Footing is not always about stress: Formalizing variable high vowel deletion in Québec French

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Introduction

Can segmental processes tell us anything about footing in a language that does not have the typical signatures of stress?

- Target language: Québec French (QF)
- Target process: High Vowel Deletion ('weakening' process)
High vowels and weakening processes in QF

Two variable phenomena with high rates of application:

- **Devoicing**
  - presipite $\sim$ presípioite $\sim$ presípioite $\sim$ presípioite

- **Deletion**
  - presipite $\sim$ pres∅pite $\sim$ presip∅te

‘to hasten’
Introduction

Devoicing

presipite, presipîte, presipîte

- Conditioned by adjacent voiceless Cs
- Possible in adjacent syllables
- Not attested in word-final position

(Gendron 1966; Dumas 1972, 1987; Walker 1984; Cedergren & Simoneau 1985; Ouellet et al. 1999; Bayles 2016; Torreira & Ernestus 2010 for EF)
Introduction

Deletion

pres∅pite, presip∅te

- **Not** conditioned by adjacent voiceless Cs
- **Not** possible in adjacent syllables
- **Not** attested in word-final position

(Dumas 1972, 1987; Verluyten 1982; Walker 1984; Cedergren & Simoneau 1985; Cedergren 1986; Ouellet et al. 1999; Bayles 2016)
Introduction

- Devoicing and Deletion: separate processes
  → Deletion **not** an advanced stage of high vowel weakening

- If voicing context does not condition High Vowel Deletion (HVD), then what does?
Introduction

- Is rhythmic structure relevant for HVD?

- Verluyten (1982): HVD is sensitive to alternating rhythmic structure
- Cedergren (1986): HVD is insensitive to alternating rhythmic structure

Verluyten: \(\checkmark\) s w s w s \(\times\) s w s w s

Cedergren: \(\checkmark\) a l̄ mā ta sjõ \(\checkmark\) or ga nØ za tœr

*alimentation* ‘nourishment’

*organisateur* ‘organizer’
Does (Québec) French have feet?

- Crosslinguistically, the Foot is the domain where stress is realized
- Problem:
  French does not behave like languages that have word-level stress
- English:
  → Iterative left-headed feet

\[
[({\text{ævə}})_F t (\text{ˈkɑː}t\_dɔu)]_{PWd} \quad \text{‘avocado'}
\]
Does (Québec) French have feet?

▶ French:

→ Only obligatory position for prominence is the right-edge of the PPh (e.g., Dell 1984)

\[ [lə mɔ̃vɛz aνc'ka]_{PPh} \quad \text{‘the bad avocado’} \]

→ ‘Stress’ is formally intonational prominence; there is no foot in the language (e.g., Jun & Fougeron 2000; see Thibault & Ouellet 1996 for evidence that QF has the same rhythmic contour as EF)
Does (Québec) French have feet?

Evidence for feet?

  a. [maˌrikrisˈtin] ‘Marie-Christine’
  b. [ˌmariˈroz], *[maˌriˈroz] ‘Marie-Rose’

- Truncation (Scullen 1997)
  a. cinéma → ciné (si'ne) ‘cinema’
  b. réfrigérateur → frigo (fri'go) ‘refrigerator’

- Schwa realization in compounds (Charette 1991)
Does (Québec) French have feet?

Evidence against feet?

- Rampant violations of word minimality (e.g., Scullen 1997)
  a. [lɛ] ‘milk’
  b. [ʃɑ] ‘chat’

- Unusual patterns of secondary stress (e.g., Fónagy 1979; Déchaine 1990; Scullen 1997; Goad & Prévost 2011)
  a. [ˌɪnɛspe're] ~ [ˌɪnɛspe're] ‘unhoped for’
  b. [ˌkɔɒpresibili'te], *[kɔɒˌpresiˌbili'te] ‘compressibility’
  c. [ˌkɔrdəlɛt o'rɑʒ] ~ [kɔrdəˌlɛt o'rɑʒ] *[ˌkɔrdəˈlɛt o'rɑʒ] ‘orange rope.DIM’
HVD in Québec French:

- Although any high vowel in non-final CV syllables can delete, **HVD is preferred in even-numbered syllables from the right edge**
  - Evidence for iterative iambic footing
- Patterns in our data indicate that HVD does not lead to resyllabification (and refooting)
- Additional competing factors regulate the application of HVD
Methods

Judgement task:

- Stimuli:
  - 2-6-syllable words \((n = 355)\), with deletion or non-deletion of [i]
  - [i] never deleted in final position, following branching onset or in closed syllable

- Participants: Native speakers of Québec French \((n = 10)\)

- Task:
  - Words orthographically and auditorily presented
  - Participants had to judge if the word they heard was pronounced in a natural way
  - Scale: \(1 = \text{completely unnatural}; 5 = \text{completely natural}\)
Methods

- Hierarchical ordinal regression with by-speaker/word random effects
- Variables:

  1. Position of deletion in foot:

     Foot-dependent position (2 or 4)  \( \text{\textcopyright(b\text@empty .n\text@empty e)} \), \( \text{\textcopyright(n\text@empty .f\text@empty s)(t\text@empty .s\text@empty j\text@empty s)} \)
        
        Foot-head position (3 or 5)  \( \text{\textcopyright(ga.n\text@empty o)(z\text@empty .t\text@empty \text@empty r)} \), \( \text{\textcopyright(p\text@empty o)(t\text@empty .l\text@empty i)(z\text@empty .s\text@empty j\text@empty s)} \)
(2) Resulting cluster mirrors a well-formed branching onset:

Well-formed:  
\[ \text{[pr]} \quad \text{sup} \quad \text{∅∅∅} \quad \text{re} \quad \text{∅∅∅} \quad \text{to sigh'} \]
\[ \text{[fl]} \quad \text{f∅le} \quad \text{∅∅∅} \quad \text{‘fillet'} \]

Ill-formed:  
*\[ \text{[bn]} \quad \text{k∅b∅ne} \quad \text{∅∅∅} \quad \text{‘to combine'} \]
*\[ \text{[lm]} \quad \text{al∅mātasjō} \quad \text{‘nourishment'} \]
Methods

(3) Morphology:

Deletion at affix boundary:
- eksklyziv-$\emptyset$te 'exclusivity'
- inisjal-$\emptyset$zasjõ 'initialization'

Deletion in root:
- im-$\emptyset$tatœr ‘impersonator’
- al-$\emptyset$mãtasjõ ‘nourishment’
Results

Deletion vs. non-deletion

- Overall, non-deletion preferred over deletion:
  \[ \hat{\beta} = 2.11, \ SE = 0.30, \ z = 6.96 \]

- HVD preferred
  - kōbine
  - imitatore

- HVD dispreferred
  - kōbōne
  - imōtatore
  - ‘to combine’
  - ‘impersonator’
Results

Position in foot

- HVD preferred in foot-dependent position:
  \[ \hat{\beta} = 0.46, \ SE = 0.19, \ z = 2.4 \]
Results

Segmental profile of resulting cluster

- HVD preferred when it yields an illicit complex onset:
  \[ \hat{\beta} = 1.05, \ SE = 0.27, \ z = 3.9 \]

<table>
<thead>
<tr>
<th>HVD preferred</th>
<th>HVD dispreferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>kõbõne</td>
<td>supõre</td>
</tr>
<tr>
<td>alõmãtasjõ</td>
<td>fõle</td>
</tr>
</tbody>
</table>
Results

Morphology

- Deletion is preferred over non-deletion in one context: when foot-dependent [i] is at the left edge of a suffix
  \[ \hat{\beta} = 1.62, \ SE = 0.27, \ z = 6 \]

  \begin{align*}
  \text{HVD preferred} & \quad \varepsilonks(klyzi)(v-\emptyset te) \\
  \text{HVD dispreferred} & \quad \varepsilonks(klyzi)(v-ite)
  \end{align*}
Analysis

Formalizing HVD in Québec French

- HVD is a variable phenomenon
  \textit{i.e., categorical approaches cannot account for HVD patterns}
- We need probabilistic outputs (one option: MaxEnt)\footnote{Hayes & Wilson 2008}
- Weighted constraints $\rightarrow$ probabilities of output(s)
Analysis

Deletion vs. non-deletion

Overall, deletion is *dispreferred*

- **Max**: Do not delete
- ***i**: Low sonority vowels are disfavoured

<table>
<thead>
<tr>
<th></th>
<th>MAX</th>
<th>*i</th>
</tr>
</thead>
<tbody>
<tr>
<td>/kõbine/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. [kõbine]</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>b. [kõbØne]</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

\[ w_{\text{MAX}} > w^{*i} \rightarrow a > b \]

\( w = \) constraint weight given our statistical results
### Analysis

#### Foot-dependent vs. foot-head position

- **MAX-HD**: Do not delete in foot-head position

<table>
<thead>
<tr>
<th>/manifestasjõ/</th>
<th>Max</th>
<th>MAX-HD</th>
<th>*i</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [ma(ni.fs)(ta.sjõ)]</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>b. [ma(nØ.fs)(ta.sjõ)]</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/manifesta/</th>
<th>Max</th>
<th>MAX-HD</th>
<th>*i</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.’ [(ma.ni)(fs.ta)]</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>b.’ [(ma.nØ)(fs.ta)]</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

\[ w_{\text{MAX-HD}} > w^*i \rightarrow b > b' \]
## Analysis

### Licit vs. illicit resulting cluster

- **Recoverability**: In a segmental string, immediate precedence relations in the Input are recoverable in the (perceived) Output

\[
\begin{array}{c}
\text{[kõbne]} \\
/kõ\text{bVne}/ * /kõbne/ \\
\end{array}
\quad \begin{array}{c}
\text{[supre]} \\
/sup\text{Vre}/ /supre/ \\
\end{array}
\]

### Consequence:

- If there is deletion, the deletion site must be recoverable
- This will only be the case if the resulting cluster is illicit
  - A vowel *must* interrupt the cluster in the input
- Otherwise, **recoverability** is violated
Analysis
Licit vs. illicit resulting cluster

- **RECOVERABILITY**: In a segmental string, immediate precedence relations in the Input are recoverable in the (perceived) Output

<table>
<thead>
<tr>
<th></th>
<th>MAX</th>
<th>*i</th>
<th>RECOVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>/kõbine/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. [kõ(bi.ne)]</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. [kõ(b∅.ne)]</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/supire/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.′ [su(pi.re)]</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.′ [su(p∅.re)]</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**RECOVERABILITY** → b > b′
Analysis

HVD at affix boundary vs. in root

- $Af[^i$: Low sonority vowels are disfavoured at affix boundaries

<table>
<thead>
<tr>
<th></th>
<th>$\text{MAX}$</th>
<th>$\text{MAX-HD}$</th>
<th>$^i$</th>
<th>$^Af[i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɛksklyzivite/</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>a. [ɛks(kly.zi)(v-i.te)]</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. [ɛks(kly.zi)(v-∅.te)]</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Non-deletion $\succ$ deletion overall, but...
  - speakers’ preferences **flip** when /i/ is at an affix boundary:

  $b \succ a$

  Gang-up effect: $(w^*i + w^*Af[i) \succ w\text{Max}$
Analysis
HVD at affix boundary vs. in root

- **But** this effect is mitigated by **MAX-HD**:

<table>
<thead>
<tr>
<th></th>
<th>Max</th>
<th>MAX-HD</th>
<th>*i</th>
<th>*Af[i]</th>
</tr>
</thead>
<tbody>
<tr>
<td>/inisjalizasjő/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.' [(i.ni)(sja.l-i)(za.sjő)]</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>b.' [(i.ni)(sja.l-∅)(za.sjő)]</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

\[b' \approx a'\]
Summary

- Overall, non-deletion $\succ$ deletion:
  \[ w_{\text{Max}} > w^{*i} \]

- If HVD occurs, foot-dependent positions are better targets:
  \[ w_{\text{Max-Hd}} > w^{*i} \]

- HVD resulting in ill-formed onset clusters are preferred:
  RECOVERABILITY

- If HVD at affix boundary $\rightarrow$ deletion $\succ$ non-deletion:
  \[ (w^{*i} + w_{Af}[*i]) > w_{\text{Max}} \]
  (gang-up effect)$^2$

$^2$Mitigated by Max-Hd
Final remarks

- Earlier accounts of HVD in Québec French:
  - Verluyten (1982): HVD associated with alternating rhythmic structure; favoured in weak positions
  - Cedergren (1986): HVD insensitive to alternating rhythm; targets any unstressed HV

- Our analysis is consistent with Verluyten’s: HVD is preferred in even-numbered syllables from the right edge, motivating iterative iambic footing

- Preference for HVD in strings mirroring illicit onset clusters suggests that footing remains intact after HVD
References


Acknowledgments

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Thank you ◦ Merci

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