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Achieving Native-like Pronunciation through Phonetic Analysis and Poetry

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Abstract

The problem of identifying phonetic phenomena related to language transfer and correction in second language (L2) production can be approached by conducting broad analyses of the same L2 speaker. This approach is applied in the present study, which investigates errors of pronunciation segmentally (grammatical mistakes, voicing of consonants, and vowel distinctions) and suprasegmentally (intonation and time-gaining techniques) in order to establish the possibility of their being corrected in two recordings of readings by a non-native French speaker. The errors from the first recording were identified, analyzed, and corrected through pronunciation exercises with the aim of raising awareness of the problems to help overcome them on the second reading attempt. The correction methods involved exercises such as reading poetry aloud, pronouncing consonantal segments in various vocalic environments, and reading the target text, syllable by syllable. In addition, the analysis investigates the possibility of phonetic transfer from the two primary languages of the speaker: Bulgarian and English.

The researcher is the speaker, the methodological implications of which are discussed, reaching the overall conclusion that it helps to raise awareness of the phonetic background of the errors. Despite the risk of compromising the data through this methodological choice, the results show that a high level of attention and monitoring of the speech alone may be insufficient for internalizing corrections. While grammatical mistakes were corrected most effectively, other segmental and suprasegmental features showed different levels of success. One of the features (the /ɛ/ and /e/ distinction) even exhibited deterioration in the second recording. These examples suggest the presence of “equivalence classification” phenomena and raise the question of the appropriateness of the phonetic exercises for overcoming the errors.

Another area of interest was determining the source of errors such as “uptalk”, the reassigning of grammatical gender, word-final devoicing, and elimination of syllable-initial lenis stop prevoicing. Due to the limited amount of data available, it was difficult to draw firm conclusions, but the tendencies observed suggested that the errors might be due to transfer from the speaker’s primary languages, whose influence appeared to be equal. Further research should therefore control for the influence of the two primary languages and extend the scope to include a second post-training recording. Overall, the second recording demonstrated that raised awareness and training helped to achieve acceptable production in the suprasegmental features as well as most of the instances of unfamiliar phones, such as /ɤ/, front-rounded vowels, and nasal vowels.

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1 Introduction

Transfers from a native language into second language (L2) production are a popular area of interest in the field of second language acquisition. Often, however, studies focus on the transfer of a very specific feature (Vanlocke 2011, Tobin and Nam 2010). Although this is advantageous as it allows for an in-depth analysis of the feature over a larger number of speakers within a bigger corpus, analyses of broader scope are also useful. Small-scale research and case studies can provide detailed insights, taking into account speakers' backgrounds and personal experience of the experimental task with an amount of precision that is usually not possible in studies of a larger scale. For this reason, they are often designed to serve as preliminary research that can inform potential future investigations (Aljaafreh and Lantolf 1994).

A vast amount of research in the specifics of L2 speech, including transfer, has concentrated on the efficiency of corrective feedback for the improvement of L2 performance (Guenette 2007, Ferris 2004). Different studies, often conducted in a classroom setting, have shown that explicit instruction and raised awareness of a specific feature lead to improvement in subsequent performance (Ellis et al. 2006, Aschwell 2000, Aljaafreh and Lantolf 1994). This has also been demonstrated for phonetic performance in particular. Kamber and Skupien-Dekens (2010) showed that non-native French speakers of various backgrounds improved their phonetic discrimination between French phonemic pairs after instruction in a multimedia lab. Hattori and Iverson (2008:3327) recorded improvement in the pronunciation of /r/ and /l/ in English by Japanese speakers after a series of pronunciation exercises and audio-visual instruction. Vanlocke (2011:63) showed that even a one-off training session can lead to improvement in the phonetic performance of adult non-native speakers of English. She presented her participants with detailed instruction on voice onset time phenomena, which usually are not discussed in language courses, including real-time spectrographs. As a result, the participants (native speakers of Belgian Flemish) produced voice onset time values that were closer to the target values in the post-test than in the pre-test. Evidence of this kind suggests that a high level of awareness of pronunciation differences from native speech and specialized phonetic understanding can lead to more effective improvement than in the case of the no-treatment control groups.

The purpose of this paper is to observe whether specific intraspeaker variation can be achieved in a third language (L3) within a 4-week period. Phonetic variants that diverge from what would be expected of native speakers were detected and analysed in two recordings of the same text. As the speaker (and researcher), I familiarized myself with my performance in the first recording with any non-native-like variants in particular, using phonetic exercises targeted at specific areas of my pronunciation, before proceeding to the second recording, in which I aimed to achieve native-like pronunciation.

The problematic concept of what "native-like" is has been simplified for the purposes of this paper in the following way. Using my own subjective experience as a speaker of Bulgarian, English, and French, along with my knowledge of the phonology of these languages from a linguistic point of view, I made a preliminary analysis of all features of pronunciation in the first recording that appeared to have been influenced by the phonology of my dominant languages, and which diverged from what would be expected according to the phonology of a standard Parisian variety of French. This particular variety was chosen as it had been the one used by my tutors in the past and because I was living in Paris at the time. Hence, it was the variety I had spent most of my time trying to assimilate to.

There were several areas of my pronunciation where I anticipated more difficulties achieving native-like pronunciation than others. English and Bulgarian do not have front-rounded and nasal vowels phonemically, and for that reason they are considered particularly difficult for native speakers of these languages (Walz 1980:426). Data on the L2 production of French by Bulgarian speakers is not available. However, Kamber and Skupien-Dekens (2010:101) investigated these vowels as common sources of perception errors. They showed that Russian participants regressed in their performance in discrimination after the training session and that Polish speakers made more mistakes in the second test, only improving in the third test. The discrimination of /ø/, in particular, did not improve after training any of the language groups (Kamber and Skupien-Dekens 2010:96, 102). Such evidence suggests that if non-native-like production occurs, it might, in part, be caused by failure of perception and of accessing the correct mental representation. This further puts into question the effectiveness of training.

Apart from differences in vowel inventories, Bulgarian, French, and English have a two-way voicing distinction of their stop consonants, which is realized with differences in voice onset time (VOT). The lenis stop consonants in Bulgarian and French /b d g/ are prevoiced (with negative VOT or voicing throughout the closure of word-internal stops), and the fortis stops are produced with a short lag (positive VOT) (Kessinger and

Blumstein 1997:147). The lenis consonants in English are produced with a short lag and the fortis stops with a long lag (aspiration). Ringen and Kulikov (2012:271) suggest that prevoicing is easily susceptible to language transfer from languages such as English that do not use it. This has been shown with data from intraspeaker variation in Sancier and Fowler (1997) with regard to the VOT difference of a Brazilian student who had lived in Brazil and the USA.

Another potential area of difficulty for me is the uvular voiced fricative /ʁ/. In my early years of studying French, I always used the alveolar trill /r/. In addition, neither /ʁ/ nor any other uvular consonants are encountered in the other languages I use. Hence, due to lack of practice and being able to draw parallels, I have found it difficult to produce and distinguish between uvular and velar places of articulation.

I had no prior expectations of suprasegmental difficulties. Martin (2009:151) proposes three binary traits for characterising the appropriate pitch contour for different types of French declarative and interrogative sentences. These traits can be translated from the French as: +/-rising (“montant”), +/-steep (“ample”), which refers to the amplitude of the contour, and +/-curve (“cloche”), which refers to pitch contours with rising and falling shape. He uses them to characterise three types of declaratives: assertions, orders, and evidence. Declaratives do not finish with rising tone, which distinguishes them from interrogatives. Assertions are -steep and -curve; orders are +steep and -curve; and evidences are +/-steep and +curve. This model did not contradict the basic intonation patterns I knew from Bulgarian and English, so I did not anticipate any divergence.

Lastly, as a non-native speaker of French, I expected to have issues with fluency, even though I was reading as opposed to producing spontaneous speech. According to Lennon (2000:25) the term “fluency” is closely related to the length and distribution of pauses; hence, I controlled for these parameters as well.

2 Aims

The principal aims of this paper are: 1) to identify variants in L2 pronunciation that differ from what is expected in native French speech; 2) to observe whether raised awareness and practice by the speaker can render them more native-like; and 3) to identify whether these variants are caused by transfer from the languages that the speaker uses daily.

For this purpose, I traced the development of my own pronunciation of French over a period of 1 month, using two recordings of myself reading an excerpt from Camus’ “L’étranger” (Appendix A). Non-native-like variants in the segmental and suprasegmental features of the speech were identified, analysed, and corrected after the first and prior to the second recording. Thus, it was possible to see whether the effects of raised awareness and practice would ameliorate them.

As I fulfilled the role of both researcher and participant, there is a risk that I might have demonstrated and/or recorded more improvement than would otherwise have been the case. This circumstance arose from the short time available for recruiting participants and the difficulty in finding a linguistically trained non-native speaker of French who would have been willing to participate. As the researcher, I was familiar with the details of the task and the intended results, including specific native-like values for various phonetic parameters. I was more motivated to show improvement from my chosen methodology than another participant would have been. The implications of this methodological choice are further explained in Section 3.4. The validity of my improvements is also discussed in light of the risks of the methodology.

3 Methodology

3.1 Speaker Background

At the time of the recording, I was 21 years old. I had lived in Bulgaria for more than 18 years. I had studied English and been exposed to various pronunciation types for over 10 years. Prior to the recordings, I had spent 3 years in English-speaking countries, and English was one of my primary languages. The expectation at the time of data collection was that I would transfer equally from English and Bulgarian to French.

Prior to data collection, I had been taught French by instructors with different accents: a Bulgarian teacher when I was between the ages of 7 and 13, an American teacher when I was 17, and both French and British instructors in the 2 years preceding the recordings. At the time of the recordings, I had spent about 7 months in Paris, France.

3.2 Recordings and Materials

The recordings were made approximately 4 weeks apart in April 2014. They took place in a quiet room, using a Zoom recorder at a sampling rate of 96kHz. The whole text was displayed on a computer screen. The sounds were analysed using Praat (Boersma and Weenink 1992–2015).

The reading was chosen because of its relatively simple syntax and vocabulary, so as to reduce any additional challenges for a non-native speaker. It was intended for observing divergence from native-like pronunciation occurring even in optimal conditions. I was familiar with the text prior to the first recording, but I had not read it aloud. A more recent text was not chosen due to intellectual property restrictions in France.

3.3 Coding and Correction Methods

3.3.1 Intonation

For the purpose of the paper, I used the model proposed by Martin (2009) as a frame, according to which I modified my pronunciation in the second reading (see 5.1 for a discussion on the drawbacks of this prescriptive approach). In order to determine whether I had adhered to the model, I manually inspected the shape of my pitch, tracing all sentences in Praat.

3.3.2 Pauses

All of the pauses in the text were examined. Generally, silences which exceed 2 seconds in naturally occurring speech might be experienced as uncomfortable and lead to disfluency (Hilton 2008:154). However, pauses exceeding 100ms are by convention considered as indicators of a phrasal boundary (Dilley and Brown 2005:34). If pauses occurred outside of phrasal boundaries and exceeded the limits mentioned above, they were categorized as instances of disfluency.

3.3.3 Vowels

I was guided by my perception as well as the formant values (manually checked in Praat), which I compared to the target values (Table 1) for female native French speakers FR3 and FR4 of the northern variety, according to Kamiyama and Vaissière (2009:16). I only checked F1 and F2 of those vowels that I perceived to sound forced and similar to my Bulgarian vowel production, rather than every vowel in the recording. Related to the aforementioned researcher-participant bias, this opens up the possibility for other non-native-like vowels to have gone unnoticed. The intended phonemes for all of the examples (given in Section 4.2.1) were taken from the Collins French Dictionary (2015) online.

Table 1: Average formant values (Hz) for two female native French speakers
(adapted from Kamiyama and Vaissière 2009:16)

| FR3 (F) | F1 | F2 | FR4 (F) | F1 | F2 |
|---------|-----|------|---------|-----|------|
| i | 347 | 2519 | i | 343 | 2451 |
| e | 500 | 2488 | e | 558 | 2321 |
| ɛ | 686 | 2190 | ɛ | 696 | 2088 |
| a | 869 | 1238 | a | 845 | 1441 |
| ɔ | 694 | 1061 | ɔ | 735 | 1108 |
| o | 481 | 776 | o | 515 | 912 |
| u | 302 | 798 | u | 385 | 744 |
| y | 306 | 2032 | y | 378 | 1989 |
| ø | 490 | 1570 | ø | 556 | 1431 |
| œ | 669 | 1733 | œ | 689 | 1551 |

3.3.4 Consonants

I manually inspected the amount of voicing (including VOT of initial stops) of all consonants and counted as devoiced all occasions where the segment was at least $\frac{2}{3}$ voiceless. A delay of voicing after a burst of more than 10ms was counted as a short lag. In the case of /ʁ/, I also compared the length of corresponding segments between the two recordings. It is important to note that what I counted as acceptable native-like production in the second recording for /ʁ/ might still not sound entirely native-like. I counted as acceptable or improved consonants that were shorter in length than the corresponding phone in the first recording, or had voicing running through a longer proportion of the stop. Unfortunately, I was still uncertain about differentiating between velar and uvular sounds, so I was not able to control for this important parameter.

3.3.5 Liaisons

Despite the widespread concept of obligatory liaisons in French, Durand et al. (2011:113) consider the term to be prescriptive and ambiguous. The corpus work of Coquillon et al. (2010, cited in Durand et al. 2011:116) has shown that different types of constructions normally considered an environment for obligatory liaisons (such as Adjective + Noun constructions), are produced in a variety of ways, including non-liaisons and liaisons with a consonant different from the last phone of the adjective. In the spirit of their work, and in order to avoid following general rules from grammar books, a native speaker of the Parisian variety of French was asked to identify where he would make liaisons when reading the text after the first reading had already been recorded. Then, he was asked to identify which of those phrases would sound wrong if the liaison were omitted. Thus, 11 liaisons were identified as obligatory according to the native informant (as shown in Appendix D, which also includes information about which tokens were voiced).

3.3.6 Correction

I had observed that my biggest difficulties in learning French pronunciation were with segmental features (consonants and vowels), and so I used exercises targeted mainly at this area. I spent 1 hour a day on 4 consecutive days prior to the second recording practising the following exercises.

Inspired by the method described by Vuletić (1966), I tried to adjust the pronunciation of my vowels by reading poems aloud. Poetry uses vowels for various stylistic effects, such as alliteration, assonance, and rhymes, which makes it appropriate for focusing on particular vowels in different contexts. The poems for the exercises were chosen from Vigny (1987). In addition, I practised reading the target text monotonously by stressing each syllable and pausing after it, thus aiming to avoid assimilation (e.g., /lə di ʁɛk tœ ma ɑ̃ kɔʁ/). In this way, it was possible to closely monitor my articulators at each syllable. Information about the articulator positions was obtained from online video guides (Frenchsounds 2010a, 2010b, 2010c, 2011).

My biggest concern with consonants was /ʁ/. I followed an online guide (Frenchsounds 2012) that made use of a different series of environments, starting with those that make the pronunciation of the target segment easiest (low vowels). In general, phonemes whose place of articulation is close to that of the target element are considered facilitating environments. The imitation nature of the exercise, the visual component, and the detailed description of the articulator positions also helped me have a clearer target.

In addition, I wanted to increase the amount of voicing in syllable-initial lenis stops. I tried pronouncing these, followed by all of the French vowel phonemes, with a hand on my larynx in order to feel the vocal fold vibration, which I tried to control. I did the same exercise again by doubling the syllables, so that the second consonant would be in word-medial position, e.g., “da”, “dada”.

3.4 Potential Disadvantages of the Methodology

This study focuses on a single speaker. The results are very much specific to these particular performances and they would be difficult to generalize to other French-Bulgarian-English speakers, especially since comparable data appear to be lacking in the literature. Further investigation may show that similar pronunciation patterns can be observed for other speakers from a similar background. Considering the small scale of the investigation, statistical analyses were avoided.

As discussed above, it is a disadvantage that the speaker and the researcher were the same person. The validity of the results could have been compromised by self-consciousness during recording and very specific efforts of improvement that were tailored to the text of this task, rather than the speaker's overall pronunciation. The results may reflect a closely monitored and manipulated speech, rather than the actual language skills of the speaker in spontaneous speech. The speaker-researcher might be biased to search for divergence from native-like speech in known areas of difficulty. Similarly, the observed improvements might in some cases reflect reaching the target value for a parameter which might not in itself be sufficient for achieving native-like performance.

It needs to be taken into account that the study investigates whether a high level of awareness, information, training, and overall optimal conditions can lead to improvement in pronunciation. It is not a direct concern of this study to determine whether the corrections are internalized, but if they are possible at all given the best circumstances for them to take place. In this respect, it is an advantage that all of the information and practice did not have to be transmitted to another participant. Given the restrictions on time and resources, it was most cost-effective to focus on improving the knowledge and performance of the person who also analyses the materials, as this analysis further contributed to the training process. The phonetic analysis, research, and practice took place after the first recording, which ensured that the pronunciation was as naïve as possible, while the second reading benefitted from the careful analysis of the first one. Taking this into consideration, the material of this study can still lead to interesting observations.

Lastly, one of the main disadvantages of the methodology is that the researcher is not a native speaker of French, so it is likely that some non-native variants of speech have gone unnoticed, despite efforts to be comprehensive. A French speaker was consulted to determine the accuracy of liaisons and to confirm the non-native-like sounding of all features listed in Sections 4.1 and 4.2.

4 Results

4.1 Suprasegmental Features

Intonation did not prove to be an area that I needed to focus on extensively. On two occasions I ended sentences introducing direct speech with falling F0 (1, 2), and once with rising F0 (3) (Figure 1).

- (1) Puis il m'a dit:
- (2) Dans l'escalier, il m'a expliqué:
- (3) Un dernier mot:

In the second recording I produced all three cases consistently with a flat contour. However, I still produced rising F0 at the end of a declarative sentence.

- (4) Je vous laisse monsieur Meursault.

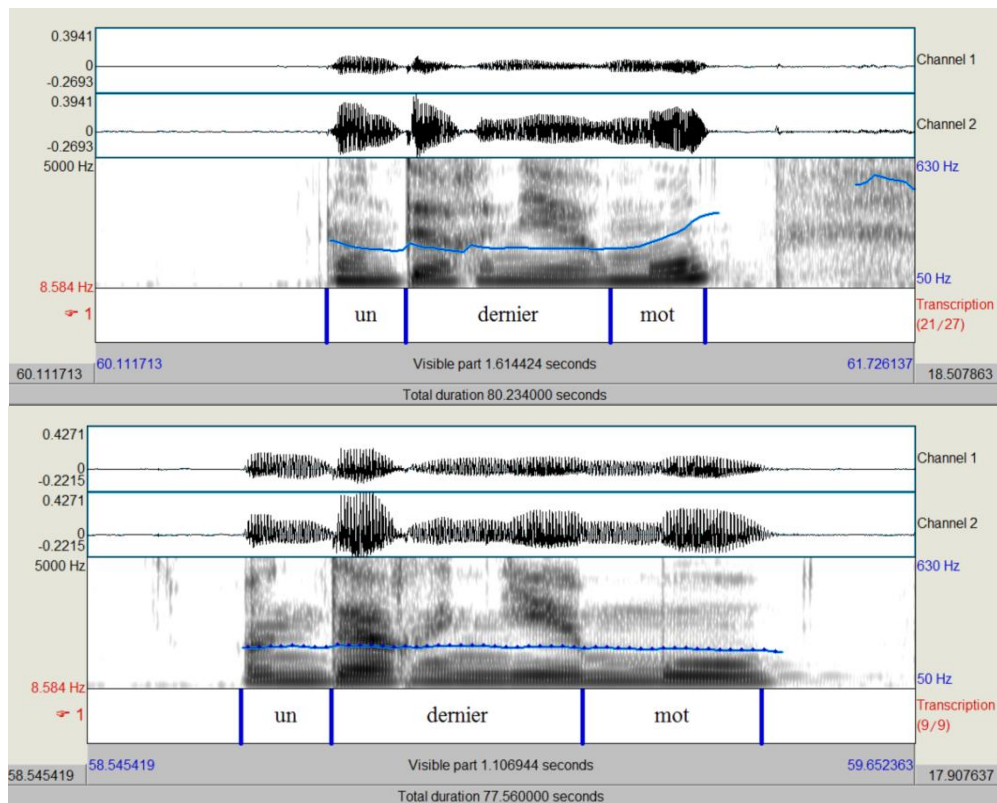


Figure 1: Rising F0 in Recording 1 (top) and level F0 contour in Recording 2 (bottom).¹

As with intonation, the use of time-gaining techniques was generally appropriate. Pauses were produced at the end of intonational phrases, which usually coincided with clause boundaries. One of the exceptions was a pause mid-clause:

- (5) Votre mère [pause] a [pause], paraît-il ...

The pause was 126ms, which was much longer than the pause before the following clause at 82ms.

¹ On all screenshots the pitch window is 75–550Hz.

Lengthening as a time-gaining method was employed for the last syllable of “traversé”. Both the sibilant and especially the vowel are anomalously elongated (Figure 2). The last /e/ in this word is almost twice as long as the previous one (213ms and 131ms, respectively).

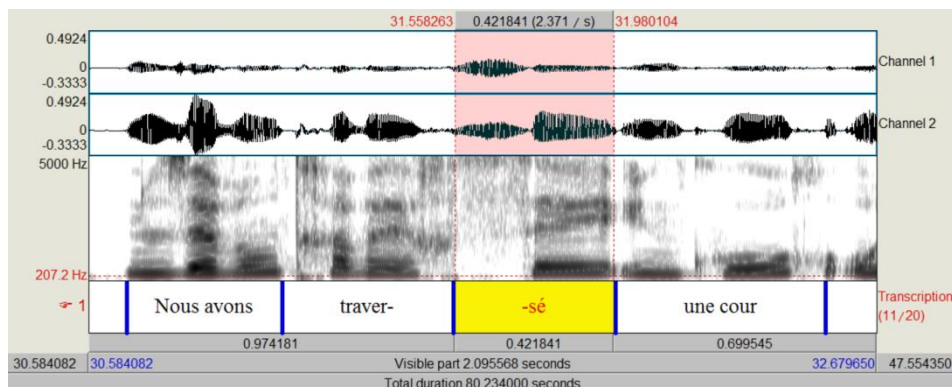


Figure 2: Elongation of the last syllable of “traversé” in Recording 1.

In the second recording, I did not make use of any of the time-gaining techniques. The pauses appeared at intonational phrase boundaries.

4.2 Segmental Features

4.2.1 Vowels

The following is a list of words from my speech showing the achieved and intended result.²

- (6) **plus** — produced [plju] instead of [ply].
- (7) **levé** — produced /ø/ instead of /ə/.
- (8) **ne pas** — formants difficult to measure: sounds like /u/ and has to be /ə/, but at the time of production, I was aiming at /œ/, which accounts for the roundedness.
- (9) **ils se taisaient** — produced /ø/ instead of /ə/, but I was aiming at /œ/.
- (10) **perruches** — the first vowel produced as /ø/ instead of /e/; the second vowel produced as /ø/ instead of /y/.
- (11) **Meursault** — produced /ɛ/ instead of /œ/.
- (12) **heures** — produced /y/ instead of /œ/.

With the exception of “Meursault”, in which I still produced /œ/ as /ɛ/, I had managed to achieve the intended vowels. However, I noticed that two new ones had appeared:

- (13) **deux** — /œ/ instead of /ø/.
- (14) **nerveux** — /œ/ instead of /ø/.

Often, I pronounced nasal vowels as a sequence of a vowel and a nasal consonant.

- (15) **pensionnaire** — pronounced /ɛ/, instead of /ã/.
- (16) **on aurait dit** — I pronounced a liaison /n/, but the previous vowel /o/ is not nasalized.
- (17) **l’enterrement** — the expected /ã/ sounds like /ɛ̃/.
- (18) **enterré** — the expected /ã/ sounds like /ɛ̃/.

On the second reading “pensionnaire” and “enterrée” were produced with /ã/, and “on” with /ɔ̃/; however, I produced the first syllable of “enterrement” with a sequence /an/, rather than with /ã/. In addition, I pronounced /ɛ̃/ as /en/ at the end of “rien” in “sans rien dire”, and /ã/ as a sequence of /an/ in “pensé” in “nous avons pensé”.

In addition to these occurrences, I had particular difficulty with the difference between /ɛ/ and /e/. The following list of substitutions was identified.

² Non-native-like segments are in bold.

- (19) voulez — pronounced with /ɛ/.
- (20) levé — too open.
- (21) précédé — the same as the above but for all three vowels.
- (22) transportée — too open.
- (23) reprenaient — pronounced with /e/.
- (24) pourrez — pronounced with /ɛ/.
- (25) exprimé — pronounced with /ɛ/.
- (26) enterrée — pronounced with two /ɛ/.
- (27) pensé — pronounced with /ɛ/.

In the second recording, most of these words were pronounced the same way: 19, 23, 24, 25, and 27. In the first half of the recording there was some change, but it appeared to be an over-correction. The formants for the word-final /e/: “parlé”, “l’escalier”, and “traverse” approached /i/. The big distance between F1 (386Hz) and F2 (2501Hz) of the final /e/ in “parlé” is also comparable to the corresponding values for /i/ of the native French speakers in Table 1.

In addition, in the second reading, I found two more instances of a more open, lax vowel, instead of the close, tense one: “impressionner” and “veiller”.

4.2.2 Consonants

Stops and fricatives were often devoiced, whether word-finally or word-initially. Appendix B shows that in the first reading, I produced 60% ($n=18$) of syllable-initial lenis stop consonants with a short lag. There are two word-final voiced consonants: “suppose” /z/ and “morgue” /g/, both of which I devoiced.

Voicing was considerably improved in the second reading: only 13% ($n=4$) of syllable-initial lenis stops were devoiced. However, the correction did not appear to be completely internalized. In Recording 1, I had produced prevoicing in /b/ in the word “bavardant”, but it was missing in Recording 2 (Figure 3). As for the word-final voiced consonants, “suppose” was still produced with a voiceless [s], while “morgue” was produced with [g] the second time.

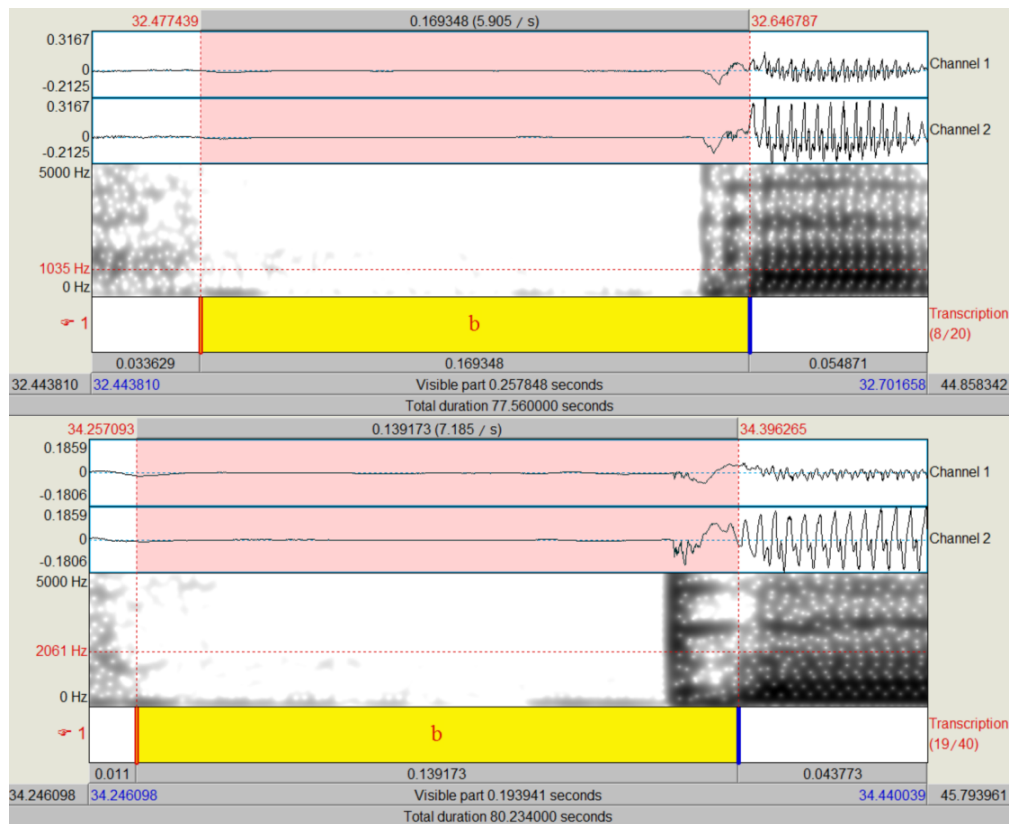


Figure 3: /ba/ from “bavardant” in Recording 1 (top) and Recording 2 (bottom).

The /ʁ/ phoneme was also consistently realized as overly elongated, voiceless and/or velar, instead of uvular. Appendix C offers descriptive information about the places of /ʁ/ tokens perceived as non-native. It is notable that none of the acceptable examples were word-final. The improvement in the second recording is clearly manifest. Starting from 78% ($n=57$) in the first recording, the proportion of too long, voiceless, and/or uvular /ʁ/-tokens has fallen to 53% ($n=39$) in the second. In the first recording, 100% ($n=30$) of the word-final /ʁ/ was long and/or uvular; in the second one, it accounted for only 63% ($n=19$). For example, in Figure 4, it is clear that the segment in the second recording (18ms) is more than three times shorter than in the first one (61ms), and that the voicing takes part of a bigger proportion of the fricative.

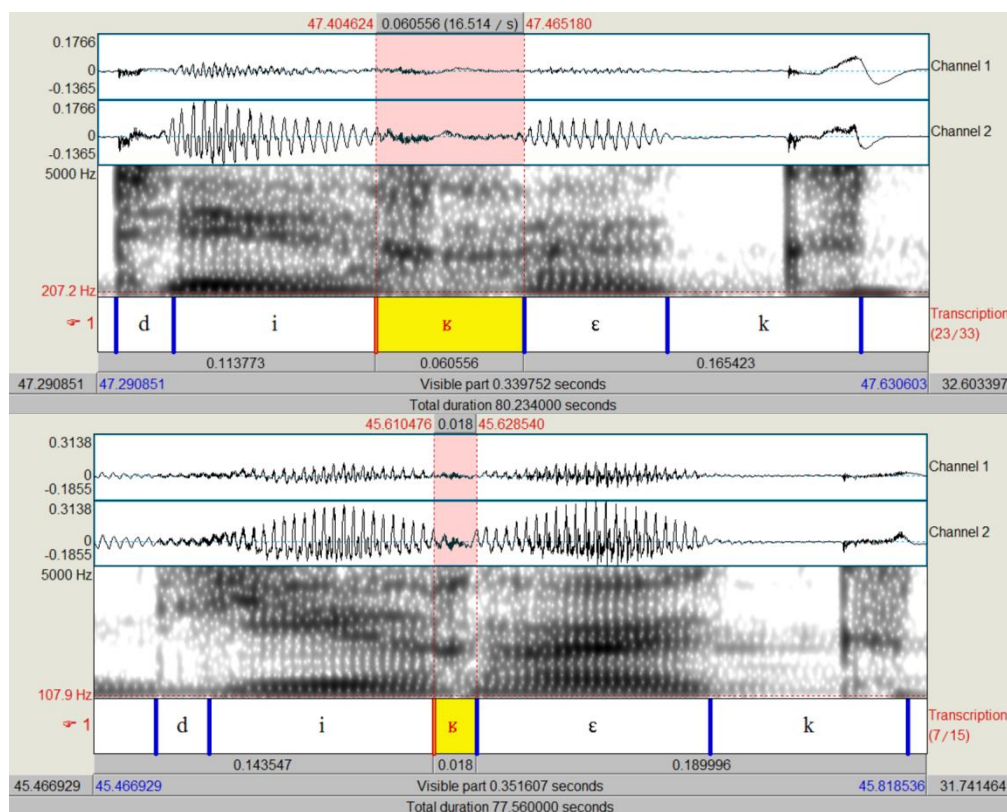


Figure 4: The first /ʁ/ in “directeur” in Recording 1 (top) and Recording 2 (bottom).

For liaisons, the results are straightforward: three were absent, four were devoiced, and four were pronounced correctly (of which there was one /t/ and one /n/). An improvement in the liaisons is clear: in the second recording, all of the obligatory ones were pronounced, and none of the /z/ liaisons were pronounced as /s/.

4.2.3 Grammatical Errors

Some of the segmental errors happened because I transferred the Bulgarian grammatical properties of words. Here is a list of all the grammatical errors I produced:

- (28) *le service* — mistake of gender: I pronounced it as /la/ for the feminine gender, instead of /lœ/ for the masculine. The equivalent of “service” in Bulgarian is feminine.
- (29) *petits groupes* — mistake of gender: I pronounced /t/ at the end of “petits”, assuming “groupes” to be feminine. The corresponding Bulgarian word is feminine.
- (30) *de perruches* — I pronounced /de/ as a plural article, instead of the preposition /də/, seeing that the following noun was in the plural.
- (31) *un dernier mot* — mistake of gender: I pronounced an /ʁ/ at the end of “dernier”, as if I were reading the feminine adjective. Again, this might have been related to the fact that the equivalent of “mot” (“word”) is feminine in Bulgarian.

All of these examples were produced with the correct gender and form in the second recording.

5. Discussion

In terms of the amount of change that resembles the native French targets, the different segmental features can be ranked in the following way: grammatical mistakes and liaisons — entirely successful; front-rounded vowels — starting with seven non-native-like variants, I reached three (two of which were new instances); nasal vowels — starting with four in Recording 1, I reached three non-native-like variants in Recording 2, but two of these instances appeared in previously well-pronounced tokens; syllable-initial stop devoicing — this fell from 60% to 13% ; /ʁ/ phoneme — this fell from 78% problematic pronunciations to 53% in Recording 2; /ɛ/ and /e/ — starting with nine swapped tokens, I reached eleven in the second recording. In terms of suprasegmental features, the adjustments were applied successfully, both with regard to intonation and time-gaining techniques, with the exception of a single instance of “uptalk” in Recording 2.

5.1 Suprasegmental Features

All sentences in the reading extract are declaratives. Without concentrating too much on pragmatics, the difference between assertions and evidence as proposed by Martin (2009:151) can be ambiguous in the current context. There are also no orders. Therefore, according to the model prescribed by Martin, I violated the expectations for assertion/evidence.

Despite my improvements, I had one rising contour at the end of a declarative sentence (4) in the second recording. It is inappropriate for French according to Martin’s model, but I often use it for declarative sentences in English. This case resembles the phenomenon of ending declarative sentences with rising intonation in some varieties of English, called “uptalk” (Tomlinson and Fox Tree 2011). There are various explanations for the social and cognitive origin of this phenomenon. In the present context, the sentence is an assertion, which should have a flat contour. The rising F0 can be associated with the intention of seeking permission or agreement from another interlocutor. Considering how widely spread “uptalk” is among Anglophone speakers, and also among younger Bulgarian speakers (according to my personal observations), there is a possibility that it is also spreading as a feature of French intonation. No literature was found on this phenomenon in French, but this does not preclude it from being an actual phenomenon. My attempt to adhere to a codified model of pronunciation may have missed an element of current French intonation patterns. In that sense, what I have coded here as a non-native variant and possible transfer from English intonation patterns, should be taken with a grain of salt.

Even though I tried to familiarize myself with the text before the recording, I needed more time to plan ahead on some occasions while reading. Focusing too much on the pronunciation or comprehension of less familiar words led me to use time-gaining techniques (pausing and lengthening of segments). Mostly, I tried to pause and plan at the end of sentences. Although none of these pauses exceeded 2 seconds, some exceeded the limit proposed by Dilley and Brown (2005), e.g., the first pause in (5), which reaches 213ms. In the case of the elongation in “traverse”, the word occurs at the beginning of a sentence. As the sentence is longer than average for the text, I may have taken time to identify the clause boundaries, leading to an interruption in the flow of speech.

On the surface, the correction of time-gaining techniques was more successful than that of intonational problems. One possible explanation for this difference is that intonation was controlled less consciously. Patterns I had not internalized could still be pronounced in the way I am most used to. Conversely, the time-gaining techniques were first used when I was less familiar with the text. In the second reading, I was more familiar with the text, so the pausing and lengthening disappeared. However, it cannot be predicted if they would reappear outside of phrase boundaries if I were to read a novel text.

5.2 Segmental Features

The segmental features that I attempted to change include vowels, consonants, and grammatical features. In terms of vowels, I had the most difficulty with the front-rounded vowels, the nasal vowels, and the /ɛ/–/e/ distinction. Though I perceived their difference in isolation, I had difficulties identifying them in connected speech. After listening to instructions (Frenchsounds 2010d), I identified instances of vowels which sounded incorrect in the first recording and confirmed this perception acoustically. The realization of “plus” in (6) in particular, appears to represent transfer from Bulgarian. The corresponding Bulgarian word “плюс” is pronounced as /pljus/. Transfer from Bulgarian is apparent among the nasal vowels as well in (15). The equivalent of the word “pensionnaire” in Bulgarian is pronounced with /ɛ/. Apart from that, the word “pensé” was pronounced without nasalization, because I briefly got distracted while reading.

As suggested by the results, most of the front-rounded vowels were pronounced with the native-like French phoneme in the second recording, even though two new tokens appeared with the wrong vowel. The fact that I am able to pronounce the front-rounded vowels but use them in the wrong context (which spreads to new tokens in the second recording), suggests that my problem might be internalizing the phonemic distinction, rather than

this representing a purely articulatory issue. This phonological problem is probably also present in my production of nasal vowels, as there is a similar amount of mostly different tokens produced with the wrong phoneme in both recordings. I had memorized the intended form of the tokens I had identified as non-native-like in the first recording, but I failed to internalize the underlying difference between the phonemes.

As for the difference between /ɛ/ and /e/, before the first reading, I was unaware that “é” and the suffix “ez” are always read as /e/, and that “ai” is usually read as /ɛ/. Even though English does make a distinction between these two phonemes, I usually pronounce /e/ as the diphthong /eɪ/; hence, for me, the phonemic difference in English is not a helpful parallel for French. Bulgarian does not make a phonemic distinction between the two. According to Ternes and Vladimirova-Buhtz (1990:46), Bulgarian uses /ɛ/ in stressed syllables, which explains my tendency to prefer this vowel and suggests possible transfer from Bulgarian. The second recording showed little improvement. However, in the first half, there are three cases of clear over-correction, where /e/ was pronounced almost as /i/. This result supports the idea that I was aware of my difficulty but had not internalized the native realization. Instead, I needed to concentrate in order to apply it on-line. Halfway through the text, I appear to have lost my concentration: the old pattern reappeared and new problems occurred, in addition to the old ones.

One of the main areas of difficulty with consonants was voicing. Given the fact that English is one of the languages I use most often, this might support Ringen and Kulikov’s (2012) argument of interference between languages. As Kessinger and Blumstein (1997:153–154) report a very wide range for the French fortis VOT, reaching over 80ms, I did not deem any of my fortis stops to have been realized inappropriately. The results suggest that while raised awareness improved the performance in the second reading, the need for voicing was probably not internalized, as previously unaffected tokens (such as “bavardant”) were realized without prevoicing.

Due to limitations of time and space, I did not focus on fricatives in great detail. It is observable, however, that the majority of underlyingly voiced fricatives were devoiced, including in initial position. A related discussion is presented in the concluding sections on liaisons and /ʁ/. I consider it likely that the cases of final stop devoicing are a transfer from Bulgarian (though the data is too limited to make any conclusive statements). In Bulgarian, word-final voiced consonants are realized as voiceless, which is a well-documented phenomenon (Schuh 2008).

My most noticeable difficulty with consonants was related to the pronunciation of the French voiced uvular fricative /ʁ/. I put conscious effort into the production of this phoneme, and as a result, I made it longer. This made it difficult to maintain both voicing and frication. The task of producing voiced fricatives is more demanding than the production of voiced stops as “for the sake of continued voicing the oral pressure should be low, but for the sake of frication the oral pressure should be high, that is, the difference between oral pressure and atmospheric pressure should be high enough to cause high air velocity through the consonantal constriction” (Ohala (1983:201). These demands, combined with my unfamiliarity with the uvular place of articulation, led to issues with the production of this phoneme. As already mentioned, all word-final /ʁ/ were devoiced but not all word-medial tokens. This could either be considered as confirmation of transfer from Bulgarian of the above-mentioned final-devoicing or of the word-medial environment facilitating their pronunciation of /ʁ/.

My tendency to devoice fricatives intervocally, as shown in my results on liaisons, is not a typical phenomenon in the languages that I speak. I could explain such tendency by supposing that in the sequence vowel-/z/-vowel, I put a syllable boundary after /z/. As a result, I devoice it as a word-final consonant, which is typical in Bulgarian. Another explanation might be my hesitancy in using them, leading to a weaker, devoiced pronunciation. This hypothesis is supported by the fact that both of the voiced /z/ liaisons that I produce appear in the expression “nous avons”, which is repeated twice in the text. As this is one of the first verbs I learnt in French, I have been familiar with this liaison for a longer time than with the rest; therefore, I probably felt more confident using it.

The majority of my grammatical mistakes in French can be accounted for as transfer from Bulgarian. The only exception is “de perruches”, where I pronounced the preposition as a plural article, which is likely to have been caused by misinterpretation, as the following noun is plural and its meaning was unfamiliar to me. The complete correction of the grammatical errors (and liaisons) suggests that errors of this nature can be improved in a relatively short amount of time and with conscious control.

6 Conclusions

On first impression, there are obvious differences between the two recordings. Overall, the second recording sounds more confident and fast paced (it is 3 seconds shorter), while the first one is quieter and more hesitant. The second recording contains no grammatical mistakes and has all the necessary liaisons. However, these superficial differences can be challenged when the two recordings are analysed more carefully.

While the vowels were produced with more native-like variants more often the second time, the native French /ɛ/-/e/ distinction was reduced in the second recording. There is evidence that attention was paid to these

phonemes, e.g., /e/ was even overcorrected to [i] at the beginning. However, the fact that many of the old tokens and some of the new ones were still realized with the wrong phoneme in the second half of the text, suggests that the distinction between the vowels was not internalized. One explanation could be that front-rounded and nasal vowels are entirely absent from the Bulgarian phonemic inventory, while [e] and [ɛ] appear as allophones. It might potentially be easier to learn a completely novel phoneme correctly than to reassign the function of phones whose roles have already been set up in the native language. This phenomenon has been observed before for adult native speakers of General American English with French as a second language: “as the result of the development of the L1 phonetic system the effect of a mechanism called equivalence classification prevents adults from producing L2 phones authentically by rendering them unable to make effective use of sensory input in speech learning” (Flege and Hillenbrand 1987:49). As a result of this mechanism, the adults were more successful at producing the French phoneme /y/, which has no equivalent in English, than the phonemes /t/ and /u/, which have similar equivalents.

Nevertheless, it needs to be taken into consideration that instances of spreading transfer and using inappropriate realizations of phonemes in previously correctly pronounced items can be observed for stops, vowels, and intonation. This evidence might suggest that the native-like distinctions were not completely internalized for any of the groups but simply the result of increased monitoring of speech. A second post-training reading would have been necessary to inspect the level of internalization. Even taking into account the researcher-participant bias, success is not equal for the different areas of speech. For example, even though there is evidence of control for both front-rounded vowels and the [e]–[ɛ] distinction, the former group was more often realized with the native patterns in the second recording.

The nature of monitoring is also important for the analysis. The big reductions of the most widely spread non-native realizations (voicing of stops and /ʁ/) might have been achieved because they were less taxing in terms of the attention required. In order to improve the voicing of lenis stops, only one feature needed to be monitored. The production of /ʁ/ involved monitoring a single frequently occurring phoneme, which was often predictable in this text from the grapheme: only in five instances are word-final “r” graphemes not pronounced as /ʁ/. The liaisons and the grammatical errors did not involve the production of unfamiliar sounds but simply learning about the properties of specific words in the text. Conversely, the monitoring of vowels was probably more taxing in terms of attention. Given that the graphic representation of vowels is rarely a helpful indicator for pronunciation, the speaker was required to be completely familiar with the intended pronunciation in order to avoid time-gaining pauses for planning ahead.

While the naïve conclusion might have been that the pronunciation exercises for /ɛ/ and /e/ were less successful or that less effort was put into controlling them, the analysis has shown that there might have been different factors interfering with the production of these phonemes, namely, the influence of the L1 phonemic system. This influence was also observed for the transfer of grammatical gender and possibly for final obstruent devoicing. The influence of English was observed on the intonation and devoicing of syllable-initial lenis stops. These conclusions are put forward tentatively, as there is an insufficient amount of data to support them. There seems to be an overall tendency for devoicing, and the suggestion that it comes as a transfer from two different languages is not entirely satisfactory. Further investigation systematically controlling the amount of exposure to English and Bulgarian as well as the production environments should be able to shed more light on the question. It would also be interesting to investigate if the influence of the L1 on grammatical gender and that of the second primary language on intonation is manifest for other speakers with two competing primary languages.

Overall, the results show that a comparison of one speaker acquiring an L3 at two different points in time is highly variable with respect to the linguistic variables examined. L3 acquisition at this level of proficiency is an active work in progress. Despite the highly conscious and motivated effort to improve pronunciation to become more native-like, this was not consistently achieved, although different levels of success were recorded for the various segments. The exercise was useful both for gaining a global perspective on difficulties with pronunciation and identifying specific areas for improvement. This paper has presented a new perspective on intraspeaker variation, one with potential implications for considerations of conscious effort and speaker intentionality.

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APPENDIX A**Reading Stimulus: Extract from Camus' "L'Etranger"**

Le directeur m'a encore parlé. Mais je ne l'écoutais presque plus. Puis il m'a dit: «Je suppose que vous voulez voir votre mère. » Je me suis levé sans rien dire et il m'a précédé vers la porte. Dans l'escalier, il m'a expliqué: « Nous l'avons transportée dans notre petite morgue. Pour ne pas impressionner les autres. Chaque fois qu'un pensionnaire meurt, les autres sont nerveux pendant deux ou trois jours. Et ça rend le service difficile. » Nous avons traversé une cour où il y avait beaucoup de vieillards, bavardant par petits groupes. Ils se taisaient quand nous passions. Et derrière nous, les conversations reprenaient. On aurait dit d'un jacassement assourdi de perruches. À la porte d'un petit bâtiment, le directeur m'a quitté: « Je vous laisse, monsieur Meursault. Je suis à votre disposition dans mon bureau. En principe, l'enterrement est fixé à dix heures du matin. Nous avons pensé que vous pourriez ainsi veiller la disparue. Un dernier mot: votre mère a, paraît-il, exprimé souvent à ses compagnons le désir d'être enterrée religieusement. J'ai pris sur moi, de faire le nécessaire. Mais je voulais vous en informer. » Je l'ai remercié. Maman, sans être athée, n'avait jamais pensé de son vivant à la religion.

APPENDIX B

Syllable-Initial Lenis Stops

Bold = devoiced

Recording 1

Le directeur m'a encore parlé. Mais je ne l'écoutais presque plus. Puis il m'a dit: « Je suppose que vous voulez voir votre mère. » Je me suis levé sans rien dire et il m'a précédé vers la porte. **D**ans l'escalier, il m'a expliqué: «Nous l'avons transportée **d**ans notre petite morgue. Pour ne pas impressionner les autres. Chaque fois qu'un pensionnaire meurt, les autres sont nerveux pendant **deux** ou trois jours. Et ça rend le service **difficile**. » Nous avons traversé une cour où il y avait beaucoup de vieillards, **bavardant** par petits **groupes**. Ils se taisaient quand nous passions. Et **derrière** nous, les conversations reprenaient. On aurait **dit d'**un jacassement assourdi **de** perruches. À la porte **d'**un petit bâtiment, le **directeur** m'a quitté: « Je vous laisse, monsieur Meursault. Je suis à votre disposition **dans** mon bureau. En principe, l'enterrement est fixé à **dix heures du** matin. Nous avons pensé que vous pourriez ainsi veiller la disparue. Un dernier mot: votre mère a, paraît-il, exprimé souvent à ses compagnons le désir **d'être** enterrée religieusement. J'ai pris sur moi, de faire le nécessaire. Mais je voulais vous en informer. » Je l'ai remercié. Maman, sans être athée, n'avait jamais pensé de son vivant à la religion.

Total syllable-initial lenis stops: 30

Devoiced syllable-initial lenis stops: 18

Recording 2

Le directeur m'a encore parlé. Mais je ne l'écoutais presque plus. Puis il m'a dit: « Je suppose que vous voulez voir votre mère. » Je me suis levé sans rien dire et il m'a précédé vers la porte. Dans l'escalier, il m'a expliqué: «Nous l'avons transportée dans notre petite morgue. Pour ne pas impressionner les autres. Chaque fois qu'un pensionnaire meurt, les autres sont nerveux pendant **deux** ou trois jours. Et ça rend le service difficile. » Nous avons traversé une cour où il y avait beaucoup de vieillards, **bavardant** par petits groupes. Ils se taisaient quand nous passions. Et derrière nous, les conversations reprenaient. On aurait dit **d'**un jacassement assourdi de perruches. À la porte d'un petit bâtiment, le directeur m'a quitté: « Je vous laisse, monsieur Meursault. Je suis à votre disposition dans mon bureau. En principe, l'enterrement est fixé à dix heures du matin. Nous avons pensé que vous pourriez ainsi veiller la disparue. Un dernier mot: votre mère a, paraît-il, exprimé souvent à ses compagnons le désir d'être enterrée religieusement. J'ai pris sur moi, de faire le nécessaire. Mais je voulais vous en informer. » Je l'ai remercié. Maman, sans être athée, n'avait jamais pensé de son vivant à la religion.

Total syllable-initial lenis stops: 30

Devoiced syllable-initial lenis stops: 4

APPENDIX C

/ʁ/

Bold = non-native-like pronunciation

Recording 1

Le directeur m'a encore parlé. Mais je ne l'écoutais presque plus. Puis il m'a dit: «Je suppose que vous voulez voir votre mère. » Je me suis levé sans rien dire et il m'a précédé vers la porte. Dans l'escalier, il m'a expliqué: « Nous l'avons transportée dans notre petite morgue. Pour ne pas impressionner les autres. Chaque fois qu'un pensionnaire meurt, les autres sont nerveux pendant deux ou trois jours. Et ça rend le service difficile. » Nous avons traversé une cour où il y avait beaucoup de vieillards, bavardant par petits groupes. Ils se taisaient quand nous passions. Et derrière nous, les conversations reprenaient. On aurait dit d'un jacassement assourdi de perruches. À la porte d'un petit bâtiment, le directeur m'a quitté: « Je vous laisse, monsieur Meursault. Je suis à votre disposition dans mon bureau. En principe, l'enterrement est fixé à dix heures du matin. Nous avons pensé que vous pourrez ainsi veiller la disparue. Un dernier mot: votre mère a, paraît-il, exprimé souvent à ses compagnons le désir d'être enterrée religieusement. J'ai pris sur moi, de faire le nécessaire. Mais je voulais vous en informer. » Je l'ai remercié. Maman, sans être athée, n'avait jamais pensé de son vivant à la religion.

Total /ʁ/: 73

Voiceless/long /ʁ/: 57

Word-final /ʁ/: 30

Word-final voiceless/long /ʁ/: 30

Recording 2

Le directeur m'a encore parlé. Mais je ne l'écoutais presque plus. Puis il m'a dit: «Je suppose que vous voulez voir votre mère. » Je me suis levé sans rien dire et il m'a précédé vers la porte. Dans l'escalier, il m'a expliqué: « Nous l'avons transportée dans notre petite morgue. Pour ne pas impressionner les autres. Chaque fois qu'un pensionnaire meurt, les autres sont nerveux pendant deux ou trois jours. Et ça rend le service difficile. » Nous avons traversé une cour où il y avait beaucoup de vieillards, bavardant par petits groupes. Ils se taisaient quand nous passions. Et derrière nous, les conversations reprenaient. On aurait dit d'un jacassement assourdi de perruches. À la porte d'un petit bâtiment, le directeur m'a quitté: « Je vous laisse, monsieur Meursault. Je suis à votre disposition dans mon bureau. En principe, l'enterrement est fixé à dix heures du matin. Nous avons pensé que vous pourrez ainsi veiller la disparue. Un dernier mot: votre mère a, paraît-il, exprimé souvent à ses compagnons le désir d'être enterrée religieusement. J'ai pris sur moi, de faire le nécessaire. Mais je voulais vous en informer. » Je l'ai remercié. Maman, sans être athée, n'avait jamais pensé de son vivant à la religion.

Total /ʁ/: 73

Bad (velar/long) /ʁ/: 39

Word-final /ʁ/: 30

Word-final bad (velar/long) /ʁ/: 19

APPENDIX D

Liaisons

(l) = obligatory liaison

X = not pronounced

D = devoiced

V = pronounced correctly

Recording 1

Le directeur m'a encore parlé. Mais je ne l'écoutais presque plus. Puis il m'a dit: « Je suppose que vous voulez voir votre mère. » Je me suis levé sans rien dire et il m'a précédé vers la porte. Dans l'escalier, il m'a expliqué: « Nous l'avons transportée dans notre petite morgue. Pour ne pas (l)X impressionner les (l)D autres. Chaque fois qu'un pensionnaire meurt, les (l)D autres sont nerveux pendant deux ou trois jours. Et ça rend le service difficile. » Nous (l)V avons traversé une cour où il y avait beaucoup de vieillards, bavardant par petits groupes. Ils se taisaient quand nous passions. Et derrière nous, les conversations reprenaient. On (l)V aurait dit d'un jacassement assourdi de perruches. À la porte d'un petit bâtiment, le directeur m'a quitté: « Je vous laisse, monsieur Meursault. Je suis à votre disposition dans mon bureau. En principe, l'enterrement est fixé à dix (l)D heures du matin. Nous (l)V avons pensé que vous pourrez ainsi veiller la disparue. Un dernier mot: votre mère a, paraît- (l)V il, exprimé souvent à ses compagnons le désir d'être enterrée religieusement. J'ai pris sur moi, de faire le nécessaire. Mais je voulais vous (l)D en (l)X informer. » Je l'ai remercié. Maman, sans (l)X être athée, n'avait jamais pensé de son vivant à la religion.

Obligatory: 11

Not pronounced: 3

Pronounced devoiced: 4

Pronounced correctly (2 voiced /z/, one /t/, one /n/): 4

Recording 2

Le directeur m'a encore parlé. Mais je ne l'écoutais presque plus. Puis il m'a dit: « Je suppose que vous voulez voir votre mère. » Je me suis levé sans rien dire et il m'a précédé vers la porte. Dans l'escalier, il m'a expliqué: « Nous l'avons transportée dans notre petite morgue. Pour ne pas (l)V impressionner les (l)V autres. Chaque fois qu'un pensionnaire meurt, les (l)V autres sont nerveux pendant deux ou trois jours. Et ça rend le service difficile. » Nous (l)V avons traversé une cour où il y avait beaucoup de vieillards, bavardant par petits groupes. Ils se taisaient quand nous passions. Et derrière nous, les conversations reprenaient. On (l)V aurait dit d'un jacassement assourdi de perruches. À la porte d'un petit bâtiment, le directeur m'a quitté: « Je vous laisse, monsieur Meursault. Je suis à votre disposition dans mon bureau. En principe, l'enterrement est fixé à dix (l)V heures du matin. Nous (l)V avons pensé que vous pourrez ainsi veiller la disparue. Un dernier mot: votre mère a, paraît- (l)V il, exprimé souvent à ses compagnons le désir d'être enterrée religieusement. J'ai pris sur moi, de faire le nécessaire. Mais je voulais vous (l)V en (l)V informer. » Je l'ai remercié. Maman, sans (l)V être athée, n'avait jamais pensé de son vivant à la religion.

Obligatory: 11

Devoiced: 0

Voiced: 8

All /t/ and /n/ liaisons: present