (n=255/2125) were examined in this investigation. Target words were selected for their varying frequency scores (spanning 377 to 801,251) from a 6,000,000-word online corpus of French (Wortschatz 2014). This was done in order to test if the application of TVD is purely phonological, or more frequent in
higher frequency items. In order to avoid binning scores into arbitrarily defined low-medium-high categories, they were rescaled and treated as continuous variables.

Binary measures of presence of TVD were submitted to a logistic mixed-model regression, with the fixed factors of Vowel (3 levels: /i/,/y/, /u/), Voicing (2 levels: voiced, voiceless), Manner (4 levels: stops, fricatives, nasals, liquids), Word Frequency (continuous), and the random factor of Participant, to allow for individual variation without Type I errors (Baayen et al. 2008). Results revealed that high vowels in CF do not undergo TVD at statistically similar rates: /i/ and /y/ manifested the variable similarly, while /u/ was significantly less likely (p <.01). A two-way distinction emerged with respect to preceding manner type: stops >> fricatives, nasals, liquids (p <.01). No main effect was found for lexical frequency (p=0.7449) or voicing of the preceding segment (p=0.2236), but a significant interaction emerged between /u/ and voicing, such that TVD was more common with /u/ when preceded by a voiceless C than a voiced one (p<.0001). See Figure 1 below.

These findings are meaningful because they reveal that TVD in CF neither behaves entirely like the larger combined phenomenon of PFVD, nor like the crosslinguistic phenomenon of TVD. TVD is a not a phonological process that happens uniformly across high vowels in CF (unlike Japanese & QF), nor does it occur most often in the same vowels as combined PFVD. It does not occur systematically in the presence of all voiceless consonants (unlike Japanese & QF), nor is it completely independent from voicing for all vowels (unlike combined PFVD). It does, however, show a preference for occurring after stops vs. other manner types (like combined PFVD), although no effect was found for lexical frequency (unlike combined PFVD). The present work has implications for phonetics and phonology by launching the discussion as to why and how TVD might be differently conditioned from other types of devoicing, but still share the same preference for preceding segments that are low in sonority.

Figure 1. Odds Ratio of TVD Occurrence by Vowel and Voice Type

<table>
<thead>
<tr>
<th>Vowel</th>
<th>Preceding Voiced C</th>
<th>Preceding Voiceless C</th>
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<tbody>
<tr>
<td>/i/</td>
<td></td>
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<td>/u/</td>
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Works cited


