

# Language maintenance and tonal variation in French in contact

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## Abstract

The prosody of French in contact with English is insufficiently studied. This case study explores intonational variation in Ontario French (Canada) and focuses on some of the features susceptible to change under contact: inventory and distribution of pitch patterns, and, through tonal alignment, their phonetic realization. Data from speakers with different language fluencies show that this variety exhibits the same pattern inventory as other French dialects; however, less fluent speakers use considerably more falling continuity contours, rather than rising ones. They also realize the phrase-final F0 peak significantly later.

## 1. Introduction

### 1.1. French in Ontario

Canada has two official languages, English and French; in all provinces except Quebec, however, French is a minority language. In the province of Ontario, the French presence was established when immigrants from neighbouring Quebec settled in Fort Pontchartrain near Detroit in 1701. The Canadian city that borders the United States at Detroit is Windsor, and data used in this study come from this region. Because of its origin, Ontario French (OF) is considered to be a transplanted variety of Québécois French (QF), and therefore it is not surprising that some vernacular features are found in both varieties. However, we also observe a divergence of OF from QF that can be explained by a system-internal restructuring or by a system-external transfer from the majority English language [1]. Due to linguistic exogamy, most francophones in Ontario are bilingual, but social contexts do not always present opportunities for an equal usage of both languages, and therefore there are speakers who identify themselves as equally bilingual, or as French or English dominant. In this way, the frequency of usage of one or the other language in different social or work situations allows us to determine the level of language restriction, or its inverse, maintenance [2]. Some effects of language contact and restriction in OF have been examined in previous morpho-syntactic, morpho-phonological, and phonetic studies [2], [3], [4]. On the prosodic level, OF and QF are usually considered to be similar, if not the same, showing an irregular rhythmic pattern [5], a larger span, and a more frequent modulation of the fundamental frequency F0 [6], in comparison with the 'standard' French of France (FF). At the same time, some similarities between OF and English have been noted [7], such as the pattern of the declination line of F0.

Considering the origin of OF, one expects that its tonal grammar will largely correspond to that of 'general French'. However, because of the close contact of this variety with English, particularly in this South-Western part of Ontario, situated far from Quebec and thus with minimal contact with

francophones there, it is also expected that some intonational particularities attributable to this English language contact may be found. Among the questions about OF intonation are: Does OF present the same melodic patterns as standard varieties of Canadian and European French? Do these patterns convey the same meaning? Are the differences phonetic or phonological, and can they be explained by language contact? Before any of these questions can be answered, we need to know more about the general characteristics of OF. In order to investigate this, I examine the contour patterns in OF, their frequency of occurrence, and the timing of phonetic realization of F0 maxima in utterance-medial phrases (continuities).

### 1.2. French intonation

Within autosegmental-metrical phonology [8], an intonational contour results from an interpolation between tonal targets – High and Low tones, that are associated with segmental material, usually, stressed syllables. In French, two types of rhythmic stress (not lexical in this language) are distinguished: primary (obligatory) and secondary (optional) (see [9] for an overview). These stresses define the minimal prosodic unit in French – the Accentual Phrase, AP [10]. Its underlying tonal pattern is LHiLH\*, whose most frequent phonetic realizations are LH\*, LLH\*, LHiH\*, HiLH\* (for continuities), and LHiL\*, HiL\* (for declarative finalities). For details and a discussion about phrasing and pattern assignment, and a proposal for a larger inventory of patterns, see [10], [11], [12]. In the above patterns, high tones are linked to syllables bearing primary (H\*) or secondary (Hi) stress, whereas the low tones are usually realized on the same or preceding syllables [10], [13].

### 1.3. Tonal alignment

Since [14], the exact appearance of the tone with regards to the segmental landmarks, such as the beginning/end of a syllable/vowel/ word (i.e., alignment), and its regularity (i.e. anchoring [15]) are found to be carrying various types of information: contrastive [16], pragmatic [17], discursive [18], and regional. For instance, standard German differs from Northern dialects by aligning the pre-nuclear rise later relative to the beginning of the stressed syllable and its vowel [19]. Also, in Scottish Standard English, peaks associated with both nuclear and pre-nuclear stresses appear later in the stressed vowel than in Southern British variety [20]. As one can see, in these studies, segmental reference points vary. This is an important methodological issue [19], which may affect the results of an analysis [21]. Researchers are continuing to test different landmarks searching for the best way to account for language/dialect tonal patterns. Methods of measuring the timing of tonal targets vary as well between taking the maxima/minima e.g. [19], [20] and finding curve turning points ('elbows') [13], [22], [23]. While some languages show evidence of anchoring (e.g. German, English), where both the start and the end of F0 rises and falls are regularly aligned

with segmental material, standard French does not provide evidence for this [13], [22]. The strict anchoring hypothesis was also not confirmed for regional French data: In her study of tonal alignment in Vaudois Swiss French, Miller concludes that this dialect shows a “less peripheral” alignment of tones associated with the initial and final rises within an AP, the intervals being relative to the syllable onsets [23].

#### 1.4. Studies on Canadian French intonation

For detailed discussions on phonetic studies of Canadian French prosody, the reader is referred to [12] and [24]. As for phonological studies, in his work on spontaneous Acadian French (another family of French varieties in Canada in contact with English), Cichocki establishes an inventory of continuity patterns [25]. In my work on read and spontaneous speech data from QF and FF (dialects in non-contact situations) [12], I found that European and Canadian French share tonal grammars, as well as their inventories of intonational contours. However, these dialects vary in the implementation of tones onto segmental material, and the same tonal specifications have different phonetic forms. Finally, in a comparison of the alignment of Hi and H\* tones in text readings from Vendée (France) and QF varieties of French, we conclude that the Canadian speakers align both high tones later with respect to the beginning of the vowel [26]. I will return to this study in the evaluation of the results of the present analysis.

#### 1.5. Scope of the present analysis

To answer the questions in Section 1.1, I focus on the types of melodic patterns, their occurrence, and the peak alignment of the F0 rise associated with primary stress in utterance-medial APs. (In this study, alignment of the preceding L target, prosodic hierarchy and focus structure are not taken into consideration.) I expect to find that OF shows an inventory of intonational contours similar to FF and QF, having the same functions. However, given the situation of language contact, I also expect to identify differences related to the distribution of patterns and their phonetic realizations, manifested by a difference in the alignment of the final peak in a continuity pattern. In addition, by considering the speakers’ language fluency/restriction factor, I am bringing a sociolinguistic perspective onto tonal alignment in regional French in contact.

## 2. Methods

### 2.1. Data and participants

Recordings used for the analysis represent text readings by four female speakers residing in the Windsor region of Ontario. These data are part of the database of the *Phonologie du français contemporain* project, that followed labovian methods in data gathering [27].

All our participants are native speakers of French; however, three of them demonstrate a reduced usage of French in their everyday life (speakers R, D, and L), while H is an unrestricted speaker of French. The age of participants varies: R is 17, D is 43, H is 65, and L is 74. Since the number of participants is small and the age did not appear to affect tonal variation, age factor is not taken into account in this paper.

### 2.2. Procedure, tags and measurements

Data was segmented into syllables and phones using Praat [28]. Then, the following landmarks were tagged: the onset of

the vowel in the stressed syllable (V1), the offset of this vowel (V2), and the F0 peak associated with the stressed syllable (H\*). Vocalic rather than syllabic boundaries were chosen as landmarks because of the variability in onset and coda structures in stressed syllables (French stress being AP-final, this can considerably affect syllable duration and therefore the difference in the interval value between the boundaries and the F0 peak), and because of perturbations of the F0 track associated with obstruent consonants. The F0 peak corresponded to the highest extracted frame value in the contour accompanying the vowel in the stressed syllable. In the case of a series of frames with identical F0 values or a plateau, it was the first one that was chosen [20], [21]. If the pitch track was interrupted by perturbations, a measurement for H\* was not taken. From the time values of these tags, the time distance (intervals) from H\* to the beginning of the vowel (H\*-V1), and from H\* to the end of the vowel (V2-H\*) were calculated.

The following statistical procedures were then applied: To test the equality of variance of intervals, error bars were used. The equality of the distribution of the intervals was established with Levene’s significance test, while the F test confirmed if there was no significant difference between speakers’ means. Finally, multiple pairwise comparisons confirmed that the unrestricted speaker’s alignment of the H\* tone was significantly different from that of the less fluent speakers.

## 3. Results

First, the overall inventory and distribution of the most frequent tonal patterns are presented. Then the alignment analysis and the comparison between Québécois and European French data [26] follow.

### 3.1. Inventory and distribution of tonal patterns

Table 1 summarises the results of data phrasing: the number of observed APs per speaker varies between 185 (L) and 211 (R), giving the total of 784 phrases.

	R	D	H	L	TOTAL
<b>Total phrases</b>	321	300	320	338	<b>1279</b>
<b>Pauses etc.</b>	107	115	116	153	<b>491</b>
<b>APs</b>	211	185	203	185	<b>784</b>

Table 1: Results of data phrasing.

All APs were assigned a tonal pattern following [10], [11], and [12]. Table 2 shows that seven types of contours account for between 82.5% and 93.1% of the speakers’ APs, with an overall average of 86.7%. These are the same patterns found in previous phonological analyses of French intonation in [10], [12] and [13]. As in QF [12], here LLH\* comes out as the most frequent rising contour (between 10.9% and 23.2% of all occurrences), while LHIL\* is the most frequent falling contour (between 10.3% and 25.6% of occurrences) (Table 2). Compared to previous reports on the distribution of tonal patterns in French, the proportion of falling contours in the current analysis is considerably higher. This difference is not simply quantitative but also qualitative, since most of the falling contours in these data are not utterance-final, but medial. Thus, the continuity intonation in OF, in addition to the usual rising pattern, has a falling one (Figure 1). Another significant observation about the distribution of tonal patterns (Table 2) is that in comparison with the unrestricted speaker H, whose cumulative percentage of descending

contours is 17.7%, the restricted speakers (R, D and L) make considerably more frequent use of falls (between the cumulative 24.9% for D, and 46% for R). Moreover, even sequences of falling continuities were observed in the data. This may be interpreted as an effect of their English grammar on the French of the latter group.

Contours	Total OF		R		D		H		L	
	N	%	N	%	N	%	N	%	N	%
LLH*	132	16.8	23	10.9	43	23.2	44	21.7	22	11.9
LH*	114	14.5	18	8.5	30	16.2	37	18.2	29	15.7
LHiLH*	47	6	10	4.7	14	7.6	19	9.4	4	2.2
HiLH*	52	6.6	15	7.1	14	7.6	14	6.9	9	4.9
LHH*	43	5.5	3	1.4	8	4.3	24	11.8	8	4.3
HiL	98	12.5	43	20.4	7	3.8	15	7.4	33	17.8
LHiL	161	20.5	54	25.6	39	21.1	21	10.3	47	25.4
Total	680	86.7	184	82.5	155	83.8	189	93.1	152	82.2

Table 2: Distribution of the seven most frequent tonal patterns.

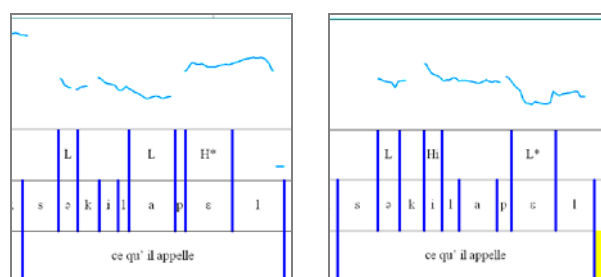


Figure 1: Rising and falling contours in the sentence-medial AP ce qu'il appelle, speaker H (left) and D (right).

I note that a falling contour occurring utterance medially is not completely unusual for (standard) French; it is often heard in stylistically marked speech (e.g. political addresses and readings out-loud), and it is also found in spontaneous speech, though to a much lesser extent [12]. However, given that language restriction is determined on the basis of a reduction in the social/situational use of a language [1], I argue that speakers D, R and L extend the use of falling contours onto continuities, thus converging with English. Analyses of spontaneous speech are needed to confirm this.

### 3.2. Alignment of H\* relative vowel boundaries

The interval measurements between the F0 peak and the stressed vowel boundaries should show the presence of stability in the alignment of the peak with regards to the left or right boundary, and also of a difference between speakers on the basis of their language maintenance. The current results are based on F0 peaks measured for LLH\*, LH\*, LHiLH\* and HiLH\* contours. Since their number varies across speakers (from 64 (L) to 114 (H), Table 2), in order to have comparable samples, I selected between 50 and 59 H\* for analysis, based on the pitch track quality: R – 50, D – 55, H – 54, and L – 59. Consequently, the number of tokens for both H\*-V1 and V2-H\* interval values were the same.

The relevant results are presented in Table 3, which shows that the mean values for both types of intervals are almost identical for the speakers R, D and L (0.15 and 0.16 for H\*-V1, and 0.01 and 0.02 sec for V2-H\*). At the same time, the speaker H stands out with a lower value for H\*-V1 (0.12 sec) and a higher value for V2-H\* (0.04 sec). Since H is the only

unrestricted speaker of French, it is possible that language maintenance can be a factor in the F0 peak alignment, whereas the speakers who are less comfortable with French realize the pitch peak associated with the stressed vowel of non-final APs later. Moreover, statistics show no significant differences between these three in this regard, but they do all differ from speaker H (Table 4). Based on the error bars in Figure 2, we conclude that the interval values for each speaker have a normal distribution, and a Levene's test confirms that there is no significant difference in variance for H\*-V1 or V2-H\* (p=0.423 and 0.232, respectively). The F test further establishes that there is no significant difference between group means (F=5.86, and 13.46, respectively).

		R	D	H	L
H*-V1	mean	0.16	0.15	0.12	0.15
	s.d.	0.05	0.07	0.07	0.05
V2-H*	mean	0.01	0.01	0.04	0.02
	s.d.	0.03	0.04	0.04	0.03

Table 3: Individual means of interval (sec) values.

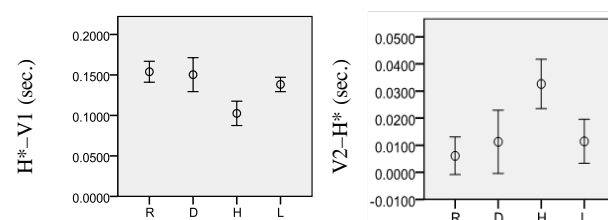


Figure 2: Individual error bars for both types of intervals.

In Figure 2, speaker H stands out by showing no overlap with the values for the other three speakers, whose intervals cover almost the same range as H. However, D's interval values have the widest spread (see also her s.d. values in Table 2), which is probably why the difference between her H\*-V1 values and those of H is not significant (p>0.05) (Table 4). The same table also shows that D is not significantly different from the speakers R and L, while H is. Also, the p value for the difference between D and H is considerably smaller (0.110) than for the differences between D and R (0.941), or D and L (1.0). On this basis D can be considered different enough from H and be placed together with the other restricted speakers.

(I) speaker	(J) speaker	H*-V1	V2-H*
H	R	0.001	0
	D	0.110	0.003
	L	0.012	0.035
D	R	0.941	
	H	0.110	
	L	1	

Table 4: P-values (<0.05 is significant) for multiple pairwise comparisons.

As far as the V2-H\* interval is concerned, the means of the three restricted participants do not show significant differences between speakers, while the unrestricted participant H stands out (Table 4). Therefore, the results for other pairwise comparisons for V2-H\* intervals are not included here.

Let us now compare these results with the previous findings on tonal alignment in French dialects in [26]. The current study combined all H\* preceded by a valley (L tone) and occurring in various patterns, while in our analysis of QF and Vendée French, we looked at F0 maxima in the LHiLH\*

contour only. That study considered peak alignment relative to the left and right boundaries of both syllables and vowels. Dialectal differences between the latencies with regards to the syllabic landmarks were not significant. Instead, distances between both H<sub>i</sub> and H\* tones and the beginning of the vowel were significantly different. For the H\* tone the interval values were 0.10 (QF) and 0.08 sec. (Vendée). These values are considerably smaller than the means for H\*-V1 in Table 3 (between 0.12 and 0.16 sec.). It is interesting that in both Canadian varieties peaks appear later than in the European one, and in OF even later than in QF. As for the distance from the tonal target to the end of the vowel, in [26] both Québécois and Vendée French have H\* appearing 0.03 seconds before the vowel offset. This is a larger interval than for the individual means of unrestricted speakers for V2-H\* in Table 3. Even though there is a difference between the two studies concerning the choice of the contours to be analyzed, I believe that the combined results suggest a genuine distinction: in the Ontario variety of Canadian French, H\* pitch peaks appear later with respect to the onset of the stressed vowel and are closer to its end. Statistical comparisons between all three varieties, using larger data samples, will tell us more.

#### 4. Conclusions

This first report on OF intonation reveals that it can be described using the same model as other varieties of French, and that the same inventory of tonal patterns, previously observed in FF and QF, accounts for 86.7% of the Ontario data. However, OF restricted speakers show an extensive use of falling continuities, which is probably the result of convergence with English. Language restriction also appears to be a factor in the alignment of the AP-final peak, since pitch peaks come significantly later with respect to the onset of the vowel in the data from the three less fluent speakers. Future work should include consideration of low targets, prosodic hierarchy, and tonal pattern differentiation. Analyses of larger data samples including different age groups and both genders, as well as samples of spontaneous speech, will allow further generalizations.

#### 5. Acknowledgements

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