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Lowering of High Vowels by French Immersion Students in Canada

by

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Abstract

While much research has been dedicated to studying the speech of French immersion students, relatively little is known about their sociolinguistic competence, particularly in the area of phonetics. This study aims to determine the extent to which a group of French immersion students in Ontario, Canada display the native Canadian French phenomenon of lowering the high vowel /i/ to its lax allophone /ɪ/ in the obligatory context of a stressed syllable closed by any consonant other than /v, z, ʒ/ or /ʀ/. Results indicate that the majority of the students do not employ the lax vowel, and those students who demonstrate some degree of vowel lowering apply the rule inconsistently. No strong correlation between social or linguistic factors is apparent in the application of the rule, suggesting that more explicit teaching of this phenomenon is necessary in order to make students aware of these kinds of native Canadian French speaker variations.

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1.0 Introduction

Using any second language in the real world can be a daunting challenge, particularly because of the numerous differences between the language taught in the classroom and the casual language used by native speakers on a daily basis. These differences are compounded by the existence of multiple varieties of the language found around the world, each having its own distinguishing features and stylistic variations at every linguistic level (phonetics, morphology, syntax, etc.). A lack of awareness of these differences and variations may contribute to a second language learner's "accent" (i.e., non-native usage of the language), which is typically at a more formal level than is found in the casual speech of native speakers.

In the case of French, the classroom version of the language may be most closely associated with "standard" French, commonly thought of as European, Parisian, or metropolitan French, but in reality even the typically "standard" dialects of the language may differ from the style of French taught in classrooms the world over. As Coveney (2001) points out, "metropolitan standard French is in many respects a rather untypical variety of language, in that it has undergone intense standardization (much more than Canadian French, and more also than

English), and this has involved the elimination of much linguistic variation" (p. 136-7). While there is certainly great value in learning standard French as a foundation, it is also extremely important for learners to be exposed to and aware of the varieties of the language that they are most likely to encounter in the real world.

Students in French immersion programs appear to echo this sentiment, and have expressed a desire to sound like their native French-speaking peers (Hart, Lapkin & Swain 1989 in Mougeon, Nadasdi & Rehner 2009, MacFarlane 2001). In addition, more knowledge about informal speech styles is desired by some of the students in a study by Tarone and Swain (1995). Development of this kind of sociolinguistic competence is also supported by the Ontario government's curriculum guidelines for French immersion programs, in that it seeks to enable students to use colloquialisms and to debate and discuss issues both formally and informally, as well as "to use appropriate language conventions during oral communication" (Ontario Ministry of Education, 2000). Although the desire to achieve a more native-like variety of French exists at both the level of the educational system and the student, students continue to feel discouraged by the fact that they are unable to use their language effectively

outside of the classroom with native speakers (Genesee 1978, 1981, Thibault and Sankoff 1993, Tarone and Swain 1995, MacFarlane 2001, Auger 2002).

Over the years, many different approaches have been taken in an effort to demonstrate how well learners of French fare with various aspects of their second language. Standardized tests may reflect how students are doing in French at school, but they do not provide an adequate means of assessing the students' use of their L2 in a real-world context. Several researchers have conducted individual studies on particular aspects of the language usage of French learners from around the world, and many of these studies focus on those students who have had prolonged exposure to a francophone environment (through exchanges or other stays abroad), an opportunity which is not afforded to most Canadian French immersion students.

Among the research that has been done on the speech of French as a second language learners to date, the most systematic, large-scale approach stems from the Mougeon and Nadasdi corpus of immersion French. This corpus is a collection of interviews with French immersion students from Ontario, many of whom have only used their French in a classroom setting and rarely use French outside of school, a situation which is similar to that experienced by the

majority of French immersion students in Canada. These interviews provide a wealth of information about how students use their second language, in a way that has allowed researchers to examine the natural speech of the L2 learner.

Much of the research that has been conducted using this corpus has focussed on describing the sociolinguistic competence of the immersion students with respect to many variables that have been identified as typical of Canadian French, and which usually differ from the forms used in the classroom (see Mougeon, Nadasdi and Rehner 2009, Nadasdi, Mougeon and Rehner 2005, Mougeon, Rehner and Nadasdi 2004). By examining the ways in which immersion speech differs from L1 speech at a sociolinguistic and stylistic level, it is possible to focus attention on creating awareness of a more native-like variety of French, in order for students to be better equipped when attempting to use French with native speakers in casual situations.

There are a vast number of distinctive features of Canadian French, such as assibilation ([t^s] and [d^z]), and diphthongs (see, for example, Dumas 1987; Walker 1984). A combination of these distinctive features and variation at all levels of the language contribute to the complex nature of what makes up Canadian French. Each of these distinctive features has its own place in the

language, and there is no single defining feature of Canadian French. However, it is certainly not the case that all features have equal status in the language. Naturally, some are less esteemed than others in terms of marking social class for example, while others are entirely commonplace among speakers of all classes and generations. As with any language, there are many intricate interactions of speech style and register to consider as well.

It is essential to investigate the immersion students' use (or non-use) of these distinctive native Canadian French features in order to gain a better understanding of where the speech of the learners diverges from that of native speakers, and hence create awareness of the differences that a learner can expect to encounter when using French outside of an academic setting.

The goal of this project is to examine the use of one of the distinctive features of Canadian French, namely the lowering of high vowels, in the speech of French immersion students from the Greater Toronto Area using the Mougeon and Nadasdi corpus of immersion French. This is a feature that is very characteristic of Canadian French (Walker 1984, Dumas 1987), but has not been widely studied empirically.

The next section discusses the background of the corpus upon which this study is based, followed by a description of the phenomenon of high vowel lowering in Canadian French. Section 4 outlines the research questions, hypotheses, and methodology of the current project, with results and discussion following in Section 5.

2.0 Background

2.1 The Mougeon and Nadasdi corpus of immersion French

Perhaps the most comprehensive body of research on French immersion speech to date is that which has been conducted using the Mougeon and Nadasdi corpus of immersion French. This research has brought together studies of at least thirteen different variables of Canadian French from lexical, grammatical, and phonetic categories. The corpus consists of semi-formal, semi-directed interviews with 41 French immersion students, and provides a glimpse of how the students use the language that they are learning in the school setting. The semi-formal, semi-directed, Labovian style interview process is the same process that has been used in other first language French corpora, such as the Sankoff and Cedergren corpus of Montreal French (see Sankoff et. al, 1976) and the

corpus of Ontario French by Mougeon and Beniak (1991). Although these corpora may be somewhat dated, their parallel structure facilitates comparison between L1 and L2 speakers.

The corpus is composed of the audio recordings and transcripts of interviews with 41 French immersion students from the Greater Toronto Area in Ontario, Canada. A total of 21 grade 9 students (13 females, 8 males) and 20 grade 12 students (17 females, 3 males) were interviewed. Information was also collected via questionnaire (see Mougeon, Nadasdi and Rehner 2009) about the following sociolinguistic variables:

- Social class (middle; lower middle; working)
- Amount of instruction in French at school
  (0–25%; 26–37%; 38–100%)
- French media usage (never; occasionally)
- Exposure to a francophone environment
  (0–1 day; 1–7 days; 1 week–3 weeks; more than 3 weeks)
- Stays with French families
  (never; less than 2 weeks; 2 weeks or more)
- Home language (English; Romance; other)

The students were interviewed by a native French speaker, and had been in French immersion from grade 5 onwards. They had been instructed in French approximately 50% of the time through grades 5 to 8, and 20% of the time thereafter. English was used elsewhere in the school, creating an English-

dominant environment, which is typical of French immersion programs in Canada. None of the students spoke French at home or had francophone parents, although many did speak one or more languages other than English. Students from all skill levels were interviewed, and the majority of the students came from middle class backgrounds.

2.2 Previous research

The studies that have been done using this corpus have reached towards the common goal of discovering the extent to which French immersion students use the same linguistic variants in the same ways as their native Canadian French speaking peers.

The majority of the existing studies have dealt with grammatical variables, such as the deletion of *ne* in negative *ne – pas* constructions (Rehner and Mougeon 1999), the use of the auxiliary verbs *etre* and *avoir* in forming the past tense (Knaus and Nadasdi 2001), and the alternation between *on* and *nous* as first person plural subject pronouns (Rehner, Mougeon and Nadasdi, 2003). Work has also been done on lexical variation within the French immersion corpus: the verbs meaning "to live" (*habiter, rester, vivre, demeurer*) and the nouns meaning "paid work" (*travail, emploi, job, ouvrage*) were examined by

Nadasdi and McKinnie (2003), and the noun meaning "car" (*auto, automobile, voiture, char, machine*) was studied by Nadasdi, Mougeon and Rehner (2008). Relatively little work has been done with regard to phonetic variables in the corpus, and Section 2.4 goes into more detail about the two phonetic variables (schwa-deletion and l-deletion) that have been examined in the corpus so far. This thesis seeks to expand on the knowledge of the immersion students' mastery of phonetic variation by examining their production of the high vowel /i/ (see Section 3).

2.3 The socio-stylistic continuum

All of the variants considered thus far in the corpus can be placed on a socio-stylistic continuum ranging from marked informal (vernacular) to hyper-formal classifications (Mougeon, Nadasdi and Rehner 2009; Nadasdi, Mougeon and Rehner 2005; Mougeon, Rehner and Nadasdi 2004). Over time, this continuum has expanded to accommodate the increasing number of variants that have been studied. The most recent description of this continuum (Mougeon, Nadasdi and Rehner, 2009) outlines five different categories: marked, mildly-marked informal, neutral, formal, and hyper-formal.

Marked variants are described as those which are typically stigmatized, such as the use of *m'as* instead of the formal *je vais* or informal *je vas* form of the first person periphrastic future (Nadasdi et al., 2003). They are more commonly used in lower social classes and are used somewhat less frequently by native speakers than informal variants. It is not expected that immersion students would make frequent use of marked variants because of their low frequency and status in Canadian French. Indeed, previous studies (Mougeon and Rehner 2001; Nadasdi et al., 2003; Rehner et al., 2003; Nadasdi and McKinnie 2003; Nadasdi et al., 2008) have discovered that the French immersion students interviewed for this corpus make very little, if any, use of vernacular variants. Nadasdi et al. (2005) attribute this to the fact that the students, in a classroom setting, have little or no exposure to vernacular variants, whether it be due to their absence in the educational input or to limited contact with native speakers.

Many of the variants that are most commonly used by native speakers fall into the mildly-marked informal category. Mildly-marked informal variants are typically used very frequently by all social classes in both formal and informal situations, and as such are not stigmatized like the marked variants, but

they do not conform to the rules of the standard language. The high frequency and lack of stigmatization associated with these types of variants suggest that immersion students should be exposed to them and able to produce them more readily than other less frequent types of variants. However, the findings of previous studies indicate that immersion students use informal variants much less frequently than native speakers (Uritescu et al., 2004; Rehner and Mougeon, 1999; Nadasdi, Mougeon, and Rehner, 2003; Rehner, Mougeon, and Nadasdi, 2003). Informal variants that have near-categorical usage in the L1 speech, such as *ne*-deletion (99%) or the use of *on* as the first-person plural pronoun (95%), are used at rates of 27% and 55% respectively by the immersion students (Rehner and Mougeon, 1999; Rehner et al., 2003). According to Nadasdi et al. (2005) these usage rates are the highest among the immersion students' use of informal variants; other variants are used even less (up to 15% for schwa-deletion) or not at all.

Neutral variants are very similar to mildly-marked informal variants in many respects. However, unlike mildly-marked informal variants, neutral variants do conform to the standard rules of the language. They are also not stigmatized, and "stand as a default alternative" (Mougeon, Nadasdi and Rehner

2009, p. 18) to other marked forms. Examples include the use of *auto* to mean 'car' rather than the more formal *automobile* and *voiture* or socially marked *char* and *machine*, and the use of *travail* to mean 'paid work' instead of the formal *emploi* and *poste* or informal *job* and *ouvrage* (Nadasdi and McKinnie, 2003; Nadasdi, Mougeon and Rehner, 2004). In addition to their lack of stigmatization and high frequency, the fact that neutral variants are acceptable in the standard language leads to the assumption that immersion students should have few reservations using the variants in this category. The limited number of studies that have examined neutral variants have come up with a variety of results that are dependent on factors such as input frequency, complexity, and similarity of the variant to English forms (see Mougeon, Nadasdi and Rehner, 2009). Forms that are found in the input more often, are similar to an English form, and/or are less structurally complex may be used more frequently by the students than those forms which are less frequent, different from English, and more complex.

Formal variants such as the use of *seulement* as an expression of restriction meaning 'only' (Mougeon and Rehner, 2001) are characteristic of a more careful style of speech, are typically used infrequently in the semi-formal interview context, and follow the rules of the standard language. It has been

shown that the immersion students use formal variants at rates much higher than native speakers (Mougeon and Rehner 2001; Nadasdi et al., 2003; Nadasdi and McKinnie, 2003; Nadasdi et al., 2008). Nadasdi et al. (2005) suggest that this over-use is likely due to the high levels of exposure the students have to the formal variants in the classroom setting.

These high levels of exposure in the classroom may also be one of the major reasons why the immersion students use hyper-formal variants at incredibly high frequencies when compared with the native speakers. Hyper-formal variants, while they do conform to standard language rules, are not typical of everyday language usage, and are generally used by speakers in the highest social classes or in formal written language. As such, variants at this extreme of the socio-stylisitc continuum may also be seen as stigmatized in their own way. This "reverse-stigmatization" is apparent in that the use of such variants may automatically cast the speaker in a certain negative light, as Dumas (1987) points out in his discussion of the assibilation of /t/ and /d/ in Canadian French:

> "Tout le monde … réalise toujours le phénomène de la même manière en parlant dans la vie de tous les jours. Tellement que si quelqu'un ne le fait pas, il n'y a que deux explications possibles:

> ou sa langue maternelle n'est pas le français québécois, ou il parle volontairement 'pointu'…" (p. 8)
>
> *"Everyone produces the phenomenon in the same manner when speaking in everyday life. So much so that if someone does not do it, there are only two possible explanations: either his first language is not Quebec French, or he is voluntarily speaking 'pointu'…"* (p. 8).

He later goes on to say:

> "…quelqu'un qui parle pointu quand ce n'est pas le temps encourt la sanction sociale et risque d'être jugé comme pédant, ou tout simplement ridicule." (p. 8)
>
> *"…someone who speaks 'pointu' when it is not the time incurs social sanctions and risks being judged as pedantic, or quite simply ridiculous."* (p. 8)

Other examples of variants that have been classified as hyper-formal include the use of *nous* as the first-person plural pronoun, and the retention of *ne* and /l/ where they would normally be deleted by native speakers. The low frequency and limited use of these forms in everyday language are factors which should discourage the use of hyper-formal variants by immersion students, but this does not appear to be the case. Whereas native speakers have been shown to use hyper-formal variants up to only 7 percent of the time (/l/-retention), the immersion students use them at rates from as low as 15 percent (the use of *donc*

as the conjunction 'so') up to an incredible 98 percent (/l/-retention) (Rehner and Mougeon, 2003; Nadasdi et al., 2005).

Table 1 provides a summary of the general characteristics of the different points on the continuum.

Table 1. Characteristics of the socio-stylistic continuum

	Marked informal	**Mildly-marked informal**	**Neutral**	**Formal**	**Hyper-formal**
Conforms to rules of standard language	x	x	√	√	√
Stigmatized	√	x	x	x	?
Typical of informal speech	√	√	√	x	x
Appropriate in formal speech	x	√	√	√	√
Used by lower social classes	√	√	√	x	x
Used by upper social classes	x	√	√	√	√
Used in written language	x	x	√	√	√

2.4 Phonetic variables

To date, there have been only two phonetic variables examined in the corpus. Uritescu et al. (2004) looked at the deletion of schwa in the speech of the immersion students, and Mougeon et al. (2001, in Mougeon et al., 2004) examined /l/-deletion in the first person pronouns *il* and *ils*.

The study of schwa-deletion (e.g., *maint(e)nant* and *j(e) sais pas*) examined a subset of eight of the immersion students from a variety of different backgrounds and levels of exposure to French. The eight students were compared with a sample of nine francophone adolescents from the Franco-

Ontarian corpus (Mougeon and Beniak 1991). The results of the study indicated that the immersion students deleted schwa 21% of the time compared to 68% for the native French speakers. They found that to a large extent the students delete schwa in the same contexts as the native speakers. Exposure to spoken French outside the classroom was a significant factor in the acquisition of schwa-deletion.

The study of l-deletion revealed a different story. The context in question was the deletion of /l/ in the personal and impersonal third-person (singular and plural) subject pronouns *il* and *ils*. The immersion students deleted /l/ only 2 percent of the time, whereas the native speakers deleted /l/ 93 percent of the time (Mougeon et al. 2001, in Mougeon et al., 2004). In this case, the results were almost completely categorical, but in opposite directions, as the L1 speakers rarely produced the /l/ while the L2 speakers rarely deleted it.

Although both of these studies have looked at the presence or absence of a phoneme, there is a large difference in the extent to which each of the phonetic variables is demonstrated by the students. There are many possible explanations for why this could be. Uritescu et al. (2004) observe that English phonology may play a role since schwa-deletion is a process that can occur in English

whereas deleting /l/ in word-final position does not occur. Another explanation is offered by Uritescu et al. (2004) in that /l/ deletion occurs only in specific morphemes and is not acquired in the same way as a phonological rule. It is also possible that English cognates influenced some of the schwa-deletion, in words such as *gouvernement* 'government' (Uritescu et al., 2004) which do not contain a schwa in English, increasing the likelihood of deleting the schwa in the French pronunciation even though a native speaker of Canadian French may avoid deleting schwa in such a context because it would create a string of too many consonants. It is difficult to generalize from these two studies what the possible implications are for the current study of high vowel lowering in immersion speech.

The analysis of these phonetic variables does come with certain challenges. No information is provided in either study with regards to search methods used in gathering the data, or about how the presence or absence of the phoneme was determined, but it can be assumed that the researchers were able to identify the variant by listening to the audio files – a time consuming endeavour which may have led to the small sample size of the schwa-deletion study. This is much harder to do when assessing the quality (i.e., tense or lax)

of an existing sound, rather than simply the presence or absence of it. Prior to the current study, the transcripts of the interviews have been separate from the audio files, making it extremely difficult to search for a particular orthographic context and find the corresponding point in the audio file. This difficulty has been overcome by synchronising the files using Transcriber (see Section 4.3).

Another challenge for the study of high vowel lowering in immersion speech is that there has not yet been a large-scale study conducted using L1 corpora, meaning that the results of the current study cannot be easily compared to empirical evidence of native speaker norms. There are, however, plenty of sources documenting the fact that high vowel lowering in the obligatory context of a word final closed syllable is a categorical phenomenon in Canadian French (e.g., Dumas and Boulanger 1982, Walker 1984, Dumas 1987, Coveney 2001).

It is difficult to place the /i/ and /ɪ/ variants on the sociostylistic continuum, particularly since they are used only in speech and are not represented in the standard written language. The question of what is "standard" when it comes to pronunciation is further complicated when considering the real, everyday language used by native speakers as opposed to what is found only in textbooks. The variation between /i/ and /ɪ/ is a matter of natural phonetic

reduction, and because the use of the lax vowel is categorical it may well be considered as the standard pronunciation in Canadian French, although it may not be standard in every francophone region of the world.

This is similar to the phenomenon of flapping in North American English, where the /t/ and /d/ sounds in the words butter and puddle are reduced to a flap (/ɾ/) by native speakers of North American English. In this respect, the flap may be considered standard pronunciation in North American English, although the canonical /t/ and /d/ sounds are found in other English speaking areas around the world.

The ubiquity, lack of social stigma, and general status of the lax vowel /ɪ/ in word final closed syllables in Canadian French lead to its classification as a neutral variant on the sociostylistic continuum. The tense vowel /i/ will be considered as hyper-formal because of its infrequent use by native speakers and the fact that the use of it is unnatural and reserved for only the most formal of situations.

2.5 Patterns and trends

As a result of the multitude of studies that have been done on French immersion speech thus far, several patterns have emerged. These include observations

about many aspects from contact with native speakers, to pedagogical input, to correlations with social class. See Mougeon, Nadasdi and Rehner (2009) for an in-depth analysis and explanation of these patterns. This section highlights those patterns which are relevant to the variable that is the topic of this study, the lowering of high vowels.

(1) As mentioned earlier, it has been found that the immersion students use neutral variants to varying degrees depending on several factors, including frequency, complexity, and similarity of the variant to English forms. The lax vowel /ɪ/ is very frequent in Canadian French and also exists as a phoneme in English, and so does not seem like it would be a complicated to learn the variation.

(2) Similarly, whether the immersion students follow linguistic constraints on variant use or not is dependent on the variable in question. Mougeon, Nadasdi and Rehner (2009) have found that the students follow all linguistic constraints with some variants, and with other variants only some or no linguistic constraints are followed, depending on factors such how complex the constraints may be to learn and whether the same context occurs in English. Since the obligatory context of the lax high vowel variant under consideration is

so specific (see Section 3.4), and since the /ɪ/ sound exists in English in much the same linguistic environment, it should be a relatively straightforward linguistic constraint for the students to learn.

(3) Effects of social class and gender have also been shown in some of the research that has been done (Mougeon & Rehner 2003, Nadasdi, Mougeon & Rehner 2003, Mougeon & Rehner 2001, Rehner & Mougeon 1999, Knaus & Nadasdi 2001). These effects have not been significant in all the studies, and not all studies have examined the effects of gender and social class. Of those that have, it seems as though in general, females and students of a higher social status show a preference for more formal variants. It remains to be seen whether this pattern will be reinforced with the analysis of high vowel lowering.

(4) For some variables, the immersion students show a preference for variants that have equivalents in their home language. For example, those students whose first language is English tend to use *juste* (similar to English 'just') to mean 'only', while those who come from a Romance (e.g., Italian, Spanish) background favour *seulement*, which is similar to 'solamente' (Mougeon and Rehner, 2001). Since the lax vowels exist in English (as

phonemes), it is possible that the immersion students may be influenced by the presence of a lax vowel in English cognates of French words.

(5) Another pattern that has emerged is the effect that contact with L1 speakers of French can have on a learner's mastery of the language. The more opportunities the students have to be exposed to native speakers of French in real life situations, the more varied their input is likely to be, and so the greater their chances of being exposed to the variants that are most commonly used by native speakers on a day-to-day basis. This is an intuitive pattern, and has been confirmed by a veritable plethora of studies (Dewaele 1992, Dewaele and Regan 2002, Lapkin, Hart, and Swain 1995, Mougeon & Rehner 2001; Regan 1996, Rehner & Mougeon 1999; Rehner, Mougeon, & Nadasdi 2003; Uritescu, et al. 2004). It is expected that in this study, students who have had more contact with native speakers might display a better mastery of high vowel lowering.

(6) Perhaps one of the most consistent trends to emerge has been the influence of input on a learner's speech. It has been shown repeatedly in numerous studies (Mougeon, Nadasdi and Rehner 2009, Auger 2002, Lyster and Rebuffot 2002, O'Connor DiVito 1991) that the students' usage of variants reflects the usage rates of those variants in both the speech of immersion

teachers and in the teaching materials (textbooks and audio materials). Another related pattern is the high frequency of formal variants and much lower frequency of mildly-marked and marked informal variants found in the input, teachers and textbooks alike. For example, in their examination of the Allen et. al (1987) corpus, Mougeon et al. (2005) found that for the mildly-marked informal variant of *ne*-deletion, teachers omitted *ne* 29% of the time, and the students deleted *ne* 28% of the time. By comparison, L1 speakers of Canadian French delete *ne* in 99% of all cases. This type of finding reinforces another of the patterns having to do with the influence of input: the language used by teachers in the classroom does not always reflect the norms of native speakers in everyday situations.

Unfortunately it has not been possible to analyse the audio of the input for the phonetic variables, so it remains unclear exactly which variant of high vowel the immerison students in this study would have been exposed to at school. On one hand, the more formal setting of a classroom may have led the teachers to use a more careful, formal style of speech in which they may have used tense vowels. On the other hand, it is quite possible that if the students

were taught by native speakers of French, they likely would have been exposed to the use of lax vowels, given their frequency and lack of stigmatization.

In summary, previous research on the sociolinguistic competence of French as a second language learners and the French immersion students from Ontario in particular, has led to the findings that the speech of the students reflects a more formal style of language than that of native speakers, and that input and contact with native speakers can have a significant effect on a learner's mastery of sociolinguistic variation. The students tend to follow linguistic and stylistic constraints in some cases, and may prefer to use variants that are familiar to them from their first language.

3.0 High vowel lowering

3.1 A note on terminology

There is some disagreement as to the correct terminology to use when referring to the vowel sets /i, y, u/ and /ɪ, ʏ, ʊ/. Much of the existing literature dealing with these vowels in Canadian French has had a tendency to refer to the former vowels as “tense” and the latter as “lax”. However, the terms "tense" and "lax" are somewhat imprecise, at least in terms of the International Phonetic Alphabet

(IPA). The term "lax" is usually used to indicate a slight relaxation of the articulators in the production of vowels, in this case meaning that the tongue is somewhat lower in the mouth during the production /ɪ/ than it is when producing /i/. Possible alternatives to the terms "tense" and "lax" include "close" and "open" vowels, but these terms with regards to vowel production will be avoided here in order to prevent confusion with the important distinction between "open" and "closed" syllables. However, there also needs to be a distinction made here between articulatory and acoustic properties, because the lowering of the tongue from the production of the sound /i/ to /ɪ/ in fact *raises* the frequency of the first formant (F1). Thus, acoustically speaking, the vowel /ɪ/ could be considered as *higher* than /i/. In order to maintain simplicity and consistency with previous literature on the subject, the vowels /i, y, u/ will be referred to here as "tense" and /ɪ, ʏ, ʊ/ as "lax". However, the process as a whole will be referred to as "high vowel lowering" (where "lowering" refers specifically to the physical lowering of the tongue in the oral cavity), as opposed to "laxing" (except in cases where the term "laxing" is used in direct association with previous literature).

3.2 High vowel lowering in Canadian French

The lowering of the high vowels /i, y, u/ to their allophones /ɪ, ʏ, ʊ/ is a phenomenon which happens predominantly in Canadian French, although it has been attested in a few other regional varieties, such as in northern France (Coveney 2001). Among speakers of Canadian French, it is a feature which does not appear to hold any negative stigma, as it is used categorically by all speakers in a variety of situations. As such, the lax vowel variant in this study is considered as a neutral variant, and the tense vowel /i/ is considered to be hyper-formal. The primary context in which high vowel lowering occurs is in a word final, stressed syllable closed by a non-lengthening consonant (any consonant other than /v, z, ʒ/ or /ʀ/). Section 3.4 goes into more detail about the various environments in which the high vowels can be lowered.

Since the lax vowels /ɪ/ and /ʊ/ exist as phonemes in English, it may appear as though the lowering of high vowels may be a process in which contact with English has played a role, but this does not appear to be the case. The high vowel lowering rule applies consistently in the obligatory context described above, and in some cases English loan words remain an exception to the rule. Dumas and Boulanger (1982) give the examples of *jeans* and *boost* (p. 53) which

do not incorporate the lower high vowels, and some loan words, such as *boom* and *mean*, retain the tense vowel because there are existing French homonyms which use the lax variant of the high vowel: *boum* and *mine* (Walker 1984, p. 59). Walker (1984) also reports that the obligatory lowering rule applies to some loan words, but fluctuates in others, as in examples in (1) – (3).

(1) *team* /tˢɪm/
(2) *loose* /lʊs/
(3) *speech* /spitʃ – spɪtʃ/

Dumas and Boulanger (1982) consider the fact that the lax vowels existed in French as far back as the 16th to 18th centuries in certain regions of France, and therefore have a historical French connection as opposed to an English connection. In addition, as we will see shortly, the lowering of high vowels is somewhat analogous to an existing pattern in the mid vowels of Canadian French (*la loi de position*). Considering all of these factors, and the fact that this process is attested in other regional dialects of French, it is very unlikely that Canadian French has adopted lax vowels as a result of English influence.

3.3 Canadian French vowel system

The vowel system of Canadian French consists of 12 oral vowel phonemes and 4 nasal vowel phonemes, as seen in Table 2.

Table 2. Canadian French vowel phonemes

	Front	Front rounded	Central	Back
High vowels	i	y		u
Mid vowels	e	ø		o
	ɛ ɛ̃	œ œ̃	ə	ɔ ɔ̃
Low vowels			a	ɑ ɑ̃

This section takes a closer look at the oral vowels and how they are distributed in Canadian French. Schwa is a complex case and will not be examined here, leaving eleven oral vowels for consideration.

There is a general tendency (known as the *loi de position*) for the upper mid vowels /e, ø, o/ to be found in open syllables and the lower mid vowels /ɛ, œ, ɔ/ to be found in closed syllables. This tendency is most common in unstressed syllables, but most of the vowels can be found in both open and closed, stressed and unstressed syllables. Exceptional cases include /e/, which is not found in stressed, closed syllables (whereas /ɛ/ is), and /œ, ɔ/, which are not found in open syllables.

Table 3. Vowel distribution in word final syllables

Vowel	_C_L (/v, z, ʒ, ʀ/)	_C Other consonants	_# Open syllables
/ø/	[œʀøːz]	[ʒøːn]	[ʒø]
	heureuse	*jeûne*	*jeu*
	'happy'	'fast'	'game'
/o/	[ʀoːz]	[soːt]	[so]
	rose	*saute*	*sot*
	'rose'	'(he) jumps'	'silly'
/ɑ/	[kʀwɑːʀ]	[mɑːl]	[mɑ]
	croire	*mâle*	*mât*
	'to believe'	'male'	'mast'
/e/	-	-	[fe]
			fée
			'fairy'
/ɛ/	[ʀɛːv]	[vɛst]	[fɛ]
	rève	*veste*	*fait*
	'dream'	'jacket'	'fact'
/œ/	[flœːv]	[gœl]	-
	fleuve	*gueule*	
	'river'	'mouth'	
/ɔ/	[pɔːʀ]	[mɔl]	-
	port	*molle*	
	'harbour'	'soft'	
/a/	[ʀaːʒ]	[ʃas]	[ta]
	rage	*chasse*	*ta*
	'rage'	'hunting'	'your'
/i/	[viːvʀ]	[vɪs]	[vi]
	vivre	*vice*	*vie*
	'to live'	'vice'	'life'
/y/	[ʒyːʒ]	[ʒʏp]	[ʒy]
	juge	jupe	jus
	'judge'	'skirt'	'juice'
/u/	[puːʀ]	[pʊl]	[vu]
	pour	*poule*	*vous*
	'for'	'hen'	'you'

Walker (1984) uses the feature "tense" to describe the upper mid vowels /e, ø, o/ plus the low vowel /ɑ/, and "lax" for the lower mid vowels /ɛ, œ, ɔ/ and the low vowel /a/. According to this classification, each of the mid and low vowel phonemes form tense-lax pairs: /e – ɛ/, /ø – œ/, /o – ɔ/, and /ɑ – a/. While there are some broad patterns in the way these phonemes are distributed, they are by no means in complete complementary distribution.

This pairing of the eight mid and low vowels creates a symmetrical system to which the high vowel phonemes do not conform on their own. The addition of the lax allophones of the tense high vowels completes the symmetrical system by creating three more tense-lax pairs: /i – ɪ/, /y – ʏ/, and /u – ʊ/. These tense and lax high vowels are found in complementary distribution in the context of stressed, closed syllables. The tense high vowels are not found in stressed, closed syllables (similar to /e/), but are replaced by their lax counterpart. Unlike the mid and low vowel tense-lax pairs, which are each separate phonemes, the high vowel tense-lax pairs are allophonic in nature, allowing for more flexibility for the lax vowels to be found in other contexts.

The range of contexts in which the lower high vowels occur is discussed in the following section.

3.4 Contexts of high vowel lowering

There are two main categories of contexts in which the high vowels are lowered: *obligatory* and *optional*. The obligatory context is the one described earlier: in Canadian French, the high vowels must be produced as lax in a stressed, word-final syllable that is closed by a non-lengthening consonant (any consonant other than /v, z, ʒ/ or /ʀ/). The examples in (4) – (9) show the common Canadian French pronunciations of words ending in lengthening and non-lengthening consonants:

(4)	*prise*	/pʀiːz/	'hold'
(5)	*pur*	/pyːʀ/	'pure'
(6)	*racine*	/ʀa'sɪn/	'root'
(7)	*disque*	/dᶻɪsk/	'disk'
(8)	*jupe*	/ʒʏp/	'skirt'
(9)	*touche*	/tʊʃ/	'touch'

As previously mentioned, the use of a tense vowel in this obligatory lowering context is characteristic of very formal, careful (or non-native) speech, and is considered unnatural by native speakers of Canadian French. The other contexts in which the lax high vowels appear are optional. Walker (1984) describes three

environments of optional lax vowel usage: "pretonic laxing", "initial syllable laxing", and "laxing harmony".

Pretonic laxing of high vowels can occur in unstressed closed syllables before a stressed syllable. In this pretonic context, no high vowel is found elsewhere in the word.

(10)	*sculpté*	/skʏlpˈte/	'sculpted'
(11)	*roulement*	/ʀʊlˈmɑ̃/	'rolling, rotation'

Words containing more than one high vowel may be subject to an optional process of laxing harmony. For instance, in a two-syllable word that meets the obligatory vowel lowering context, other high vowels in the word may also optionally be produced as lax.

(12)	*équilibre*	/ekiˈlɪb – ekɪˈlɪb/	'balance'
(13)	*musique*	/myˈzɪk – mʏˈzɪk/	'music'
(14)	*coutume*	/kuˈtˢʏm – kʊˈtˢʏm/	'custom'
(15)	*routine*	/ʀuˈtˢɪn – ʀʊˈtˢɪn/	'routine'
(16)	*ridicule*	/ʀidᶻiˈkʏl –ʀɪdᶻɪˈkʏl/	'ridiculous'
(17)	*inutile*	/inyˈtˢɪl – ɪnʏˈtˢɪl/	'useless'

The "initial syllable laxing" rule (Walker 1984) explains cases where lax vowels may appear in unstressed, open syllables. This is particularly the case in derived

forms, where harmony can be preserved. Consider these derivations from the examples above:

(18)	*équilibré*	/ekilibʀe – ekɪlibʀe/	'balanced'
(19)	*musical*	/myzikal – mʏzikal/	'musical'
(20)	*accoutumé*	/akutˢyme – akʊtˢyme/	'accustomed'

The phenomenon of vowel lowering in Canadian French is far from simple, but for the purposes of this study, only the front unrounded high vowels /i/ and /ɪ/ in the obligatory context of a stressed, closed syllable in word-final position will be examined, as it is the most straightforward and salient context for a learner to identify and learn as a rule.

4.0 Methodology

4.1 Research questions and hypotheses

In keeping with the larger themes of the research that has been completed using the Mougeon and Nadasdi corpus of immersion French thus far, this study attempts to discover answers to the following questions:

1. To what extent do the French immersion students use the lowered high vowels /i/ and /ɪ/ in the appropriate (obligatory) context?

2. What factors, linguistic and/or extralinguistic, may influence the acquisition of high vowel lowering in immersion speech?

From the patterns that have emerged from the previous research, the following hypotheses can be made:

(1) It is expected that the immersion students will make use of the neutral variant /ɪ/ due to its prevalence and status in Canadian French.

(2) The students may follow the linguistic constraint of lowering /i/ in the specific obligatory context of a stressed, word final syllable closed by a non-lengthening consonant. It is also a possibility that the students may produce lax vowels in other contexts as well, and this will be investigated further in Section 5.4.

(3) Females and/or students from higher social classes may employ the more formal variant more than males and/or students from working and lower-middle classes.

(4) The presence of a tense or lax vowel in English cognates of French words may influence the students' choice of variant.

(5) The students who have had contact with native speakers may be more likely to use the lax vowels than students who have not.

(6) As there is no information available about the input the students have received for this variable, no hypothesis can be confirmed regarding this pattern.[1]

4.2 Materials

The materials used for this study consist of the audio recordings and corresponding transcripts of the 41 interviews conducted for the Mougeon and Nadasdi corpus of immersion French (see section 2.1 above). Each interview records the interaction of two speakers: the interviewer and the student. Although the interviewer asks questions in a semi-directed style, the responses provide a rich sample of spontaneous speech for each student. The speech of the interviewer is not analysed in this study, and the average length of each interview is approximately 35-40 minutes. The audio recordings of the interviews were initially provided in .MP3 format, and were subsequently converted to .WAV files in order to improve the accuracy of the extraction process (described below).

[1] However, if the students are found to use the lax vowel, it may be indicative of the type of input they are receiving with regards to this particular variable.

4.3 Methods

To facilitate searches in the corpus, the audio and transcripts were synchronized using Transcriber. The Transcriber tool allows for the insertion of time stamps within the transcript, marking the time of utterance, essentially matching the transcript to the audio and making it easier to navigate the long audio files. For this study, time stamps were manually placed in the transcripts after approximately each utterance.

Each synchronized Transcriber file was then searched using the Transcriber Search application. This program allows the user to search one or more Transcriber files with a regular expression. Using the information from the time stamps, it can then extract the matching audio segments and create smaller, more manageable audio files as well as Praat text grids. In order to search for the specific obligatory vowel lowering context, a regular expression was needed that included as many words as possible ending in the appropriate orthographic context. The resulting regular expression search returned words ending with orthographic "i*C*e" (where *C* was any number of consonants other than "v" /v/, "z" /z/, "r" /ʀ/, or "g" /ʒ/), as well as spelling variations ending

with unpronounced letters (such as "s"). In this way, all forms of the target words were included (e.g., *habite, habites, habitent*).

Although the lowering phenomenon occurs with all three high vowels, only the front unrounded vowels /i/ and /ɪ/ were examined for this study. This is because these two vowels are the more different from each other in terms of their acoustic properties than the rounded pairs /y-ʏ/ and /u-ʊ/. That difference makes the /i-ɪ/ distinction more salient and hence it may be easier for the learner to perceive than the more subtle difference between /u/ and /ʊ/ or the non-English sounds /y/ and /ʏ/.

Once the relevant audio segments were extracted, the resulting 412 individual audio segments were listened to and the target vowels were identified as tense, lax, or unusable. The spectrograms were visually analysed, and the frequencies of the first and second formants (F1 and F2) as well as the durations of the target vowels were calculated using Praat.

Many of the words containing the target vowels were deemed unusable, for a variety of reasons. Words ending with /l/ created several unusable tokens, as many of the students would pronounce the word final /l/ as [ɬ]. This created syllables of [*C*iəɬ] instead of the expected French pronunciation [*C*il] or [*C*ɪl].

Other examples were excluded if the target syllable was not pronounced as the last syllable of the word. For example, the words *chapitre* 'chapter' and *libre* 'free' (as in *temps-libre* 'free-time') were pronounced with [ʁʌ] as the last syllable. Some examples were excluded due to overlapping speech, and some due to inaudibility or poor quality (for example if the student was whispering or yawning). There were a few cases that were excluded because the student used the English word (generally because he or she was unsure of what the French equivalent was), such as "acuponcturiste" and "médicines".

In addition to each speaker's social factors outlined in Section 2.1, each token was coded for the following linguistic factors: 1) presence of a tense or lax vowel in English cognates, in order to determine if this has an effect on variant choice; 2) presence of /i/ or /ɪ/ elsewhere in the word (e.g. *limites* 'limits'), to determine any effects of vowel harmony; 3) number of syllables in the word (as pronounced by the student); 4) phoneme preceding the target vowel; and 5) phoneme following the target vowel, to determine what effect the phonetic environment of the target phoneme may have on variant choice.

Once the usuable tokens were identified, GoldVarbII was used to determine any significant relationships between variant use and social and

linguistic factors, and is widely used in sociolinguistics. GoldVarbII is a program that performs regression factor analysis, and for this study a step-wise regression analysis was done for the social factors (by speaker), and for the linguistic factors (by token), in the same fashion as previous studies using this corpus.

5.0 Results

5.1 General results

Of the 41 students interviewed, 3 did not provide any usable examples of the obligatory vowel lowering context, and were not included in the analysis. The remaining 38 students provided a total of 249 usable tokens, ranging from 1 to 27 tokens per speaker, with an average of about 7 tokens per speaker. Overall, 215 (86.3%) of the usable tokens were produced with the tense vowel [i] and 34 (13.7%) with the lax vowel [ɪ]. The 34 occurrences of lax vowels were produced by 10 speakers, meaning that 28 speakers did not demonstrate vowel lowering. Thus, these results do not support the hypothesis that the neutral [ɪ] variant would be used more frequently than the hyper-formal variant [i]. Appendix A lists the all the words produced by the 38 students, whether the

tense or lax variant was used, as well as whether they had English cognates and other information about linguistic factors.

The next section provides a breakdown of the results by social factor for all 38 speakers, section 5.3 explains the results by linguistic factor, and section 5.4 goes into more detail about the subgroup of 10 speakers who demonstrated some degree of vowel lowering.

5.2 Social factors

Table 4 summarizes the results by social factor. Each social factor is listed in the leftmost column, followed by the number of students in each category in Column A. Column B lists the number of students in each category who demonstrated some degree of vowel lowering. The rightmost column (C) displays the percentage of students in each category who produced lax vowels (e.g., 1 of the 9 males used lax vowels, giving a rate of 11.1%).

Table 4. Social factor results

	A All students	B Use lowered vowels	C Percent
Gender			
m	9	1	11.1
f	29	9	31.0
Grade			
9	19	4	21.1
12	19	6	31.6
Social Class			
Middle	23	7	30.4
Lower-middle	13	3	23.1
Working	1	0	0.0
School Exposure			
0-25%	7	1	14.3
26-37%	24	8	33.3
38-100%	6	1	16.7
Media Exposure			
Never	23	4	17.4
Occasionally	15	6	40.0
Exposure to a Francophone Environment			
0-1 day	12	2	16.7
1-7 days	8	3	37.5
1-3 weeks	13	5	38.5
3+ weeks	5	0	0.0
Stays with a Francophone Family			
0	24	5	20.8
1-2 weeks	6	1	16.7
2+ weeks	8	4	50.0
Home Language			
English	19	4	21.1
Romance	7	2	28.6
Other	12	4	33.3
Total:	38	10	

The group of 38 students is made up of mostly females, and students from grades 9 and 12 are evenly represented. Middle, lower-middle, and working classes are represented, as well as all levels of exposure to French (in school,

with families, media, etc.). Each category of home language is also represented.

In the subgroup of 10 students who used lax vowels, these same categories are represented with two exceptions: the working class is absent and, surprisingly, none of the five students who had been exposed to a francophone environment for more than 3 weeks demonstrated vowel lowering.

Looking at the group as a whole, it is apparent that females and grade 12 students had a slightly higher rate of vowel lowering than the males and grade 9 students, but the males are far outnumbered by the females in this sample. Recall that the second hypothesis predicts that females would have a higher tendency to use the formal variant [i] than males, which does not appear to be the case in these results. If they had been exposed to the lax vowel, and because of the neutral status of the neutral status of the lax vowel, it is possible that the females were attempting to sound more native-like by imitating the speech of their teachers. However, without audio recordings of the teachers, this is impossible to verify.

The same pattern can be seen in the results by social class. The results of previous literature led to the hypothesis that higher social classes may use formal variants more frequently, but this is not the case with high vowel

lowering in the speech of the French immersion students. Here the middle class uses the neutral variant [ɪ] more frequently than the working and lower-middle classes, which is not surprising due to the lack of social stigma of the lax vowel.

There are mixed results in the categories of exposure to French. The hypothesis predicts that more exposure to French may lead to an increase in use of the lax variant /ɪ/. Those students who made occasional use of French media did use the lax vowel more than those who did not. However, the other three categories (exposure to French at school, exposure to a francophone environment, and stays with a francophone family) show no trends in either direction. In fact, the five students who had the most exposure to a francophone environment (more than three weeks) did not produce any tokens with a lax vowel.

Despite the fact that lax high vowels exist in English, students who spoke English at home did not show a preference for using them in French as the hypothesis predicts. This may be due to the fact that they have been taught that the letter "i" is pronounced as /i/, and perhaps even that the /ɪ/ sound does not exist in French. The students are likely not told about the possibility of variation of this sound in different contexts or dialects of French.

Although these numbers show some interesting results, none of the social factors were selected as significant in the GoldVarb analysis, suggesting that there may be a different explanation as to what is influential in the acquisition of the high vowel lowering rule.

5.3 Linguistic factors

The subgroup of 10 students who produced lowered high vowels provided 96 (38.5%) of the total 249 tokens. Table 5 lists the 34 different types of words that were produced by these 10 students, along with the total number of times each word was produced with a tense or lax vowel, and whether or not the word has an English cognate (with either a tense or lax vowel). Within these 34 words, 21 were produced with a lax vowel.

Table 5. Words produced by speakers displaying variation

Word	Tense	Lax	Cognate Type
artiste	1	0	lax
bibliques	1	0	lax
catholique	16	2	lax
Christine	0	4	tense
classique	1	1	lax
colline	2	0	no
comiques	0	1	lax
communistes	0	1	lax
cousine	1	1	lax
crimes	1	0	no
difficile	0	4	no
facile	1	1	no
film	0	1	lax
Floride	1	1	lax
fusilles	1	0	no
habite	3	1	no
intensif	1	2	lax
limites	0	1	lax
magazines	1	1	tense
mathématique	3	1	lax
musique	3	2	lax
optimiste	1	0	lax
petite	3	0	no
Phillipines	2	4	tense
physique	1	1	lax
politiques	4	0	lax
pratique	3	0	lax
publique	5	1	lax
romantique	3	0	lax
scientistes	0	1	lax
spécifiques	1	0	lax
stricte	0	2	lax
suite	1	0	tense
vite	1	0	no
Total	62	34	

Three of the words that were produced with a lax vowel do not have cognates in English that would affect the production of the target vowel in the French word (*difficile* 'difficult'; *facile* 'easy'; and *habite* 'live'). Another three words (of those produced with a lax vowel) have an English cognate containing [i] (Christine, Phillipines, magazines), and the remaining 15 words are cognates containing [ɪ] (e.g., *comique,* 'comic'; *optimiste,* 'optimist'; *stricte,* 'strict'). Closer inspection of the results by linguistic factor reveals that words having an English cognate with a tense vowel are more likely to be produced with a lax vowel in French. This category was selected by GoldVarb as a significant factor in the application of high vowel lowering, but it is important to note that two of the words (proper nouns Christine and Philippines) were produced as lax only by the two speakers who display advanced mastery of the high vowel lowering rule, and the remaining word (magazines) was produced with a lax vowel only once by one speaker. This small sample size may present a misrepresentation in the statistical significance of this finding. Table 6 summarizes the results of the cognates by token.

Table 6. Cognate results

Type of cognate	Produced as Tense		Produced as Lax		Total
	Number	Percent	Number	Percent	
Tense	4	30.7	9	69.2	13
Lax	46	69.7	20	30.3	66
None	12	70.6	5	29.4	17
None	62		34		96

The presence of either variant of the target vowel earlier in the word (as produced by each speaker) was considered in order to account for potential effects of vowel harmony. The numbers in Table 7 suggest that words containing a lax high vowel prior to the final syllable facilitate the use of a lax vowel in the final syllable, but again, on further inspection 3 of the 4 words in question (Christine, Philippines, physique) were produced by the 2 advanced speakers. This factor was not selected as significant, and no effect was found concerning the number of syllables in the word.

Table 7. Results of vowel harmony effects

Quality of /i/ elsewhere in word	Tense target vowel		Lax target vowel		Total
	Number	Percent	Number	Percent	
Tense	5	71.4	2	28.6	7
Lax	3	27.3	8	72.7	11
None	51	72.9	19	27.1	70

The tokens were also coded for phonetic environment (the phonemes immediately preceding and following the target vowel). Many different strategies were adopted, including grouping the environments individually, and

also by place of articulation, but no analysis could be performed on these groups due to the limited amount of data. Categorizing the preceding phoneme as a stop, fricative, nasal, /l/, or /ʀ/ did create a large enough sample to be analyzed, but no effect was found. Where /l/ occurred as the phoneme immediately following the target vowel, the vowel was produced as lax 6 out of 8 times, but recall that many tokens with /l/ as the final phoneme were deemed unusable and therefore excluded from the analysis. This may suggest that correct pronunciation of word final /l/ could be linked to the lowering of high vowels.

Table 8. Results by phonetic environment

	Preceding Phoneme		Following Phoneme	
Category	Tense	Lax	Tense	Lax
Stop	21	10	50	14
Fricative	14	15	3	4
Nasal	1	3	7	10
/l/	24	3	2	6
/r/	2	3	-	-
Total	62	34	62	34

So far, none of the social or linguistic factors have emerged as a clear indicator of the acquisition of high vowel lowering. The next section takes a closer look at the results on an individual level.

5.4 Individual results

The 10 speakers who display some degree of high vowel lowering can be

divided into three categories: those who make very limited (or one-time) use of the lax vowel (Group 1); those who use the lax vowel infrequently (Group 2); and those who use the lax vowel in most cases (Group 3).

Table 9. Rate of lax vowel usage by speaker

	Speaker number	Tense		Lax		Total
		Number	Percent	Number	Percent	
Group 1	39	26	96%	1	4%	27
	18	9	90%	1	10%	10
Group 2	38	3	75%	1	25%	4
	17	5	71%	2	29%	7
	10	6	67%	3	33%	9
	41	2	67%	1	33%	3
	26	2	67%	1	33%	3
Group 3	8	7	41%	10	59%	17
	2	2	14%	12	86%	14
	20	0	0%	2	100%	2
Total		62		34		96

Group 1

The two speakers in Group 1 cannot be said to have mastered the rule of high vowel lowering. Speaker number 18 uses a lax vowel once in the 10 tokens produced (in the word *difficile*), and speaker 39 uses a lax vowel only once in 27 tokens (in the word *intensif*). It may be the case that their use of the lax vowel in these cases was an error, or perhaps it could be that they have learned to use a lowered vowel in only these words and have not learned a generalized rule. In either case, it is clear that these two speakers have not acquired the high

vowel lowering rule.

Group 2

In Group 2, speakers use the lax vowel between 25 and 33 percent of the time. The five speakers in this category generally did not provide many tokens, so it is difficult to say definitively whether they have acquired high vowel lowering as a rule. Within each speaker's tokens, there is no overlap of using both a tense and lax vowel for the same word. For example, speaker 10 produces *publique* consistently with the tense variant, and *stricte* with the lax variant. However, this is not the case when looking across speakers, as one speaker produces *catholique* as lax, while the others use the tense variant. It is possible that these speakers may be in the process of acquiring the high vowel lowering rule, and are producing the variant inconsistently. The students may also be learning the variant lexically (word by word) as opposed to learning a general rule and applying it in appropriate contexts.

Group 3

Three speakers use the lowered high vowel more than 50 percent of the time. Speaker 20 provides only 2 tokens, both of which are produced with the lax vowel. This limited amount of data does not necessarily confirm mastery of the

high vowel lowering rule for this speaker. The other two speakers use the lowered vowel in 12 of 14 (85%) and 10 of 17 (58%) cases respectively. Speaker 2 uses 12 different types of words, 10 of which are produced only with the lax vowel. One type is produced with a tense vowel, and one type (*habite*) is produced twice, once with each variant. Speaker 8 provides 9 types of words: 3 with the lax variant only, 5 with the tense variant only, and 1 type (*Philippines*) that is produced twice with the tense variant and 4 times with the lax variant. These two speakers show at least a partial mastery of the vowel lowering rule.

In order to determine if these speakers are indeed applying a rule of high vowel lowering, other contexts were examined in their speech to see if the lax vowels occurred in syllables other than the word final closed syllable. It is possible that the speakers may have overgeneralized the rule to apply to non-lowering contexts (such as open or unstressed syllables). A small sample of words taken from each speaker in Group 3 reveals that the speakers appear to use both high vowel variants in a variety of contexts, as seen in Table 9.

Table 10. Lax vowels in other contexts

Speaker 2		Speaker 8		Speaker 20	
Word	Transcription	Word	Transcription	Word	Transcription
minutes	/mɪ'nʏt/	vivre	/viv/	l'immersion	/limə˞'ʒɔn/
dimanche	/dɪ'mɑ̃ʃ/	dimanche	/di'mɑ̃ʃ/	dimanche	/dɪ'mɑ̃ʃ/
l'église	/leg'lɪz/	l'église	/lɛg'liz/	nourriture	/nuɹɪ'tuɹ/
habitude	/abɪ'tu/	difficulté	/dɪfɪkʊl'te/	l'italien	/lɪta'ljɛn/
histoire	/is'twaɹ/	combiné	/kɔmbi'ne/	l'université	/lunivə˞si'te/

All three of these speakers use the lax vowel in open, unstressed syllables (e.g., *dimanche, difficulté, nourriture*), and Speaker 2 uses the lax vowel before a lengthening consonant in *l'église*. The use of the lax vowels /ɪ/ and /ʏ/ in the word *minutes* (Speaker 2) are valid applications of the high vowel lowering rule. A more complete and in-depth analysis of these other contexts may reveal patterns in variant use, but at first glance it is apparent that the Group 3 speakers do not always follow the specific linguistic constraints of lowering the high vowel in a stressed, closed syllable, and instead may be using these allophones interchangeably in other contexts.

5.5 Acoustics and perception discussion

In their study of Canadian French vowel categorization by Canadian English speakers, Escudero and Polka (2003) analyzed the spectral and durational

properties of high vowels and front vowels of Canadian French (CF) and Canadian English (CE). They found that the CF high front unrounded vowels /i/ and /ɪ/ fall between the equivalent CE vowels with respect to F1 and F2, and that the difference in mean duration between the two CF vowels is much less than that of the CE vowels. That is, the CF tense and lax vowels are much closer in duration to each other than the CE tense and lax vowels are to each other (in English, /i/ tends to be longer than /ɪ/), likewise the CF vowels are closer to each other in terms of F1 and F2 than the CE vowels.

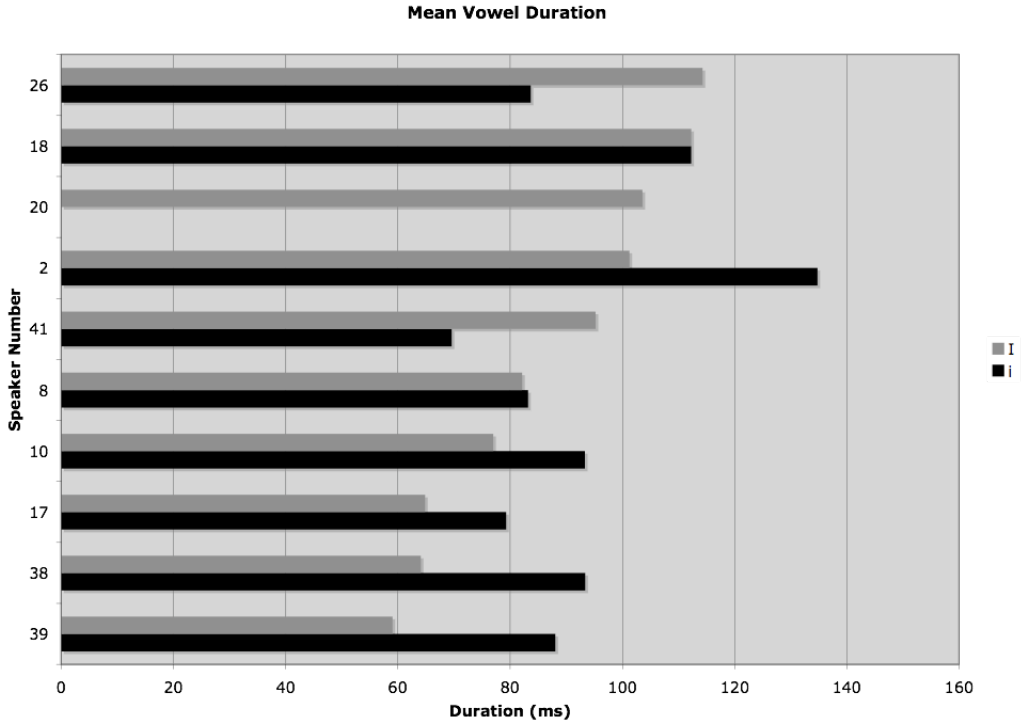
The aim of their experiment was to evaluate the ability of CE speakers to categorize CF vowels, with the hypothesis that "the CF vowel segments will be mapped onto more than one vowel" (p. 2). Participants heard isolated CF vowels taken from recordings of native Canadian French speakers and were asked to identify which vowel they heard by choosing one of seven options. The researchers found that although /i/ had a higher accuracy rate than the other vowels in the study, it was still categorized as two different vowels (/i/ and /ɪ/). This means that when a native Canadian English speaker heard the /i/ and /ɪ/ sounds in French, they had difficulty identifying the sound properly. They came to the conclusion that "beginning learners of CF will misidentify many CF vowel

tokens so long as they rely on their English cue weighting scheme" (p. 4). Therefore, if English listeners are relying on their knowledge and expectations of English sounds, they may experience difficulty in identifying subtle differences between French sounds, in this case the tense and lax allophones /i/ and /ɪ/.

With such subtle differences between the two CF high front unrounded vowels, and the subtle differences between the CF and CE vowels, it is unrealistic to expect that a learner would be able to readily distinguish the two variants, particularly if they are not aware of the distinction between the two vowels.

In terms of high vowel production by the immersion students in this study, no comparison can be made to their English vowels, but the spectral and durational properties of both vowels were compared for each speaker. Table 9 summarizes the mean duration of /i/ and /ɪ/ by speaker.

Table 11. Mean vowel duration



For at least 5 of the speakers, the vowel /i/ was much longer than /ɪ/, as in English. For 2 speakers the lax vowel was longer than the tense vowel, and 2 speakers had similar mean durations for both vowels. One speaker did not use the tense vowel. Interestingly, the two speakers (speaker 2 and speaker 8) who display advanced mastery of vowel lowering show different duration patterns. The vowel durations of speaker 2 are quite different and look similar to the English vowel durations, while the vowel durations of speaker 8 are more similar to how a native speaker of Canadian French would produce these vowels, since they are much closer together.

Appendix B shows the plots of the F1 and F2 values of the vowels produced by each speaker. Small sample sizes limit the conclusions that can be drawn from the data, but the values were used to help identify ambiguous tokens in the initial data collection. Most of the Group 2 speakers have fairly distinct tense and lax vowels, which is expected in English, whereas the Group 3 speakers' vowels are more similar to each other, along the lines of what Escudero and Polka (2003) found for the CF speakers. This supports the notion that the speakers in Group 3 have picked up on the subtle acoustic cues of these Canadian French vowels and are in fact making use of them.

5.6 General discussion

The 10 students who display some degree of high vowel lowering show a great deal of variation both within and across speakers. It is clear from the results that the rule of lowering high vowels is not being applied consistently in the appropriate context by any of the students. Social factors such as grade, gender, social class, exposure to French, and home language do not appear to have any significant effect on acquisition of the rule, and variant choice does not seem to be heavily influenced by linguistic factors, apart from a potential effect of cognates containing the variant /i/ in the target syllable. Regarding this effect, it

is possible that the presence of a tense vowel in the English cognate may be beneficial to a learner when hearing the French word, because the difference between the tense and lax vowel in this case may be enough to make the phenomenon more salient. Hearing a word containing a lowered vowel in both languages may not stand out as exceptional to a learner, as may be the case with the lax cognates of French words.

The fact that even those students who use the lax vowel in the majority of their tokens do not follow the relatively straightforward linguistic constraints consistently and use the lax vowel in open, unstressed syllables may suggest that high vowel lowering is not necessarily being learned as a rule (i.e., the students do not know what the linguistic constraints are), or if it is being learned as a rule, the rule is being employed incorrectly (i.e., generalized to inappropriate contexts in the process of learning how to use the rule).

Previous studies of the sociolinguistic competence of immersion students have been able to relate many of their results to the three key interactions of (a) frequency, (b) complexity, and (c) similarity to English. In the case of /i/ and /ɪ/, and in terms of the neutral status of the variable, the lax vowel exists in English and is not a complex sound to produce in the obligatory context under

examination, and so these factors should not be what is deterring the students from using a lax vowel. Since the majority of the students do not use it, it is possible that they are not receiving the lax vowel at the same categorical level in their input in the classroom context. Without any way of assessing their input, however, it is impossible to claim that lack of exposure is hindering their use of lax vowels in this case. Instead, it could be argued that the differences between the tense and lax vowels are so subtle that the students, and perhaps even the teachers, are not aware of the distinction, do not consider it to be of importance, and hence pay it no attention.

Certainly the lack of effect of either linguistic or extra-linguistic factors suggests that the acquisition of high vowel lowering may instead be facilitated by more explicit teaching in the classroom. Schmidt's noticing hypothesis (1990, 1993, 1995) asserts that language learning is a conscious process and that students learn what they are aware of, or in other words what they notice. In a French immersion classroom, teachers draw attention to different verb forms and tenses, spelling, and even pronunciation, thus making the students aware of what they are learning. However, if students are not taught and remain unaware of the variations that take place in Canadian French, they will be hard pressed to

notice these variations on their own and will likely have difficulty when attempting to communicate with native French speakers in Canada.

In the case of high vowel lowering, and most other phonetic variations, it is of great importance to draw a learner's attention to the subtle differences in production that exist within and across dialects. A lexical or grammatical difference between what the student expects and what they hear is most often a relatively salient difference, one that may lead to a breakdown in communication, and as such is likely to be noticed by the student whether or not they had been aware of it previously. In this case, the student and the speaker become aware of the problem, and a simple explanation (e.g., "use this word instead") may correct the mistake. On the contrary, phonetic differences (especially allophonic differences) can be much more difficult to pinpoint, do not usually lead to a major breakdown in communication, and the student may not realize that he or she sounds unnatural to a native speaker. At the same time, even if the student were aware of their accent and wanted to improve it, most native speakers of Canadian French would not necessarily be able to explain precisely where, when, or why they use one sound instead of another unless they happened to be well versed in the linguistic tendencies of their

language.[2] It is therefore worthwhile for a student to be explicitly taught about such low-awareness variations while they are in a classroom setting, rather than being expected to pick up such subtleties on their own.

Of course, this is not to suggest that French immersion programs in Canada should teach all and only the type of French that is specific to Quebec. The "standard" variety of classroom French is a necessary foundation for being able to communicate to some extent in most, if not all, French-speaking areas of the world. However, classroom French as it is currently taught is arguably not sufficient for communicating in a natural, casual, everyday manner with native speakers of any variety of French. Particularly in a French immersion classroom in Canada, it is important to build on the foundations that are in place, and provide students with knowledge of Canadian French that will benefit them so that if they choose to use their years of immersion education, for example to travel or to gain employment, they will be able to do so more comfortably and with relative confidence in their ability to communicate effectively with their Canadian French-speaking neighbours.

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[2] Think of an average Canadian English speaker being asked to explain Canadian Raising. Most are not aware of what it is, let alone where it occurs, and would certainly have difficulty explaining it to a non-native speaker.

6.0 Conclusions

The French immersion students in this study did not display a high level of mastery of the high vowel lowering rule (an overall lowering rate of 13.7%), and the majority of the students (74%) did not show any degree of lax vowel usage. Future analysis of more contexts and extending the analysis to include the other high vowels of Canadian French may reveal more about how this variable is being learned by the students and would provide more data for the purposes of statistical analysis. The results of this study do not indicate any strong linguistic or extra-linguistic patterns regarding the acquisition of high vowel lowering by French immersion students. A more active approach to teaching this kind of rule would benefit the learner much more than expecting students to be able to passively pick up the subtle, low-awareness features of these tense and lax allophones through exposure to the language in or outside of the classroom. Simply providing students with the knowledge of the existence of this native speaker variation would increase their awareness of the phenomenon and would enhance their ability to perceive the frequent use of lowered vowels in Canadian French. If the students are better able to perceive this phenomenon, they are

more likely to be influenced by their exposure to native speakers, and hence may learn to produce the lax vowels in the appropriate contexts earlier than if they are required to learn it on their own. This is one of the many areas that contributes to the "accent" of immersion students, and requires attention in the classroom if a more native-like variety of French is the goal of students and the education system alike.

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APPENDIX A – Complete word list by type

Word	Tense	Lax	Total	Cognate	/i/-previous[1]
actrice	1	0	1	lax	
artiste	3	0	3	lax	
automobiles	1	0	1	tense	
bibliques	1	0	1	lax	yes
cabine	1	0	1	lax	
catholique	26	2	28	lax	
Chine	1	0	1	no	
Christine	4	4	8	tense	yes
classique	3	1	4	lax	
cliniques	1	0	1	lax	yes
cliques	1	0	1	yes[2]	
colline	2	0	2	no	
comédiques	1	0	1	lax	
comique	3	1	4	lax	
communistes	0	1	1	lax	
cousine	11	1	12	lax	
crimes	1	0	1	no	
dessine	1	0	1	no	
difficile	7	4	11	no	yes
directrice	2	0	2	no	yes
disciplines	1	0	1	lax	yes
disques	1	0	1	lax	
dramatiques	1	0	1	lax	
économiques	1	0	1	lax	
électrique	1	0	1	lax	
équipe	7	0	7	no	
facile	3	1	4	no	
film	0	1	1	lax	
Floride	2	1	3	lax	
frites	1	0	1	no	
fusilles	1	0	1	no	
habite	6	1	7	no	
historiques	2	0	2	lax	yes
intensif	8	2	10	lax	yes
limites	0	1	1	lax	yes

magazines	4	1	5	tense	
maritimes	1	0	1	no	yes
mathématique	9	1	10	lax	
médecines	1	0	1	lax	
Mexique	1	0	1	lax	
musique	8	2	10	lax	
optimiste	1	0	1	lax	yes
petite	17	0	17	no	
Phillipines	1	4	5	tense	yes
physique	1	1	2	lax	yes
piscine	1	0	1	no	yes
politiques	7	0	7	lax	yes
pratique	8	0	8	lax	
publique	16	1	17	lax	
romantique	4	0	4	lax	
sacrifices	1	0	1	no	yes
scientifiques	2	0	2	lax	yes
scientistes	0	1	1	lax	yes
spécifiques	1	0	1	lax	yes
statistiques	3	0	3	lax	yes
stricte	2	2	4	lax	
stupide	4	0	4	lax	
suite	1	0	1	tense	
synthétiques	1	0	1	lax	yes
touristiques	1	0	1	lax	yes
triste	4	0	4	no	
uniques	1	0	1	tense	
ville	1	0	1	no	
visites	1	0	1	lax	yes
vite	6	0	6	no	
Total	215	34	249		

[1] This column indicates whether an /i/ or an /ɪ/ occurred elsewhere in the word, as produced by the speaker. The quality (and presence) of this sound varied from speaker to speaker and from token to token, and was included in the full analysis.

[2] The French word *clique* is used in English with both tense and lax vowels. It was not produced with a lax vowel by any of the speakers in this sample.

APPENDIX B – Speaker formant plots