Contrast, or its counterpart similarity, is emerging as one of the most fundamental notions in phonology. The desirability of contrast between phonological elements, or the avoidance of similarity, pervades all corners of the field and manifests itself in a variety of ways: the avoidance of identical patterns, the need to block similar elements, and the specific realization of sounds. It applies under adjacency or at a distance, in a categorical or gradient fashion.

Much recent work focuses on the role of similarity avoidance in the formation of morphemes (Morpheme Structure Constraints), e.g., Pierrehumbert (1993, 1994a, 1994b), Berkley (1996), and the specific realization of phonological processes: consonant deletion (Coflte' 1997a, b, 1998; Guy & Boberg 1997), dissimilation (Suzuki 1998), reduplication (Kelepir 1998; Wedel 1999, 2000), tonal patterns (Harrikari 1999), voicing agreement at a distance (Walker 2000, to appear).

The research just cited deals with syntagmatic aspects of contrast, between elements that co-occur in the speech stream. Phonologists have also recently explored paradigmatic aspects, in attempts to combine the role of contextual constraints in morphological processes with previous work on phonological processes. Different constraints and the specific realization of phonological processes in determining the pronunciation of homographs and morphological processes in determining the pronunciation of homographs in English have also recently explored the domain of contextual aspects of contrast between morphemes and words.

This chapter is concerned with the role of syntagmatic contrast in consonant deletion and vowel epenthesis. It elaborates on the generalization noted in chapters 1 and 2 that consonants that are more similar to adjacent segments are more likely to delete or trigger epenthesis than consonants that are more contrastive. An alternative formulation is that consonants that are more similar to adjacent segments need to benefit from the cues associated with a flanking vowel, preferably a following one.

4.1. THE PROPOSED APPROACH TO CONTRAST BETWEEN ADJACENT SEGMENTS

4.1.1. REVIEW OF THE CONSTRAINT SYSTEM

The approach to contrast presented in chapter 3 rests on a proposed correlation between the amount of acoustic modulation in a sound sequence and its perceptual salience (e.g., Kawasaki 1982; 1995). The approach is based on the idea that the more similar a segment is to a neighboring segment, the more it needs to be adjacent to a vowel to comply with the Principle of Perceptual Salience.
This idea is encoded in sub-families of markedness and faithfulness constraints. Markedness constraints require that consonants that agree in some feature $F$ with a neighboring segment be adjacent to, or followed by, a vowel. These markedness constraints, given in (13) in chapter 3, are repeated below:

\[(1) \text{MARKEDNESS CONSTRAINTS ENCODING THE ROLE OF SIMILARITY:} \]

\[a. \ C(\text{AGREE} = F) \leftrightarrow V \quad \text{A consonant that agrees in some feature } F \text{ with a neighboring segment is adjacent to a vowel.} \]

\[b. \ C(\text{AGREE} = F) \_ V \quad \text{A consonant that agrees in some feature } F \text{ with a neighboring segment is followed by a vowel.} \]

Different features can be combined in more complex constraints of the type in (2). The inherent rankings are given in (3). (3a) is motivated by the lower perceptibility of consonants that violate a constraint of the $C \leftrightarrow V$ family in comparison with that of consonants that violate the corresponding constraint of the $C \_ V$ family.

\[(2) \text{COMPLEX MARKEDNESS CONSTRAINTS ENCODING SIMILARITY:} \]

\[a. \ C(\text{AGREE} = F \land G) \leftrightarrow V \quad \text{A consonant that agrees in some features } F \text{ and } G \text{ with a neighboring segment is adjacent to a vowel.} \]

\[b. \ C(\text{AGREE} = F \land G) \_ V \quad \text{A consonant that agrees in some features } F \text{ and } G \text{ with a neighboring segment is followed by a vowel.} \]

\[(3) \text{INHERENT RANKINGS BETWEEN MARKEDNESS CONSTRAINTS:} \]

\[a. \ C(\text{AGREE} = F) \leftrightarrow V \gg C(\text{AGREE} = F) \_ V \]

\[b. \ C(\text{AGREE} = F) \_ V \gg C \_ V \]

\[C(\text{AGREE} = F) \leftrightarrow V \gg C \leftrightarrow V \]

\[C(\text{AGREE} = F \land G) \_ V \gg C(\text{AGREE} = F) \_ V ; C(\text{AGREE} = G) \_ V \]

\[C(\text{AGREE} = F \land G) \leftrightarrow V \gg C(\text{AGREE} = F) \leftrightarrow V ; C(\text{AGREE} = G) \leftrightarrow V \]

As discussed in section 3.3, MAX-C constraints prevent the deletion of consonants and induce features and constraints according to the desirability of contrast. MAX-C constraints are projected and ranked according to the constraints' relative perceptibility, as expressed in the constraints in (4a) and the general rankings in (4b).

\[(4) \text{FAITHFULNESS CONSTRAINTS ENCODING SIMILARITY AND INHERENT RANKING:} \]

\[a. \ \text{MAX-C/CONTRAST}=p \quad \text{Do not delete a consonant that contrasts in some feature } F \text{ with an} \quad \text{adjacent segment.} \]

\[b. \ \text{MAX-C/CONTRAST}=p \quad \text{Do not delete a consonant that contrasts in some feature } F \text{ with an} \quad \text{adjacent segment.} \]

\[a. \ \text{MAX-C/CONTRAST}=p \quad \text{Do not delete a consonant that contrasts in some feature } F \text{ with an} \quad \text{adjacent segment.} \]

\[b. \ \text{MAX-C/CONTRAST}=p \quad \text{Do not delete a consonant that contrasts in some feature } F \text{ with an} \quad \text{adjacent segment.} \]

\[a. \ \text{MAX-C/CONTRAST}=p \quad \text{Do not delete a consonant that contrasts in some feature } F \text{ with an} \quad \text{adjacent segment.} \]

\[b. \ \text{MAX-C/CONTRAST}=p \quad \text{Do not delete a consonant that contrasts in some feature } F \text{ with an} \quad \text{adjacent segment.} \]

Before moving to specific case studies, let us briefly discuss previous approaches to syntagmatic contrast.
4.1.2.1. Early proposals

Trnka (1936) already proposed a Law of Minimal Phonological Contrast, which states that a segment cannot be neither followed nor preceded in the same morpheme by a segment that differs from it by only one feature value. This law accounts for the impossibility of, for instance, sequences such as [fp] and [pb] in English, [pph] in Sanskrit and Old Greek, [t-tj] in Russian, a nasal vowel and the corresponding oral one in French (Trnka 1936: 57-58). Trnka's principle says nothing beyond the threshold of one contrast. The approach taken here is more global and allows any level of contrast to be considered. This highlights the importance of considering the actual realization of segments in different contexts, and that classifying clusters on the number of contrasting features may be misleading.

4.1.2.2. The Obligatory Contour Principle

The OCP has been widely used and accepted as a principle dealing with contrast between phonological elements (see section 1.2.1.2). But it has become apparent that the OCP as it has been used and accepted so far does not capture all relevant aspects of phonological contrast.

4.1.2.3. Early proposals

Kawasaki (1982), discussing Saporta's and Cutting's studies, objects to the use of distinctive features to evaluate contrast. She points out that the actual realization of a segment highly depends on the context within which it appears, as evidenced by the fact that speakers often use different features in quite different ways, and that classifying clusters on the number of contrasting features may be misleading.

One might reply that if features have any psychological reality, we may expect that speakers abstract away from the phonetic variability when computing contrast. I have no claim to make on this issue. But I do not give any number of contrasting features, irrespective of their identity, unlike Trnka, Cutting, Saporta, or earlier work of mine (Coflte' 1997a,b, 1998).

4.1.3. Early proposals

Interspeaking of their nature, are problematic.
increasingly clear that, in its standard version, the OCP can only scratch the
surface of the role of contrast and similarity in phonology. Consider the following
definition of the OCP, from McCarthy (1986: 208):

\[ \text{OBLIGATORY CONTOUR PRINCIPLE (OCP):} \]

At the melodic level, adjacent identical elements are prohibited.

Suzuki (1998) provides a clear and detailed discussion of the limitations of
such an approach to identity avoidance. I would like to mention two of the
shortcomings pointed out in this work, both ... avoidance is greatest
when elements are strictly adjacent, but there is no reason to limit its application to
this context.

The approach taken here deals with gradient effects on the identity
dimension. This is achieved through the hierarchy of \( C(AGR=F)_V \) and
\( C(AGR=F) \leftrightarrow V \) constraints that can be constructed using the inherent
rankings in (3).

The rankings in (6), for example, encode the fact that the more features a
consonant shares with an adjacent segment, the more similar they are
considered to be. The degree of preference for a given level of similarity
expressed by the hierarchy of constraints allows to avoid a situation where
features are strongly correlated but not identical. By the definition of the OCP,
the distribution of consonant pairs in the corpus clearly shows how
the preference for similarity and contrast affects the output of the
consonantal system.

Besides the proximity and identity dimensions in contrast, clearly identified by
Suzuki (1998), the deletion and epenthesis patterns investigated in this and
chapters 1-2 reveal the existence of another dimension that escapes the
scope of the OCP: the distinction between what I call absolute and relative
similarities.

Absolute similarity avoidance refers to situations where agreement in some
feature \( F \) between two adjacent segments is not tolerated, independently of
the context in which these two segments find themselves. Examples include:

\[ \begin{align*}
C(AGR=F) & \not\leftrightarrow V \\
C(AGR=F) & \not\leftrightarrow C
\end{align*} \]

Relative similarity avoidance is characterized by the presence of compensatory
effects between different components of the consonantal perceptibility. The
degree of tolerance for a given level of similarity expressed by the
hierarchy of constraints allows to avoid a situation where features are strongly
correlated but not identical. By the definition of the OCP, the distribution of
consonant pairs in the corpus clearly shows how
the preference for similarity and contrast affects the output of the
consonantal system.
An example will help to make the absolute/relative distinction clear. Suppose the three sequences in (7), in which C1 and C2 agree in a feature F. Suppose also the existence of a constraint that militates against a segment sharing the feature F with an adjacent segment.

(7) **ABSOlute VS. RELATIVE SIMILARITY AVOIDANCE:**

a. VC1C2VC1, C2=[F] *absolute* √

b. VC1C2CxVC1, C2=[F] *absolute* 

   *relative*  

c. VC1C2## C1, C2=[F] *absolute* 

   *relative*

If this constraint is interpreted in an absolute fashion, the three forms in (7) are equivalent with respect to it. C1 and C2 are adjacent and they are both specified for F; this is sufficient to induce a violation of the constraint, no matter what other segments appear next to C1 and C2. But if the constraint is interpreted relatively, it may distinguish (7a) from (7b) and (7c). Specifically, it would be violated only in (7b-c). In (7a), C1 and C2 agree in F, but they are also adjacent to a vowel, which provides them with optimal perceptual cues. They may therefore tolerate a relatively similar segment on the other side, specifically one that shares the feature F. In (7b) and (7c), however, C2 is followed by another consonant Cx or by no segment, two contexts in which C2 does not benefit from good contextual cues. In such situations C2 may not tolerate too similar adjacent segments on the other side, in this case segments that agree with it in the feature F.

The OCP is designed to derive cases of absolute identity avoidance: two adjacent segments cannot share one or several feature specifications, irrespective of how they stand with respect to other segments. The constraint system proposed here, however, is able to handle both types of contrast effects. Constraints of the C(AGREE=F)_V family are equivalent to OCP-F constraints and deal with absolute identity avoidance. Constraints of the C(AGREE=F) ↔ V family directly derive the relative interpretation of similarity avoidance, and the inherent rankings in (3b-c) encode the idea that the more similar a segment is to an adjacent segment, the higher the level of perceptual salience. The OCP is thus subsumed into a more general approach to similarity avoidance.

The interaction of the constraints C(AGREE=F)_V >> C(AGREE=F) ↔ V >> C(AGREE=F) V with faithfulness constraints determine whether agreement in the feature F between adjacent segments is: tolerated (FAITH ranked high, 8a), subject to relative avoidance (8b), or subject to absolute avoidance (FAITH ranked low, 8c).

(8) **DERIVING IDENTITY AVOIDANCE:**

a. FAITH >> C(AGREE=F) ↔ V >> C(AGREE=F) V

   Agreement in F always tolerated

b. C(AGREE=F) ↔ V >> FAITH >> C(AGREE=F) V

   Relative avoidance of agreement in F

c. C(AGREE=F) ↔ V >> C(AGREE=F) V >> FAITH

   Absolute avoidance of agreement in F

To illustrate the effect of C(AGREE=F)_V, C(AGREE=F) ↔ V, and OCP constraints, let us briefly consider three simple examples from Lenakel, French, and Hungarian introduced in previous chapters. Let us consider three simple examples from Lenakel, French, and Hungarian.

We saw in section 3.1.1 that in Lenakel epenthesis obligatorily takes place between two identical consonants across a morpheme boundary (9).

To illustrate the effect of C(AGREE=F)_V, C(AGREE=F) ↔ V, and OCP constraints, let us briefly consider three simple examples from Lenakel, French, and Hungarian.

We saw in section 3.1.1 that in Lenakel epenthesis obligatorily takes place between two identical consonants across a morpheme boundary (9).
and analyzed in more detail in section 4.2.4. Moreover, the full analysis in the Hungarian case of relative identity avoidance, sketched below.

In this particular case the OCP approach could be made to work if the domain of application of the OCP constraint were restricted to the syllable. Only tautosyllabic sequences sharing the feature [+vocoid] would violate OCP-[+vocoid], heterosyllabic ones being immune to the effect of this constraint. The correct output ([fymrje]) would therefore not be subject to epenthesis, since it is not tautosyllabic.

In the French case of epenthesis, however, the OCP approach fails to work, as is clearly shown by the faithful output ([fymrje]).

In section 4.2.3, it is developed in more detail in section 4.2.3.

Consider now the case of French, which is developed in more detail in section 4.2.3. As discussed in section 4.2.3, the epenthetic insertion of schwa between a verbal stem ending in a consonant and a 1st/2nd plural conditional ending /-rjø~,-rje/ (12a) does not occur with stems ending in a vowel (12b).

I argued that /r/ and /j/ are both glides specified as [+vocoid], and that epenthesis in (12a) is motivated by the desire for every consonant that appears in the environment following a vowel to be adjacent to a vowel. This is achieved in (12a) by the DEP-V constraint which prohibits insertion morpheme-internally.

Epenthesis always takes place at morpheme boundaries.

Insertion morpheme-internally.
Recall from section 1.2.3.1. that stops may delete under certain conditions in medial position of triconsonantal clusters in Hungarian. First, stop deletion is possible if the following segment is a liquid or a glide. The following data show the effect of these conditions on stop deletion.

(16) STOP DELETION IN HUNGARIAN:

<table>
<thead>
<tr>
<th>No simplification</th>
<th>Simplification</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (\lambda)mbdø</td>
<td>(\lambda)mdø</td>
</tr>
<tr>
<td>b. (\alpha)stma</td>
<td>(\alpha)stma</td>
</tr>
<tr>
<td>c. (\rho)ntgen</td>
<td>(\rho)ntgen</td>
</tr>
<tr>
<td>d. (\delta)mbteto'</td>
<td>(\delta)mbteto'</td>
</tr>
</tbody>
</table>

(17) DELETION BLOCKED IF THE PRECEDING CONSONANT IS [+APPROXIMANT]:

| a. \(\alpha\)lpa' | \(\alpha\)lpa' |
| b. \(\alpha\)rbt | \(\alpha\)rbt |
| c. \(\gamma\)jtm | \(\gamma\)jtm |
| d. \(\delta\)zalkto' | \(\delta\)zalkto' |

(18) DELETION BLOCKED IF THE FOLLOWING CONSONANT IS [+CONTINUANT]:

| a. \(\alpha\)ktfot | \(\alpha\)ktfot |
| b. \(\alpha\)ngs | \(\alpha\)ngs |
| c. \(\alpha\)nle | \(\alpha\)nle |
| d. \(\alpha\)ntum | \(\alpha\)ntum |
| e. \(\alpha\)mptr | \(\alpha\)mptr |

I interpret this pattern in the following way. The motivation for the continuancy condition on the following segment relates to the audibility of the stop-release burst: only [+continuant] consonants are inserted if the cues otherwise available to the stop are reduced. The presence of compensatory effects between the two sides of the stop is clear: if the audibility of the stop burst is not threatened, any level of similarity between the stop and the preceding consonant is tolerated.

It is hard to see how an OCP approach could account for this pattern. Let us adopt an OCP-[approximant] constraint. This constraint is equally violated in [\(\alpha\)st.mø], [\(\alpha\)ktfot], and [\(\alpha\)ngs], but only in the first case is deletion observed. This problem cannot be solved by restricting the application of the OCP to tautosyllabic sequences. For this solution to work, we would have to adopt an OCP-[continuant] + [+approximant] constraint.

Instead, I suggest that the OCP deals with the desirability of contrast between phonological elements. The approach taken here is more general and is able to account in particular for relative similarity avoidance effects, as opposed to absolute ones. The two types are handled by different constraints, where the OCP only applies in coda clusters, and not in onset ones. Under these conditions, the OCP would be violated in [\(\alpha\)st.mø], which contains a sequence of two [+approximant] consonants in coda position. These two types are handled by different constraints, which I call C(A=GREE=F) ↔ V and C(AGREE=F)_V constraints, respectively. In addition to the French and Hungarian cases just presented, the rest of the chapter provides an analysis of stop deletion in Catalan, English, and Québec French. I take these patterns to also display relative rather than absolute similarity avoidance. In all of them stops delete word-finally but stay before vowel-initial suffixes, e.g. cold vs. col der. This contrast follows from the presence of vocalic cues: similarity between the stop and the preceding consonant is tolerated if the stop otherwise benefits from good transition cues.

As in the French case above, using the syllable as the relevant domain for the application of OCP constraints could save the OCP approach here: \(\lambda\) and \(d\) are tautosyllabic in cold but heterosyllabic in col.der. Alternatively, it could be specified that stops may only delete in absolute word-final position. The fact that neither of these solutions is available in Hungarian shows the crucial character of this pattern in establishing the distinction between absolute and relative similarity avoidance.
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4.2. IDENTITY AVOIDANCE: FIRST APPLICATIONS

In this section I present several deletion and epenthesis patterns conditioned by similarity with an adjacent segment on one or more dimensions. The first three cases – Catalan, Black English, and Que'bec French – are discussed in section 4.2.1. A more complex case – Que'bec French – is discussed at length in section 4.3.

4.2.1. AGREEMENT IN [PLACE]: CATALAN

In Catalan, as mentioned in section 1.2.1.2, word-final clusters are productively simplified by deletion of the last consonant (Mascaro' 1983, 1989; Bonet 1986; Wheeler 1986, 1987; Morales 1995; Herrick 1999). The process can be quite simply described in terms of two observations: stop drops, as shown in (20), while fricatives and nasals are stable word-finally, in contexts that are otherwise identical (19).

(20) DELETION OF WORD-FINAL STOPS:

a. \[-rt\]:
   - fort
     
   b. \[-lt\]:
     - alt
   c. \[-nt\]:
     - punt
   d. \[-st\]:
     - bast
   (Wheeler 1987; Morales 1995)

Second, a homorganicity condition applies to consonant deletion: only stops that are homorganic with the preceding consonant may be omitted. Contrast the data in (21) and (22), which contain words ending in heterorganic and homorganic clusters, respectively. The heterorganic ones surface intact (21), but those in (22) show deletion of the final stop.

(21) RETENTION OF NON-HOMORGANIC STOPS:

a. \[-lp\]:
   - balb
   b. \[-lk\]:
     - calc
   c. \[-rp\]:
     - herb
   d. \[-rk\]:
     - arc
   e. \[-sp\]:
     - Casp
   f. \[-sk\]:
     - fosc

(22) DELETION OF HOMORGANIC STOPS:

a. \[-rt\]:
   - fort
   b. \[-lt\]:
     - alt
   c. \[-nt\]:
     - punt
   d. \[-mp\]:
     - camp
   e. \[-˜k\]:
     - bank
   f. \[-st\]:
     - bast

Previous attempts to explain the contrastive behavior of stops, fricatives, and nasals are unsatisfactory. Wheeler (1987) suggests that word-final fricatives do not delete when they follow a stop ... (1998) and Papademetre (1982) adopt the same idea for Que'bec French and Siatista Greek, respectively (these two patterns will be described below). This process is not available when a stop follows a fricative, which explains the contrast in obstruent clusters, but fails to explain why stops, but not fricatives, delete after a sonorant.

Morales (1995) suggests filling this gap by using Radical Underspecification. In the account he proposes for the Catalan facts in (19)-(22), the special status of stops is explained by the contrastive behavior of stops, fricatives, and nasals are underspecified.

(9) RETENTION OF NON-HOMORGANIC STOPS:


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for manner features, whereas all other segments are specified for at least one such feature ([continuant] for fricatives, [lateral] for /l/, [sonorant] for /r/, and [nasal] for nasals). According to ... takes place. The relevant contrasts are illustrated in (23).

\[
(23) \text{MERGER AND NON-MERGER OF WORD-FINAL STOPS (Morales 1995):}
\]

\[
a. \text{Merger takes place: } /n/ + /t/ \rightarrow /nt/ \quad \text{(ex. punt [punt])}
\]

\[
b. \text{Merger does not take place because } /s/ \text{ is specified for } [\text{cont}]: /n/ + /s/ \n\rightarrow /ns/ \quad \text{(ex. fons [fons])}
\]

\[
c. \text{Merger does not take place because } /k/ \text{ is specified for } [\text{vel}]: /l/ + /k/ \rightarrow /lk/ \quad \text{(ex. calc [kalk])}
\]

This approach yields the correct results for the data presented here because only homorganic clusters can be simplified in this language. So, no place or manner of articulation features ever get deleted. It does not extend, however, to other patterns of final stop deletion, such as those observed in Quebec French and English (see section 4.3). As we will see below, non-homorganic clusters in these languages also differ from those observed in Quebec French and English in that stop deletion does not occur unless the preceding consonant is a stop.

This approach also has to stipulate that the OCP only applies to tautosyllabic segments. Stops delete word-finally but not when followed by a vowel-initial suffix, as shown by the contrast between the examples in (24).

<table>
<thead>
<tr>
<th>Base form</th>
<th>Diminutive</th>
</tr>
</thead>
<tbody>
<tr>
<td>[pun]</td>
<td>[punt´t]</td>
</tr>
<tr>
<td>[ba˜]</td>
<td>[bˇk´t]</td>
</tr>
<tr>
<td>[kam]</td>
<td>[kamp´t]</td>
</tr>
</tbody>
</table>

The merger solution also fails to explain the correlation mentioned in the previous footnote between the likelihood of deletion and the degree of similarity in manner of articulation between the stop and the preceding segment.
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4.2 AGREEMENT IN [PLACE]: CONTRAST

4.2.1 AGREEMENT IN [PLACE]: CATALAN

In Catalan, word-final stops are subject to deletion when they agree in place of articulation with an adjacent segment. The relevant markedness constraints and inherent ranking are as follows:

\[ \text{stop}(\text{AGREE}=[\text{place}]) \leftrightarrow V \]

The relevant faithfulness constraints and inherent ranking are:

\[ \text{MAX-C} \leftrightarrow \text{V} \]

The only language-specific ranking between the markedness and faithfulness constraints that we need to establish is given in (27). This ranking generates the deletion of all word-final stops that are homorganic with the preceding segment. This is shown in the tableau in (28).

(28) DELETION AND RETENTION OF WORD-FINAL CONSONANTS IN CATALAN:

A. /punt/ MAX-C/—V MAX-C/V—stop(AGREE=[place]) \leftrightarrow V MAX-C \leftrightarrow V

B. /fons/ \_ fons (s) fon * ! fos * !

C. /kalk/ \_ kalk (k) kal * ! kak * !

D. /punt+´t/ \_ punt´t pun´t * ! put´t * !

4.2.2 AGREEMENT IN [VOICE]: BLACK ENGLISH

Final stop deletion in English provides a case similar to Catalan. Only stops delete (e.g., bend vs. ben), they do so only following another consonant (e.g., bend vs. bed), and deletion fails to apply before a vowel-initial suffix (e.g., bend vs. ben ding). As explained in section 1.2.3.3, final stop deletion is favored by agreement in some feature(s) between the members of the cluster. In Black and Puerto Rican English, however, the deletion of stops in word-final clusters is closely correlated with agreement in voicing between the members of the cluster. The deletion in Black English provides a case similar to Catalan. Only stops that agree in voicing with a preceding consonant are subject to deletion. The relevant markedness and faithfulness constraints are as follows:

\[ \text{stop(AGREE}=[\text{voice}]) \leftrightarrow V \]

The only language-specific ranking between the markedness and faithfulness constraints that we need to establish is given in (29). This ranking generates the deletion of all word-final stops that are homorganic with the preceding segment. This is shown in the tableau in (30).

(29) RANKING SPECIFIC TO BLACK ENGLISH:

\[ \text{stop(AGREE}=[\text{voice}]) \leftrightarrow V \]

The only language-specific ranking between the markedness and faithfulness constraints that we need to establish is given in (30). This ranking generates the deletion of all word-final stops that are homorganic with the preceding segment. This is shown in the tableau in (31).

(30) DELETION AND RETENTION OF WORD-FINAL CONSONANTS IN BLACK ENGLISH:

A. /punt/ MAX-C/—V MAX-C/V—stop(AGREE=[voice]) \leftrightarrow V MAX-C \leftrightarrow V

B. /fons/ \_ fons (s) fon * ! fos * !

C. /kalk/ \_ kalk (k) kal * ! kak * !

D. /punt+´t/ \_ punt´t pun´t * ! put´t * !
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sonorant + obstruent final sequences (29c,e). For Black English, Shiels-Djouadi reports the following percentages of final coronal stop deletion after /l/, /n/, and obstruents:

(29) PERCENTAGE OF FINAL CORONAL STOP DELETION:

a. /t,d/ 72%
Examples: post, buzzed
b. /ld/ 74%
Examples: killed, gold
c. /lt/ 0%
Examples: built, bolt
d. /nd/ 86%
Examples: send, finde
/nt/ 13%
Examples: rent, pint

The contrast between the cluster /ld/, which shows agreement in voicing, and /lt/, which does not, is striking: /d/ is deleted in 74% of the tokens, whereas /t/ is invariably retained. The interaction between these two processes is best illustrated with the following tableau.

(30) MARKEDNESS CONSTRAINT AND RANKING SPECIFIC TO BLACK ENGLISH:

\[ \text{stop(AGREE=\{voice\})} \leftrightarrow \text{V} \]
\[ \text{stop(AGREE=\{voice\})} \leftrightarrow \text{V} \gg \text{MAX-C} \gg \text{C} \leftrightarrow \text{V} \]

4.2.3. AGREEMENT IN [+VOCOID]: FRENCH

We saw in chapter 2 (section 2.3.5.) the role played by the feature [+vocoid] in the distribution of schwa. In particular, schwa epenthesis applies to ensure that every consonant that agrees in [+vocoid] is followed by a vowel when it arises with suffixes or words beginning with an /r/+glide cluster. The relevant constraints are given below (31). When /r/ in this context is considered a glide, the constraint is derived from the distribution of schwa in the Paradigm. The relevant markedness constraint is derived from the following tableau.

(31) OBBLIGATORY SCHWA IN /C+rjVI:

a. gaflerions
Examples: 'spoil+COND.1PL' /gat+rjø~/[gat(rjø~]
b. fumeriez
Examples: 'smoke+COND.2PL' /fym+rje/[fym(rje]

No schwa in /V+rjVI:

a. finirions
Examples: 'finish+COND.1PL' /fini+rjø~/[finirjø~]
b. cre'eriez
Examples: 'create+COND.2PL' /kre+rje/[krerje]

Optional schwa in other /CC+r/ sequences in future/cond forms:

a. posterais
Examples: 'mail+COND.1SG' /pøst+r`/ [pøst(r`]
b. fermerais
Examples: 'close+COND.1SG' /f´rm+r´/ [f´rm(r´]
c. adopterais
Examples: 'adopt+COND.1SG' /adøpt+r´/ [adøpt(r´]

Optional schwa before word-initial /r/+glide sequences:

a. aime rien
Examples: 'like nothing' /´m rj´~/[´m(rj´~]
b. Patrick Roy
Examples: (name)/patrik rwa/[patrik(rwa]

These facts are derived by means of markedness constraints specific to Black English.
Chapter 4: Contrast

RELEVANT MARKEDNESS CONSTRAINTS:

(a) CØ (AGREE=[+vocoid]) ↔ V
A PW-internal consonant (which is adjacent to no prosodic boundary) that agrees in [+vocoid] with a neighboring segment is adjacent to a vowel.

(b) CØ ↔ V
A PW-internal consonant is adjacent to a vowel.

(c) PW[C (AGREE=[+vocoid]) ↔ V
A consonant that is preceded by a PW boundary and agrees in [+vocoid] with a neighboring segment is adjacent to a vowel.

(d) PW[C ↔ V
A consonant that is preceded by a PW boundary is adjacent to a vowel.

INHERENT RANKINGS BETWEEN THE MARKEDNESS CONSTRAINTS IN (35):

(a) CØ (AGREE=[+vocoid]) ↔ V  >>  CØ ↔ V
(b) PW[C (AGREE=[+vocoid]) ↔ V  >>  PW[C ↔ V
(c) CØ (AGREE=[+vocoid]) ↔ V  >>  PW[C (AGREE=[+vocoid]) ↔ V
(d) CØ ↔ V  >>  PW[C ↔ V

The repair used in French to avoid violating these markedness constraints is epenthesis, constrained by DEP-V (37a). In French schwa is inserted at morpheme junctures, never morpheme-internally. This is also the situation found in Chukchi, as analyzed by Kenstowicz (1994b), who proposes that the position of the epenthetic vowel is determined by a CONTIGUITY constraint that requires segments that are contiguous in the lexical representation of a morpheme to also be contiguous in the output. I adopt this position and the position of the epenthetic vowel is determined by a constraint defined in Chapter 2, with a slightly modified definition from that given in Kenstowicz (1994b: 167). This constraint is

FAITHFULNESS CONSTRAINTS:

(a) DEP-V Do not insert a vowel
(b) CONTIGUITY Segments contiguous in the lexical representation of a morpheme are contiguous in the output.

Our task is now to rank DEP-V with respect to the markedness constraints in (36). Epenthesis is obligatory word-internally in /C+rj/ contexts. From this we can infer the ranking in (38). Epenthesis is optional if there is no agreement in vocoid between adjacent consonants (33) or if consonants appear at the edge of a PW (34).

12

As seen in Chapter 2, epenthesis is obligatory in all CCC sequences involving a derivational suffix boundary, as opposed to an inflectional suffix one like the future/conditional ending. Recall that the contrast between

garderie /gard+ri/ [gard+ri] 'daycare' and

garderez /gard+re/ [gard(re)] 'keep+FUT.1SG'. I assume the stricter distribution of consonants across derivational suffix boundaries follows from an additional morphological condition which I do not consider here.
Chapter 4: Contrast

In the first example in /fym+rje/ (40a), the faithful output *[rje] fatally violates the constraint C\(\text{Ø}(\text{AGR}=[+\text{voc}]) \leftrightarrow \text{V}\). The segment [r] agrees in vocoidness with the following consonant [j] and it is not adjacent to a prosodic boundary; the constraint therefore requires that it be adjacent to a vowel, which is not the case in [fymrje]. Epenthesis must apply given the lower ranking of D\(\text{EP-V}\), and it does so at the morpheme juncture, in conformity with \text{CONTIGUITY}; [fymrje] is therefore preferred over *[fymr]. In /f´rm+r´/ (40b), the faithful output with a three-consonant sequence [f´rmr´] is tolerated. It violates only the lower-ranked markedness constraint C\(\text{Ø} \leftrightarrow \text{V}\) since the middle consonant [m] does not agree in [+vocoid] with an adjacent segment, making this candidate immune to the effect of C\(\text{Ø}(\text{AGR}=[+\text{voc}]) \leftrightarrow \text{V}\). Since C\(\text{Ø} \leftrightarrow \text{V}\) and DEP-V are unranked with respect to each other, schwa insertion at the morpheme juncture is also an option in this form. In the form /fini+rjø~/ (40c), the faithful candidate is the only winner: [r] and [j] agree in [+vocoid] but they are both adjacent to a vowel, so none of the relevant markedness constraints is violated. A violation of D\(\text{EP-V}\) then rules out the candidate with epenthesis [fini+rjø~]. Finally, the case in (40d) is similar to that in (40b), except that the relevant markedness constraint is PW\(\text{C (AGR}=[+\text{voc}]) \leftrightarrow \text{V}\) rather than C\(\text{Ø} \leftrightarrow \text{V}\), which is also unranked with respect to DEP-V.

4.2.4. INTERACTION OF MANNER AND PLACE: HUNGARIAN AND SIATISTA GREEK

The process of consonant deletion in Hungarian was discussed at length in chapter 1. I now provide a formal analysis of it. I focus exclusively on word-internal cluster simplification and omit the degemination facts presented in the second part of section 1.2.3.1.

The generalizations for cluster simplification are given in (41). Words that meet the conditions for consonant deletion are given in (42); for these two forms are possible, with and without the ... they fail to meet one of the requirements in (41b-d). I refer the reader to section 1.2.3.1 for additional examples.

(41) a. Only the middle consonant of a three-consonant sequence deletes.
d. Stops do not delete if followed by a [+continuant] segment: glides, liquids, and fricatives (45).

(42) DELETION WHEN ALL THE CONDITIONS IN (41) ARE MET:  

<table>
<thead>
<tr>
<th>Word</th>
<th>Simplified</th>
<th>Deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>lambda</td>
<td>lombdo</td>
<td>No simplification</td>
</tr>
<tr>
<td>asthma</td>
<td>østmo</td>
<td>Simplification</td>
</tr>
<tr>
<td>X-ray</td>
<td>røngen</td>
<td>No simplification</td>
</tr>
<tr>
<td>hilltop</td>
<td>domtØ:</td>
<td>No simplification</td>
</tr>
</tbody>
</table>

(43) NO DELETION WHEN THE MIDDLE CONSONANT IS A FRICATIVE OR AFFRICATE:  

<table>
<thead>
<tr>
<th>Word</th>
<th>Simplified</th>
<th>Deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>indifferent</td>
<td>snftl´n</td>
<td>No deletion</td>
</tr>
<tr>
<td>obscure</td>
<td>opkuruß</td>
<td>No deletion</td>
</tr>
<tr>
<td>from (an) orange</td>
<td>nørønbo:l</td>
<td>No deletion</td>
</tr>
<tr>
<td>popular song</td>
<td>ta:ndøl</td>
<td>No deletion</td>
</tr>
</tbody>
</table>

(44) NO DELETION WHEN THE FIRST CONSONANT IS [+APPROXIMANT]:  

<table>
<thead>
<tr>
<th>Word</th>
<th>Simplified</th>
<th>Deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>lackey</td>
<td>tølpn∆ølo:</td>
<td>No deletion</td>
</tr>
<tr>
<td>from (a) Serb</td>
<td>s´rptØ:l</td>
<td>No deletion</td>
</tr>
<tr>
<td>cell nucleus</td>
<td>ß´jtmøg</td>
<td>No deletion</td>
</tr>
<tr>
<td>basalt stone</td>
<td>bøzøltkØ:</td>
<td>No deletion</td>
</tr>
</tbody>
</table>

(45) NO DELETION WHEN THE LAST CONSONANT IS [+CONTINUANT]:  

<table>
<thead>
<tr>
<th>Word</th>
<th>Simplified</th>
<th>Deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>nude photograph</td>
<td>øktfoto:</td>
<td>No deletion</td>
</tr>
<tr>
<td>sound sequence</td>
<td>hø˜kßor</td>
<td>No deletion</td>
</tr>
<tr>
<td>second-hand dealer</td>
<td>hønle:</td>
<td>No deletion</td>
</tr>
<tr>
<td>center</td>
<td>tÍnrum</td>
<td>No deletion</td>
</tr>
<tr>
<td>computer</td>
<td>kómju:t´r</td>
<td>No deletion</td>
</tr>
</tbody>
</table>

The first generalization in (41a) has a clear interpretation: only consonants that are not adjacent to a vowel ever get deleted. Only stops delete (41b), and they do so only if followed by a [+approximant] consonant (since all [+approximant] segments are also [+continuant]). These conditions all ensure that only the least perceptible consonants delete.

These factors could in principle be integrated into faithfulness (\text{MAX-C}) or markedness (C\(\text{↔} \text{V}\)) constraints, as illustrated in the table in (35) in chapter 3. I use here perceptually-motivated faithfulness constraints. The relevant ones are given in Table 4.2.

The process of consonant deletion in Hungarian was discussed at length in chapter 1. I now provide a formal analysis of it. I focus exclusively on word-internal cluster simplification and omit the degemination facts presented in the second part of section 1.2.3.1.
two consonants of the cluster share the same point of articulation, then in a cluster

supported but deletion is more frequent and natural. In paradigms in which the first

articulation of the medial stop – velar in (50a), alveolar in (50b) – stop may be

affected, we observe optional deletion in this form. If deletion applies, it

occurs only when the underscored CR–V... Consonants that are underscored are

subject to any of the higher-ranked faithfulness constraints. Hence, if we

examine the cliticization of other consonants, which are underlined in (49d),

deletion is only observed in the second consonant of the cluster. The last

column in (49i) provides the correct output in all cases.

The tableau below illustrates with one example from each of the four groups

of data in (47)-(49) how the grammar generates the correct output in all cases.

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Chapter 4: Contrast

EFFECT OF HOMORGONICITY ON THE LIKELIHOOD OF STOP DELETION:

a. Recskboł [r’dΩgbØ:l] [r’dΩbØ:l] ‘from Recsk’
b. parasztboł [pørøzdbo:l] [parazbo:l] ‘from the peasant’

This homorganicity condition may be integrated into our system of faithfulness constraints with the constraint in (51a), which is inherently ranked higher than the simple MAX-C constraint (51b). Like MAX-C, this new constraint remains unranked with respect to C ↔ V, which results in the optionality of deletion. But the inherent ranking in (51b) yields the desired effect on the likelihood or frequency of deletion. There are three possible rankings of the constraints in (51b) and C ↔ V, given in (52). In two of them MAX-C ranks below C ↔ V, as opposed to only one for MAX-C/Contrast= [Place]. If we assume that the likelihood of outputs is determined by the proportion of rankings that derive them, deletion is more likely if there is agreement in place. The mini-grammar in (48) is updated as in (53).

(51) ADDITIONAL FAITHFULNESS CONSTRAINT AND INHERENT RANKING:
a. MAX-C/CONTRAST= [Place] Do not delete a consonant that contrasts in place of articulation with an adjacent segment.
b. MAX-C/CONTRAST= [Place] >> MAX-C

(52) POSSIBLE RANKINGS OF THE CONSTRAINTS IN (51) AND C ↔ V:
a. C ↔ ↔ ↔ ↔ V >> MAX-C/CONTRAST= [Place] >> MAX-C _ Deletion in (50a-b)
b. MAX-C/Contrast= [Place] >> C ↔ ↔ ↔ ↔ V _ Deletion only in (50b)
c. MAX-C/Contrast= [Place] >> MAX-C >> C ↔ ↔ ↔ ↔ V _ No deletion

(53) PARTIAL GRAMMAR OF HUNGARIAN II:

Max-C/CONTR= [app]                 Max-C/_V
Max-C/V_                                  C ↔ ↔ ↔ ↔ V        Max-C/Cont= [pl]
Max-C
Max-stop/__[+cont]      Max-C(-stop)

Hungarian illustrates a situation where the possibility of consonant deletion is determined by contrast in manner of articulation, in this case the feature [approximant], with contrast in place of articulation. Greek dialect of Siatista provides an example of the opposite situation: both homorganicity and similarity in manner of articulation play a role, but the former is more important than the latter. Siatista Greek (Papademetre 1982) obligatorily simplifies homorganic triconsonantal clusters but leaves non-homorganic ones unchanged. This is unlike the stop-fricative-liquid cluster in (54c), which contains an insufficient contrast in manner of articulation, unlike the stop-fricative-liquid cluster in (54c).

(54) CONSONANT DELETION IN SIATISTA GREEK:
a. No deletion in non-homorganic clusters:
   ßt ßm: /stimoni/ ‘spindle’ _ ßtßimoni _ [ßtßmon]
b. Deletion in homorganic (coronal) clusters:
   ßt ßn: /stinora/ ‘on time’ _ ßtßinora _ [ßnora]
c. No deletion in clusters with sufficient dissimilarity in manner:
   kßl:/ksilas/ ‘lumberjack’ _ kßilas _ [kßlas]
d. Optional deletion in clusters without sufficient dissimilarity in manner:
   çt ßp: /xtipo/ ‘I hit’ _ çtßipo _ [çtßpo]/ [xpo]

What counts as sufficient or insufficient contrast in manner of articulation is not totally clear from Papademetre’s description and I will not attempt to provide explicit constraints and a formal system of faithfulness. But the facts support the homorganicity analysis. Khan’s claim would mean that it is dissimilarity in manner of articulation that favors reduction. This is contrary to what we know about cluster simplification in other languages. Yet the facts are consistent with the contrast-based account I propose.
In this section I analyze in great detail the complex pattern of word-final cluster simplification in Que'bec French (QF). I propose that simplification in QF is motivated by two distinct factors: the Sonority Sequencing Principle and the Principle of Perceptual Salience. The SSP is violated in all clusters whose last consonant is more sonorous than the preceding one, for example in \textit{bible} /bibl/ or \textit{organisme} /ørganism/. In all such cases final consonant deletion is observed, but its frequency is proportional to how severely the cluster violates the SSP. Among the clusters that do not violate the SSP, some always surface unreduced (e.g. \textit{parc} /par/, \textit{e'clipse} /eklip/), while others allow simplification, with more or less regularity (e.g. \textit{piste} /pist/, \textit{hymne} /imn/). I argue that the factor that determines the behavior of clusters is perceptual salience. Only the least salient consonants may ... contrast in a cluster is determined mainly by manner of articulation, but place and voicing also play a substantial role.

### 4.3.1. Attested Final Clusters and Previous Analyses

Modern French displays a large number of word-final consonant clusters. Some of them are structural relics of clusters that resulted from apocopes that took place in Old French, some are more recent and stem from the introduction and borrowing of new words, and from spelling-based reformations that restored consonants which had ceased to be pronounced. But the loss of word-final clusters in the pronunciation of French in the seventeenth century can be related to two main factors: the introduction of regional varieties and the influence of apocopes that took place in Old French. Other words are more recent and stem from the introduction and borrowing of new words, and from spelling-based reformations. All these factors contribute to the complex pattern of word-final cluster simplification in Que'bec French.
Chapter 4: Contrast

Table 5: Possible word-final clusters in French

<table>
<thead>
<tr>
<th>Type</th>
<th>Combinations</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>/rl/</td>
<td>perle 'pearl', parle 'speak', Charles</td>
</tr>
<tr>
<td></td>
<td>/rm, rn, rµ</td>
<td>arme 'weapon'; corne 'horn'; épargne 'savings'</td>
</tr>
<tr>
<td>AF</td>
<td>/lv, lf, ls, lΩ</td>
<td>valve 'valve'; golf 'golf'; valse 'waltz'; belge 'Belgian'</td>
</tr>
<tr>
<td></td>
<td>/r/ + any F</td>
<td>énerve 'irritate'; surf 'surf'; quatorze 'fourteen'; force 'strength'; orge 'barley'; arche 'arch'</td>
</tr>
<tr>
<td>AS</td>
<td>/l/ + any S</td>
<td>bulbe 'bulb'; Alpes 'Alps'; solde 'sale', Donald; révolte 'revolt'; algue 'seaweed'; calque 'tracing'</td>
</tr>
<tr>
<td></td>
<td>/r/ + any S</td>
<td>barbe 'beard'; harpe 'harp'; corde 'cord'; tarte 'pie'; orgue 'organ'; barque 'boat'</td>
</tr>
<tr>
<td>NA</td>
<td>/ml/</td>
<td>jumele 'pair, twin'</td>
</tr>
<tr>
<td>NN</td>
<td>/mn/</td>
<td>hymne 'hymn', indemne 'safe (of a person)'</td>
</tr>
<tr>
<td>NF</td>
<td>/nß, nz/</td>
<td>Loanwords: ranch, lunch; Ben's</td>
</tr>
<tr>
<td>NS</td>
<td>/nd, nt, mp, µk, µg/</td>
<td>Loanwords: week end, sprint; bump; punk; ping-pong</td>
</tr>
<tr>
<td>FA</td>
<td>/fl, fr, vr/</td>
<td>pantoufle 'slipper'; chiffre 'number'; livre 'book'</td>
</tr>
<tr>
<td>FN</td>
<td>/sm/</td>
<td>enthousiasme 'enthusiasm', tourisme 'tourism'</td>
</tr>
<tr>
<td>FF</td>
<td>/vz/</td>
<td>Reeves (proper name)</td>
</tr>
<tr>
<td>FS</td>
<td>/ft, sp, st, sk/</td>
<td>shift; Deraspe (name); vaste 'vast'; risque 'risk'</td>
</tr>
<tr>
<td>SA</td>
<td>/bl, pl, gl, kl, dl/</td>
<td>table 'table'; couple 'couple'; ongle 'nail'; cycle 'cycle'; jodle 'yodel'</td>
</tr>
<tr>
<td></td>
<td>any S + /r/</td>
<td>chambre 'room'; propre 'clean'; cadre 'frame'; autre 'other'; pégre 'underworld organization'; sucre 'sugar'</td>
</tr>
<tr>
<td>SN</td>
<td>/gn, tm, gm, km/</td>
<td>stagne 'stagnates'; rythme 'rhythm'; énigme 'enigma'; drachme 'drachma'</td>
</tr>
<tr>
<td>SF</td>
<td>/ps, ts, ks, dΩ, tß/</td>
<td>éclipse 'eclipse'; ersatz; taxe 'tax'; Cambodge; sandwich</td>
</tr>
<tr>
<td>SS</td>
<td>/pt, kt/</td>
<td>apt 'apt'; directe 'direct'</td>
</tr>
<tr>
<td>FSA</td>
<td>/str, skl/</td>
<td>orchestre 'orchestra'; muscle 'muscle'</td>
</tr>
<tr>
<td>SFS</td>
<td>/kst/</td>
<td>texte 'text', mixte 'mixed'</td>
</tr>
<tr>
<td>SSA</td>
<td>/ptr, ktr/</td>
<td>sceptre 'scepter'; spectre 'specter'</td>
</tr>
<tr>
<td>SFSA</td>
<td>/kstr/</td>
<td>ambidextre 'ambidextrous'</td>
</tr>
</tbody>
</table>

The present analysis relies on the same basic ideas as my previous papers; however, it includes more facts and is integrated into a broader framework.

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Word-final cluster simplification is a widespread and productive process in French. The present analysis relies on the same basic ideas as my previous papers (Coflette 1997a,b, 1998), but it includes more facts and is integrated into a broader framework. The first description and analysis of cluster reduction in QF that I know of is normally pronounced [skylt], without the medial [p]; this is the standard pronunciation indicated in dictionaries. But the spelling-based pronunciation with a [p] is also attested.

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Word-final cluster simplification is a widespread and productive process in French. The present analysis relies on the same basic ideas as my previous papers (Coflette 1997a,b, 1998), but it includes more facts and is integrated into a broader framework. The first description and analysis of cluster reduction in QF that I know of is normally pronounced [skylt], without the medial [p]; this is the standard pronunciation indicated in dictionaries. But the spelling-based pronunciation with a [p] is also attested.

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Word-final cluster simplification is a widespread and productive process in French. The present analysis relies on the same basic ideas as my previous papers (Coflette 1997a,b, 1998), but it includes more facts and is integrated into a broader framework. The first description and analysis of cluster reduction in QF that I know of is normally pronounced [skylt], without the medial [p]; this is the standard pronunciation indicated in dictionaries. But the spelling-based pronunciation with a [p] is also attested.
Two points of comparison between my treatment of cluster simplification in QF and previous ones should be mentioned, one empirical, one theoretical. First, previous investigations suffer from a lack of an empirical focus. This is exemplified by the fact that posológica (1999) and Coflte (1997a, 1998) both fail to consider the role of the data. Second, independently from this empirical issue, Pupier & Drapeau (1973), Kemp et al. (1980), and Nikie'ma (1998, 1999) propose a unique simplification rule for QF, whereas I take the process to be more complex and require a principled account for these facts. This is exemplified by the fact that posológica (1999) and Coflte (1997a, 1998) both fail to consider the role of the data.  

4.3.2. CLUSTER REDUCTION AND SONORITY  

Sonority Sequencing Principle:  
Sonority maxima correspond to sonority peaks. 

Sonority hierarchy: 
glides (G) > liquids (L) > nasals (N) > obstruents (O) 

Clusters that violate the SSP comprise the obstruent+/r,l/, obstruent+nasal and nasal+/l/ sequences. We will look at each of these configurations in turn.

Nikie'ma (1999) criticizes Coflte (1997a, 1998) at length for not accounting for the data. Strikingly enough, however, he only considers sonority as a motivating factor for cluster simplification in my analysis, and yet the main element of my approach, and the only one discussed in Coflte (1998). The "counterexamples" to my analysis brought by Nikie'ma all fall under the scope of salience and were clearly accounted for in the papers cited. Nikie'ma's criticism can therefore be dismissed.
Chapter 4: Contrast

consider only final clusters comprised of two consonants. It should be clear after I provide the complete analysis that the proposed generalizations extend automatically to clusters of more than two consonants.

4.3.2.1. Obstruent-approximant clusters

Obstruent+approximant final clusters are by far the most frequent in the language (Male'cot 1974; Kemp, Pupier & Yaeger 1980) and their behavior is quite clear. Approximant deletion in these clusters is a well-known process in French. What distinguishes QF from the Parisian ... couple of examples of stop+/r/ and fricative+/l/ final clusters in pre-consonantal, pre-pausal, and pre-vocalic position:

(55) O+A FINAL CLUSTERS IN —C, —V, AND —# CONTEXTS:

FA: —C:

pantoufle bleue
'blue slipper' /pa~tufl blØ/ _ 
[pa~t¨fblØ]

—#:
pantoufle
'slipper' /pa~tufl/_ 
[pa~t¨f]

—V:
pantoufle orange
'orange slipper' /pa~tufl øra~Ω/ _ 
[pa~t¨føra~Ω]

SA: —C:
sucre dur
'hard sugar' /sykr dyr/ _ 
[sÁkdzÁr]

—#:
sucre
'sugar'/sykr/ _  
[sÁk]

— V:
sucre arabe
'Arabic sugar' /sykr arab/ _ 
[sÁkarab]

The fact that these clusters simplify systematically in all contexts raises the obvious question of whether clusters are present in the underlying forms. That is, are we dealing here with a synchronic deletion or a phonological process that removes the final consonant? For example, crisse (swear word) /kris/ derives from Christ 'Christ' /krist/.

Similar examples include:

1. tabarnac (swear word) /tabarnak/ < tabernacle 'tabernacle' /tab´rnakl/;

3. piasse 'dollar' /pjas/ < piastre 'piastre' /pjastr/;

4. canisse 'container' /kanis/ < canistre /kanistr/.

This reanalysis is apparent in derived words in which a vowel-initial suffix is added, such as the infinitive marker /e/ in crisser /kris+e/ and the adjectival suffix -ant /a~/ in tabarnacant /tabarnak+a~/.

Such changes in underlying forms are obviously favored when words are not related to morphologically derived forms in which the final consonant resurfaces, which points to the important role of the morphology in maintaining these final clusters in lexical representations.

Disregarding these obvious cases of reanalysis, traditional derivational analyses would argue that the final approximant is necessary in underlying representations to get morphologically derived words, like pantouflard 'stay-at-home' /pa~tuflår/ from pantoufle and sucrier 'sugar bowl' /sykrije/ from sucre. But these are not productive derivations, and it is not clear that such words are derived and phonologically reanalyzed.

Additional examples of final approximant deletion are provided below:

(56) S:

(a) cibler
'target+INFINITIVE' /sibl+e/ _ 
[sible]  

(b) cible
'target+PRES(ENT)' /sibl/ _ 
[sˆb]

(57) D:

(a) livre
'deliver+PRES' /livr/ _ 
[liv]

(b) souffle
'blow+PRES' /sufl/ _ 
[s¨f]

(c) règle
'solve+PRES' /r´gl/ _ 
[r´g]

(d) cadre
'frame+PRES' /kådr/ _ 
[kå¨d]
4.3.2.2. Obstruent-nasal clusters

Obstruent+nasal clusters are more complex. They do not behave as systematically as obstruent+approximant and other nasal-final ones. Words ending in /-sm/, the only attested form of this type, have a special history. They were the result of an approximant retention in most forms in which a nasal is found at the end of a stressed syllable, where it would have been expected to be lost.

As for /-sm/ clusters, they are heard in various words and seem to be more frequent than those ending in /-ist/ (58). As we will see, final /-st/ clusters consistently lose their final /t/; if /-sm/ also simplifies, forms like "communisme" and "communiste" become homophonous.

The forms in /-ism/ are usually less frequent than those in /-ist/, and pertain to a somewhat higher level of speech. It is not uncommon to keep the final /m/ in /-ism/ (while reducing the /-ist/ cluster), but this is by no means an absolute rule.

(58) Words in /-ism/ with a (more frequent) correspondent in /-ist/:

- a. tourisme
- b. communisme
- c. "fanatisme"
- d. "vandalisme"
- e. "cate'chisme"
- f. "anglicisme"
- g. "fantasme"
- h. "enthousiasme"
- i. "asthme"
- j. "schisme"

Other words in /-sm/ include those not ending in the suffix /-ism/ and words ending in /-ism/ for which there is no corresponding form ending in /-ist/ (e.g. "fanatisme", "vandalisme"), or for which this form is much rarer (e.g. "cate'chisme", "cate'chiste") or semantically not in a direct correspondence relation (e.g. "anglicisme", "angliciste").

For some words, there seems to be an incentive to maintain a contrast between the /-sm/ form and another form in the paradigm. In such cases, the /-sm/ form is preferred, although not quite as automatic as in the obstruent+approximant group. Only two reasonably common verbs could be found:

- fantasmer
- enthousiasmer

(59) Words in /-ism/ without a (more frequent) correspondent in /-ist/:

- a. rhumatisme
- b. orgasme
- c. organism
- d. "cate'chisme"
- e. "anglicisme"
- f. "fantasme"
- g. "enthousiasme"
- h. "asthme"
- i. "schisme"

4.3.2.3. Nasal-approximant clusters

I have found only one example containing a final nasal+approximant sequence (61). /Ωyml/ is the non-standard present form of the verb "jumeler" (the normative one being "jumelle").

When the final cluster /-ml/ arises, the final /l/ is easily dropped in the output. But this being the only relevant form, it is hard to draw any generalization on the behavior of this cluster.

This judgment agrees with the one given by Pupier and Drapeau (1973), but The`riault (2000) considers deletion to be impossible in this form, which might reflect a change in progress.

The /l/ in the present form alternates with ^ in the infinitive (a reflex of an historic schwa, indicated by the written <e>), on the model of "appeler" vs. "appelle". These verbs are analyzed in present-day French as having two stems, e.g. "[Ωyml-]" and "[Ωym´l-]" or "[apl-]" and "[ap´l-]". The norm prescribes its use, notably in the present tense (singular and 3rd plural). Hence "[Ωyml]" rather than "[Ωym´l]".

We will see that /-lm/ final clusters are also simplified. There are therefore two possible motivations for the deletion of /l/ in /Ωyml/: the SSP and the avoidance of sequences composed of a lateral and a nasal.
I will simply observe that deletion in this unique form is consistent with how SSP violations are treated in other sequences (obstruent+approximant and obstruent+nasal ones). Let us attach a numerical value to each category of consonants in the sonority hierarchy: glides=3 > liquids=2 > nasals=1 > obstruents=0, as is done in Clements (1990). The SSP bans elements that are not adjacent to a vowel. Notice that a sequence of two consonants ranked a vowel on one side is not violated. Notice that a sequence of two consonants ranked a vowel on both sides is not violated. Notice that a sequence of two consonants ranked a vowel on both sides is not violated. Notice that a sequence of two consonants ranked a vowel on both sides is not violated.

Violations of the SSP may be relativized by considering the magnitude of the sonority difference between a segment and its neighbors: the lower they are, the higher the corresponding constraint. If a consonant is flanked by a consonant on both sides, I take the higher of the two sonority differences to be relevant. Notice that the sonority difference between a consonant and its neighbors should not be strictly positive; equal sonority differences should not be strictly positive, either. This is expressed in the definition in (62a), which projects a family of SSP constraints, inherently ranked as in (62b).

Finally, the SSP allows sonority plateaus. The cluster [st] is permitted, for instance, whereas [st] and [st] are not. Let us apply this proposal to word-final clusters. We get a SSP violation if

\[ \text{Sonority Sequencing Principle (revised formulation):} \]

as in (62).

Violation of the SSP may be relativized by considering the magnitude of the sonority difference between a segment and its neighbors: the lower they are, the higher the corresponding constraint. If a consonant is flanked by a consonant on both sides, I take the higher of the two sonority differences to be relevant. Notice that the sonority difference between a consonant and its neighbors should not be strictly positive; equal sonority differences should not be strictly positive, either. This is expressed in the definition in (62a), which projects a family of SSP constraints, inherently ranked as in (62b).

Let us apply this proposal to word-final clusters. We get a SSP violation if
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rather than simply MAX-C since the deleted final consonant is never a stop when the SSP is violated. The ranking in (63c) follows from the categorical nature of simplification when SSP(2) (or SSP(3)) is violated. MAX-C(-stop) and SSP(1) are unranked with respect to each other. This indeterminacy yields the variable consonant deletion in obstruent+nasal clusters. Including stops, the ranking in (63d) is also established. This is illustrated in the tableau in (64).

(63) RANKINGS WITH RESPECT TO THE SSP:
   a. SSP (3) >>  SSP (2)  >>  SSP (1)
   b. MAX-C/V—  >>  MAX-C
   c. SSP (2)  >>  MAX-C(-stop)
   d. MAX-C/V—  >>  MAX-C(-stop)

(64) DELETION IN FINAL CLUSTERS OF INCREASING SONORITY:
   a. /O+r/ /livr/  MAX-C/V—   SSP (3)  SSP (2)  MAX-C(-stop)  SSP (1)
     -Or   [livr]  *
     _ -O     [liv]  *
     -r      [lir]  *
   b. /O+l/ /sufl/  -Ol    [sørfl]  *
     _ -O     [sørfl]  *
     -l       [søl]  *
   c. /O+N/ /ritm/ vs. /døgm/  -ON   [rˆtm]  [døgm]  *
     -O  [rˆt]  [døg]  *
     -N   [rˆm]  [døm]  *

4.3.3. CLUSTER REDUCTION AND PERCEPTUAL SALIENCE

QF has a fairly complex pattern of cluster simplification when sonority is not violated. But two crucial factors can easily be identified. If deletion takes place, it is determined by the amount of contrast between the final consonant and the preceding one. One specific category of consonants, however, never delete: those that follow an /r/.

4.3.3.1. Data

4.3.3.1.1. /r/-initial clusters

/r/+C clusters are unaffected by final consonant deletion. They comprise the sequences /-rl/ (65), /r/+nasal (66), /r/+fricative (67), and /r/+stop (68).

(65) /-rl/  CLUSTERS:
   a. $parle /parl/  _[parl]  *
   b. $de'ferle /def´rl/  _[def´rl]  *

(66) /r/+NASAL CLUSTERS:
   a. $ferme /f´rm/  _[f´rm]  *
   b. $incarne /e~karn/  _[e~karn]  *
   c. $e'pargne /eparµ/  _[eparµ]  *

(67) /r/+FRICATIVE CLUSTERS:
   a. $e'nerve /en´rv/  _[en´rv]  *
   b. $amorphe /amørf/  _[amørf]  *
   c. $quatorze /katørz/  _[katørz]  *
   d. $berce /b´rs/  _[b´rs]  *
   e. $e'merge /em´rΩ/  _[em´rΩ]  *
   f. $cherche /ß´rß/  _[ß´rß]  *

(68) /r/+STOP CLUSTERS:
   a. $courbe /kurb/  _[k¨rb]  *
   b. $usurpe /yzyrp/  _[ÁzÁrp]  *
   c. $accorde /akørd/  _[akørd]  *
   d. $apporte /apørt/  _[apørt]  *
   e. $nargue /narg/  _[narg]  *
   f. $marque /mark/  _[mark]  *

Postvocalic /r/, however, is subject to a vocalization/deletion process whereby it becomes a vocalic offglide, which may even reduce to nothing. This is true both when /r/ is in absolute final position and when it is followed by another consonant. When it becomes a vocalic offglide, which may reduce to nothing, the process is triggered by a contrast between the final consonant and the preceding one. Once the contrast between the final consonant and the preceding one is high, the deletion rule will apply. However, the deletion process is only triggered when the contrast is high enough. This is illustrated in the tableau in (69).

(69) DELETION IN FINAL CLUSTERS OF INCREASING SONORITY:
   a. /O -> /I/  "-O   [I]  "
   b. /O -> /I/  "-O   [I]  "
   c. /O -> /I/  "-O   [I]  "
   d. /O -> /I/  "-O   [I]  "

4.3.3.1.2. /r/-medial clusters

Postvocalic /r/ is also subject to a deletion process, but this process is triggered by a contrast between the final consonant and the preceding one. Once the contrast is high enough, the deletion rule will apply. However, the deletion process is only triggered when the contrast is high enough. This is illustrated in the tableau in (70).

(70) DELETION IN MEDIAL CLUSTERS OF INCREASING SONORITY:
   a. /O -> /I/  "-O   [I]  "
   b. /O -> /I/  "-O   [I]  "
   c. /O -> /I/  "-O   [I]  "
   d. /O -> /I/  "-O   [I]  "

4.3.3.1.3. /r/-final clusters

Postvocalic /r/ is also subject to a deletion process, but this process is triggered by a contrast between the final consonant and the preceding one. Once the contrast is high enough, the deletion rule will apply. However, the deletion process is only triggered when the contrast is high enough. This is illustrated in the tableau in (71).

(71) DELETION IN FINAL CLUSTERS OF INCREASING SONORITY:
   a. /O -> /I/  "-O   [I]  "
   b. /O -> /I/  "-O   [I]  "
   c. /O -> /I/  "-O   [I]  "
   d. /O -> /I/  "-O   [I]  "

4.3.3.2. Nature of clusters that do not delete

Cluster deletion is not always predictable based solely on the amount of contrast between the final consonant and the preceding one. In some cases, other factors may influence the deletion process. This is illustrated in the tableau in (72).

(72) CLUSTERS THAT DO NOT DELETE:
   a. /O -> /I/  "-O   [I]  "
   b. /O -> /I/  "-O   [I]  "
   c. /O -> /I/  "-O   [I]  "
   d. /O -> /I/  "-O   [I]  "

4.3.3.3. Conclusions

QF has a fairly complex pattern of cluster simplification when sonority is not violated. However, two crucial factors can easily be identified. If deletion takes place, it is determined by the amount of contrast between the final consonant and the preceding one. One specific category of consonants, however, never delete: those that follow an /r/.
... the classification of /r/ as a glide in this position. It interacts with cluster simplification by effectively reducing the cluster to a single consonant, but is independent of it since it applies also to clusters that are not simplified by the process of gliding.

4.3.3.1.2. Other clusters not ending in a stop

These clusters can be grouped into three categories. The largest category comprises all the clusters that are never simplified: approximant+fricative, nasal+fricative, and stop+fricative. Two others are discussed later in this section: nasal+nasal and fricative+fricative clusters. Nasal+nasal clusters lose their final consonant in all words, as exemplified by the examples in (73).

In all words, /z/ and /s/ occur as flaps and /s/ as spirant. These examples of glottal frication are important. The examples in (74) are unique, and none of this type.

The process of glide formation (75) concerns clusters that end in a glide. This is why I adopted a different notation for the glide and a surface representation. This is why I adopted a different notation for the glide and a surface representation.

### Nasal+nasal clusters (73)

- hymne: [nymn]
- indemne: [edmn]

### Fricative+fricative clusters (74)

- Reeves: [riv]

The example in (74), unfortunately the only one I have found of this type, deserves a few comments. First, this example of fricative deletion is important because it has previously been assumed that fricatives after consonants other than fricatives, like those in (70)-(72), are deleted. However, in QF fricative+fricative clusters are not simplified by the omission of the final fricative. This is true for all clusters that end in a fricative, except for fricative+fricative ones.

In all words, the nasal + nasal and fricative + fricative clusters regularly lose their final consonant. However, the clusters that end in a fricative are not simplified. These clusters can be grouped into three categories: the largest category.

### Nasal+nasal clusters (73)

- hymne: [nymn]
- indemne: [edmn]

### Fricative+fricative clusters (74)

- Reeves: [riv]
Finally, the cluster /-lm/, the only non-/r/-initial sonorant combination, is exceptional in that it is the /l/ that disappears rather than the final nasal. No other clusters, including the other /l/-initial ones, may lose a non-final consonant.

\[(75) /-lm/\]

**CLUSTERS:**

<table>
<thead>
<tr>
<th>Example</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>filme</td>
<td>/film/</td>
</tr>
<tr>
<td>calme</td>
<td>/kalm/</td>
</tr>
</tbody>
</table>

I suggest that these forms involve not the deletion of /l/ but, as in the case of /r/ above, its merging with the preceding vowel. In support of this interpretation, I notice that the vowels in (75) are... in similar forms not containing an underlying liquid. Consider in this respect the following pair of sentences.

\[(76) OPTIONAL LENGTHENING WITH \(/l/ DELETION:\)\]

<table>
<thead>
<tr>
<th>Example</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Les enfants sont calmes</td>
<td>/... kalm/</td>
</tr>
</tbody>
</table>
| J'ai achete' une CAM | /... kam/ | *

Unlike /r/-vocalization, however, /l/-vocalization is not generally available in postvocalic position. We can make sense of this distinction if we assume that the more sonorous or vowel-like the combination of laterals and nasals /lm/. I will get back to this contrast in the analysis in section 4.3.3.2.

4.3.3.1.3. Other clusters ending in a stop

The final category we have to consider comprises stop-final clusters. These are more complicated and necessitate an elaborate discussion. In particular, clusters differ on whether they display lexical... more frequent and the less... a word, the more likely it is to get simplified. I consider this lexical variability to be a property of the clusters themselves, because the clusters that do not display these lexical effects include frequency and register. The more frequent and the less... factors are their differential influence. We need for example to consider how clusters are affected by their environment. In this respect, it is essential to consider the nature of the clusters themselves. For example, some clusters may be simplified and others may not. This is the case for... clusters. These more simplified clusters are typically found in... examples provide, but we have also seen that other clusters can be simplified in different contexts. For example, clusters like /-st/ and /-sp/ may be simplified... clusters, where the sonorant is preserved. This is in contrast with the... simplification is limited to contexts where it is needed to avoid a... /-st/ final clusters are... systematic reductions, without distinctions among different lexical items. For example, /exist/ /´gzist/ and /mail/ /pøst/ are both reduced to /´gzˆs/ and /pøs/ respectively. On the other hand, /stay/ /r´st/ is not reduced to /r´s/.

\[(78) /-st/ CLUSTERS:\]

<table>
<thead>
<tr>
<th>Example</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>existe</td>
<td>/´gzist/</td>
</tr>
<tr>
<td>poste</td>
<td>/pøst/</td>
</tr>
<tr>
<td>reste</td>
<td>/r´st/</td>
</tr>
</tbody>
</table>

By contrast, simplification in /-sp/, /-sk/, and /-ft/ clusters is more frequent and the less... a word, the more likely it is to get simplified. I consider this lexical variability to be a property of the clusters themselves, because the clusters that do not display these lexical effects include frequency and register. The more frequent and the less... factors are their differential influence. We need for example to consider how clusters are affected by their environment. In this respect, it is essential to consider the nature of the clusters themselves. For example, some clusters may be simplified and others may not. This is the case for... clusters. These more simplified clusters are typically found in... examples provide, but we have also seen that other clusters can be simplified in different contexts. For example, clusters like /-st/ and /-sp/ may be simplified... clusters, where the sonorant is preserved. This is in contrast with the... simplification is limited to contexts where it is needed to avoid a... /-st/ final clusters are... systematic reductions, without distinctions among different lexical items. For example, /exist/ /´gzist/ and /mail/ /pøst/ are both reduced to /´gzˆs/ and /pøs/ respectively. On the other hand, /stay/ /r´st/ is not reduced to /r´s/.

\[(78) /-st/ CLUSTERS:\]

<table>
<thead>
<tr>
<th>Example</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>existe</td>
<td>/´gzist/</td>
</tr>
<tr>
<td>poste</td>
<td>/pøst/</td>
</tr>
<tr>
<td>reste</td>
<td>/r´st/</td>
</tr>
</tbody>
</table>
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The cluster /-ft/ does not occur in the native French lexicon and is found only in loanwords from English. As we will see in more detail below, the greater likelihood of deletion in /sp, sk, ft/ as opposed to /st/ follows from the amount of contrast within the cluster.

(79) /-sp/

a. Deraspe (proper name) /dœrasp/ → [dœras]

b. crispe 'shrivel+PRES' /krisp/ → ?? [krˆs]

c. casque 'cap' /kask/ → [kas]

d. disque 'disk' /disk/ → ?? [dˆs]

e. risque 'risk+PRES' /risk/ → ?? [rˆs]

f. masque 'mask+PRES' /mask/ → ?? [mas]

g. brusque 'be brusk+PRES' /brysk/ → ?? [brÁs]

h. fisc 'Treasury' /fisk/ → * [fˆs]

(80) /-sk/

a. casque 'cap' /kask/ → [kas]

d. disque 'disk' /disk/ → ?? [dˆs]

c. risque 'risk+PRES' /risk/ → ?? [rˆs]

d. masque 'mask+PRES' /mask/ → ?? [mas]

(81) /-ft/

a. draft ⇒ [draf]

b. lift ⇒ [lˆf]

c. Kraft (food company) ⇒ [kraf]

d. shift ⇒ [߈f]

e. loft ⇒ (?) [løf]

Nasal+stop clusters are found only in borrowings from English. They are always homorganic, but the final stop may be voiced or voiceless. Clusters with a voiced stop may always be simplified (82), whereas the behavior of clusters with a voiceless stop is more variable, here again depending on the lexical item. Forms with a deletable final stop are given in (83), others with a stable cluster appear in (84).

(82) /-nd/

a. weekend ⇒ [wik´n]

b. band ⇒ [ban]

c. stand (Noun) ⇒ [stan]

d. blind (Noun) ⇒ [blan]

(83) /-mp, -nt, -˜k/ CLUSTERS WITH STOP DELETION:

a. pimp ⇒ [pˆm]

b. cent ⇒ [s´n]

c. peppermint ⇒ [papœrman], *[paparman]

d. drink (Noun) ⇒ [drˆµ]

e. sink (Noun) ⇒ [sˆµ]

f. lipsync ⇒ [lˆpsˆµ]

g. skunk ⇒ [skøµ] (Bergeron 1980)

(84) /-mp, -nt, -˜k/ CLUSTERS WITH STOP RETENTION:

a. bump (N. and V.) ⇒ [bømp], * [bøm] (infin. *[bømp+e])

b. jump (N. and V.) ⇒ [dΩømp], * [dΩøm] (infin. *[dΩømp+e])

c. sprint (N. and V.) ⇒ [sprˆnt], ?? [sprˆn] (infin. *[spint+e])

d. bunt (V.) ⇒ [bønt], * [bøn] (infin. *[bønt+e])

e. punk ⇒ [pøµk], * [pøµ]

f. dunk (V.) ⇒ [døµk], * [døµ] (infin. *[døµk+e])

There is another strategy available when borrowing words ending in a nasal+stop. May always be simplified (85), whereas the deletion of clusters with a vowel nasalization leads to the pronunciation of these forms. The pronunciation with the nasal stop is prohibited.

(85) /-nd/ CLUSTERS WITH VOWEL NASALIZATION:

a. band ⇒ [be~d] (Bergeron 1980)

b. stand (N.) ⇒ [ste~d] (Bergeron 1980)

(86) /-mp, -nt, -˜k/ CLUSTERS WITH VOWEL NASALIZATION:

a. [mp], [nt], [˜k] (Bergeron 1980)

b. [mp], [nt], [˜k] (Bergeron 1980)

c. [mp], [nt], [˜k] (Bergeron 1980)

There is another strategy available when borrowing words ending in a nasal+stop. May always be simplified (82), whereas the deletion of clusters with a vowel nasalization leads to the pronunciation of these forms. The pronunciation with the nasal stop is prohibited.

(87) /-mp, -nt, -˜k/ CLUSTERS WITH VOWEL NASALIZATION:

a. [mp], [nt], [˜k] (Bergeron 1980)

b. [mp], [nt], [˜k] (Bergeron 1980)

c. [mp], [nt], [˜k] (Bergeron 1980)

There is another strategy available when borrowing words ending in a nasal+stop. May always be simplified (85), whereas the deletion of clusters with a vowel nasalization leads to the pronunciation of these forms. The pronunciation with the nasal stop is prohibited.

(88) /-mp, -nt, -˜k/ CLUSTERS WITH VOWEL NASALIZATION:

a. [mp], [nt], [˜k] (Bergeron 1980)

b. [mp], [nt], [˜k] (Bergeron 1980)

c. [mp], [nt], [˜k] (Bergeron 1980)

There is another strategy available when borrowing words ending in a nasal+stop. May always be simplified (82), whereas the deletion of clusters with a vowel nasalization leads to the pronunciation of these forms. The pronunciation with the nasal stop is prohibited.

(89) /-mp, -nt, -˜k/ CLUSTERS WITH VOWEL NASALIZATION:

a. [mp], [nt], [˜k] (Bergeron 1980)

b. [mp], [nt], [˜k] (Bergeron 1980)

c. [mp], [nt], [˜k] (Bergeron 1980)

There is another strategy available when borrowing words ending in a nasal+stop. May always be simplified (85), whereas the deletion of clusters with a vowel nasalization leads to the pronunciation of these forms. The pronunciation with the nasal stop is prohibited.

(90) /-mp, -nt, -˜k/ CLUSTERS WITH VOWEL NASALIZATION:

a. [mp], [nt], [˜k] (Bergeron 1980)

b. [mp], [nt], [˜k] (Bergeron 1980)

c. [mp], [nt], [˜k] (Bergeron 1980)
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(86) /-mp, -nt, -µk/ CLUSTERS WITH VOWEL NASALIZATION:

a. dump (N. and V) ⇒ [dø~p]

b. swamp ⇒ [swø~p]

c. tramp ⇒ [tre~p] (Rogers 1977)

d. stamp ⇒ [ste~p] (Bergeron 1980)

e. bunk ⇒ [bø~k] (Bergeron 1980)

f. crank (N. and V.) ⇒ [kre~k] (Gendron 1967)

g. skunk ⇒ [skø~k] (Bergeron 1980)

For some words both simplification strategies are used: band, stand, and skunk are attested with final deletion in (82b-c) and nasalization in (85) and (86g).

The example in (87b) is more interesting since the forms have two different meanings, both corresponding to the English tank: The form with the cluster [ta˜k] and the simplified one with a low nasal vowel [ta~k] refer to the military vehicle, whereas the form with a mid nasal vowel corresponds to the container in a car for holding gas. The verb tinquer /te~k+e/ 'tank up+INF', always pronounced [te~ke], derives from this last form. Notice that the nasal vowel in this verb is stable throughout the paradigm and is not "undone" when a vowel-initial suffix is added. That is, we do not get [te~k] for the noun or the bare form of the verb and * [ta˜ke] or * [t´˜ke] with the infinitive suffix /-e/, even though these forms are phonotactically perfectly acceptable, e.g. in bingo 'bingo' [bˆ˜go], caneton 'young duck' [kantø~], or camping [kampˆµ]. The same holds for the verbs dumper [dø~pe] and cranker [kre~ke], derived from dump and crank in (86a and 86f). This suggests that the nasal vowel is present in the underlying representation.

(87) /-mp, -nt, -µk/

CLUSTERS WITH STOP RETENTION OR VOWEL NASALIZATION:

a. jump ⇒ [dΩømp] / [dΩø~p]

b. tank ⇒ military vehicle: [ta˜k] / [ta~k]

container for gas: [te~k]

Finally, the liquid /l/, like /r/ in section 4.3.3.1.1, can be followed by any stop /d, t, b, p, g, k/. The final stop fails to delete in all of these combinations, with the notable exception of /-ld/. The examples in (88) illustrate the retention of the two consonants in /l/+stop clusters other than /-ld/.

(88) /l/+STOP CLUSTERS OTHER THAN /-ld/:

/-lt/: a. $ re'volte 'revolt+PRES' /revølt/ _ [revølt]

b. $ "pellete" 'shovel+PRES' /p´lt/ _ [p´lt]

c. $ insulte 'insult+PRES' /e~sylt/ _ [e~sÁlt]

/-lb/: d. bulbe 'bulb'/bylb/ _ [bÁlb]

/-lp/: e. $ disculpe 'exculpate+PRES' /diskylp/ _ [disk¨lp]

f. $ palpe 'touch+PRES' /palp/ _ [palp]

/-lg/: g. algue 'seaweed'/alg/ _ [alg]

h. $ divulgue 'divulge+PRSE' /divylg/ _ [divÁlg]

/-lk/: i. $ calque 'make a tracing+PRES' /kalk/ _ [kalk]

Some words ending in /-ld/ behave like those in (88) and always retain their final stop, in particular proper names (90) and borrowings from English (91). But many other words behave differently and may lose their final stop in /l/+stop clusters other than /-ld/.

(90) /-ld/ CLUSTERS WITH STOP DELETION – PROPER NAMES:

a. Le'opold (first name)/leopøld/ _ [leopøl] / [leøpøl]

b. Donald (first name)/donald/ _ [donal]

c. Romuald (first name) /rømyald/ _ [rømyal]

d. Raynald (first name) /renald/ _ [renal]

(91) /-ld/ CLUSTERS WITH STOP DELETION – LOANWORDS:

a. (Glenn) Gould ⇒ [gu:l] / [g¨l]

b. windshield ⇒ [wˆnßi:l]

c. McDonald (fast food chain) ⇒ [makdonal] / [makdønal]

The most interesting example attesting to the deletion of the final stop is the one in (90a). The name Le'opold has often been confused with Le'o-Paul, which has never contained a final /d/. Both spellings have been used to refer to the same person. Again, [p´lt] is a reanalyzed form of an earlier [p´l´t]. See examples (61) and (77d) and the corresponding footnotes.
individual, as can be seen in genealogical documents, and a statistical study of

The possibility of deletion after /l/ is noteworthy since it was assumed by Pupier and Drapeau (1973), Kemp, Pupier & Yaeger (1980), Walker (1984), Nikieła (1998), Papen (1998), and Thériault (2000) that nothing could drop after a liquid, so that all liquid-stop clusters were stable. This generalization was established on the basis of words such as those in (88) and (89), but these authors did not consider the items in (90) and (91).

4.3.3.1.4. Synthesis

It is now time to synthesize all the data given so far, which yield a very complex pattern. The clusters that do not violate the SSP can be divided into three categories, based on whether cluster reduction is possible or not. I disregard at this point the possibility of vocalization of /r/, whose application extends beyond cluster simplification.

The clusters in each of these categories are given in (92):

(92) C

LASS 1. REDUCTION POSSIBLE FOR ALL LEXICAL ITEMS:

1. /-vz/:

Reve [ri:v]  

2. /-mn/:

hymne [ˆm]  

3. /-lm/:

calm [kam]  

4. Stop+Stop clusters:

   a. /-pt/:

accepte [aks´pt]  

   b. /-kt/:

collecte [køl´kt]  

5. /-st/:

existe [´gzˆs]  

6. /-nd/:

band [ban]  

CLASS 2. REDUCTION POSSIBLE FOR A SUBSET OF LEXICAL ITEMS:

1. /-ld/:

Leopold [leopøl]  

vs. sold [søl]  

2. /-sp/, /-sk/, and /-ft/ clusters:

   a. /-sp/:

Deraspe [dœras]  

vs. crispe [krˆs]  

   b. /-sk/:

casque [kas]  

vs. masque [mas]  

   c. /-ft/:

draft [draf]  

vs. loft [løf]  

3. /-nt/, /-mp/, and /-µk/ clusters:

   a. /-nt/:

cent [s´n]  

vs. sprint [sprˆn]  

   b. /-mp/:

pimp [pˆm]  

vs. djompe [*dΩøm]  

   c. /-µk/:

drink [drˆµ]  

vs. punk [*pøµ]  

CLASS 3. NO REDUCTION:

1. All /r/-initial clusters  

2. All /l/-initial clusters  

3. All fricative-final clusters, except /-vz/  

The results may be characterized in a more compact way, but it is useful for that purpose to establish the feature specifications I adopt for the QF consonants. These consonants are given in (93) by means of articulation, place of articulation, and for distinguishing voicing. I only give the glide version of /r/, which is the only articulation in this analysis. Place of articulation for the fricatives is irrelevant in the analysis to come.

(93) C

ONSONANT INVENTORY IN QUEBEC FRENCH:

Labial Coronal Palatal/velar Uvular

Stops -vc p t k  +vc b d g

Fricatives -vc f s ß  +vc v z Ω

Nasals m n µ

Liquids l

Glabrescent glides w j ¥

I

consider the cases in (90) and (91). The results may be characterized in a more compact way, but it is useful for that purpose to establish the feature specifications I adopt for the QF consonants. These consonants are given in (93) by means of articulation, place of articulation, and for distinguishing voicing. I only give the glide version of /r/, which is the only articulation in this analysis. Place of articulation for the fricatives is irrelevant in the analysis to come.

(93) C

ONSONANT INVENTORY IN QUEBEC FRENCH:

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Stops -vc p t k  +vc b d g

Fricatives -vc f s ß  +vc v z Ω

Nasals m n µ

Liquids l

Glabrescent glides w j ¥

I
To express voicing and place contrasts I use the standard features \([\text{voice}], \text{labial}, \text{coronal}, \text{and velar}\). The uvular place of articulation of the rhotic plays no role and I leave it aside. The feature \([\text{noisy}]\) is specified only for obstruents. In (94) to distinguish between stops and fricatives, I use a feature \([\text{noisy}]\), which is specified only for obstruents.

\[
\begin{array}{cccccc}
\text{CONSONANT SPECIFICATIONS FOR MANNER OF ARTICULATION FEATURES:} \\
\text{Stops} & \text{Fricatives} & \text{Nasals} & \text{Liquids} & \text{Glides} \\
\text{Noisy} & - & + & + & + \\
\text{Sonorant} & - & - & + & + & + \\
\text{Approximant} & - & - & - & - & + \\
\text{Vocoid} & + & + & + & + & + \\
\end{array}
\]

The feature \([\text{noisy}]\) used here corresponds to an acoustic/auditory version of \([\text{continuant}]\), which is defined in articulatory terms. The reason why I make this distinction is the following. So far I have assumed that continuancy is a useful in many phonological contexts other than the one described here, notably place assimilation among these segments.

Yet in other contexts nasals and other sonorants fail to participate in continuancy distinctions, which are limited to obstruents. Cases of continuancy dissimilation, for instance, involve only obstruents, e.g. in Modern Greek (Kaisse 1988, cited in Rice 1992) or Yucatec Maya (Straight 1976; Lombardi 1990; Padgett 1992). I believe such cases involve an acoustic/perceptual dimension rather than a formal one. The operation of stops and nasals under the specification \([\text{noisy}]\) can be described by the following rule: Acoustically a major distinguishing factor among consonants is sonorancy, which can be defined according to the presence or absence of formant structure. Obstruents are thus specified according to \([\text{noisy}]\), and it is expected that the corresponding use of two different features will reflect the existence of two quite distinct dimensions, one also expects the corresponding use of two different features.

The feature specifications of French consonants now being established, we can take a different look at the pattern of cluster reduction in QF and propose the generalizations in (95). For the purpose of the current analysis, I will only consider those clusters that agree in \([\text{vocoid}]\), which are the clusters that arise in tense environments.

\[
\begin{array}{cccccc}
\text{GENERALIZATIONS ON FINAL CLUSTER SIMPLIFICATION IN QF:} \\
\text{a. General rule:} \\
\end{array}
\]

1. Simplification is obligatory for clusters that agree in \([\text{noisy}]\).
2. There are other sonorant-final clusters. Simplification is obligatory /lm, mn/.
3. There are other sonorant-final clusters. Simplification is optional /vz, pt, kt/.
4. Other different rules apply.

The feature \([\text{noisy}]\) is obligatory for clusters that agree in \([\text{noisy}]\); it is optional for clusters that disagree in \([\text{noisy}]\). Different rules apply for clusters of class 2, and profile the behavior of class 2. The feature \([\text{noisy}]\) is obligatory for clusters of class 1, optional for class 1.

The French [m] and [n] clusters are distinguished from the French [r] clusters by the presence of \([\text{noisy}]\). The French [m] and [n] clusters are distinguished from the French [r] clusters by the absence of \([\text{noisy}]\). The French [m] and [n] clusters are distinguished from the French [r] clusters by the presence of formant structure. The French [m] and [n] clusters are distinguished from the French [r] clusters by the absence of formant structure.
The analysis I propose closely follows the generalizations above. It rests on several constraints concerned with contrast or similarity between a consonant and its adjacent segments. These constraints are designed to capture the generalization that stops, affricates, and glides are more resistant to deletion than fricatives and nasals. The inherent rankings among these constraints are derived from the general ranking schema (3c).

The backbone of the analysis is formed by a series of markedness constraints penalizing similarity in manner of articulation.

\[
\begin{align*}
\text{(96) RELEVANT MARKEDNESS CONSTRAINTS:} \\
\text{a. } & C(\text{AGR}=[+\text{son}] \land [\text{-vocoid}]) \leftrightarrow V \\
\text{b. } & C(\text{AGR}=[\text{noisy}]) \leftrightarrow V \\
\text{c. } & C(\text{AGR}=[\text{-approx}]) \leftrightarrow V \\
\text{d. } & C(\text{AGR}=[\text{-vocoid}]) \leftrightarrow V \\
\text{e. } & C \leftrightarrow V
\end{align*}
\]

These constraints are inherently ranked as follows:

\[
\begin{align*}
\text{(97) INHERENT RANKINGS AMONG MARKEDNESS CONSTRAINTS:} \\
\text{a. } & C(\text{AGR}=[\text{noisy}]) \leftrightarrow V \gg C(\text{AGR}=[\text{-approx}]) \leftrightarrow V \gg C(\text{AGR}=[\text{-vocoid}]) \leftrightarrow V \gg C \leftrightarrow V \\
\text{b. } & C(\text{AGR}=[+\text{son}] \land [\text{-vocoid}]) \leftrightarrow V \gg C(\text{AGR}=[\text{-vocoid}]) \leftrightarrow V \gg C \leftrightarrow V
\end{align*}
\]

These rankings follow from the general ranking schema (3c). The one in (97b) is transparent in this regard. To derive (97a), it suffices to notice that consonants that agree in [-approx] necessarily also agree in [-vocoid] since the set of [-approx] segments is a subset of the set of [-vocoid] ones. The constraint \(C(\text{AGR}=[\text{-vocoid}]) \leftrightarrow V\) could be equivalently rewritten as \(C(\text{AGR}=[\text{-approx}] \land [\text{-son}] \land [\text{-approx}] \land [\text{-vocoid}]) \leftrightarrow V\), which automatically dominates \(C(\text{AGR}=[\text{-approx}]) \leftrightarrow V\). The same reasoning applies to \(C(\text{AGR}=[\text{noisy}]) \leftrightarrow V\) vs. \(C(\text{AGR}=[\text{-approx}]) \leftrightarrow V\): segments that agree in noisiness are all obstruents, that is, [-sonorant], [-approximant], and [-vocoid].

In the context of final clusters in QF, the inherent rankings in (97) serve to encode the generalization that the more contrast in manner of articulation there is between the word-final consonant and the preceding vowel, the more resistant that consonant is to deletion. To derive these results, the constraints in (96) interact with two series of faithfulness constraints that deal with the processes that are attested to avoid final clusters: deletion and coalescence with the preceding vowel. The MAX-C constraints, given in (98), are concerned with deletion and the faithfulness constraints that deal with the processes that are attested to avoid final clusters.

\[
\begin{align*}
\text{(98) MAX-C CONSTRAINTS:} \\
\text{a. } & \text{MAX-C/CONTRAST=[place]} \\
\text{b. } & \text{MAX-C/CONTRAST=[voice]} \\
\text{c. } & \text{MAX-C(-stop)} \\
\text{d. } & \text{MAX-C/V—}
\end{align*}
\]

I assume merging or coalescence between adjacent segments violates uniformity constraints (McCarthy & Prince 1995) (99a). I suggest more specifically a series of constraints of the type in (100), where the input is a sequence of segments that merge with the output.

\[
\begin{align*}
\text{(100) RELEVANT MARKEDNESS CONSTRAINTS:} \\
\text{a. } & \text{MERGE(Vowel)} \leftrightarrow V_\text{Input} \land V_\text{Output} \\
\text{b. } & \text{MERGE(Stop)} \leftrightarrow V_\text{Input} \land V_\text{Output} \\
\text{c. } & \text{MERGE(Affricate)} \leftrightarrow V_\text{Input} \land V_\text{Output} \\
\text{d. } & \text{MERGE(Nasal)} \leftrightarrow V_\text{Input} \land V_\text{Output}
\end{align*}
\]

The backbone of the analysis is formed by a series of uniformity constraints that deal with the processes that are attested to avoid final clusters. These constraints are designed to capture the generalization that stops, affricates, and glides are more resistant to deletion than fricatives and nasals. The inherent rankings among these constraints are derived from the general ranking schema (3c). The one in (97b) is transparent in this regard. To derive (97a), it suffices to notice that consonants that agree in [-approx] necessarily also agree in [-vocoid] since the set of [-approx] segments is a subset of the set of [-vocoid] ones. The constraint \(C(\text{AGR}=[\text{-vocoid}]) \leftrightarrow V\) could be equivalently rewritten as \(C(\text{AGR}=[\text{-approx}] \land [\text{-son}] \land [\text{-approx}] \land [\text{-vocoid}]) \leftrightarrow V\), which automatically dominates \(C(\text{AGR}=[\text{-approx}]) \leftrightarrow V\). The same reasoning applies to \(C(\text{AGR}=[\text{noisy}]) \leftrightarrow V\) vs. \(C(\text{AGR}=[\text{-approx}]) \leftrightarrow V\): segments that agree in noisiness are all obstruents, that is, [-sonorant], [-approximant], and [-vocoid].
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UNIFORMITY CONSTRAINTS:

a. UNIFORMITY
No element in the output has multiple correspondents in the input.

b. UNIFORMITY-V
No vowel in the output corresponds to itself and another segment in the input.

Sonority-relative Uniformity-V Constraints:

a. UNIFORMITY-V [-sonorant]
No vowel in the output corresponds to itself and a [-sonorant] segment in the input.

b. UNIFORMITY-V [-approximant]
No vowel in the output corresponds to itself and a [-approximant] segment in the input.

c. UNIFORMITY-V [-vocoid]
No vowel in the output corresponds to itself and a [-vocoid] segment in the input.

I propose that the more vowel-like or sonorous a segment is, the more easily it may coalesce with an adjacent vowel. This effect is obtained with the following fixed ranking, which encodes the idea that the [-sonorant] segment is more sonorous than the [-approximant] segment and the [-vocoid] segment is the most sonorous of the three:

UNIFORMITY-V [-sonorant] >> UNIFORMITY-V [-approximant] >> UNIFORMITY-V [-vocoid]

These are all the constraints that we need in order to derive the QF pattern. I repeat below the inherent rankings that have been established so far within the three series of constraints.

(101) INHERENT RANKING AMONG UNIFORMITY-V CONSTRAINTS:


Let us now see how these constraints interact and what work they do to yield...
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(103) RANKINGS SPECIFIC TO QF (/r/-INITIAL CLUSTERS):

a. \( \text{MAX-C} \gg \text{C} \leftrightarrow \text{V} \)

b. \( \text{C} \leftrightarrow \text{V} \) and \( \text{UNIFORMITY-V} \) are crucially unranked.

(104) NO DELETION AND /r/ VOCALIZATION IN /-rC/ CLUSTERS:

(66a) /f_<r> rm_<3> /MAX-CC \leftrightarrow \text{VUNIFORMITY-V}

(68d) /ap<_r> t_<3> /\text{ap}_<_r> t<_3>(t)

4.3.3.2.3. Clusters composed of highly similar segments

At the other extreme, consider the clusters that violate the highest-ranked markedness constraints \( \text{C}(\text{AGR}=[+\text{son}] \land [-\text{vocoid}]) \leftrightarrow \text{V} \) and \( \text{C}(\text{AGR}=[\text{noisy}]) \leftrightarrow \text{V} \) (96a-b), that is clusters whose members are highly similar in terms of manner of articulation. These clusters include /lm/, ... and stop+stop. In the case of /lm/ the /l/ obligatorily merges with the preceding vowel (75), in violation of \( \text{UNIFORMITY-V}([-\text{vocoid}]) \). In the other three cases the final consonant automatically deletes (73, 74, 77).

Stop deletion violates MAX-C, but the omission of nasals and fricatives violates the higher-ranked \( \text{MAX-C}([-\text{stop}]) \). Nasals and obstruents do not merge with a preceding vowel: deletion of the following consonant is always preferable. \( \text{MAX-C}([-\text{stop}]) \) therefore ranks between \( \text{UNIFORMITY-V}([-\text{approx}]) \) and \( \text{UNIFORMITY-V}([-\text{son}]) \). These facts allow us to derive the additional rankings in (105), applied to one example of each type of cluster in (106). Deletion of the postvocalic consonant is never an option; this would violate \( \text{MAX-C}([-\text{e}]) \), which dominates \( \text{MAX-C}([-\text{stop}]) \), as determined in (63d). Deletion of the final consonant is therefore necessarily less costly. This is not indicated in (105)-(106).

(105) RANKINGS SPECIFIC TO QF (HIGHLY SIMILAR SEQUENCES):

a. \( \text{C}(\text{AGR}=[+\text{son}] \land [-\text{vocoid}]) \leftrightarrow \text{V}; \text{C}(\text{AGR}=[\text{noisy}]) \leftrightarrow \text{V} \gg \text{MAX-C}([-\text{stop}]) \gg \text{UNIFORMITY-V}([-\text{vocoid}]) \)

b. \( \text{UNIFORMITY-V}([-\text{son}]) \gg \text{UNIFORMITY-V}([-\text{approx}]) \gg \text{MAX-C}([-\text{stop}]) \)

(106) DELETION AND MERGER IN HIGHLY SIMILAR SEQUENCES:

(75b) /ka<_l>m<_3>/ \text{C}(\text{AGR}=[+\text{son}] \land [-\text{voc}] ) \leftrightarrow \text{V} \text{C}(\text{AGR}=[\text{noisy}]) \leftrightarrow \text{V} \text{UNIF-V}([-\text{son}]) \text{UNIF-V}([-\text{approx}]) \text{MAX-C}([-\text{stop}]) \text{UNIF-V}([-\text{vocoid}]) \text{MAX-C}

(73a) /i<_1>m<_2>n<_3>/ \hat{1}m<_2>n<_3>(n) \leftrightarrow \hat{1}m<_2> \hat{n>_3} \hat{n>3}

(74) /ri<_1>v<_2>z<_3>/ \text{ri}_<_1>v<_2>z<_3>(z) \leftrightarrow \text{ri}_<_1>v<_2> \text{ri>_2}z<_3> \text{ri>_3}

(77b) /ka<_1>p<_2>t<_3>/ \text{ka<_1>p<_2>t<_3>(t)} \leftrightarrow \text{ka<_1>p<_2> \text{ka>_2}t<_3>} \text{ka>_3}

About the loss of /l/ before nasals, it is worth mentioning that this process is limited to QF. It is attested in other dialects of French, e.g. Louisiana French (Papen & Rottet 1997: 77), and in other languages, e.g. English (see the pronunciation of calm, salmon, etc.) and Korean (ex: /kum/ 'to starve; famines'). Flemming (1995) notes that lateral and nasal have similar acoustic signals. The expectation is consistent with the general claim made here that clusters about the loss of /l/ before nasals, it is worth mentioning that this process is not limited to QF. Flemming (1995) notes that lateral and nasal have similar acoustic signals. The expectation is consistent with the general claim made here that clusters

Before moving on to the next set of clusters, I would like to comment on the fact that the process of lateral deletion is not limited to QF. It is attested in other dialects of French, e.g. Louisiana French (Papen & Rottet 1997: 77), and in other languages, e.g. English (see the pronunciation of calm, salmon, etc.) and Korean (ex: /kum/ 'to starve; famines'). Flemming (1995) notes that lateral and nasal have similar acoustic signals. The expectation is consistent with the general claim made here that clusters...
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Assumed here. But both options lead to the conclusion that QF does allow sonority plateaus, and that we have to come up with a different explanation for the reduction of N+N, F+F, and S+S clusters.

If fricatives are more sonorous than stops, stop+fricative word-final clusters should be disfavored by the SSP, more so than stop+stop, fricative+fricative, and fricative+stop clusters. The reality is ... at play in comparing obstruent clusters, which is why positing sonority distinctions among obstruents is unjustified here.

If fricatives and stops are equal in sonority, all obstruent clusters are expected to be ruled out if sonority plateaus are disallowed. Since such clusters are commonplace in QF, it cannot be the case that ... in the simplification of fricative+fricative and stop+stop clusters, an argument that can be extended to nasal+nasal ones.

The irrelevance of sonority plateaus in cluster simplification in QF is also supported by the fact that the clusters with sonority plateaus that do simplify do so more categorically than in QF. This point being made, we are now ready to proceed to the analysis of the remaining obstruent-final clusters.

4.3.3.2.4 Clusters composed of moderately similar segments

We have so far accounted for /r/-initial clusters, all the sonorant-final clusters, and those that agree in noisiness. We are left with all the obstruent-final clusters other than F+F and S+S. Let us first ... and no contrast in other dimensions. The word-final consonant in these sequences violates the constraint requiring every consonant that agrees in [-approx] with an adjacent segment to appear next to a vowel: C(AGR=[-approx]) ↔ V (96c). The final consonant is a stop, whose deletion violates the general MAX-C constraint. This leads to the ranking C(AGR=[-approx]) ↔ V >> MAX-C.

Crucially, clusters containing the same amount of contrast but with a final consonant other than a stop are not reduced. This applies to the clusters /ts/ (72c), the mirror image of /st/, and /nz/ (71c). These final fricatives equally violate C(AGR=[-approx]) ↔ V, yet they never delete. Deletion of the fricative would entail a violation of the higher-ranked MAX-C(-stop), which is concerned with consonants other than stops. We can then establish that MAX-C(-stop) outranks C(AGR=[-approx]) ↔ V. We obtain the ranking in (107a).

Some stop-final clusters other than /st/ and /nd/ also violate C(AGR=[-approx]) ↔ V but are only variably reduced. These are /sp, sk, ft/ (79)-(81) and /mp, nt, ˜k/ (83)-(84). /sp, sk, ft/ crucially differ from /st/ in being composed of heterorganic consonants. /mp, nt, ˜k/ differ from the previous set in being composed of homorganic consonants, which is why they are retained without any further deletions. The deletion of these clusters is not ruled out by the MAX-C constraint, since they do not meet the constraint in question.

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DELETION AND RETENTION IN MODERATELY SIMILAR SEQUENCES:

MAX-C(AGR=-approx) ↔ V

MAX-C(AGR=-vocoid) ↔ V

UNIFORMITY-V (-vocoid) >> C(AGR=-vocoid) ↔ V

MAX-C

The following ranking must hold:

MAX-C(AGR=-vocoid) << MAX-C(AGR=-approx)

The final constraint ranking for cluster simplification in QF is given in (111).

The final category of clusters we have to consider is the /l/+obstruent one. These include clusters such as /sø1l2d3/ vs. /leopø1l2d3/ (89a) and /va1l2s3/ vs. /leopø1l2s3/ (70a).

The final constraint ranking for cluster simplification in QF is given in (111).
This grammar contains four zones of variability:

1. Indeterminate ranking between UNIFORMITY-V and C<->V yields variable /r/-vocalization.
2. Indeterminate ranking between SSP(1) and MAX-C(-stop) yields variable final deletion in obstruent+nasal clusters.
3. Indeterminate ranking between C(AGR=[-appr])<->V, MAX-C/CONTRAST=[Place], and MAX-C/CONTRAST=[voice] yields variable final deletion in [sk, sp, ft] and [mp, nt, ˜k].
4. Indeterminate ranking between C(AGR=[-vocoid])<->V and MAX-C yields variable final deletion in [-ld].

UNIFORMITY-V is also unranked with respect to C<->V since vocalization is also possible with

4.3.3.3. A similar pattern: Philadelphia English

Philadelphia English presents a pattern of word-final consonant deletion that is strikingly similar to the QF one. Word-final stop deletion in English depends on a number of factors, among others the phonological environment and the number of consonants. A word-final stop deletion is more frequent after those in (112c), the segments in (112b) forming an intermediate category. The hierarchy is extremely similar to the one given in (92) for QF English.
Chapter 4: Contrast

The generalizations that apply to the PE facts in (112) closely replicate those obtained for QF. This convergence is all the more interesting since these generalizations are based on distinct types of evidence from interactions between different levels of contrast, the distinct behavior of stops vs. other consonants, possible coarticulation between vowels and consonants, and the effects of speaker's identity. The chapter was devoted to the detailed examination of these interactions and their implications for our understanding of the role of contrast in consonant reduction. The evidence for the role of contrast in consonant deletion and epenthesis is provided by a range of deletion and epenthesis patterns involving similarity avoidance.

4.4. Conclusions

This chapter has discussed the role of similarity/contrast between adjacent segments in deletion and epenthesis processes. Identity avoidance has long been established as a meaningful factor in these processes, where the degree of similarity is prohibited between two adjacent segments. The chapter devoted to the detailed description and analysis of word-final cluster reduction in Quebec French, which derives from intricate interactions between different levels of contrast, the distinct behavior of stops vs. other consonants, possible coalescence between vowels and following approximant segments, and the SSP.

The following approximate segment, and the segment of stops vs. other consonants, possible coarticulation between vowels and consonants, and the effects of speaker's identity support the validity of speakers' judgments and show that the generalizations obtained for QF closely replicate those obtained for PE. The chapter has discussed the role of similarity/contrast in consonant deletion and epenthesis processes. Evidence for the role of contrast in consonant deletion and epenthesis is provided by a range of deletion and epenthesis patterns involving similarity avoidance.