Goals of this paper:
➢ To examine the interaction between the word-final consonant deletion and cliticisation in Catalan.
➢ To show that the Contiguity constraints that are relativised to morphosyntactic boundaries can account for the difference between plural formation and cliticisation with respect to word-final deletion.

1 Word-final r-deletion in Catalan

1.1 Word-final r-deletion
➢ Word-final r is deleted if it is preceded by a stressed vowel (Mascaró 1976, Wheeler 1979, Hualde 1992, Bonet and Lloret 1998):

(1) primer [primé] ‘first (m.sg.)’ cf. primera [priméɾa] ‘first (f.sg.)’
clar [klá] ‘clear (m.sg.)’ clara [kláɾa] ‘clear (f.sg.)’
sencer [sánséɾ] ‘whole (m.sg.)’ sencera [sánséɾa] ‘whole (f.sg.)’
voler [buléɾ] ‘to want’
tirar [tíɾaɾ] ‘to throw’

➢ r is not deleted when:
• It is preceded by an unstressed vowel:
(2) míser [mízéɾ] ‘miserable’
mortífer [móɾtíɾer] ‘deadly’
• It is not underlyingly word-final:
(3) curt [kúɾ(t)] ‘short’
matern [maɾtãɾ] ‘maternal (m.sg.)’

1.2 Opaque deletion in plurals
➢ r is deleted if it is followed by a plural morpheme s:

(4) primers [priméɾs] ‘first (m.pl.)’
clars [kláɾs] ‘clear (m.pl.)’
sencers [sánséɾs] ‘whole (m.pl.)’

• r-deletion overapplies in plural forms, although the stem-final r is not in the word-final position.
• Given that Catalan generally allows the word-final rs cluster as in curs [kúɾɾ] ‘course’, the deletion of r in (4) cannot be attributed to the restrictions on syllable structures.

1.3 Interaction of word-final deletion with cliticisation
➢ The final r of infinitives is not deleted when it is followed by enclitics without regard to whether the clitic-initial segment is vowel or consonant (Wheeler 1979, Hualde 1992, Bonet and Lloret 1998):

(5) a. infinitive + V-initial clitics
pensar-ho [pansáɾu] ‘to think it’ cf. pensar [pansáɾ] ‘to think’
voler-ho [buléɾu] ‘to want it’ voler [buléɾ]
tirar-ho [tiráɾu] ‘to throw it’ tirar [tiráɾ]
b. infinitive + C-initial clitics
agrar-hi [aɾɾaɾɾiɾiɾ] ‘to thank him for it’
voler-te [buléɾɾaɾ] ‘to want you’
sortir-ne [surtíɾɾeɾ] ‘for us to leave’
saber-la [saɾɾeɾaɾ] ‘to know it’

➢ In the dialect spoken in Barcelona (Barceloní), the clitics nos, vos, and los are realised as [nzəɾ], [wzəɾ], and [ləɾ], respectively. The infinitive-final r is deleted if the following clitic begins with a consonantal sequence (Wheeler 1979, Bonet and Lloret 1998, Wheeler, Yates and Dols 1999):

(6) a. tirar-nos [tiráɾnəɾ] ‘to throw to us’
introduir-nos [inتروduɾɾəɾ] ‘to introduce us’
trobar-nos [truɾɾaɾɾəɾ] ‘to meet us’
b. arreglar-vos [aɾɾeɾɾaɾɾaɾɾ] ‘to fix for you’
arreglar-vos-la [aɾɾeɾɾaɾɾaɾɾalɾ] ‘to fix it for you’
arreglar-vos-el [aɾɾeɾɾaɾɾaɾɾelɾ] ‘to fix it for you’
c. tirar-los [tiráɾlɾ] ‘to throw them’
fer-los [fəɾɾlɾ] ‘to make them’
endur-los-en [əɾɾəɾɾəɾəɾ] ‘to take them away’
1.4 The Issues

Q The nature of the deletion process:
- Why is r deleted in word-final position?
- Why does stress play a crucial role?

Q Interaction of deletion process with plural formation and cliticisation:
- Why do clitics block r-deletion to apply?
- Why do clitics beginning with consonantal sequences fail to block r-deletion?
- How does the deletion in cliticisation differ from the deletion in plurals?

2 An OT analysis I: The deletion process (Kikuchi 2003)

✓ Why is r deleted in word-final stressed syllable?

⇒ r is too sonorous to be in the 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 (eg. initial syllable, stressed syllables).

(7) Sonority constraint hierarchy (Prince and Smolensky 1993)
  a. The margin sonority hierarchy:
     *M(ARGIN)/X: X must not be parsed as a marginal position of a syllable.
     || *M/vowel >> *M/glide >> *M/liquid >> *M/nasal >> *M/obstruent ||
  b. The nucleus sonority hierarchy:
     N(UCLEUS)/X: X must not be parsed as a syllable nucleus.
     || *N/obstruent >> *N/nasal >> *N/liquid >> *N/glide >> *N/vowel ||

(8) Prosodic markedness hierarchy in stressed syllables:
  a. Margin sonority constraints in stressed syllables
     *M(AVED)/X: X must not be parsed as a marginal position of a stressed syllable.
     || *M/vowel >> *M/glide >> *M/liquid >> *M/nasal >> *M/obstruent ||
  b. Nucleus sonority constraints in stressed syllables
     *N(AVED)/X: X must not be parsed as a nucleus of a stressed syllable.
     || *N/obstruent >> *N/nasal >> *N/liquid >> *N/glide >> *N/vowel ||

(9) Constraint ranking for word-final consonantal deletion in Catalan:
  *M(AVED)/liquid >> MAXO >> *M/liquid

The ranking *M(AVED)/liquid >> *M/liquid is universally fixed, because they are in a stringency relationship: violations of *M(AVED)/liquid are always a subset of those of *M/liquid.

(10) Deletion of r in stressed syllable:

<table>
<thead>
<tr>
<th>/klá/</th>
<th>*M(AVED)/liquid</th>
<th>MAXO</th>
<th>*M/liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. klär</td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. klá</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(In this paper, stress is prespecified in the input for the sake of simple arguments.)

(11) Non-deletion of r in unstressed syllable:

<table>
<thead>
<tr>
<th>/mí.ţ/</th>
<th>*M(AVED)/liquid</th>
<th>MAXO</th>
<th>*M/liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. mi.ţər</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. mi.ţə</td>
<td></td>
<td></td>
<td>*!</td>
</tr>
</tbody>
</table>

⇒ r-deletion does not apply to word-internal r because the deletion of non-peripheral segment is not allowed by the dominant DOMAİN-CONTIG(UITY) constraint.

(12) D(OIMAİN)-CONTIG(UITY):

If the elements in the input are contiguous in a morphological domain, their correspondents in the output must be contiguous.

(13) Non-deletion in word-internal position: D-CONTIG >> *M(AVED)/liquid >> MAXO

<table>
<thead>
<tr>
<th>/p5.ţ2t3a/ 'door'</th>
<th>D-CONTIG</th>
<th>*M(AVED)/liquid</th>
<th>MAXO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. p5.ţ2t3a</td>
<td>D-CONTIG</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. p5.ţ2t3a</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(14) D-CONTIG does not affect the result for word-final deletion:

<table>
<thead>
<tr>
<th>/klá/</th>
<th>D-CONTIG</th>
<th>*M(AVED)/liquid</th>
<th>MAXO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. klår</td>
<td>D-CONTIG</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. klá</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. An OT analysis II: Interaction of r-deletion with plural formation and cliticisation

3.1 Relativised Contiguity and non-deletion in cliticised forms

- What is the difference between plurals and cliticised forms?
  - Morphosyntactic boundary that lies between the stem-final r and the following morphemes.

(15) a. Plural forms: morpheme boundary (denoted by "+")
  clars /klar + s/

b. Cliticised forms: word boundary (denoted by "#")
  tirar-ho /tirar # u/
  saber-la /saber # la/
  tirar-los /tirar # lz/

Proposal: Morphosyntactically relativised Contiguity (cf. Lamontagne 1997)
  - JUNCTURE-CONTIGUITY constraints can be relativised to morphosyntactic boundaries. Each relativised Contiguity constraints are ranked in a specific-general order.

(16) J(UNCTURE)-CONTIG(UITY):
  If the elements in the input are contiguous across a morphosyntactic boundary, their correspondents in the output must be contiguous.

(17) J(#)-CONTIG(UITY):
  If the elements in the input are contiguous across a word boundary (#), their correspondents in the output must be contiguous.
  - J(#)-CONTIG is universally ranked higher than the general J-CONTIG, because word boundary is a specific instance of morphosyntactic boundaries.

(18) Relevant constraint ranking
  J(#)-CONTIG >> *M(σ)/liquid >> J-CONTIG

(19) r is deleted in plurals:

<table>
<thead>
<tr>
<th>/klár佩服 s</th>
<th>J(#)-CONTIG</th>
<th>*M(σ)/liquid</th>
<th>J-CONTIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. klár佩服s₁</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. klárs₁</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(20) r is not deleted in cliticised forms:

<table>
<thead>
<tr>
<th>/tirár佩服 la/</th>
<th>J(#)-CONTIG</th>
<th>*M(σ)/liquid</th>
<th>J-CONTIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. tirár佩服la</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. tirála</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2 Opaque r-deletion in Barceloní

- In Barceloní, the infinitive-final r is deleted when it is followed by a clitic beginning with a consonantal sequence:

(21) a. tirar-nos /tirar#nz/ [ti.rán.z] 
    c. tirar-los /tirar#lz/ [ti.rál.z]

    b. arreglar-vos /arreglar#wz/ [ar.reg.gláw.z] 

- In (21b, c), it is clear that the deletion of the infinitive-final r is motivated by constraints on syllable structure in Catalan: the sequences of three consonants created by the cliticisation pose a problem of syllabification. In particular, the middle consonant of the sequence, w and l, cannot be syllabified neither to the coda of the preceding syllable nor to the onset of the following syllable.

- However, the deletion in (17a) cannot simply be attributed to syllable structure constraints, because rn (or even rns) is permitted as coda in Catalan:

(22) carn [kárn] 'flesh'
    carns [kárnz] 'fleshes'
    intern [intérns] 'internal'

- Underlying forms of Catalan pronominal clitics:
  Pronominal clitics in Catalan can be analysed as /person morpheme (+ plural morpheme) with epenthetic weak vowels [i, u, ə] (Bonet and Lloret 1998, Wheeler, Yates and Dols 1999).

(24) nos /ns/ [nus], [nɔs] (Epenthetic vowels are in bold face.)
    vos /bs/ ([βs], [ɔs])
    los /ls/ ([lɔs], [lsæ])

- The difference of the epenthesis site between Standard and Barceloní Catalan is attributed to the difference of the constraint ranking between these dialects.
(25) Relevant constraint rankings for Standard and Barceloní Catalan
   a. Standard Catalan:
      \[ CC\&ANCHOR >> J(#)-CONTIG >> D-CONTIG >> *M(\sigma)/liquid >> ANCHOR >> DEP >> CC \]
   b. Barceloní Catalan:
      \[ CC\&ANCHOR >> D-CONTIG >> J(#)-CONTIG >> *M(\sigma)/liquid >> ANCHOR >> DEP >> CC \]

(26) \( r \)-deletion does not apply if clitics begin with a single consonant (Standard Catalan)

<table>
<thead>
<tr>
<th>/tirá1r2n3s/</th>
<th>CC&amp;ANCHOR</th>
<th>J(#)-CONTIG</th>
<th>D-CONTIG</th>
<th>*M(\sigma)/liq</th>
<th>ANCHOR</th>
<th>DEP</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ti.rá1r2n3s</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ti.rá1r2n3us</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. ti.rá1n3us</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d. ti.rá1r2n3s</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>e. ti.rá1n3s</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(27) \( r \)-deletion applies if clitics begin with a consonantal sequence (Barceloní Catalan)

<table>
<thead>
<tr>
<th>/tirá1r2n3s/</th>
<th>CC&amp;ANCHOR</th>
<th>D-CONTIG</th>
<th>J(#)-CONTIG</th>
<th>*M(\sigma)/liq</th>
<th>ANCHOR</th>
<th>DEP</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ti.rá1r2n3s</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ti.rá1r2n3us</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. ti.rá1n3us</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d. ti.rá1r2n3s</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>e. ti.rá1n3s</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(28) The addition of CC\&ANCHOR does not affect the analysis of opaque \( r \)-deletion in plurals

<table>
<thead>
<tr>
<th>/klár+s|</th>
<th>CC&amp;ANCHOR</th>
<th>D-CONTIG</th>
<th>J(#)-CONTIG</th>
<th>*M(\sigma)/liq</th>
<th>ANCHOR</th>
<th>DEP</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. klár|</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. klás</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. klár|</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(29) Complex codas are generally allowed in Catalan.

<table>
<thead>
<tr>
<th>/kárn+s|</th>
<th>CC&amp;ANCHOR</th>
<th>D-CONTIG</th>
<th>J(#)-CONTIG</th>
<th>*M(\sigma)/liq</th>
<th>ANCHOR</th>
<th>DEP</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kárn|</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. kán|</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

3.3 Summary of constraint ranking

(30) \[ CC\&ANCHOR >> [J(#)-CONTIG >> D-CONTIG] >> *M(\sigma)/liquid >> ANCHOR >> DEP >> CC \]

4 Conclusion

In this paper, it is claimed that:

- The word-final \( r \)-deletion is accounted for by the positional markedness constraints, that militate against the marked structures in prominent position.
- The different interactions of the \( r \)-deletion with plural formation and cliticisation are accounted for by the JUNCTURE-CONTIGUITY constraints that are relativised to morphosyntactic boundaries.
- Dialectal variations of the shapes of clitics and their influence on the application of \( r \)-deletion are accounted for by the different constraint rankings between two dialects.

References