Stress-conditioned morphophonological asymmetries in Spanish, Catalan and Galician

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0 Overview of my dissertation

Title of the dissertation:
A study on domain-specific constraints and stress-conditioned morphophonological asymmetries: on the morphophonological phenomena in Spanish, Catalan, and Galician

Aims of the dissertation:
- To investigate the following stress-conditioned morphophonological phenomena in Spanish Romance languages from the viewpoint of positional asymmetry:
  - Vowel alternations in Spanish, Catalan, and Galician
  - Definite article allomorphy in Spanish
  - Word-final deletion in Catalan
- To show that the stress-conditioned asymmetries in these phenomena are accounted for in a uniform way by the constraints that are specific to stressed syllables.

1 Vowel alternations in Spanish, Catalan, and Galician

1.1 Stress-conditioned mid vowel alternations in Spanish, Catalan, and Galician

The alternating diphthongs (Harris 1985, Carreira 1991, etc.)

The diphthongs [je, we] in stressed syllables alternate with [e, o] in unstressed syllables, respectively:

(1) a. t[je]ne 's/he has' t[e]nér 'to have'
    d[je]nte 'teeth' d[e]ntía 'dentin'
    m[je]l 'honey' m[e]lóso 'sweet'
    c[je]go 'blind' c[e]guera 'blindness'
    b. b[we]no 'good' b[o]ndá 'to weary'
    p[we]nta 'door' p[o]rtón 'door'
    f[we]nte 'strong' f[o]ral 'strength'
    c[we]po 'body' c[o]poral 'physical'

There are diphthongs [je, ye] and monophthongs [e, o] which do not show stress-conditioned alternations (in this paper, alternating diphthongs and non-alternating diphthongs are represented as [je, we] and [je, ye], respectively):

(2) a. or[je]nte 'east' or[je]ntal 'oriental'
    f[je]rio 'fierce' f[je]ría 'fierceness'
    b. estr[ye]ndo 'din' estr[ye]ndó 'noisy'
    ab[ye]lo 'grandfather' ab[ye]lastro 'father of stepparent'

(3) a. b[we]llo 'beautiful' b[e]llo 'beauty'
    p[e]so 'I weigh' p[e]sar 'to weigh'
    b. s[o]lo 'sole' s[o]ledad 'solitude'
    c[o]mes 'you eat' c[o]mer 'to eat'

1.1.2 Vowel reduction in Catalan

Vowel reduction in Central Catalan (Hualde 1992, Herrick 2003)

Central Catalan has a seven vowel inventory, /i, e, æ, o, u, œ, ë/, in stressed syllables. In unstressed syllables, the inventory reduces to three vowels, [u, i, a]:

(4) a. Rounded vowels, /u, o, æ/, are reduced to [u]:
    [u]ll 'eye' [u]llo 'eye-grass'
    cami[o] 'truck' cami[u]net 'truck (dim.)'
    c[œ]sa 'thing' c[u]seta 'thing (dim.)'
    b. Non-rounded non-high vowels, /e, æ/, to [a]:
    m[e]nja 'he eats' m[a]jar 'to eat'
    t[æ]rra 'land' t[a]reta 'land (dim.)'
    p[a]sta 'dough' p[a]seta 'dough (dim.)'
    c. High front vowel /i/ does not change:
    ll[i]bre 'book' ll[i]bre 'notebook'

Contrast between high-mid and low-mid vowels is neutralised.
1. 1. 3 Vowel reduction in Galician

Vowel distribution in Galician (Freixeiro Mato 1998)

Galician has a seven vowel inventory, /i, e, a, õ, o, u/, in stressed syllables (5a), while only five vowels [i, e, a, o, u] can appear in posttonic unstressed syllables (5b):

(5) a. cam[i]sa 'shirt' p[u]so 'pulse'
p[e]cho 'chest' t[o]do 'all'
m[e]xico 'doctor' s[o]cio 'member'
m[a]sa 'dough'
b. m[u]s[i]ca 'music' claus[u]la 'clause'
núm[e]ro 'number' cóm[o]do 'comfortable'
pá[r]amo 'high plateau'

Neutralisation of high-mid and low-mid vowels (Veiga 1976)

Low-mid vowels /e, õ/ are neutralised to [e, o] when it is unstressed:

(6) a. p[E]dra 'stone' p[ê]drada 'throw of a stone'
c[e]go 'blind' c[e]gár 'to blind'
p[e]lo 'I knock' p[e]támos 'we knock'
b. m[õ]rte 'death' m[o]rtál 'mortal'
c[õ]lo 'neck' c[o]lár 'necklace'
p[o]do 'I can' p[o]démos 'we can'

1. 1. 4 Historical sources of alternating diphthongs and low-mid vowels

The vowels that show stress-dependent alternation have common historical sources (Penny 2002): low-mid vowels /e, õ/ in Vulgar Latin. /e/ and /õ/ in Vulgar Latin have developed from the Classical Latin short mid vowel E and Õ, respectively. In addition, the Classical Latin diphthong AE have changed to /E/ in Vulgar Latin.

(7) a. Development of E

<table>
<thead>
<tr>
<th>LATIN</th>
<th>SPANISH</th>
<th>CATALAN</th>
<th>GALICIAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEL</td>
<td>m[e]l</td>
<td>m[e]l</td>
<td>m[e]l 'honey'</td>
</tr>
<tr>
<td>CAELU</td>
<td>c[e]lõs</td>
<td>m[õ]lõs</td>
<td>m[õ]lõso 'sweet'</td>
</tr>
<tr>
<td></td>
<td>c[e]lêste</td>
<td>c[e]lêsta</td>
<td>c[e]lêste 'sky'</td>
</tr>
</tbody>
</table>

b. Development of O

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FOCU</td>
<td>f[õ]go</td>
<td>f[õ]k</td>
<td>f[õ]go 'fire'</td>
</tr>
<tr>
<td></td>
<td>f[õ]gos</td>
<td>f[õ]gos</td>
<td>f[õ]gos 'ferry'</td>
</tr>
</tbody>
</table>

An adequate analysis of the vowel alternations should account for the parallelism among these vowel alternations.
The mid vowels resulting from vowel coalescence inherit a [back] feature from the first element of the diphthong and a [high] feature from the second:

\[ \begin{align*}
& a. /w_1 e_2/ \quad [o_12] \\
& \quad [+\text{high}]_1 \quad [-\text{high}]_2 \\
& \quad [+\text{back}]_1 \quad [+\text{back}]_1
\\
& b. /j_1 e_2/ \quad [e_12] \\
& \quad [+\text{high}]_1 \quad [-\text{high}]_2 \\
& \quad [-\text{back}]_1 \quad [-\text{back}]_1
\end{align*} \]

The arguments against the diphthongisation approach:
- There is no reason why stressed mid vowels must diphthongise because there are stressed mid vowels in Spanish.
- It cannot provide an analysis that accounts for the segmental alternations [je] ~ [e] and [we] ~ [o] in a unified way.

OT analysis by positional faithfulness

**The prosodic issue**

(11) Relevant constraints

a. *Branching-µ (*Branch-µ; Rosenthall 1994):
\[ *\mu \]
\[ / \]
\[ \mu \]
\[ \mu \]
\[ V_i \]
\[ V_j \]

b. *Diphthong (*Diph; Rosenthall 1994):

\[ *\sigma \]
\[ / \]
\[ \mu \]
\[ \mu \]
\[ V_i \]
\[ V_j \]

c. Uniformity\(T_{[\text{Unif}]} \) (McCarty and Prince 1995):

No segment of the output has multiple correspondents in the input.

d. Uniformity\(T_{[\text{Unif}(\hat{\sigma})]} \) (Unif(\(\hat{\sigma}\))):

No stressed segment of the output has multiple correspondents in the input.

e. Ident\(T_{[\text{F}]} \) (Ident\(T_{[\text{F}]} \)) (McCarty and Prince 1995):

Correspondent segments have identical value for the feature [F].

f. Ident\(T_{[\text{F}}(\hat{\sigma}) \) (Ident\(T_{[\text{F}(\hat{\sigma})]} \) (Alderete 1995):

Correspondent segment in stressed syllables have identical value for the feature [F].

g. Dep-µV: Every vocalic mora in the output must have its input correspondent.

h. Max\(V \) : Every vocalic segment in the input must have its output correspondent.
The segmental issues

(17) Relevant constraints
a. *{+high}: Avoid [+high].
b. *{-high}: Avoid [-high].
c. *{+back}: Avoid [+back].
d. *{-back}: Avoid [-back].

(18) IDENTFO{+back} >> IDENTFO[F] >> *{+high}, *{+back} >> *{-high}, *{-back}
(where [F] stands for the feature other than [+back])
- The ranking, *{+high}, *{+back} >> *{-high}, *{-back}, is confirmed by the
  fact that the epenthetic vowel in Spanish is [e].

(19) [je] □ [e]:

<table>
<thead>
<tr>
<th>/tjɛ̃nɛɾ/</th>
<th>*BRANCH-µ</th>
<th>In{+back}</th>
<th>In[F]</th>
<th>*{+high}</th>
<th>*{+back}</th>
<th>*{-high}</th>
<th>*{-back}</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. tjɛ̃nɛɾ</td>
<td>*!</td>
<td>-</td>
<td>-</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>b. tɛ̃nɛɾ</td>
<td></td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. tɛ̃nɛɾ</td>
<td></td>
<td>*</td>
<td>-</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(20) [we] □ [o]:

<table>
<thead>
<tr>
<th>/bwә̃ndá/</th>
<th>*BRANCH-µ</th>
<th>In{+back}</th>
<th>In[F]</th>
<th>*{+high}</th>
<th>*{+back}</th>
<th>*{-high}</th>
<th>*{-back}</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. bwә̃ndá</td>
<td>*!</td>
<td>-</td>
<td>-</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. bә̃ndá</td>
<td></td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. bә̃ndá</td>
<td></td>
<td>*</td>
<td>-</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. bә̃ndá</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. bә̃ndá</td>
<td></td>
<td>*</td>
<td>-</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary of constraint ranking:
(21) a. Dominant constraints: MAXIO-V, DEPFO-MIV
b. Monophthongisation via coalescence:
   UNIFORMITYFO{6}, IDENTFO[F]{6} >> *BRANCHING-µ >> UNIFORMITYFO,
   IDENTFO{+back} >> IDENTFO[F] >> *DIPHTHONG

c. Vowel alternations:
   *BRANCHING-µ >> IDENTFO{+back} >> IDENTFO[F] >> *{+high}, *{+back} >> *{-high}, *{-back} >>

1.2.2 Catalan vowel reduction

(22) Vowel features in Catalan and Galician

<table>
<thead>
<tr>
<th></th>
<th>i</th>
<th>e</th>
<th>ɛ</th>
<th>a</th>
<th>o</th>
<th>u</th>
<th>ɔ</th>
</tr>
</thead>
<tbody>
<tr>
<td>[high]</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>[low]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>[ATR]</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>[round]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

- It is assumed that [ɔ] does not have any feature value.

- Non-high non-rounded vowels changed to [ə] in order to avoid the [-high] feature.
- Rounded vowels does not reduced to [ə] because roundedness must be preserved. In
  this case, the least marked rounded vowel [u] appears.
- High front vowel does not changed to [ə] because high vowels cannot be lowered. (cf.
  Herrick 2003)
  In Catalan, the vowel markedness constraints are ranked as *{-high} >> *{+high} >> *ə

(23) The constraint ranking for Catalan vowel reduction:
   *NUCLEUS{6}/ə >> IDENTFO[F]{6}, IDENTFO{round} >> IDENTFO{+high} >> *{-high}
   >> *{+high} >> IDENTFO[-high] >> *ə >> IDENTFO{back}, IDENTFO{low},
   IDENTFO{ATR} >> *[ɨ back], *[ɨ low], *[ɨ round], *[ɨ ATR]

(24) [e] □ [ə] in unstressed syllables:

<table>
<thead>
<tr>
<th></th>
<th>In{round}</th>
<th>In{+high}</th>
<th>*{-high}</th>
<th>*{+high}</th>
<th>In{-high}</th>
<th>*ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. e</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. i</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. e</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. u</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>e. ə</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
(25) [i] is not reduced to [ə]:

<table>
<thead>
<tr>
<th></th>
<th>/i/</th>
<th>Id[round]</th>
<th>Id[+high]</th>
<th>*[+high]</th>
<th>Id[-high]</th>
<th>*ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>e</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>i</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c.</td>
<td>e</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d.</td>
<td>u</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>e.</td>
<td>ə</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(26) [ɔ] ≠ [u] in unstressed syllables:

<table>
<thead>
<tr>
<th></th>
<th>/ɔ/</th>
<th>Id[round]</th>
<th>Id[+high]</th>
<th>*[+high]</th>
<th>Id[-high]</th>
<th>*ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>ɔ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>u</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d.</td>
<td>ə</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(27) No vowel reduction in stressed syllables:

<table>
<thead>
<tr>
<th></th>
<th>/ɛ/</th>
<th>*N(ɛ)/ʊ</th>
<th>Id[F(ɛ)]</th>
<th>*[+high]</th>
<th>Id[-high]</th>
<th>*ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>ɛ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>é</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c.</td>
<td>ő</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d.</td>
<td>ı</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>e.</td>
<td>ʌ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

1. 2. 3 Vowel reduction in Galician

- Low-mid vowels are avoided because they have [-ATR, -low] which are prohibited by Grounded Path Condition in (28).

(28) RTR/LO Condition (Archangeli and Pulleyblank 1994)

If [-ATR] then [+low]. If [-ATR] then not [-low]

(29) An OT interpretation of RTR/LO Condition

RTR/LO = [*-ATR] & seg*[-low]

A segment cannot be both [-ATR] and [-low].

(30) IDENT[lo][F(ð), IDENT[lo][F] >> RTR/LO >> IDENT[lo][ATR] >> *[ð high], *[ð back], *[ð ATR], *[ð low], *[ð round]

IDENT[lo][F] = {IDENT[lo][round], IDENT[lo][low], IDENT[lo][high], IDENT[lo][back]}

(31) Low-mid vowels are reduced to high-mid vowels in unstressed syllables:

<table>
<thead>
<tr>
<th></th>
<th>/e/</th>
<th>Id[low]</th>
<th>RTR/LO</th>
<th>Id[ATR]</th>
<th>*[+ATR]</th>
<th>*[-low]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>e</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>ə</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c.</td>
<td>u</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

(32) No vowel reduction in stressed syllables:

<table>
<thead>
<tr>
<th></th>
<th>/e/</th>
<th>Id<a href="%C3%B0">ATR</a></th>
<th>RTR/LO</th>
<th>Id[ATR]</th>
<th>*[+ATR]</th>
<th>*[-low]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>é</td>
<td>*</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>ć</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>a</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

(33) Vowels other than mid vowels are not reduced:

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>i</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>e</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>a</td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

1. 3 Summary

- The core rankings of mid vowel alternations in Spanish, Catalan, and Galician

34. a. Spanish alternating diphthongs

= UNIFORMITY[lo](ð), IDENT[lo][F(ð)] >> BRANCHING-H >> UNIFORMITY[lo], IDENT[lo][+back] >> IDENT[lo][F] >> *[+high], *[+back] >> *[+ATR], *[+low]

b. Catalan vowel reduction

IDENT[lo][F(ð)] >> IDENT[lo][+high] >> *[+high], *[+back] >> *[+ATR], *[+low]

34. c. Galician vowel reduction

IDENT[lo][F(ð)], IDENT[lo][F] >> RTR/LO >> IDENT[lo][ATR]

- By analysing the diphthong/monophthong alternations in Spanish as the monophthongisation process, it is possible to account for the stress-conditioned vowel alternations, which have developed from the same historical sources, the low-mid vowels of Vulgar Latin, by the effect of the positional asymmetry ranking, F(str) >> M >> F.
2.  Word-final deletion in Catalan

2.1  Word-final deletion processes in Catalan

- n-deletion (Mascaró 1976; Wheeler 1979, 2005, etc.)

- In Catalan, word-final n is deleted if it is preceded by a stressed vowel:
  (35) a. cosí [ku'zi] ‘cousin (m. sg.)’
      ple [ple] ‘full (m. sg.)’
      catalá [katɔ'la] ‘Catalan (m. sg.)’
      felí [fə'li] ‘feline (m. sg.)’
  b. cosina [ku'zina] ‘cousin (f. sg.)’
      plena [plenə] ‘full (f. sg.)’
      catalana [katɔ'lanə] ‘Catalan (f. sg.)’
      felina [fə'linə] ‘feline (f. sg.)’

- The feminine forms show that the corresponding masculine forms have a nasal consonant in their stem underlyingly.

- Coda nasals are not deleted word-internally.
  (36) candid [kandit] ‘candid (m. sg.)’
  penca [penka] ‘cut’
  sincopen [sɪŋkʊpə] ‘syncope’

- Word-final n is not deleted if it is in an unstressed syllable.

- r-deletion (Mascaró 1976; Wheeler 1979, 2005, etc.)

- In Catalan, word-final r is deleted if it is preceded by a stressed vowel:
  (38) a. primer [pri'me] ‘first (m. sg.)’
      clar [kla] ‘clear (m. sg.)’
      sencer [sən'ʃəɾ] ‘whole (m. sg.)’
  b. primera [pri'merə] ‘first (f. sg.)’
      clara [klaɾə] ‘clear (f. sg.)’
      sencera [sən'ʃəɾə] ‘whole (f. sg.)’

- Coda r is not deleted word-internally.
  (40) miser ['mizəɾ] ‘miserable (m. sg.)’
  mortïfer [mor'tifəɾ] ‘deadly’
  semàfor [sə'mafəɾ] ‘traffic light’

- Word-final r is not deleted if it is in an unstressed syllable.

The difference between n- and r-deletion

- Stem-final n is not deleted if it is followed by the plural suffix:
  (41) cosins [ku'zins] ‘cousin (m. pl.)’
  plens [plenəs] ‘full (m. pl.)’
  catalans [katɔ'lanəs] ‘Catalan (m. pl.)’

- Contrastively, stem-final r is deleted even if it is followed by the plural suffix:
  (42) primers [pri'mes] ‘first (m. pl.)’
  clars [klas] ‘clear (m. pl.)’
  sencers [sən'səɾəs] ‘whole (m. pl.)’

- To account for the different applications in plural forms, the rule-based analyses (Mascaró 1976, Wheeler 1979, Morales 1995, etc.) must assume two distinct but very similar deletion processes that are ordered differently with respect to the plural suffixation. In addition, the rules or filters proposed in these analyses only describe the environment where word-final consonants are deleted but do not explain why they must be deleted in that environment.

Issues

- The nature of the deletion processes:
  - Why are n and r deleted in word-final position?
  - Why does stress play a crucial role?

- The different interaction with the plural suffixation:
  - Why do n- and r-deletion apply differently in plurals?

2.2  An OT analysis

2.2.1  The deletion process

- Why are n and r deleted in stressed word-final syllables?
  - These consonants are too sonorous to be in coda position of a stressed syllable.
Prosodic markedness constraints in prominent positions (de Lacy 2001):

Prosodic markedness constraints can be relativised to phonologically prominent positions (e.g. initial syllable, stressed syllable).

(43) Sonority constraint hierarchy (after Prince and Smolensky 1993 [2004])
a. The margin sonority hierarchy:
   \[ \text{*M(ARGIN)/X}: X \text{ must not be parsed as a marginal position of a syllable.} \]
   \[ || \text{*M/vowel >> *M/glide >> *M/liquid >> *M/nasal >> *M/obstruent} || \]

b. The nucleus sonority hierarchy:
   \[ \text{*N(UCLEUS)/X}: X \text{ must not be parsed as a syllable nucleus.} \]
   \[ || \text{*N/obstruent >> *N/nasal >> *N/liquid >> *N/glide >> *N/vowel} || \]

(44) Prosodic markedness hierarchy in stressed syllables:

a. Margin sonority hierarchy in stressed syllables
   \[ \text{*M(σ)/X}: X \text{ must not be parsed as a marginal position of a stressed syllable.} \]
   \[ || \text{*M(σ)/vowel >> *M(σ)/glide >> *M(σ)/liquid >> *M(σ)/nasal >> *M(σ)/obstruent} || \]
   
   **Interpretation:** The more sonorous a segment is, the less favorable it is in a marginal position of a stressed syllable.

b. Nucleus sonority hierarchy in stressed syllables
   \[ \text{*N(σ)/X}: X \text{ must not be parsed as a nucleus of a stressed syllable.} \]
   \[ || \text{*N(σ)/obstruent >> *N(σ)/nasal >> *N(σ)/liquid >> *N(σ)/glide >> *N(σ)/vowel} || \]
   
   **Interpretation:** The more sonorous a segment is, the more favorable it is as a nucleus of a stressed syllable.

(45) Constraint ranking schema for word-final deletion in Catalan:

\[ \text{*M(σ)/X} >> \text{MAXX₀-C} >> \text{*M/X} \]

- \( \text{MAXX₀-C} \) universally fixed, because they are in a stringency relationship: violations of \( \text{*M(σ)/X} \) are always a subset of those of \( \text{*M/X} \).

(46) \( r \)-deletion: \( \text{*M(σ)/liquid} >> \text{MAXX₀-C} >> \text{*M/liquid} \)

\[
\begin{array}{|c|c|c|c|}
\hline
\text{/klár/} & \text{Max} & \text{M-liquid} & \\
\hline
\text{a. klár} & *! & & \\
\hline
\text{b. klá} & * & & \\
\hline
\end{array}
\]

(47) No deletion in unstressed syllables:

\[
\begin{array}{|c|c|c|c|}
\hline
\text{/átun/} & \text{M(σ)/nasal} & \text{MAX} & \text{M/nasal} \\
\hline
\text{a. á.tun} & * & & \\
\hline
\text{b. á.tu} & *! & & \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|c|c|}
\hline
\text{/mízer/} & \text{M(σ)/liquid} & \text{MAX} & \text{M/liquid} \\
\hline
\text{a. mi.zer} & * & & \\
\hline
\text{b. mi.zo} & *! & & \\
\hline
\end{array}
\]

Non-deletion in word-internal positions

(49) DOMAİN-CONTIGUITY [D-CONTIG] (cf. Lamontagne 1997)

If the elements in the input are contiguous in a morphological domain, their correspondents in the output must be contiguous. No skipping within a morphological domain.

(50) Coda \( n/r \) is not deleted word-internally:

\[
\begin{array}{|c|c|c|c|}
\hline
\text{/tá1rd3a/} & \text{D-CONTIG} & \text{M(σ)/liq} & \text{MAX} & \text{M/liq} \\
\hline
\text{a. tá1rd3a} & * & & \\
\hline
\text{b. tá1rd3a} & *! & & \\
\hline
\end{array}
\]

Non-deletion of onset consonants

*ARGIN/X constraints do not distinguish coda consonants from osent ones. However, \( n/r \) in onset is not deleted both word-internally and word-initially.

(51) a. gener [\( \text{3a'ne} \)] 'January'
    
    \( \text{análisi} \) [\( \text{'nalizi} \)] 'analysis'

b. noranta [\( \text{nu'rants} \)] 'ninety'
    
    plorós [\( \text{plu'ros} \)] 'tearful (m.sg.)'
(52) a. nas ['nas] 'nose'
   nata ['nata] 'cream'
   b. ric ['rik] 'rich (m.sg.)'
   ratlla ['raɫə] 'line'

(53) Non-deletion in word-internal onset positions:

<table>
<thead>
<tr>
<th>/səʔ, nəʔ/</th>
<th>D-CONTIG</th>
<th>*M(ð)/nas</th>
<th>Max</th>
<th>*M/nas</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ʕən, nəʔi</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ʕən, ʕəʔi</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(54) ANCHORC(GrWd, σ, initial) [ANCHORC]:
The initial consonant of a grammatical word in the input must be in correspondence with a syllable-initial segment in the output.

(55) Non-deletion in word-initial position:

<table>
<thead>
<tr>
<th>/nəʔtə/</th>
<th>ANCHORC</th>
<th>D-CONTIG</th>
<th>*M(ð)/nas</th>
<th>Max</th>
<th>*M/nas</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. nəʔtə</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ʔəʔtə</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Non-deletion of consonants other than n and r

Word-final obstruents are not deleted:

(56) mot ['mot] 'word'
   cap ['kap] 'head'
   lloc ['lɔk] 'place'
   pis ['pis] 'flat'
   baix ['baf] 'low'

Non-deletion of obstruents is accounted for by the ranking of MAXIO-C with respect to the margin sonority hierarchy in stressed syllables (44a):

(57) *M(ð)/vowel >> *M(ð)/glide >> *M(ð)/liquid >> *M(ð)/nasal >> MAXIO-C >> *M(ð)/obstruent

(58) Non-deletion of obstruents:

<table>
<thead>
<tr>
<th>/mót/</th>
<th>*M(ð)/liq</th>
<th>*M(ð)/nas</th>
<th>Max</th>
<th>*M(ð)/obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. mét</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. mó</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
</tbody>
</table>

Sonorants other than n and r are not deleted:

(59) [n]: nom ['nom] 'name'
   resum ['ɾəzʊm] 'summary'
   [ŋ]: bony ['bɔŋ] 'lump'
   madrileny ['maɾdɾiˈleni] 'person from Madrid'
   [l]: mal [ˈmal] 'bad'
   gentil [ˈɡɛntil] 'elegant'
   [ʎ]: bell [ˈbɛʎ] 'beautiful'
   cavall [ˈka væl] 'horse'
   [j]: rei [ˈɾei] 'king'
   heroi [ˈɾeɾei] 'hero'
   [ʝ]: pau [ˈpau] 'peace'
   fideu [ˈfi dəu] 'noodle'

The difference between n/r and other sonorants is attributed to the difference in their featural structure: sonorants other than n and r have a labial or a dorsal node, while n and r have a coronal node (cf. Halle 1995, Walsh Dickey 1997).

(60) Featural structures of nasal consonants (relevant parts only)

<table>
<thead>
<tr>
<th>a. [n]</th>
<th>b. [m]</th>
<th>c. [ŋ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+cons</td>
<td>+cons</td>
<td>+cons</td>
</tr>
<tr>
<td>+son</td>
<td>+son</td>
<td>+son</td>
</tr>
<tr>
<td>+nas</td>
<td>+nas</td>
<td>+nas</td>
</tr>
<tr>
<td></td>
<td>Place</td>
<td>Place</td>
</tr>
<tr>
<td></td>
<td>Coronal</td>
<td>Labial</td>
</tr>
<tr>
<td></td>
<td>Coronal</td>
<td>Dorsal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[+back]</td>
</tr>
</tbody>
</table>

(61) Featural structures of liquids and glides (relevant parts only)

<table>
<thead>
<tr>
<th>a. /r/</th>
<th>b. laterals</th>
<th>c. glides</th>
</tr>
</thead>
<tbody>
<tr>
<td>+cons</td>
<td>+cons</td>
<td>-cons</td>
</tr>
<tr>
<td>+son</td>
<td>+son</td>
<td>+son</td>
</tr>
<tr>
<td>-lat</td>
<td>+lat</td>
<td>-lat</td>
</tr>
<tr>
<td></td>
<td>Place</td>
<td>Place</td>
</tr>
<tr>
<td></td>
<td>Coronal</td>
<td>Coronal</td>
</tr>
<tr>
<td></td>
<td>Dorsal</td>
<td>Dorsal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[+back]</td>
</tr>
</tbody>
</table>

Deletion of \( n \) and \( r \):

<table>
<thead>
<tr>
<th>/plán/</th>
<th>Max[Dir]</th>
<th>Max[Lab]</th>
<th>*M(( \delta ))/X</th>
<th>Max[Cor]</th>
<th>Max-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>plán</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>plé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/klá/</td>
<td>Max[Dir]</td>
<td>Max[Lab]</td>
<td>*M(( \delta ))/X</td>
<td>Max[Cor]</td>
<td>Max-C</td>
</tr>
<tr>
<td>klár</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>klá</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Non)-deletion of sonorants other than \( n \) and \( r \):

<table>
<thead>
<tr>
<th>/nóm/</th>
<th>Max[Dir]</th>
<th>Max[Lab]</th>
<th>*M(( \delta ))/X</th>
<th>Max[Cor]</th>
<th>Max-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>nó</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nóm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/mál/</td>
<td>Max[Dir]</td>
<td>Max[Lab]</td>
<td>*M(( \delta ))/X</td>
<td>Max[Cor]</td>
<td>Max-C</td>
</tr>
<tr>
<td>mál</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>má</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/réi/</td>
<td>Max[Dir]</td>
<td>Max[Lab]</td>
<td>*M(( \delta ))/X</td>
<td>Max[Cor]</td>
<td>Max-C</td>
</tr>
<tr>
<td>réj</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ré</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The constraint ranking for Catalan word-final deletion:

D-CONTIG, ANCHORCio, MaxCor[Dir], MaxCor[Lab]

\[ \ldots >> *M(\( \delta \))/glide >> *M(\( \delta \))/liquid >> *M(\( \delta \))/nasal \] \( A \)

\[ >> \text{MaxCor}[Cor], \text{MaxCor}[Cor] >> \{ *M(\( \delta \))/obstruent \} \] \( A \)

\[ >> \ldots >> *M/liquid >> *M/nasal >> ... \] \( B \)

(A: positional margin constraint hierarchy; B: margin constraint hierarchy)

2.2.2 (Non)-deletion in plural forms

- Why do \( n \)- and \( r \)-deletion apply differently in plurals?

- The deletion of \( r \) in plurals cannot be attributed to the constraint against \( rs \):

<table>
<thead>
<tr>
<th>quars ['kwars] 'quartz'</th>
<th>univers [uni'fers] 'universe'</th>
</tr>
</thead>
<tbody>
<tr>
<td>dors ['dors] 'back'</td>
<td>curs ['kurs] 'course'</td>
</tr>
</tbody>
</table>

- The existence of the morpheme boundary is crucial in \( r \)-deletion in plurals.

- The different application of the deletion processes in plurals are accounted for by the possibility of the deletion across morpheme boundary.


- If the elements in the input are contiguous across a morpheme boundary, their correspondents in the output must be contiguous.

*\( M(\( \delta \))/liquid >> \text{J-CONTIG} >> *M(\( \delta \))/nasal\)

Non-deletion of \( n \) in plurals:

<table>
<thead>
<tr>
<th>/plé, n₁ + s₁/</th>
<th>*M(( \delta ))/liquid</th>
<th>J-CONTIG</th>
<th>*M(( \delta ))/nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. plé, n₁ s₁</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. plé, s₁</td>
<td></td>
<td></td>
<td>!</td>
</tr>
</tbody>
</table>

Deletion of \( r \) in plurals:

<table>
<thead>
<tr>
<th>/klá, r₁ s₁ + s₁/</th>
<th>*M(( \delta ))/liquid</th>
<th>J-CONTIG</th>
<th>*M(( \delta ))/nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. klá, r₁ s₁</td>
<td></td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>b. klá, s₁</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Non-deletion of morpheme-internal \( rs \):

<table>
<thead>
<tr>
<th>/kú, r₁ s₁/</th>
<th>D-CONTIG</th>
<th>*M(( \delta ))/liquid</th>
<th>J-CONTIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kú, r₁ s₁</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. kú s₁</td>
<td></td>
<td></td>
<td>!</td>
</tr>
</tbody>
</table>

The plural suffix is not deleted:

<table>
<thead>
<tr>
<th>/klá, r₁ + s₁/</th>
<th>*M(( \delta ))/liq</th>
<th>J-CONTIG</th>
<th>*M(( \delta ))/obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. klá, r₁ s₁</td>
<td>!</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. klá, s₁</td>
<td>*</td>
<td></td>
<td>!</td>
</tr>
</tbody>
</table>
2.3 Summary

(74) The complete ranking for Catalan word-final deletion

\[
\text{D-CONTIG, ANCHOR}_{c0}, \text{MAX}_{X0}[\text{Dor}], \text{MAX}_{X0}[\text{Lab}] \gg \{ \ldots \gg \ast M(\ldots)/\text{glide} \gg \ast M(\ldots)/\text{liquid} \}_A \gg J-\text{CONTIG} \\
\{ \ast M(\ldots)/\text{nasal} \}_A \gg \text{MAX}_0[\text{Cor}], \text{MAX}_0-C \gg \{ \ast M(\ldots)/\text{obstruent} \}_A \\
\{ \ldots \gg \ast M/\text{liquid} \gg \ast M/\text{nasal} \gg \ldots \}_B \\
\]

(A: positional margin constraint hierarchy; B: margin constraint hierarchy)

Some consequences of the proposed analysis

- Deletion is the most economical way to avoid \(\ast M(\ldots)/X\) violations: among faithfulness constraints that can interact with \(\ast M(\ldots)/X\), only \(\text{MAX}_0\) constraints do not have positional counterparts that are specific to stressed syllables. Given that the focus of \(\text{MAX}_0\) is an input element and that prosodic structures are not present in the input, it is not possible to restrict its focus to elements that are in stressed syllables.

- Given that the ranking between \(\ast M(\ldots)/\text{liquid}\) and \(\ast M(\ldots)/\text{nasal}\) is universally fixed, the ranking of \(J-\text{CONTIG}\) with respect to \(\ast M(\ldots)/X\) constraints predicts the following factorial typology:

  - No deletion in plural forms: \(J-\text{CONTIG} \gg \ast M(\ldots)/\text{liquid} \gg \ast M(\ldots)/\text{nasal}\)
  - Both \(n\) and \(r\) are deleted: \(\ast M(\ldots)/\text{liquid} \gg \ast M(\ldots)/\text{nasal} \gg J-\text{CONTIG}\)
  - Only \(r\) is deleted: \(\ast M(\ldots)/\text{liquid} \gg J-\text{CONTIG} \gg \ast M(\ldots)/\text{nasal}\)

This typology predicts that if the application of the deletion processes diverge in some derived contexts, it is always the case that the more sonorous segment is deleted.

3 Concluding remarks

- The viewpoint of positional asymmetry in stressed syllables provides a deeper understanding of the stress-conditioned morphophonological phenomena in Spanish Romance languages, which the previous analyses with ad hoc stipulations cannot provide.

- The proposed OT analyses based on domain-specific constraints to stressed syllables account for the stress-conditioned phenomena in a uniform way and make some falsifiable predictions.

References


