



Word stress position and word-final segments in Central Catalan

Xevi Pujol i Molist

Contents

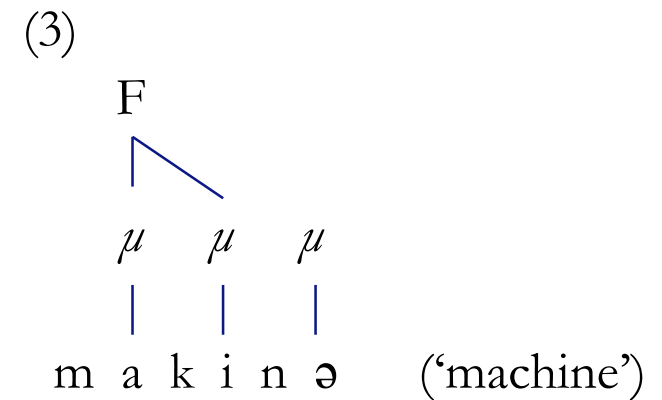
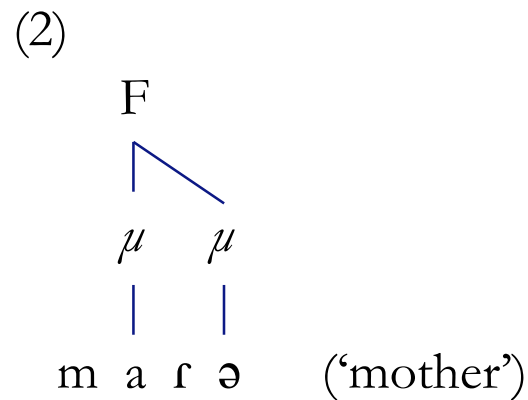
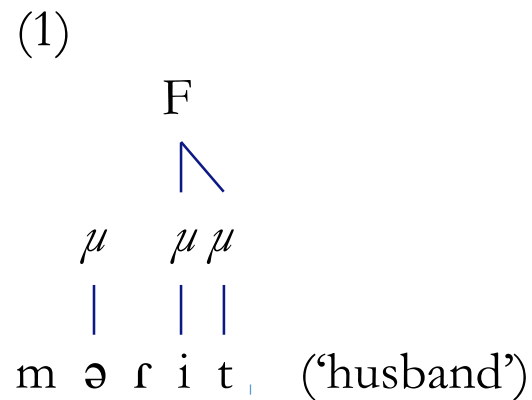
1. Introduction
2. Approach
3. Results
4. Discussion
5. Final remarks
6. References

1. Introduction

1.1. Preliminaries

Word stress assignment in Catalan (Oliva & Serra, 2002/2008):

- Catalan is sensible to syllable quantity.
- Basic foot, F: moraic trochee. → Right aligned.
- In some cases stress is lexical.



1. Introduction

1.2. Some clues

Starting point: loanwords in Catalan.

In Cabré (2009):

Adaptation to the unmarked stress position in Catalan:

- | | | |
|-------------------------|-----------------------|----------------------------------|
| (4) | | (5) |
| <i>merci</i> (French) | → [m'érsi] | |
| <i>tiquet</i> (English) | → [tikét] | |
| <i>futbol</i> (English) | → [fubból] / [fudból] | [əβərəést] / [e'βeres] 'Everest' |

(The transcriptions are ours.)

1. Introduction

1.2. Some clues

Pons-Moll (2021):

(6)

<i>polaroid</i>	→ [pɔlə'ɾɔjt] (cf. English: ['pɒlə,ɾɔɪd])
<i>bungalow</i>	→ [bʊŋgə'lɔw] (cf. English: ['bʌŋgə,lɒʊ])
<i>Instagram</i>	→ [ɪnstə'ɣrɑm] (cf. English: ['ɪnstəɡrɑm])
<i>avatar</i>	→ [əβə'tɑr] (cf. English: ['ævə,tɑr])

1. Introduction

1.2. Some clues

Loans preserving the original stress position:

Pons-Moll (2021):

(7) Stress position preservation.

Charleston ['tʃarleston]

Instagram ['instəʊɡrɑːm]

avatar ['ævətɑː]

hooligan ['xuːliɡən]

happening ['xæpenɪŋ]

Washington ['wɑːʃɪŋtən]

Calendar ['kælɪndər]

cardigan ['kɑːdɪɡən]

establishment [ə'stæblɪʃmənt]

Spiderman [ə'spaɪdəmən]

Mascaró (2011):

(8)

(Roger) *Federer* → [féðerər]

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(8)

(Roger) *Federer* → [féðerər]

(5) (Cabré, 2009):

[əβərést] / [éβerəs] 'Everest'

1. Introduction

1.2. Some clues

Therefore, a possible degree of correlation between proparoxytone words and the following word-final consonantal segments is detected:

- [n] and maybe nasals in general
- /r/
- [s]

2. Approach

2.1. Hypotheses

Hypothesis h_1

The word stress pattern of Catalan has a significant degree of correlation with the type of word-final segments of words in Central Catalan.

Hypothesis h_2

- i. Nasals (at least [n], [m] and [ɲ]), rhotics and [s] seem to be maximally suitable as word-final consonants for proparoxytone words.
- ii. It is additionally predicted that nasals and rhotics are minimally suitable for oxytone words as Central Catalan has the active phonological processes of final *n* and final *r* deletion.

A generalization out of this could be done: all segments that do not fit in proparoxytones word-finally are the ones that fit maximally in oxytones word-finally. An exception arises, however, at first glance: [s].

2. Approach

2.2. Goal

The main aim of this research is to shed some light on this concern by trying to prove or refute hypotheses h_1 and h_2 through an analysis focusing mainly on the native lexicon.

2. Approach

2.3. Methodology

To this end, a lexicographic approach has been chosen:

An exploratory search has been done throughout the corpus of the normative Catalan dictionary (DIEC2; <https://dlc.iec.cat/>) by means of the searching tool Diccionari RegEx (<https://www.visca.com/dr/>).

Filter interface:

Cadena:	<input type="text" value="\$v(\$c\$c i\$ c u\$c \$c\$c\$c i\$c\$c u\$c\$c)\$"/>		
Filtre:	<input type="text" value="(à è é í ò ó ú) (\$vll\$) (ix\$) (nt\$ nd\$) (nc\$ ng\$) (mp\$ mb\$) (lt\$ ld\$) (rt\$ rd\$)"/>		
Categoria gramatical Deixeu els quadrats en blanc si no voleu agrupar els resultats per categoria gramatical.			
<input type="checkbox"/> Totes les categories			
<input type="checkbox"/> Adjectius <input type="checkbox"/> Adverbis <input type="checkbox"/> Preposicions <input type="checkbox"/> Articles <input type="checkbox"/> Conjuncions	<input type="checkbox"/> Tots els noms i pronoms <input type="checkbox"/> Noms femenins <input type="checkbox"/> Noms masculins <input type="checkbox"/> Pronoms	<input type="checkbox"/> Tots els verbs <input type="checkbox"/> Verbs intransitius <input type="checkbox"/> Verbs transitius <input type="checkbox"/> Verbs pronomials	<input type="checkbox"/> Locucions <input type="checkbox"/> Interjeccions <input type="checkbox"/> Contraccions <input type="checkbox"/> Prefixos <input type="checkbox"/> Sufixos
Suprimeix ocurrències			
<input type="radio"/> si el mot pertany a... <input checked="" type="radio"/> llevat que el mot pertanyi a...			
<input type="radio"/> totes aquestes categories <input checked="" type="radio"/> qualsevol d'aquestes categories			
<input type="checkbox"/> Adjectius <input type="checkbox"/> Adverbs <input type="checkbox"/> Preposicions <input type="checkbox"/> Articles <input type="checkbox"/> Conjuncions	<input type="checkbox"/> Tots els noms i pronoms <input type="checkbox"/> Noms femenins <input type="checkbox"/> Noms masculins <input type="checkbox"/> Pronoms	<input type="checkbox"/> Tots els verbs <input type="checkbox"/> Verbs intransitius <input type="checkbox"/> Verbs transitius <input type="checkbox"/> Verbs pronominals	<input type="checkbox"/> Locucions <input type="checkbox"/> Interjeccions <input type="checkbox"/> Contraccions <input type="checkbox"/> Prefixos <input type="checkbox"/> Sufixos
<input type="button" value="Search"/>			

2. Approach

2.3. Methodology

Only simple codas analyzed: syllables VC, CVC, CCVC...

Monosyllabic words included in the case of oxytone words.

2. Approach

2.3. Methodology

Possible drawbacks of this method:

In terms of capability for representing the lexicon:

- It does not include verbal inflected forms, clitic groups, etc.
- Frequencies of use of words are not considered.

An aspect to be taken into account:

The number of occurrences has to be scaled by some factor when comparing frequencies between the proparoxytone and the oxytone contexts because in Catalan there are much more oxytone words than proparoxytone ones as proparoxytone is a marked context (see, for example, Oliva & Serra, 2002/2008, or Pons-Moll, 2021). Therefore, relevant comparisons must be done within each stress pattern.

3. Results

Word-final segments	OXYTONES		PROPAROXYTONES		PAROXYTONES	
	Frequency	Norm. freq.	Frequency	Norm. freq.	Freq.	Norm. freq.
[p]	142	1,16	0	0,00	38	0,60
[t]	4839	39,56	6	5,83	371	5,83
[k]	557	4,55	0	0,00	2855	44,85
[ts]	137	1,12	0	0,00	307	4,82
[tʃ]	258	2,11	0	0,00	1	0,02
[f]	46	0,38	0	0,00	136	2,14
[s]	1642	13,42	68	66,02	1171	18,40
[ʃ]	85	0,69	0	0,00	0	0,00
[m]	334	2,73	9	8,74	226	3,55
[n]	132	1,08	18	17,48	303	4,76
[ɲ]	115	0,94	0	0,00	0	0,00
[ŋ]	265	2,17	2	1,94	13	0,20
r	12139	99,25	3	2,91	459	7,21
[l]	1936	15,83	0	0,00	479	7,53
[ʎ]	712	5,82	0	0,00	0	0,00
[j]	103	0,84	0	0,00	1	0,02
[w]	928	7,59	0	0,00	5	0,08
Vowel	5043		4664		28927	
TOTAL C	12231		103		6365	

Considerations:

1. In Catalan there is a categorical process of final obstruent devoicing.

⇒ Just voiceless obstruents surface word-finally.

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Considerations:

1. In Catalan there is a categorical process of final obstruent devoicing.

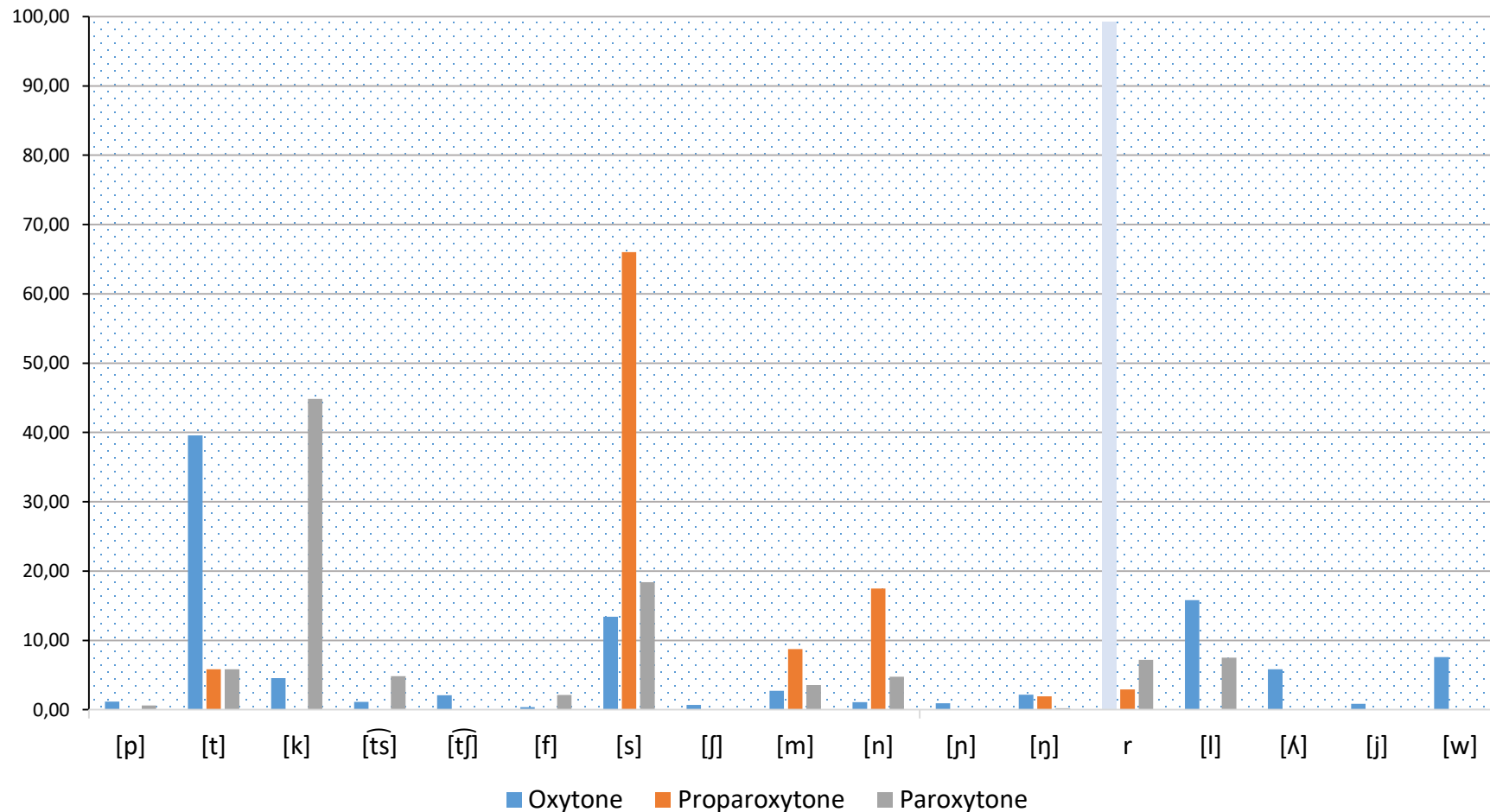
⇒ Just voiceless obstruents surface word-finally.

2. In Catalan there are relatively few proparoxytones.

⇒ Comparisons must be done between sounds and their proportions of occurrences by means of the **normalized frequencies**.

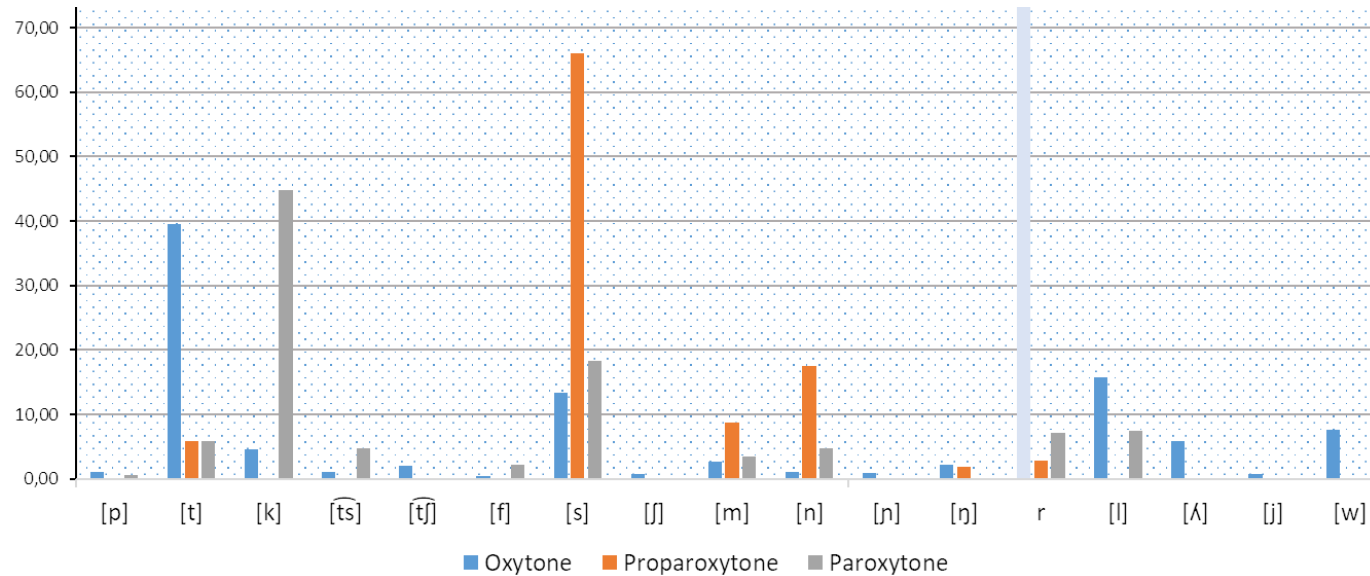
3. Results

Normalized frequencies of word-final segments



r (depicted in light blue): there is a low number of exceptions to final *r* deletion that cannot be captured by using orthography (e.g., *amor*, *mar*, *enter*, etc.).

3. Results



1.c. Two other consonants have to be mentioned regarding the same terms: [k] is likewise relatively frequent and [m] has samples in the three stress-type cases while being also quite frequent.

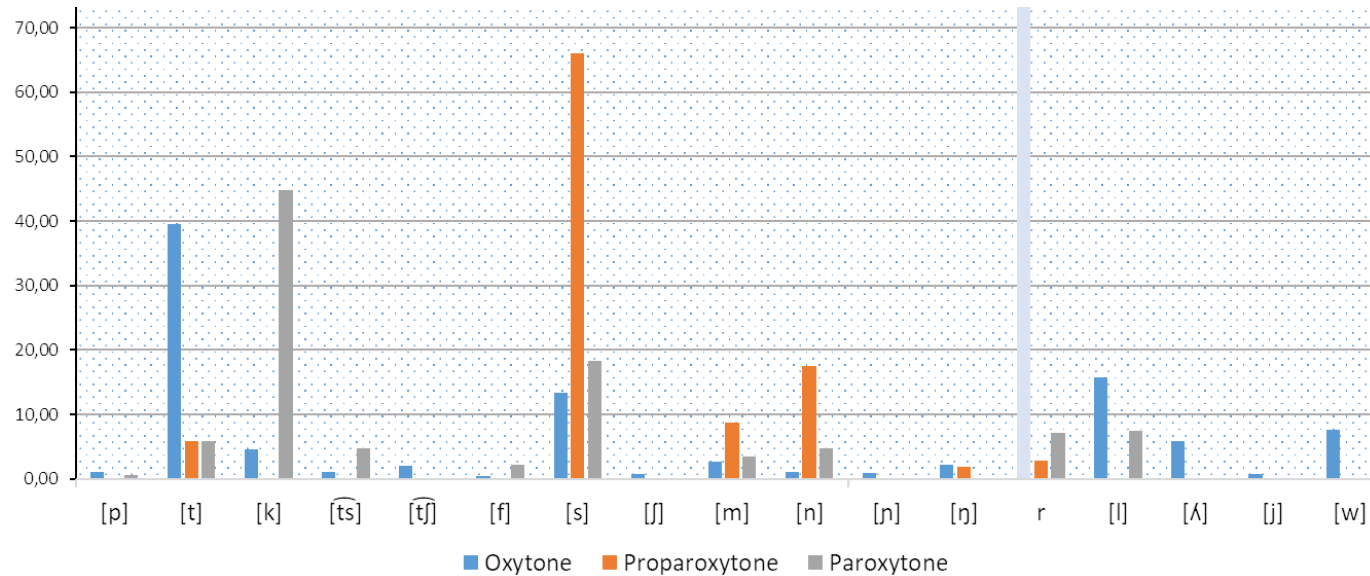
1. CORONALS (excluding alveolo-palatals):

1.a. [t], [s], [n], /r/ and [l], are relatively more frequent in average terms than the rest.

1.b. All coronals except for [l] and [ts̄] show occurrences for all stress patterns.

This general tendency is expectable because coronal is the unmarked place of articulation with respect to labial and dorsal.

3. Results



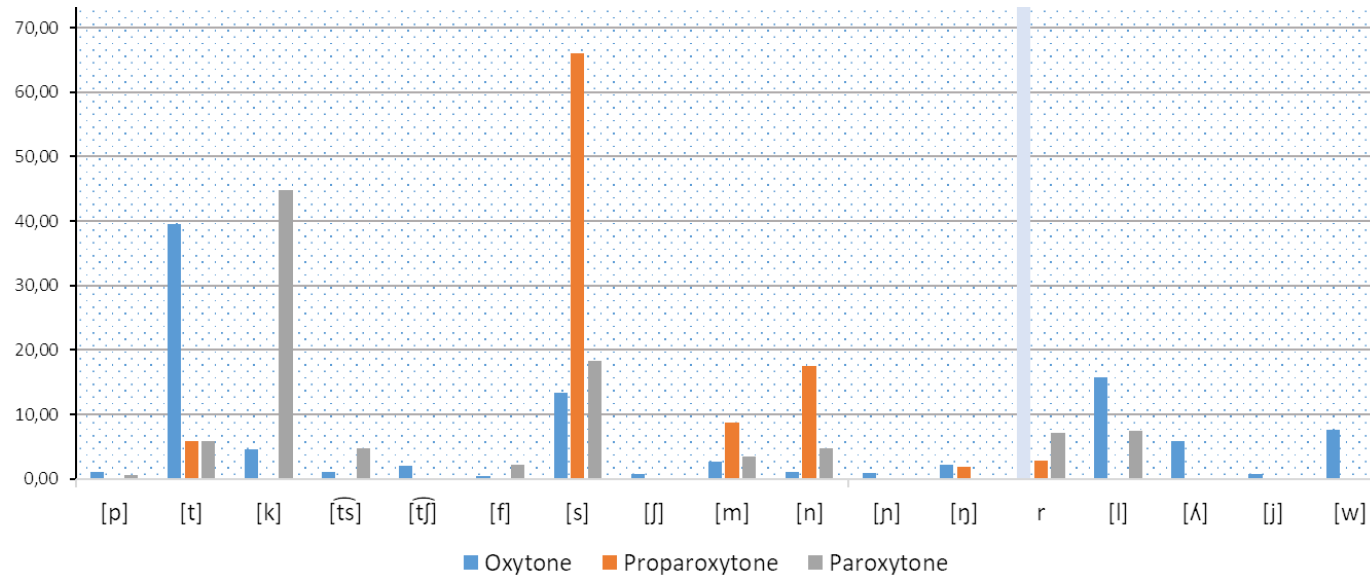
3. [s], [m] and [n] display the same profile: the relative frequency is descending following the order proparoxytone, paroxytone and oxytone.

2. [s] is the segment with highest average values of percentage of occurrences over the three stress patterns. Thus, it seems to be very suitable as word-final segment in the three contexts. → **Singular behaviour.**

This seems to point out a correlation for these segments which could mean that [s], [m] and [n] are relatively more suitable word-final as less final the word stress is.

These 3 segments are the most frequent in the proparoxytone context.

3. Results



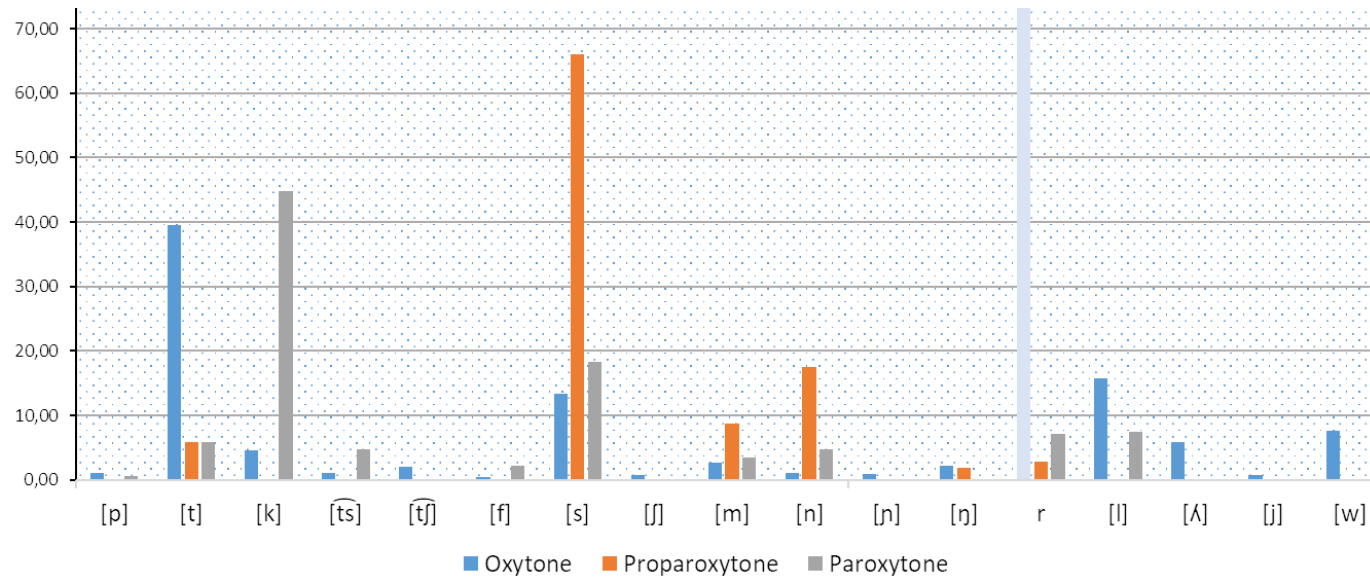
4.b. [w] shows the same behavior despite of not being palatal. It is relevant bearing in mind that this segment has a secondary articulation, as it is a labio-velar segment.

4. PALATALS:

4.a. All palatal and alveolo-palatal segments, $[\widehat{tʃ}]$, $[ʃ]$, $[ɲ]$, $[ʎ]$ and $[j]$, just have more than 1 occurrence as word-final segments in the oxytone context. They seem to be banned as word-final segments for paroxytone and proparoxytone words.

Consonants with complexity in terms of place of articulation and palatals behave alike. This is coherent since constriction surface is relatively longer in palatals (Recasens, 2014).

3. Results



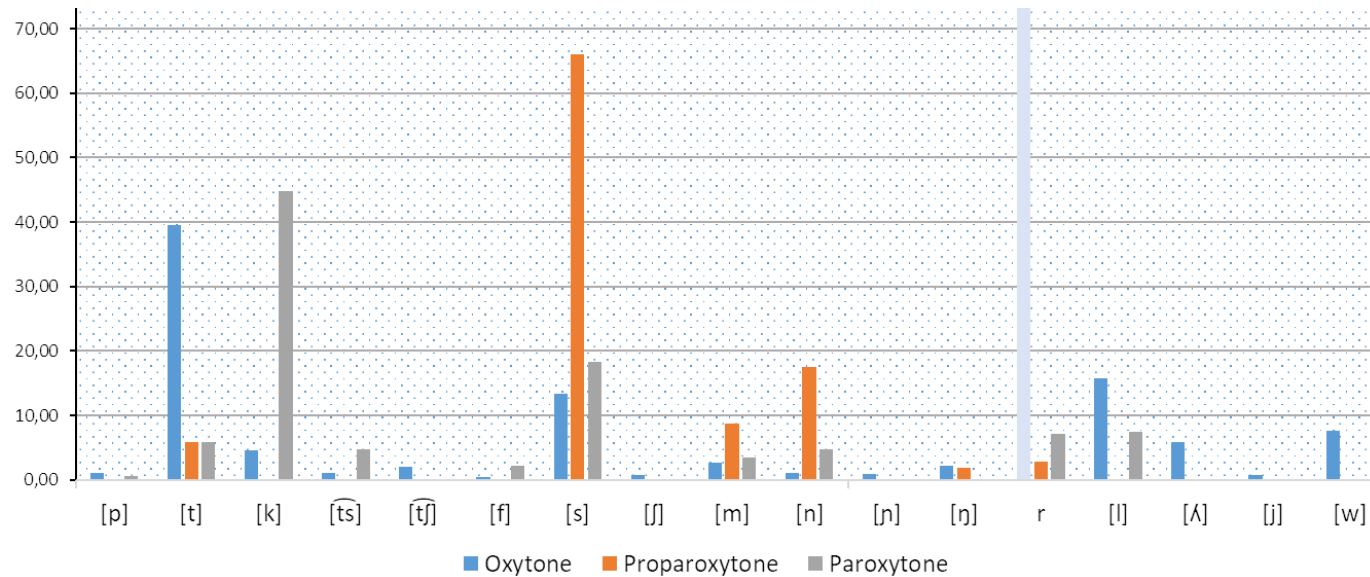
5. PLOSIVES:

5.a. The stops [t] and [k] seem to be, for the oxytone and paroxytone cases, in semi-complementary distribution (there is roughly a 10 factor between one frequency and the other and vice versa).

5.b. Analysing this case more into detail, one detects that many of the 2885 occurrences (maybe most of them) are due to the Catalan prestressing suffix *-ic* (*centre* ‘center’ ~ *cèntric* ‘central’; see, for instance, Mascaró, 2015).

Stops seem to be much more favored for oxytone and paroxytone words. [k] has a singular behavior contrasting with result number 1. [t] has the singularity of having occurrences in proparoxytone words.

3. Results

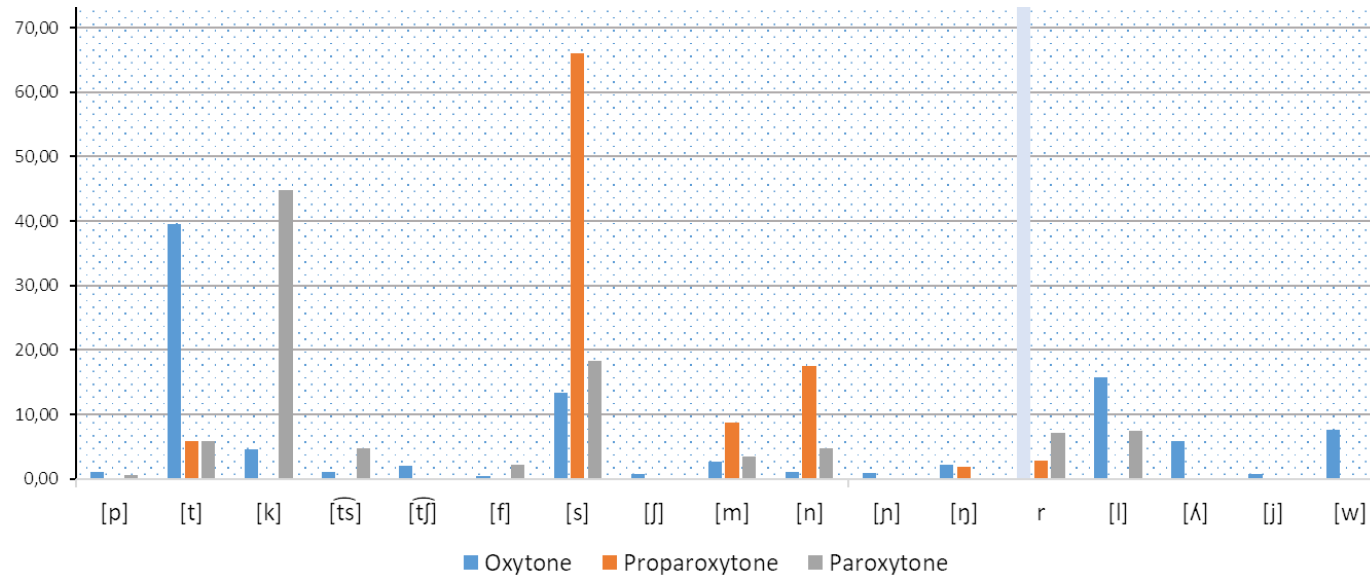


6. AFFRICATES AND FRICATIVES:

6.a. Affricates are by far less frequent than stops and they do not show occurrences for proparoxytone words.

6.b. [f] has no occurrences only in the case of proparoxytone words, as the affricate [ts].

3. Results



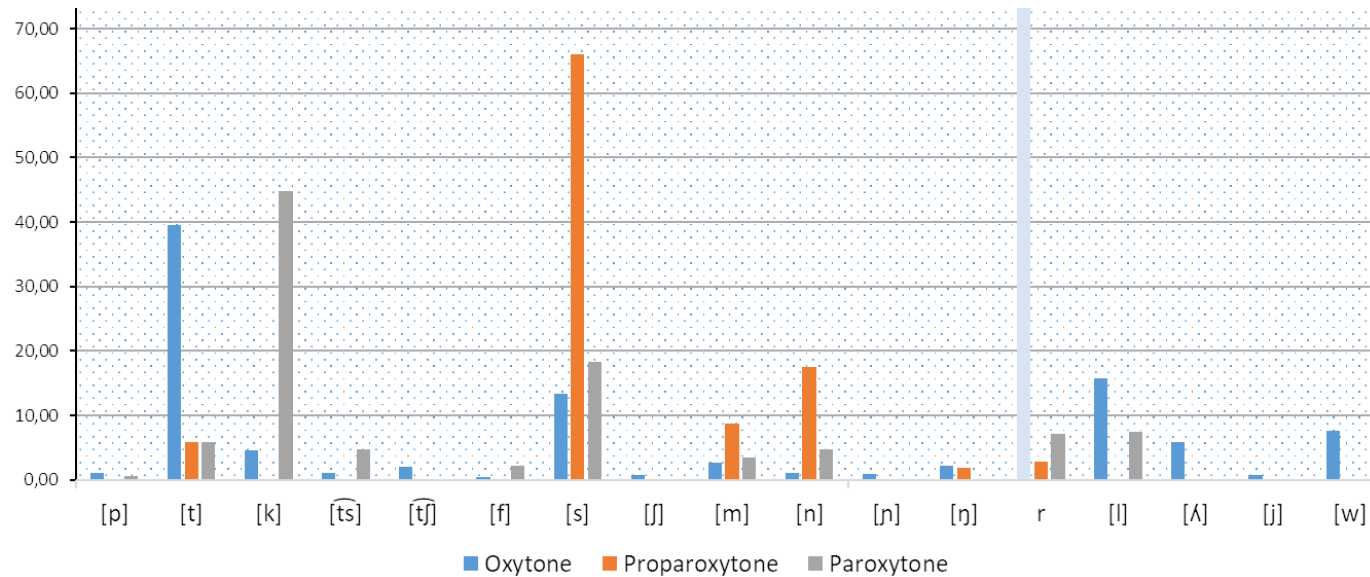
7. NASALS (and others):

7.a. Nasals are, among sonorants, the ones that display the highest frequencies in proparoxytone words.

7.b. Among sonorants, apart from the three nasals, [m], [n] and [ɲ], only /r/ has occurrences for the proparoxytone pattern.

7.c. In the general scope, also [t] and, with the highest value, [s] have occurrences regarding proparoxytones.

3. Results



8. LATERALS:

8.a. Laterals do not have any occurrence in proparoxytone words but they are quite frequent, as well as [w], for the oxytone case.

8.b. [l] is also a complex segment, as it has a secondary velar articulation.

4. Discussion

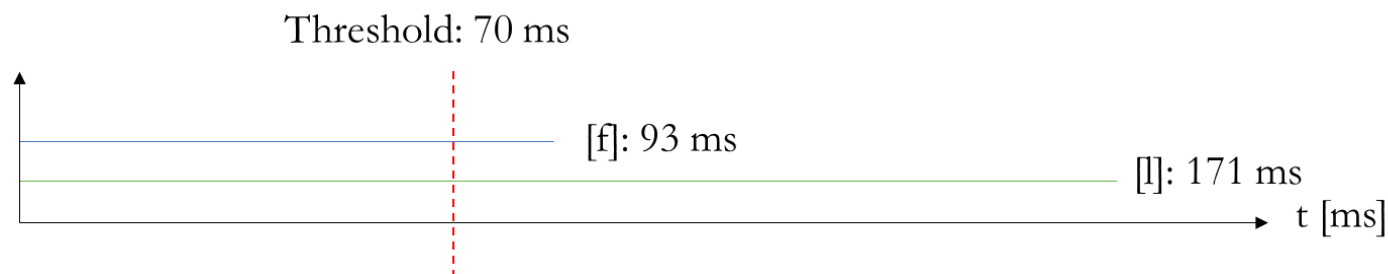
4.1. Preliminary definition of conditions

From a perceptibility point of view some factors have been pointed out as key factors (partially inspired by the main idea laying behind the P-map; Steriade, 2008):

Sonority

(Extended) continuance: laterals are not considered as continuants in Catalan (see Bonet & Lloret, 1998); I include nasals in this group as they do not interrupt the air flow through the nasal cavity and they can be prolonged as long as the breath lasts.

Short: word-final consonants must have the chance to be short and though easily identified and decoded. Consonants that word-finally have a duration below 70 ms have been considered as short segments (as this is the attested duration for final [t], [s] and [r], and [n] is shorter; Recasens, 2014).



4. Discussion

4.1. Preliminary definition of conditions

From the ease point of view (in the same sense than the Theory of effort by Kirchner and Boersma; Wheeler, 2005):

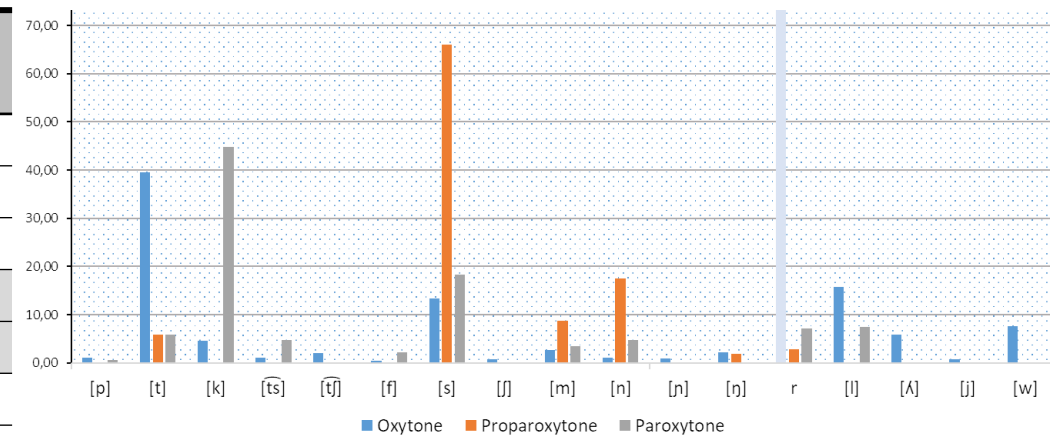
Coronal (non-palatal)

Non-complex and non-palatal: consonants and glides that are non palatal and that do not have a secondary place of articulation or that do not follow a sequence with two places of articulation.

4. Discussion

4.2. An attempt to an overall explanation

Segment	Coronal (non-palatal)	Sonorant	Continuant	Short	Non-complex and non-palatal (ease)
[p]					✓
[t]	✓			✓	✓
[k]					✓
[ts]	✓			?	
[tʃ]				?	
[f]			✓		✓
[s]	✓		✓	✓	✓
[ʃ]			✓		
[m]		✓	✓		✓
[n]	✓	✓	✓	✓	✓
[ɲ]		✓	✓	?	✓
r	✓	✓	✓	✓	✓
[l]	✓	✓			
[ʎ]		✓			
[j]		✓	✓	?	
[w]		✓	✓	?	



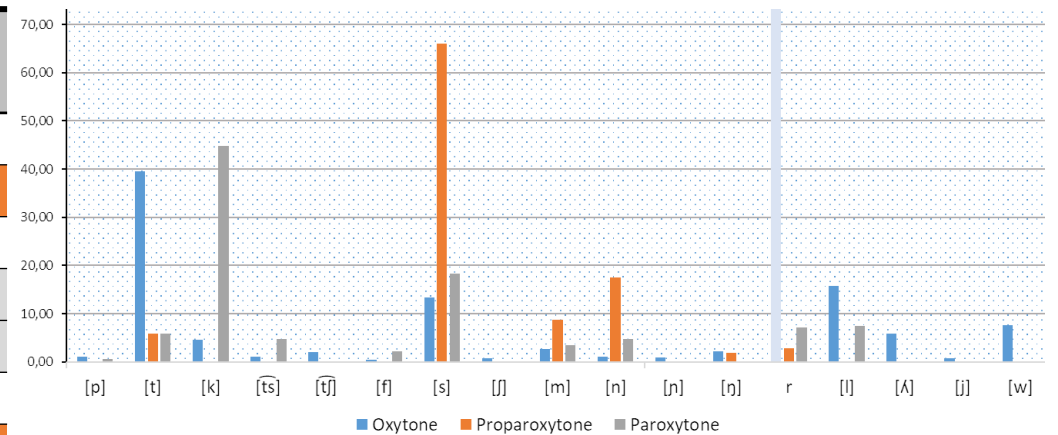
PROPAROXYTONES:

1. The word-final segments that have occurrences for this stress pattern are the ones meeting at least 3 conditions.

4. Discussion

4.2. An attempt to an overall explanation

Segment	Coronal (non-palatal)	Sonorant	Continuant	Short	Non-complex and non-palatal (ease)
[p]					✓
[t]	✓			✓	✓
[k]					✓
[ts]	✓			?	
[tʃ]				?	
[f]			✓		✓
[s]	✓		✓	✓	✓
[ʃ]			✓		
[m]		✓	✓		✓
[n]	✓	✓	✓	✓	✓
[ɲ]		✓	✓	?	✓
r	✓	✓	✓	✓	✓
[l]	✓	✓			
[ʎ]		✓			
[j]		✓	✓	?	
[w]		✓	✓	?	



PROPAROXYTONES:

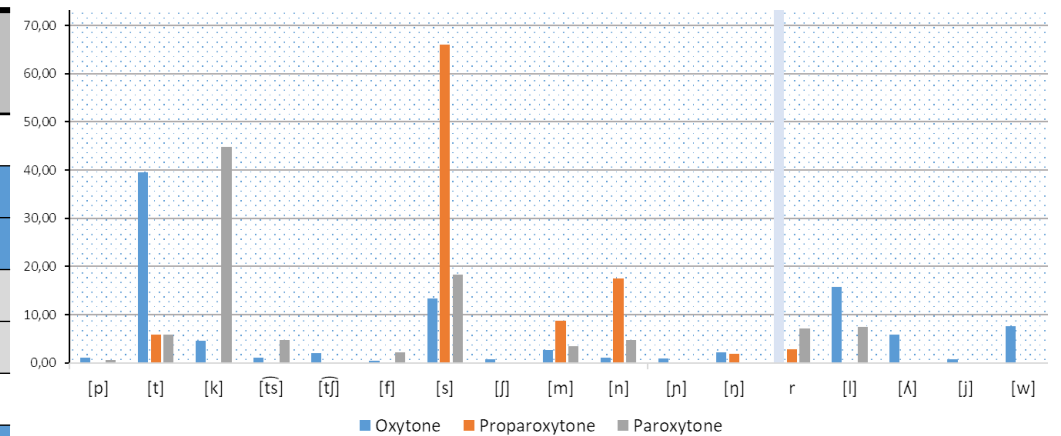
1. The word-final segments that have occurrences for this stress pattern are the ones meeting at least 3 conditions.

2. The only two segments that meet all conditions are [n] i /r/. It seems coherent with the $-n$ and $-r$ deletion processes if b_2 holds.

4. Discussion

4.2. An attempt to an overall explanation

Segment	Coronal (non-palatal)	Sonorant	Continuant	Short	Non-complex and non-palatal (ease)
[p]					✓
[t]	✓			✓	✓
[k]					✓
[ts]	✓			?	
[tʃ]				?	
[f]			✓		✓
[s]	✓		✓	✓	✓
[ʃ]			✓		
[m]		✓	✓		✓
[n]	✓	✓	✓	✓	✓
[ɲ]		✓	✓	?	✓
r	✓	✓	✓	✓	✓
[l]	✓	✓			
[ʎ]		✓			
[j]		✓	✓	?	
[w]		✓	✓	?	



OXYTONES:

1. If a segment is sonorant, it has to be of highest sonority (except for [j]).

(9) Pons-Moll (2008):

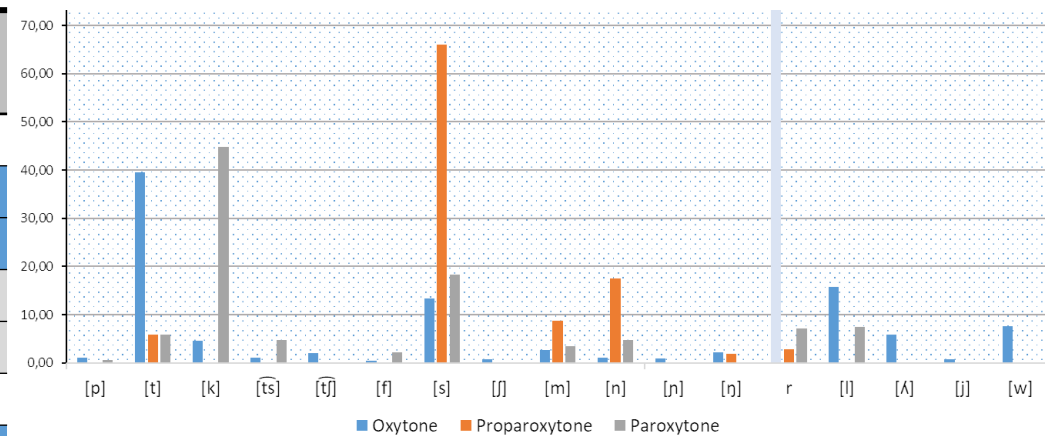
Classical scale of sonority $\rightarrow r, r > l > n$

Proposed scale of sonority $\rightarrow r > l > r > n$

4. Discussion

4.2. An attempt to an overall explanation

Segment	Coronal (non-palatal)	Sonorant	Continuant	Short	Non-complex and non-palatal (ease)
[p]					✓
[t]	✓			✓	✓
[k]					✓
[ts]	✓			?	
[tʃ]				?	
[f]			✓		✓
[s]	✓		✓	✓	✓
[ʃ]			✓		
[m]		✓	✓		✓
[n]	✓	✓	✓	✓	✓
[ɲ]		✓	✓	?	✓
r	✓	✓	✓	✓	✓
[l]	✓	✓			
[ʎ]		✓			
[j]		✓	✓	?	
[w]		✓	✓	?	



OXYTONES:

2. If a segment is obstruent, it has to be non-complex and non-palatal, and short ([k] has not been marked as short but it is shorter than [p] and [f]).

Results 1 and 2 can be coherent with final *r* and *n* deletion and with final cluster reduction.

5. Final remarks

- Some of the results show a relatively high degree of inner coherence (for instance, no palatal segments are found as word-final for paroxytone and proparoxytone words). → These results are not merely due to an accident (diachrony, etc.). $\Rightarrow b_1$ holds to a large extent.
- Point *i)* of b_2 also holds to a large extent.
- Point *ii)* of b_2 is just true for [n], [m] i [s].
- An experiment with novel words (wug-test) would be certainly of high interest for clarifying which of the found tendencies would hold.

6. References

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Merci beaucoup!

Questions?

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