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Phonetic change over the career: a case study

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Abstract: This study is concerned with phonetic flexibility in adulthood. Through a longitudinal analysis of the speech of the public French speaker Michaëlle Jean, we explore the relationship between an individual's phonetic characteristics and career path. We carried out an acoustic analysis of the contextual tense-lax split of the high vowels /i y u/, a phonetic feature of Quebec French that is not found in other French-speaking areas. Sixty-two recordings spanning three decades and divided into five different stages of the speaker's career were considered. The results showed that Jean produced the tense-lax split as a journalist based in Quebec, but progressively suppressed it as her career became more international, after which a reversal of the trend was observed. Taken together, these results indicate that a certain phonetic flexibility is maintained over the lifespan, and that career is an influential external factor that could be more frequently considered in sociolinguistic studies. From a broader perspective, our study contributes to a better understanding of language use during social ageing, which has proven to be less linear than chronological ageing.

Keywords: career; French; lifespan; longitudinal; public speaker; tense-lax split; vowels

1 Introduction

In an influential book on language biology, Lenneberg (1967) laid the foundations of the *critical period hypothesis*, which suggested that language acquisition in humans was most effective between the age of two and the onset of puberty. By means of an arguably large leap from Lenneberg's original argument, the idea that speakers do not change their pronunciation over adulthood eventually took hold in linguistics, which in turn led to “a vast wasteland in the study of variation” (Eckert 1997: 165) with adults aged 20–60 years generally underrepresented in studies focusing on intra-individual longitudinal change (Buchstaller and Wagner 2018; Gerstenberg and Voeste 2015).

Nevertheless, researchers have recently shown increased interest in the topic (Hazan 2017; Sankoff 2018a). They have found that the phonetic system of adult speakers was more flexible than previously assumed, with external factors like geographic mobility (De Decker 2006; Evans and Iverson 2007; Kwon 2018; Reubold and Harrington 2015; Sankoff 2004), social mobility (Sankoff 2004; Sankoff and Blondeau 2013) and change in progress in the community (Bowie 2005, 2015; Harrington et al. 2000a, 2000b; MacKenzie and Sankoff 2010; Nahkola and Saanilahti 2004; Sankoff and Blondeau 2007) identified as influential. According to Sankoff (2018a), these put sufficient pressure on the speakers' linguistic system to outweigh a natural tendency to stability and declining plasticity.

Some studies also illustrate that important events in an individual's life trajectory coincide with phonetic changes. For instance, in a longitudinal study of British-American broadcaster Alistair Cooke spanning seven decades (1934–2004), Reubold and Harrington (2018) found that during his first years in the USA, Cooke had acquired some features of American English, but by the end of his life, those features were back to being more RP-like. The authors tied these trends to Cooke's perception of the USA: from very enthusiastic in the early years, the time when the reversal occurred saw him become disillusioned. Shapp et al. (2014) investigated the speech of

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Ruth Bader Ginsburg and found an increase in her use of non-standard variants of New York City English when she was Justice at the Supreme Court, in the 2000s, compared to when she was a lawyer in the 1970s.

Both studies on Cooke and Ginsburg exemplify how important benchmarks, some specific to particular speakers, may trigger phonetic changes. The study by Shapp et al. (2014) further highlights that benchmarks during adulthood are often related to work. In modern Western societies, a person's first full-time employment, promotions, job loss, career changes, retirement, etc., are indeed "life experiences that give age meaning" (Eckert 1997: 167) more than chronological ageing *per se* (Pichler et al. 2018; see also Arnett 2000, 2004; Biggam 2012 for more about life stages and the concept of *emerging adulthood*). These may therefore set phonetic changes in motion just like moving abroad or up and down the social ladder (Buchstaller and Wagner 2018; Gerstenberg and Voeste 2015).

This idea of the career as a potentially influential external factor has not been empirically much explored yet, partly because longitudinal investigations covering decades of adults' lives remain scarce (Hazan 2017). There are practical reasons for this: the longer the time span, the more likely the researchers lose contact with participants who move away, lose interest, become ill; research teams and focus change, funding dries up; and so on (Gerstenberg and Voeste 2015). However, in recent years, as audio and audio-visual material has become increasingly available online, longitudinal studies spanning several decades have grown more numerous, particularly of speakers Sankoff (2018a: 307) calls "notable individuals", such as politicians, broadcasters, actors and other public figures whose speech has been abundantly recorded. Using this type of material prevents the practical difficulties mentioned above and helps understand how linguistic and life trajectories match since details of the notable individuals' biographies are usually made public. This has been our approach in investigating in further depth the career as a possible influential external factor.

The public speaker in this case study is Michaëlle Jean,¹ who was born in Haiti in 1957, moved to Thetford Mines, Quebec with her family in 1968 and grew up speaking both French and Creole. In 1988, at age 31, Michaëlle Jean became a journalist for Radio-Canada, the French-speaking public television network in Canada counterpart to the English-speaking CBC. After her career as a journalist (1988–2005), she was sworn in as Governor General of Canada, therefore exercising diplomatic functions (2005–2010). She was then appointed UNESCO Special Envoy for Haiti after her country of birth was devastated by an earthquake (2010–2014), parallel to which she was the Great Witness overseeing the proper use of French at the London Olympic Games (2012) and chancellor of the world's largest French-English bilingual university, the University of Ottawa (2012–2014). Michaëlle Jean subsequently became Secretary General of La Francophonie, an organization representing 84 French-speaking states and countries (2014–2018). To this day, she still regularly speaks at public forums.

For the past three decades, Michaëlle Jean has thus been a public figure whose speech has been regularly recorded. Her various mandates have made the great stages of her career clearly time-bounded, allowing exploration of the influence of this factor on her phonetic trajectory. At least two aspects of her career that change over time potentially bear linguistic relevance: the audience she addresses (Bell 1984) and the meaning of her being a francophone. First, her audience varies from mostly local during her years as a journalist, to increasingly international as she undertakes diplomatic functions (e.g. Governor General) and works for an international organisation (La Francophonie). Second, while her francophone identity is not particularly relevant when she works as a journalist, it is increasingly emphasized. For instance, in recent history, the position of Governor General is held alternately by francophone and anglophone Canadians, which means that Jean would not have had the job in 2005 in the first place if she had not spoken French. Her francophone identity is further enhanced through her mandate as a watchdog at the London Olympic Games and culminates when she *represents* French speakers of 84 countries and territories at the head of La Francophonie.

To summarize, in this study, the general hypothesis is that the phonetic system of adult speakers remains flexible and that their phonetic trajectory is influenced by external factors. Our aim is to verify whether the career could be one of these influential factors. Our specific prediction is that the speech of Michaëlle Jean will be more locally oriented in her early career as a journalist and will include features of Quebec French, while

¹ Biographic details were retrieved from Michaëlle Jean's official website: <https://www.michaellejean.ca/>.

these will be suppressed as her career becomes more international. To test this prediction, Michaëlle Jean's speech will be analyzed over the five following periods:

- 1) Journalist: 1988–2005
- 2) Governor General: 2005–2010
- 3) UNESCO: 2010–2014
- 4) La Francophonie: 2014–2018
- 5) Other: 2019–2021

2 Methods

2.1 Feature selected: the tense-lax split of the high vowels

We will focus on phonetic realizations of the high vowels /i y u/. In Quebec French, when these appear in word-final syllables, they are produced as either tense [i y u] or lax [ɪ ʏ ʊ] variants depending on the consonantal context (see Paradis and Dolbec 1998 and references therein). Tense variants appear in open syllables, e.g. in *vie* 'life' [vi], *vue* 'view' [vy] and *vous* 'you, plural' [vu]. Lax variants appear in syllables closed by a non-lengthening coda, i.e. any coda other than /v z ʒ ʁ vb/, e.g. in *bile* 'bile' [bɪl], *bulle* 'bubble' [bʏl], *boule* 'ball' [bʊl].² Vowels in these consonantal contexts will be referred to as (V#) and (VK) respectively, as in previous work on Quebec French (Paradis 1985; Yaeger 1979). The tense-lax split is characterized acoustically by differences in the first and second formants (F1, F2): lax variants have a higher F1 than tense variants, and they are also more centralized, with a lower F2 in front [ɪ ʏ] than [i y], and a higher F2 in back [ʊ] than [u]. Analyses of laboratory speech have shown very little overlap in the F1 × F2 acoustic space between tense and lax variants of vowels produced by Quebec French speakers (e.g. Sigouin and Arnaud 2014).

This feature was selected because it is considered as one of the most systematic and distinguishing of Quebec French (Brasseur 2009; Dumas 1974). Listeners do not evaluate it negatively (Lappin 1982); on the contrary, speakers avoiding lax variants in (VK) tend to be seen as snobbish (Paradis and Dolbec 1998). It is widely produced in the most formal contexts, including media broadcasts (Reinke and Ostiguy 2016). This feature is therefore important for sounding like a Quebecer, but suppressing it is also a very good way not to sound like one. If, as hypothesized, the speech of Michaëlle Jean was more locally oriented during her years as a journalist in Quebec, we would expect the tense-lax split to be produced at that time, but perhaps not later on, when she addresses and represents a more international body of French speakers.

2.2 Data processing

We collected audio and audio-visual recordings of Michaëlle Jean publicly available on her website, YouTube and the Radio-Canada archives. Only those in French and of reasonable enough quality for a formant analysis were considered. For instance, recordings or parts thereof with substantial background noise (e.g. music, a whirring helicopter) or derived from analog telephone interviews were excluded, but those that we judged to have clear formant structures were kept. The earliest such speech snippet we could find dates back to 1989, when the speaker was 32 years old, and the most recent is from 2021. In total, 62 recordings of varying length (mean 4 m 10 s, minimum 17 s, maximum 29 m 49 s, total 4 h 38 m 55 s) have been used, as detailed in Table 1.

The data was processed through a series of tools established within the Bavarian Archive for Speech Signals web services (Kisler et al. 2017). First, since no orthographic transcription of the recordings was available except for a few speeches, we used automatic speech recognition (ASR) and manually corrected the

² There are some uncertainties and disagreements in the literature regarding the quality of the high vowels in syllables closed by a lengthening coda, which have been described as either tense, lax or/and diphthongized (Côté 2012; Dumas 1974; Paradis and Dolbec 1998; Santerre and Millo 1978; Sigouin and Arnaud 2015). These have been excluded from the current study.

Table 1: Characteristics of the speech material analyzed for the five periods investigated.

Period	Number of recordings	Total length (incl. pauses)	Number of words
Journalist (1988–2005)	28	42 m 10 s	7,165
Governor General (2005–2010)	12	49 m 20 s	7,284
UNESCO (2010–2014)	9	45 m 56 s	6,792
La Francophonie (2014–2018)	7	100 m 26 s	14,852
Other (2019–2021)	6	41 m 03 s	6,103
Total	62	278 m 55 s	42,196

output. Second, these orthographic transcriptions were turned into canonical phonological transcriptions using grapheme-to-phoneme conversion (G2P; Reichel 2012; Reichel and Kisler 2014). Third, the phonological transcriptions were forced-aligned with the speech signal using WebMAUS General (Schiel 1999, 2015) trained on (European) French data. This material was then structured into a speech database using EMU-SDMS (Winkelmann et al. 2017).

Formant frequencies were calculated with the `forest()` function in EMU-SDMS (see Bombien et al. 2021 for details), with a window shift of 5 ms and a window length of 30 ms. The boundaries marking the onset and offset of the vowels as determined by the forced-aligner were manually corrected when needed, as well as formants that had obviously been miscalculated. The first two formant frequencies (F1, F2) were sampled at 11 equidistant time points from vowel onset to offset.

2.3 Analyses

We analyzed 2,281 tokens of high vowels in either (V#) or (VK) contexts, as shown in Table 2. The number of tokens per vowel and context is not balanced due to specificities of the French lexicon, where for instance /i/ has been reported to be twice as frequent as /y u/ (Wioland 1991). Also, /y/ is more frequent in (V#) than (VK) largely because (y#) is involved in forming the past participle of several verbs in French (e.g. *vu* ‘seen’, *perdu* ‘lost’), a verb tense that is frequently used orally (Blanche-Benveniste and Adam 1999).

The degree of separation between tokens produced in (V#) and (VK) contexts was evaluated by computing inter-Euclidean distances using the following procedure. First, the 11 measurement points of F1 and F2 were averaged per token. Our choice of several measurement points was to get away from the idea that vowel information is represented at a single point in time (e.g. at a steady-state; Hillenbrand et al. 1995; Peterson and Barney 1952). Averaging them constitutes a compromise over a more sophisticated temporal parametrization of formant dynamics (Morrison 2013) in a context where another temporal dimension has to be taken into account (the different periods). Furthermore, even though we do not exclude that some spectral changes may occur over the course of the vowels, we expect such dynamic differences between (V#) and (VK) to be small (Sigouin and Arnaud 2015); moreover, their perceptual relevance to Quebec French listeners has yet to be demonstrated (Sigouin and Arnaud 2014). The choice of 11 sampling points (i.e. points at 10% proportional intervals) instead

Table 2: Number of tokens analyzed per vowel and context.

	(V#)	(VK)	Total
/i/	659	727	1,386
/y/	337	125	462
/u/	234	199	433
Total	1,230	1,051	2,281

of e.g. 3 or 21 was arbitrary. Second, for /i y u/ separately but all recordings across all time periods pooled, the Euclidean distance between all (V#) tokens and the centroid of (VK) in the F1/F2 space was computed using formula (1), then the same was done for all tokens of (VK) relative to the centroid of (V#):

$$ED(\vec{x}) = \sqrt{\|\vec{x} - \vec{c}\|^2} \quad (1)$$

where $\vec{x}$ is a token, $\|\cdot\|$ denotes vector magnitude, and $\vec{c}$ is the centroid of the category relative to which the Euclidean distance ED is calculated. The reason why Euclidean distances to both centroids were computed was in order to obtain a distance measure for every token in the database. If, for example, we had calculated distances of only (VK) tokens to the (V#) centroid, then there would be no distances for any of the (V#) tokens. The output of (1) was log-transformed, then set as the response variable in a linear mixed-effect regression model carried out in R (R Core Team 2022), using the *lme4* package (Bates et al. 2015) and syntax shown in (2):

$$\text{lmer}(\log(ED) \sim \text{Vowels} * \text{Periods} + (1|\text{Words})) \quad (2)$$

where *Vowels* is a three-level fixed factor (i, y, u), *Periods* is a five-level fixed factor (Journalist, Governor General, UNESCO, La Francophonie, Other) and *Words* is a random factor. Initially, we had also included a two-level fixed factor aimed at modelling whether the speaker had a direct interlocutor or not in the speech snippets considered, but it was removed after the *step()* function from the *lmerTest* package (Kuznetsova et al. 2017) indicated it was not significant (backward elimination). For the post-hoc analysis, estimated marginal means were obtained via the *emmeans* package (Lenth 2022).

For Figure 1 (but not in the statistics), we made use of z-score transformed F1 and F2 sampled at vowel temporal midpoint (Lobanov 1971).

3 Results

Figure 1 shows normalized F1 × F2 spaces with /i y u/ in (V#) and (VK) contexts per period. The greatest degree of separation between (V#) and (VK) is observed during the Journalist (1988–2005) period. In the following period (Governor General, 2005–2010), the degree of separation is reduced for all three vowels analyzed. The two following periods, UNESCO (2010–2014) and La Francophonie (2014–2018), show the most merged vowels. While this trend is mostly due to (VK) merging into (V#), a slight reduction of the peripherality of (V#) during La Francophonie can also be observed. In the final Other (2019–2021) period, some separation between (V#) and (VK) contexts is observed again, although it is more reduced than during the Journalist period. When the split is realized, vowels in (VK) show greater variability, with larger ellipses and more dispersed tokens. Also in (VK), F2 of /u/ varies more than that of /i y/, a tendency that has been found in other acoustic studies of Quebec French (e.g. Riverin-Coutlée and Roy 2022). Vowels in (V#) and (VK) are not as separated as in Sigouin and Arnaud (2014), which could be due to methodological differences (laboratory vs. faster speech) or Jean having moved to Quebec at an age when native-like acquisition of features is already uncertain (Chambers 1992; Payne 1980).

Figure 2 presents (log-transformed) inter-Euclidean distances between (V#) and (VK), per period and vowel. Consistent with our qualitative observations from Figure 1, greater distances were obtained for the Journalist (1988–2005) period for all pairs of vowels. The computed inter-Euclidean distances are then reduced, until their value increases again in the Other (2019–2021) period, in such a way that a U-shape can be observed for each (V#)-(VK) pair. In general, inter-Euclidean distances are larger for /u/ than /i y/, which is likely due to the aforementioned spread of F2 values for (uK).

The results of the statistical analysis show a significant interaction between the fixed factors *Vowels* and *Periods* [$F[8, 2,236] = 6.07, p < 0.001$; see Table A1 in Appendix A for model summary). For the post-hoc tests, since we are mainly interested in changes in distances over time within vowel categories, we will only report differences between these in Table 3 (and not across vowel categories, e.g. between /i/ of UNESCO and /u/ of Other).

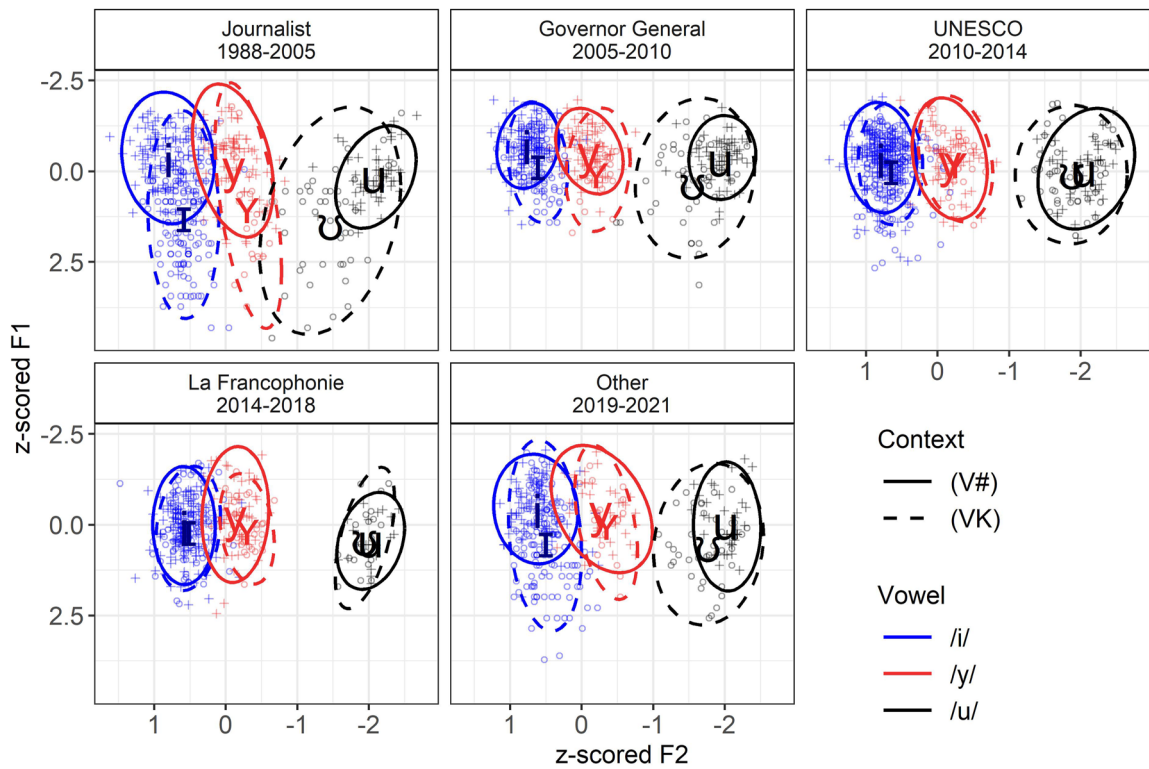


Figure 1: F1 $\times$ F2 plane of vowels /i y u/ in (V#) and (VK) contexts over five periods of Michaëlle Jean's career ($n = 2281$, formants measured at vowel temporal midpoint, z-scored). Tokens in (V#) context are represented by crosses, those in (VK) by circles. The phonetic symbols correspond to the centroids of the ellipses, which encompass 95% of the data.

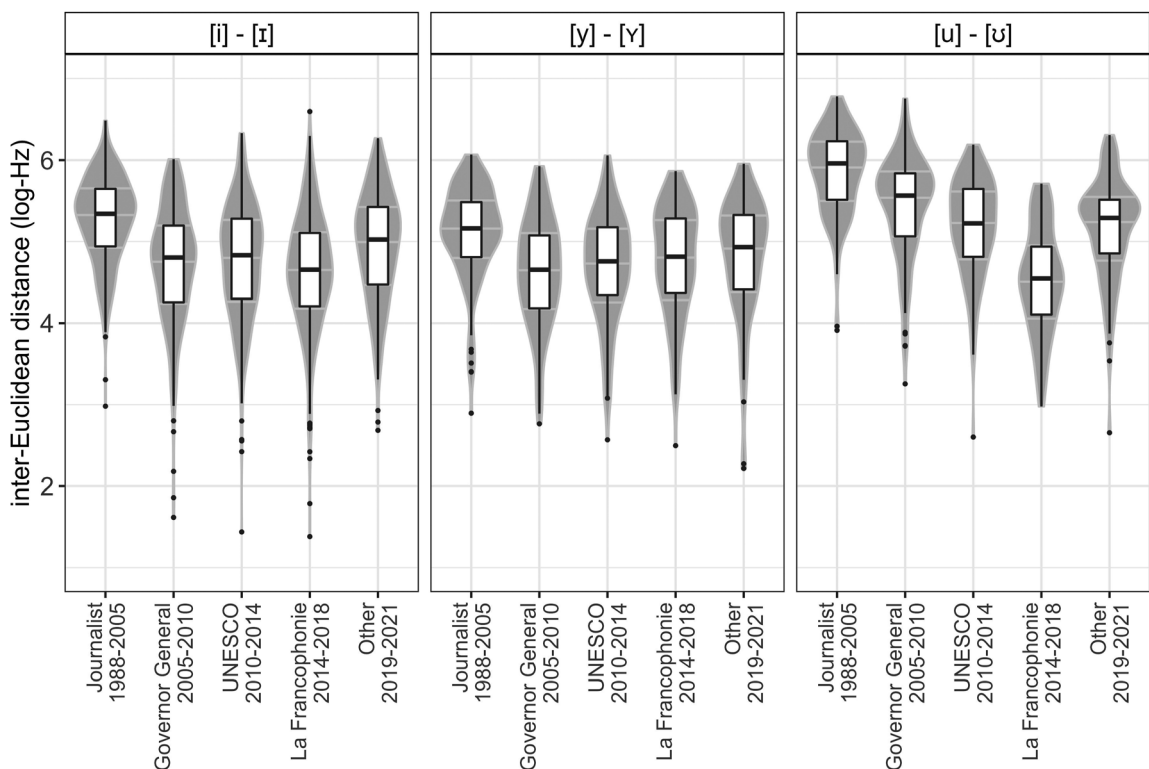


Figure 2: Box and violin plots of log-transformed inter-Euclidean distance between vowels /i y u/ in (V#) and (VK) contexts over five periods of Michaëlle Jean's career.

Regarding /i/, distances are significantly larger for Journalist (1988–2005) than the four following periods, i.e. Governor General (2005–2010), UNESCO (2010–2014), La Francophonie (2014–2018) and Other (2019–2021). Distances are also significantly larger for Other compared to all previous periods except Journalist. La Francophonie has the smallest distances, since it is also significantly different from UNESCO. The other pairwise comparisons are not significant.

For /y/, distances during Journalist are once again the largest; they are significantly larger than those of Governor General, UNESCO and La Francophonie, but not Other. None of the other pairwise comparisons is significant.

Finally, the distances for /u/ are significantly larger during Journalist than for all following periods. They are at their lowest during La Francophonie, as they are significantly different from all the other periods. The remaining pairwise comparisons are not significant.

Table 3: Results of the post-hoc tests of the linear mixed-effect model in (2). The rightmost column indicates whether significant differences in (log-transformed) inter-Euclidean distances for two given periods become larger (+) or smaller (–) over time.

(i#)-(iK)						
Contrast	Estimate	Std err	d.f.	t.ratio	p-Value	+/-
Journalist-Governor General	0.5724	0.0651	1,979	8.789	<0.0001	–
Journalist-UNESCO	0.5190	0.0573	1,879	9.056	<0.0001	–
Journalist-La Francophonie	0.6766	0.0635	1,932	10.651	<0.0001	–
Journalist-Other	0.3451	0.0650	1,861	5.308	<0.0001	–
Governor General-UNESCO	–0.0534	0.0607	1,984	–0.879	0.9047	
Governor General-La Francophonie	0.1042	0.0674	1,914	1.546	0.5326	
Governor General-Other	–0.2272	0.0681	1,972	–3.338	0.0077	+
UNESCO-La Francophonie	0.1576	0.0560	2,230	2.814	0.0395	–
UNESCO-Other	–0.1739	0.0592	2,091	–2.937	0.0277	+
La Francophonie-Other	–0.3314	0.0649	2,144	–5.110	<0.0001	+
(y#)-(yK)						
Contrast	Estimate	Std err	d.f.	t.ratio	p-Value	+/-
Journalist-Governor General	0.4859	0.0921	2,260	5.276	<0.0001	–
Journalist-UNESCO	0.4230	0.0984	2,241	4.298	0.0002	–
Journalist-La Francophonie	0.4008	0.0990	2,239	4.049	0.0005	–
Journalist-Other	0.2867	0.1107	2,254	2.591	0.0724	
Governor General-UNESCO	–0.0629	0.0987	2,245	–0.638	0.9689	
Governor General-La Francophonie	–0.0851	0.0984	2,248	–0.864	0.9098	
Governor General-Other	–0.1992	0.1126	2,265	–1.769	0.3919	
UNESCO-La Francophonie	–0.0222	0.1022	2,258	–0.217	0.9995	
UNESCO-Other	–0.1363	0.1161	2,266	–1.174	0.7665	
La Francophonie-Other	–0.1141	0.1166	2,265	–0.978	0.8651	
(u#)-(uK)						
Contrast	Estimate	Std err	d.f.	t.ratio	p-Value	+/-
Journalist-Governor General	0.4837	0.0948	2,153	5.102	<0.0001	–
Journalist-UNESCO	0.7088	0.0970	2,172	7.308	<0.0001	–
Journalist-La Francophonie	1.3026	0.1242	2,265	10.487	<0.0001	–
Journalist-Other	0.6799	0.1025	2,201	6.631	<0.0001	–
Governor General-UNESCO	0.2251	0.0934	2,058	2.410	0.1129	
Governor General-La Francophonie	0.8189	0.1219	2,261	6.716	<0.0001	–
Governor General-Other	0.1961	0.1018	2,214	1.926	0.3036	
UNESCO-La Francophonie	0.5938	0.1239	2,256	4.794	<0.0001	–
UNESCO-Other	–0.0290	0.1018	2,141	–0.285	0.9986	
La Francophonie-Other	–0.6227	0.1296	2,265	–4.804	<0.0001	+

To summarize, the results of the statistical analysis carried out on inter-Euclidean distances between (V#) and (VK) contexts have confirmed that the greatest degree of separation was during the Journalist period (1988–2005) for the three vowel pairs considered. Globally, La Francophonie (2014–2018) was the period during which they were most merged. In the final Other (2019–2021) period, vowels in (V#) and (VK) were once again distinguished, in such a manner that U-shapes are observed in Figure 2. Changes in the realization of vowels in (VK) are largely responsible for these trends.

4 Discussion and conclusion

In this paper, our general hypothesis was that adult speakers retain some phonetic flexibility and that their lifespan phonetic trajectory is influenced by external (non-linguistic) factors. Our aim was to verify whether a person's career could be one of those influential factors. We carried out an acoustic analysis of the high vowels of Michaëlle Jean, a French-speaking public figure, over five great stages of her career spanning three decades. The tense-lax split of the high vowels /i y u/ was chosen because it is an important, yet sociolinguistically neutral feature of pronunciation in Quebec. This is where Jean spent her life from the age of 11 years and also started her career. A tense-lax split has, however, not been documented for the many other francophone varieties that the speaker addressed and represented in later stages of her career. Our specific prediction was that the tense-lax split would be produced in earlier, but not later, stages of her career.

The results showed that Jean produced, to a certain extent at least, the tense-lax split during her years as a journalist in Quebec (1988–2005). The split progressively disappeared as her career and audience became more international, with contexts where lax variants were expected yielding tense variants. In the last stage of her career (Other, 2019–2021), there seemed to be a reversal of the trend, with a greater degree of separation between contexts where tense and lax variants were expected than in previous periods, although not as much as in the initial Journalist period. Our overall prediction that a person's career appears to be an influential external factor on an adult's phonetic characteristics was therefore supported.

Our results also suggest high phonetic sensitivity and flexibility from the speaker, in line with conclusions from a growing body of work arguing that adulthood does not necessarily bring fossilization (Bowie 2005, 2015; De Decker 2006; Evans and Iverson 2007; Harrington et al. 2000a, 2000b; Kwon 2018; MacKenzie 2017; MacKenzie and Sankoff 2010; Nahkola and Saanilahti 2004; Reubold and Harrington 2015, 2018; Sankoff 2004; Sankoff and Blondeau 2007, 2013; see Bowie and Yaeger-Dror 2015 for a review). Our study also shows that phonetic changes during adulthood occur even in public speakers like Michaëlle Jean (or Queen Elizabeth II, Alistair Cooke, David Attenborough, etc.) despite the potential need or will to project a consistent persona (see e.g. Dowling 2007). If anything, this implies that non-public speakers who are not under the same pressure to project a constant persona should also be prone to changes over the lifespan. As highlighted before (e.g. Harrington et al. 2000b; Sankoff 2018b), this suggests that more longitudinal studies are needed to aid in the interpretation of results from apparent time studies which do not take account of lifespan changes in the individuals being sampled.

Jean's early experience with linguistic diversity, with her growing up as a Creole-French bilingual who moved to Quebec during pre-adolescence, may perhaps in part explain her great phonetic flexibility (Antoniou et al. 2015; Clopper and Pisoni 2004; Evans and Tomé Lourido 2019). In addition, it is likely that she acquired the tense-lax split when living in Quebec. Therefore, she could be more aware of this feature than most speakers of Quebec French and able to "turn it on" or off when need be. She is also a professional journalist with at least some voice and pronunciation training. This could have further enhanced her metalinguistic

knowledge of features of Quebec French, although it is interesting to note that at the time, she judged the tense-lax split to be an acceptable feature for a journalist to produce on television.

An important finding of this study is the apparent reversal of the merging of lax into tense variants in the last period considered (i.e. Other, 2019–2021), possibly because some pressure to represent and perform for an international audience was relaxed. There have been other reports of such reversals, e.g. by Reubold and Harrington (2018) for Alistair Cooke, who abandoned features of American English he had acquired, and also by Shapp et al. (2014) for Ruth Bader Ginsburg, who moved towards less standard variants in her late career. Reversals in older age may not be especially surprising (Eckert 1997; Pichler et al. 2018), but they constitute a strong argument against the idea of fossilization: even features that are considered as having changed might continue changing. That being said, the linguistic features a speaker uses in a given communicative setting at a particular time never reflect the entire range of features they are able to use (Schilling 2013). The formal situations in which Jean produced the speech we analyzed are not necessarily representative of how she would speak in her private life; therefore, our conclusions regarding change and reversal must be received with caution. Studies at the interface between stylistic variation and second dialect acquisition (e.g. Johnson and Nycz 2015; Nycz 2018; Sharma 2018) have indeed highlighted the rich use of features in different communication situations and speech modalities by speakers who have acquired proficiency in another dialect than their native one. More broadly, all these findings show that speakers do not necessarily lose old features when acquiring new ones (Nycz 2015; Walker 2018).

There are other limitations to our study beyond the narrow stylistic range investigated. One of these is that only one phonetic feature was analyzed. We cannot generalize our observations to every aspect of the speaker's pronunciation, and some parts of her system could be more resistant to variation and change. There is also a general lack of knowledge in the literature regarding the phonetics and phonology of Haitian French. This makes it difficult to identify which features could be inherited from Jean's childhood and which ones were acquired in Quebec. Finally, we only have access to the speech of Jean from the age of 32 years onwards, leaving a considerable number of formative years unaddressed.

To conclude, we have put forward the career as an external factor that can influence the phonetic trajectory of adult speakers, but we do not claim that all adults will change at every turn of their career: there has to be some linguistic relevance to these career stages. Through an arguably extreme case of such linguistic relevance of career stages, in which Michaëlle Jean both performed for a changing audience and represented millions of francophones worldwide, we suggest that the career should be included within the variationist research agenda. A challenge for future work will be to devise questionnaires, scales and other tools usable beyond case studies, i.e. with larger numbers of participants, that will model the career and its possible interactions with other classic factors such as the social class and speaking style.

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Appendix A

Table A1: Summary of linear mixed effect regression model in (2). Estimates are reported on the logarithmic scale.

Predictors	Inter-Euclidean distance (log-Hz)				
	Estimates	Std err	CI	Statistic	p-Value
(Intercept)	5.26	0.04	5.17 to 5.34	118.35	<0.001
Period [Governor General]	−0.57	0.07	−0.70 to −0.44	−8.80	<0.001
Period [UNESCO]	−0.52	0.06	−0.63 to −0.41	−9.07	<0.001
Period [La Francophonie]	−0.68	0.06	−0.80 to −0.55	−10.67	<0.001
Period [Other]	−0.35	0.06	−0.47 to −0.22	−5.32	<0.001
Vowels [(y#)-(yK)]	−0.10	0.08	−0.27 to 0.06	−1.24	0.217
Vowels [(u#)-(uK)]	0.53	0.09	0.35 to 0.72	5.76	<0.001
Period [Governor General] * Vowels [(y#)-(yK)]	0.09	0.11	−0.13 to 0.31	0.77	0.443
Period [UNESCO] * Vowels [(y#)-(yK)]	0.10	0.11	−0.13 to 0.32	0.84	0.399
Period [La Francophonie] * Vowels [(y#)-(yK)]	0.28	0.12	0.05 to 0.51	2.35	0.019
Period [Other] * Vowels [(y#)-(yK)]	0.06	0.13	−0.19 to 0.31	0.46	0.649
Period [Governor General] * Vowels [(u#)-(uK)]	0.09	0.11	−0.14 to 0.31	0.77	0.441
Period [UNESCO] * Vowels [(u#)-(uK)]	−0.19	0.11	−0.41 to 0.03	−1.69	0.092
Period [La Francophonie] * Vowels [(u#)-(uK)]	−0.63	0.14	−0.90 to −0.35	−4.49	<0.001
Period [Other] * Vowels [(u#)-(uK)]	−0.33	0.12	−0.57 to −0.10	−2.76	0.006
Random effects					
σ^2	0.43				
τ_{00} Words	0.06				
ICC	0.12				
N Words	707				
Observations	2,281				
Marginal R^2 /conditional R^2	0.160/0.257				

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