Catalan (im)possible nativizations in the light of Weighted Scalar Constraints*

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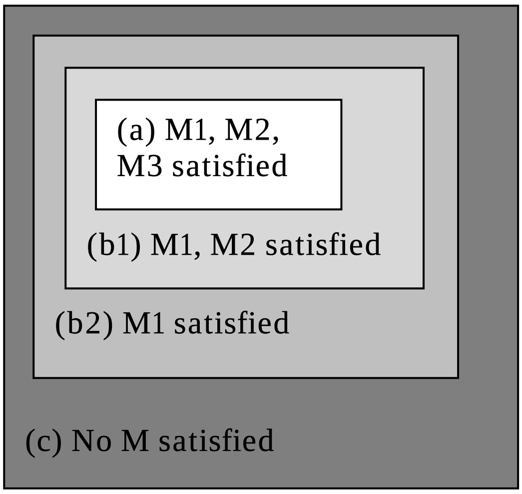
1. INTRODUCTION AND GOALS

- Loanwords can comply with the markedness constraints satisfied by native words, but usually they comply only with a subset of these markedness constraints, and, in many cases, with none.

- This situation brings about a nested core-periphery structure of the lexicon, with different strata (Itô & Mester 1999, 2008 / 2009): a. the *core stratum*, in which loanwords behave as native words and satisfy all markedness constraints (*nativized loanwords*) (1a); b. *the intermediate strata*, in which loanwords satisfy only a subset of the markedness constraints active in the core strata (*partially nativized loanwords*) (1b1, 1b2); c. the *peripheral stratum*, in which loanwords do not satisfy any of the markedness constraints active in the previous strata (*non-nativized loanwords*) (1c).

(1) Core-periphery structure of the lexicon (Itô & Mester 1999, 2008 / 2009)



- In Itô & Mester's model, the differences according to each of these strata are explained by the variable position of a block of faithfulness constraints F1, F2, F3..., to which lexical items in each stratum are indexed, with respect to a language-particular fixed hierarchy of markedness constraints (M1 >> M2 >> M3).

* Vlad Martin-Diaconescu has taken care of the the treatment of the data in Excel and Python (§ 3), and did the calculations of the weights depending on the scaling factor variable in Excel (§ 4). This research is supported by the Catalan Government (2014SGR918) and by the project FFI2016-76245-C3-3-P.

(2) Differences across strata

F1 (c. non-nativized loanwords)
M1
F2 (b2. partially nativized loanwords)
M2
F3 (b1. partially nativized loanwords)
M3
F4 (a. nativized loanwords)

- Such a structure gives rise to asymmetrical implicational patterns in the adaptation of loanwords.

  "Structures [...] are built out of a network of implicational relations involving lexical items and phonological constraints of the following kind: items that are subject to constraint *A* are also always subject to constraint *B*, but not all items subject to *B* are also subject to *A*." (Itô & Mester 2008 / 2009: p. 554).

- In this talk we deal with two cases involving implicational patterns of this sort in the adaptation of loanwords in Catalan (see Pons-Moll 2015).

- The purpose of the talk is to present the results of two surveys supporting quantitatively these kinds of patterns and to attempt a formalization of them under the *Weighted Scalar Constraints* version of *Harmonic Grammar*, following the recent proposals by Hsu & Jesney (2017, 2018).

2. Data

2.1. Word-final /n/ deletion (ND) and vowel reduction (VR)

Word-final /n/ deletion and vowel reduction are general processes in the native lexicon of Catalan.

(3) ND (Mascaró 1976, Bonet & Lloret 1998)

pla[n]s ~ pla[n]íssim ~ pla[∅]	'flat.PL' ~ flat.SUPERL' ~ 'flat.SG'
cosi[n]s ~ cosi[n]et ~ cosí[∅]	'cousin.PL' ~ 'cousin.DIM' ~ 'cousin.SG'

(4) VR (Mascaró 1976, Bonet & Lloret 1998)

c[á]sa ~ c[ə]seta	'house.SG' ~ 'house.DIM'
t[έ]rra ~ t[ə]rrestre	'earth.SG' ~ 'terrestrial'
f[é]ra ~ f[ə]roç	'beast.SG' ~ 'fierce'
p[ɔ́]rta ~ p[u]rtal	'door.SG' ~ 'hallway'
p[ó]ma~ p[u]mera	'apple.SG' ~ 'apple tree'

2.2. Underapplication of ND and VR

- These two processes, though, tend to underapply in loanwords.

(5) Underapplication of ND in loanwords (Pons-Moll *et. al* 2019)

diva[n]	taliba[n]	Pakista[n]
futo[n]	catipé[n]	Afganista[n]
canca[n]	mato[n]	Suda[n]
xama[n]	canto[n]	Vuitto[n]
catamara[n]	pasto[n]	Nissa[n]

(6) Underapplication of VR in loanwords (Mascaró 2002, Cabré 2009, Pons-Moll 2012, Pons-Moll *et. al* 2019)

cutr[e]	Goog[e]l	m[o]jit[o]
gor[e]	pilat[e]s	pest[o]
fly[e]r	típ[e]x	jud[o]
gadg[e]t	Kleen[e]x	sad[o]
hípst[e]r	ram[e]n	cron[o]
màst[e]r	youtub[e]r	tac[o]
cút[e]r	t[e]mpura	parkins[o]n
blíst[e]r	s[e]rotonina	gastr[o]bar
Twitt[e]r	c[o]ntàin[e]r	c[o]llage

Interestingly enough, loans susceptible to undergo both processes show a consistent behavior in which underapplication of both processes is the most common solution (*t*[o]*b*[o]*ga*[n]), followed closely by just underapplication of ND (*t*[u]*b*[u]*ga*[n]), followed by far by application of both processes (*t*[u]*b*[u]*ga*[∅]), and in which underapplication of VR and application of ND (**t*[o]*b*[o]*ga*[∅]) is **unattested**.

(7) Implicational relations between ND and VR, and tendencies

↓	Most common	Underapplication of ND and VR	*t*[o]*b*[o]*ga*[n]	PatA1
	Less common	Underapplication of ND and application of VR	*t*[u]*b*[u]*ga*[n]	PatA2
	Least common	Normal application of ND and VR	*t*[u]*b*[u]*ga*[∅]	PatA3
	Unattested (impossible nativization)	Underapplication of VR and application of ND	**t*[o]*b*[o]*ga*[∅]	PatA4

- Underapplication of both processes can co-occur.
- Application of both processes can also co-occur.
- Application of VR and underapplication of ND can also co-occur.
- Underapplication of VR and application of ND cannot co-occur.

If ND applies so does VR, but not viceversa.
If VR is blocked so it is ND, but not viceversa.

2.3. Mid vowel laxing (VL) and VR

In Catalan, there is a notable tendency to prefer [–ATR] mid vowels in stressed position ([ɛ́], [ɔ́]), over the [+ATR] counterparts ([é], [ó]), which is manifested through a wider distribution of the former across the Catalan lexicon (Mascaró 2002) and in loanword adaptation (cf. universal ranking for vowels in stressed position).

(8) Preference for [–ATR] mid vowels in loanword adaptation (Mascaró 2002, Pons-Moll *et al.* 2019)

top t[ɛ́]n	postd[ɔ́]c
tr[ɛ́]ndy	p[ɔ́]st-it
tr[ɛ́]kking	l[ɔ́]ft
s[ɛ́]lfie	Power P[ɔ́]int
l[ɛ́]ggings	
gill[ɛ́]tte	

This tendency, which we interpret as a process of sonority-driven vowel laxing (VL) in stressed position of an underlying /e/ or /o/ also interacts with VR in loanwords (see Pons-Moll 2015).

In these cases, the most common solution is underapplication of both processes ([é]*ur*[o], *p*[ó]*st*[e]*r*),[2] followed by far by the application of both processes ([ɛ́]*ur*[u], *p*[ɔ́]*st*[ə]*r*); on the contrary, mixed patterns with underapplication of VL and application of VR ([é]*ur*[u], *p*[ó]*st*[ə]*r*), or with application of VL and underapplication of VR ([ɛ́]*ur*[o], *p*[ɔ́]*st*[e]*r*) are generally avoided, although they can be found sporadically in some specific words (Cabré 2009).

(9) Implicational relations between VL and VR, and tendencies

↓	Most common	Underapplication of VL and VR	[é]*ur*[o], *p*[ó]*st*[e]*r*	PatB1
	Less common	Application of VL and VR	[ɛ́]*ur*[u], *p*[ɔ́]*st*[ə]*r*	PatB2
↓	Very infrequent	Application of VR and underapplication of VL	?[é]*ur*[u], ?*p*[ó]*st*[ə]*r*	PatB3
	Unattested (impossible nativization)	Application of VL and underapplication of VR	*[ɛ́]*ur*[o], **p*[ɔ́]*st*[e]*r*	PatB4

- Underapplication of both processes can co-occur.
- Application of both processes can also co-occur.
- Application of VR and underapplication of VL can co-occur, at a low frequency.
- Application of VL and underapplication of VR cannot co-occur.

If VL applies so does VR, and viceversa.

[2] See Bonet *et al.* (2007) and Cabré (2009) for an alternative interpretation of this pattern based on vowel harmony.

3. Experimental survey

3.1. Picture-naming production task

- 16 loanwords with word-final /n/ after a stressed V + unstressed vowels (*t**o**bog**a**n*; *c**a**im**a**n*)
- 6 loanwords containing a stressed mid vowel + unstressed mid vowels (***e**ur**o**, p**ò**st**e**r*)
- 31 Barcelona Catalan speakers aged 18-23 during the period 2017-2018
- Most: students of the BA degree Comunicació i Indústries Culturals
- The test was fulfilled with loanwords with just one of the relevant structures (e.g. *diva**n***, *màst**e**r*, etc.), and was presented in a randomized way.

(10) Results of the picture-naming production task

a. Patterns A

Patterns A	% of answers
a. PATA1 t[o]b[o]ga[n]	65,2%
b. PATA2 t[u]b[u]ga[n]	25%
c. PATA3 t[u]b[u]ga[∅]	9,8%
d. PATA4 t[o]b[o]ga[∅]	0%

b. Patterns B

Patterns B	% of answers
a. PATB1 p[ó]st[e]r	98,9%
b. PATB2 p[ɔ́]st[ə]r	1,1%
c. PATB3 p[ó]st[ə]r	0%
d. PATB4 p[ɔ́]st[e]r	0%

3.2. Judgment test inquiring the naturality of the four possible patterns

- Presented in an audio file via a Google form available on Internet
- The same 16+6 loanwords (22 x 4 patterns = 88 items)
- Patterns valued along a Likert scale of 1-5 (very unnatural, quite unnatural, natural enough, quite natural, very natural).
- The test was fulfilled with loanwords with just one of the relevant structures (e.g. *diva**n***, *màst**e**r*, etc.), and was presented in a randomized way.

(11) Results of the judgment tests

a. Patterns A

PatA1 t[o]b[o]ga[n]	% of answers
Very natural	47,6%
Quite natural	17,3%
Natural enough	14,1%
Quite unnatural	15,1%
Very unnatural	5,8%

PatA2 t[u]b[u]ga[n]	% of answers
Very natural	35,5%
Quite natural	25,6%
Natural enough	17,7%
Quite unnatural	15,7%
Very unnatural	5,4%

PatA3 t[u]b[u]ga[∅]	% of answers
Very natural	12,1%
Quite natural	16,0%
Natural enough	16,8%
Quite unnatural	27,1%
Very unnatural	28,1%

PatA4 t[o]b[o]ga[∅]	% of answers
Very natural	10,9%
Quite natural	15,1%
Natural enough	15,9%
Quite unnatural	25,2%
Very unnatural	32,9%

a. Patterns B

PatB1 p[ó]st[e]r	% of answers
Very natural	55,9%
Quite natural	18,3%
Natural enough	16,1%
Quite unnatural	7,0%
Very unnatural	2,7%

PatB2 p[ɔ́]st[ə]r	% of answers
Very natural	12,4%
Quite natural	16,7%
Natural enough	16,7%
Quite unnatural	33,3%
Very unnatural	21,0%

PatB3 p[ó]st[ə]r	% of answers
Very natural	11,8%
Quite natural	19.9%
Natural enough	23,7%
Quite unnatural	24,7%
Very unnatural	19,9%

PatB4 p[ɔ́]st[e]r	% of answers
Very natural	8,1%
Quite natural	12,4%
Natural enough	23,7%
Quite unnatural	30,6%
Very unnatural	25,3%

About these results, which generally fit the gradations exposed in §2, we should comment the following:

(a) Mixed patterns B3 and B4 received a high score for the neutral category "natural enough" (23,7% in both cases), which reveals the hesitation of speakers in front of this type of realizations.

(b) We attribute the low scores for PatA3 *t*[u]*b*[u]*ga*[∅] and PatB2 [ɛ́]*ur*[u] (*i.e.* nativized patterns), both in the production and in the judgment tests, to the age of the inquired speakers.

(c) No significant differences were detected in patterns A with respect to the quality of the unstressed vowels (*i.e.* low /a/, as in *or*[a]*ngutan*, *vs*. mid /e/, /o/, as in [o]*rangutan*) (see the Appendix).

(d) Results are more categorical in the production test than in the judgment test, where there is more variability, and this is expected.

4. Analysis with weighted scalar constraints

- Implicational patterns of the sort exemplified in the previous sections are predicted to exist in a model with weighted constraints as in Harmonic Grammar (Smolensky & Legendre 2006), and more specifically with weighted scalar constraints.

4.1. Harmonic Grammar quick overview

(12) *Illustrated through VR*

/mez+ɛt/	*e,o$_{\sigma\text{UNSTR}}$ w = 5.5	IDENT-V$_{\text{UNSTR}}$ w = 2	H
a. [mezɛ́t]	–1		–5.5 (–1x5.5)
☞ b. [məzɛ́t]		–1	–2 (–1x2)

4.2. Weighted Scalar constraints applied to strata

- The penalty associated to the violation of a markedness or a faithfulness constraint can be scaled in the following way (Hsu & Jesney 2018: 255):

(13) Scaled Faithfulness
Given a basic constraint weight w,
a scaling factor s, and a distance from the core d,
For each input structure that is not realized faithfully in the output,
Assign a weighted violation score of $\boldsymbol{w}$ **x** $\boldsymbol{s(d)}$

(14) *Scaled Markedness*
Given a basic constraint weight w,
a scaling factor s, and a distance from the core d,
For each instance of the marked structure
Assign a weighted violation score of $\boldsymbol{w}$ **x** $\boldsymbol{s(d)}$

- In the analysis presented here, which follows Hsu & Jesney (2017, 2018), faithfulness violations are scaled according to the definition in (13).

4.2.1. Patterns A (ND & VR)

- For the cases belonging to Pattern A, we assume a structure made of three lexical strata in the Catalan grammar (15, 16, 17):

(a) the core one (for those speakers [and loans] with application of VR and ND: t[u]b[u]ga[∅]);
(b) the intermediate one (for those speakers [and loans] with just application of VR: t[u]b[u]ga[n]);
(c) the peripheral one (for those speakers [and loans] with underapplication of both VR and ND: t[o]b[o]ga[n]).

- The two M constraints involved are *e,o$_{\sigma\mathrm{UNSTR}}$ (against unstressed high-mid vowels) and *n]$_{\mathrm{WD}}$ (against word-final posttonic –*n*), which receive respectively a stable weight of 5.5 and 2.5 across all three possible strata. The highest weight for *e,o$_{\sigma\mathrm{UNSTR}}$ in relation to *n]$_{\mathrm{WD}}$ expresses the higher productivity of vowel reduction in relation to word-final –*n* deletion in Catalan. (For the constraint definitions, see 17).

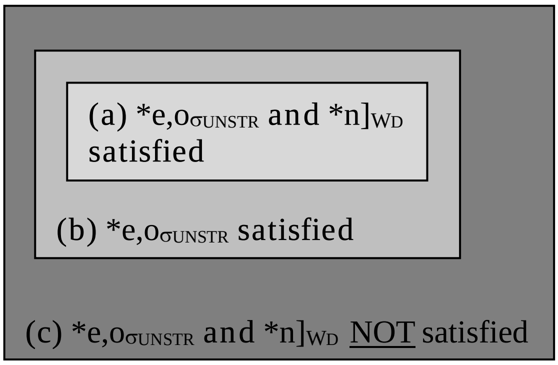
- These two markedness constraints interact with the faithfulness constraints IDENT-V$_{\mathrm{UNSTR}}$ (against featural changes for unstressed vowels) and MAX-IO (against deletion), which receive respectively a stable weight of 2 and 1.5 across all three possible strata.

- Scaled faithfulness ensures that the weight values for the faithfulness constraints increase from the core stratum (in which s = 1), towards the intermediate stratum (which starts with s = 1.8), until reaching the **peripheral stratum** (which starts with s = 2.8).

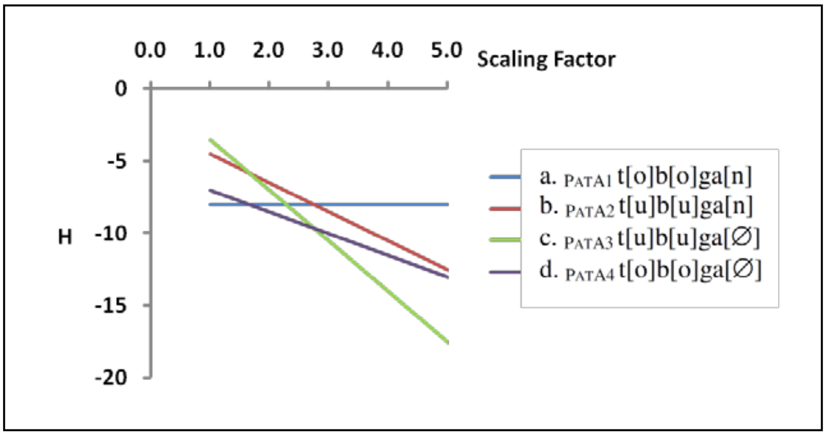
- **Faithfulness values** acquire, thus, a **higher relevance** the closer to the peripheral strata.

- Given the constraint weights, no scaling factor can yield the impossible nativization PatA4 *t[o]b[o]ga[∅] (as the strata cross overpoints in 16 show).

(15) Core-periphery grammar



(16) Strata cross overpoints for Patterns A



(17) HG with *weighted scalar constraints* tableau for Patterns A

i. /tobogan/	*e,o$_{\sigma\text{UNSTR}}$ w = 5.5	*n]$_{\text{WD}}$ w = 2.5	Ident-V$_{\text{UNSTR}}$ w = 2	Max-IO w = 1.5	H	*Scaling factor for F*	*Strata*
a. [toβoɣán]	–1	–1			–8 (–5.5)+(–2.5)		
b. [tuβuɣán]		–1	–1		–4.5 (–2.5)+(–2)	1	*Core stratum*
☞c. [tuβuɣá∅]			–1	–1	–3.5 (–2)+(–1.5)		
d. [toβoɣá∅]	–1			–1	–7 (–5.5)+(–1.5)		
ii. /tobogan/	*e,o$_{\sigma\text{UNSTR}}$ w = 5.5	*n]$_{\text{WD}}$ w = 2.5	Ident-V$_{\text{UNSTR}}$ w = 2	Max-IO w = 1.5	H	*Scaling factor for F*	
a. [toβoɣán]	–1	–1			–8 (–5.5)+(–2.5)		
☞ b. [tuβuɣán]		–1	–1		–6.1 (–2.5)+(–2x1.8)	1.8	*Intermediate stratum*
c. [tuβuɣá∅]			–1	–1	–6.3 (–2x1.8)+(–1.5x1.8)		
d. [toβoɣá∅]	–1			–1	–8.2 (–5.5)+(–1.5x1.8)		
iii. /tobogan/	*e,o$_{\sigma\text{UNSTR}}$ w = 5.5	*n]$_{\text{WD}}$ w = 2.5	Ident-V$_{\text{UNSTR}}$ w = 2	Max-IO w = 1.5	H	*Scaling factor for F*	
☞ a. [toβoɣán]	–1	–1			–8 (–5.5)+(–2.5)		
b. [tuβuɣán]		–1	–1		–8.1 (–2.5)+(–2x2.8)	2.8	*Peripheral stratum*
c. [tuβuɣá∅]			–1	–1	–9.8 (–2x2.8)+(–1.5x2.8)		
d. [toβoɣá∅]	–1		–1		–11.1 (5.5)+(–2x2.8)		

Constraint definitions:

- *n]$_{\text{WD}}$: Assign one violation for every nasal in word-final position and after a stressed V.
- *e,o$_{\sigma\text{UNSTR}}$: Assign one violation mark for every unstressed high-mid vowel.
- MAX-IO: Assign one violation mark for every segment in the input that has no correspondent in the output.
- IDENT-V$_{\text{UNST}}$: Assign one violation mark for every unstressed vowel in the output whose input correspondent has a different featural specification.

Tableau explanation:

- At the *core stratum* markedness constraints overweight faithfulness constraints, and this explains that the selected candidate is the one with the application of all "native" processes.

- At the *intermediate stratum*, the scaling factor of 1.8 is enough for the constraint MAX-IO to overweight the markedness constraint *n]$_{\text{WD}}$, with which it interacts, but not for the constraint IDENT-V$_{\text{UNSTR}}$ to overweight *e,o$_{\sigma\text{UNSTR}}$, and this explains the selection of the candidate with the mixed pattern (with vowel reduction but no word-final –*n* deletion).

- At the *peripheral stratum*, the scaling factor of 2.8 is high enough for both faithfulness constraints to overweight the markedness constraints with which they are in conflict.

4.2.2. Patterns B (VL & VR)

- For pattern B, we also assume a structure made of three lexical strata (18, 19):

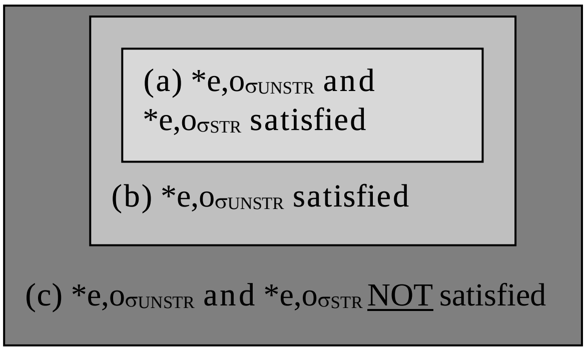
  (a) the core one (for speakers [and loans] with application of VR and VL: [ɛ́]*ur*[u], *p*[ɔ́]*st*[ə]*r*);
  (b) an intermediate one (for speakers [and loans] with application of VR but underapplication of VL: *p*[ó]*st*[ə]*r*), and
  (c) the peripheral one (for speakers [and loans] with underapplication of both VR and VL: [é]*ur*[o], *p*[ó]*st*[e]*r*).

- The two markedness constraints involved are *e,o$_{\sigma\mathrm{UNSTR}}$ and *e,o$_{\sigma\mathrm{STR}}$ (against stressed mid-high vowels) which receive both a stable weight of 5.5 across all possible strata.

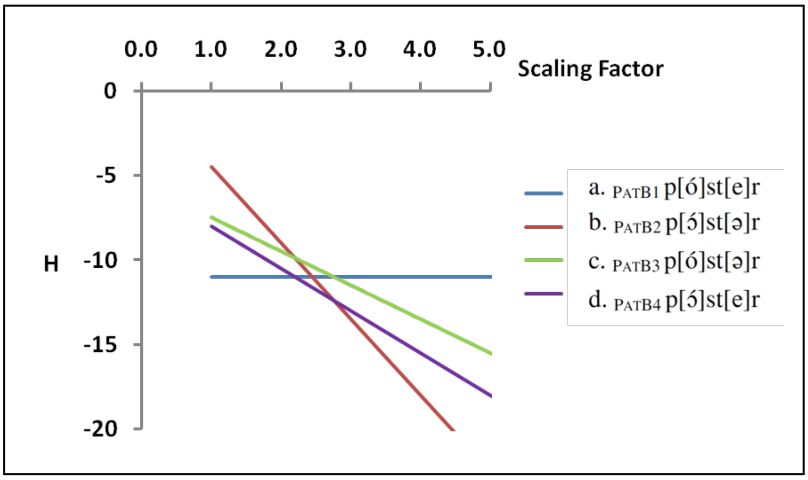
- In this case, the transition *scaling factors* from one strata to the other are 1, 2.3 and 2.8.

- Given the constraint weights, no scaling factor can yield the nativization PatB4 (*p[ɔ́]st[e]r), and a very small scaling factor for the intermediate stratum with PatB3 p[ó]st[ə]r) is predicted (see 19).

(18) Core-periphery grammar



(19) Strata cross overpoints for Patterns B



(19) HG with *weighted scalar constraints* tableau for Patterns B

i. /poster/	*e,o$_{\sigma\text{UNSTR}}$ w = 5.5	*e,o$_{\sigma\text{STR}}$ w = 5.5	IDENT-V$_{\text{STR}}$ w = 2,5	IDENT-V$_{\text{UNSTR}}$ w = 2	H	*Scaling factor for F*	*Strata*
a. [póster]	–1	–1			–11 (–5.5)+(–5.5)	1	*Core stratum*
☞ b. [pɔ́stər]			–1	–1	–4.5 (–2.5)+(–2)		
c. [pɔ́ster]	–1		–1		–8 (–5.5)+(–2.5)		
d. [póstər]		–1		–1	–7.5 (–5.5)+(–2)		
ii. /poster/	*e,o$_{\sigma\text{UNSTR}}$ w = 5.5	*e,o$_{\sigma\text{STR}}$ w = 5.5	IDENT-V$_{\text{STR}}$ w = 2,5	IDENT-V$_{\text{UNSTR}}$ w = 2		*Scaling factor for F*	
a. [póster]	–1	–1			–11 (–5.5)+(–5.5)	2.3	*Intermediate stratum*
b. [pɔ́stər]			–1	–1	–10.35 (–2.5x2.3)+(–2x2.3)		
c. [pɔ́ster]	–1		–1		–11.25 (–5.5)+(–2.5x2.3)		
☞ d. [póstər]		–1		–1	–10.1 (–5.5)+(–2x2.3)		
iii. /poster/	*e,o$_{\sigma\text{UNSTR}}$ w = 5.5	*e,o$_{\sigma\text{STR}}$ w = 5.5	IDENT-V$_{\text{STR}}$ w = 2,5	IDENT-V$_{\text{UNSTR}}$ w = 2	H	*Scaling factor for F*	
☞ a. [póster]	–1	–1			–11 (–5.5)+(–5.5)	2.8	*Peripheral stratum*
b. [pɔ́stər]			–1	–1	–12.6 (–2.5x2.8)+(–2x2.8)		
c. [pɔ́ster]	–1		–1		–12.5 (–5.5)+(–2.5x2.8)		
d. [póstər]		–1		–1	–11.1 (–5.5)+(–2x2.8)		

Constraint definitions:

- *e,o$_{\sigma\text{UNSTR}}$: Assign one violation mark for every unstressed high-mid vowel.
- *e,o$_{\sigma\text{STR}}$: Assign one violation mark for every stressed high-mid vowel.
- IDENT-V$_{\text{UNSTR}}$: Assign one violation mark for every unstressed vowel in the output whose input correspondent has a different featural specification.
- IDENT-V$_{\text{STR}}$: Assign one violation mark for every stressed vowel in the output whose input correspondent has a different featural specification.

Tableau explanation:

- At the *core stratum* markedness constraints overweight faithfulness constraints, and this explains that the selected candidate is the one with the application of all "native" processes.

- At the *intermediate stratum*, the scaling factor of 2.3 is enough for the constraint IDENT-V$_{\text{STR}}$ to overweight the markedness constraint *e,o$_{\sigma\text{STR}}$, with which it interacts, but not for the constraint IDENT-V$_{\text{UNSTR}}$ to overweight *e,o$_{\sigma\text{UNSTR}}$, and this explains the selection of the candidate with the mixed pattern (with vowel reduction but no vowel laxing).

- At the *peripheral stratum*, the scaling factor of 2.8 is high enough for both faithfulness constraints to overweight the markedness constraints with which they are in conflict.

5. Alternative analyses

5.1. Ranked constraint alternatives:

- Indexation of constraints that apply to individual lexical strata (Itô & Mester 1999)
- Separate co-phonologies associated with individual lexical strata (Inkelas & Zoll 2007)

5.2. These approaches predict all possible patterns, but nothing prevents *overgeneration* of the impossible ones: given inherent OT constraint reranking (across strata or across phonologies), nothing prevents rankings such as, for instance, $*n]_{WD}$ >> MAX-IO, IDENT-V_{UNST} >> IDENT-V_{UNST}, leading to *t[o]b[o]ga[∅].

5.3. This is why Itô & Mester 1999 resort to the metacondition "Ranking consistency":

"Let F and G be two types of I-O Faithfulness constraints [...], there are no strata A, B such that the relative rankings of the indexed versions of F and G are inconsistent with each other. If $F/_A$ >> $G/_A$ for some stratum A, then there is no stratum B such that $G/_B$ >> $F/_B$." (p. 27)

5.4. "There is an underlying unity behind the various stratal incarnations of a given faithfulness constraint" (p. 28)

5.5. Metaconditions are not necessary within Harmonic Grammar with Scalar Constraints, where the weight of the constraints, along with any scaling factor, gives no chance to the impossible patterns *t[o]b[o]ga[∅] and *p[ɔ́]st[e]r.

6. Conclusions

- In this talk we have explored phonological nativization patterns in Catalan loanwords, and we have shown, on the basis of a production and a judgment test, that the three processes under scrutiny (word-final –*n* deletion [ND], vowel reduction [VR], and vowel laxing of stressed mid-vowels [VL]) interact in an asymmetrical way.

- We have argued that these asymmetrical interactions can be straightforwardly formalized resorting to Harmonic Grammar with Scalar Weighted Constraints (Hsu & Jesney 2017, 2018), in which faithfulness constraints acquire an increasing relevance from the core to the peripheral strata and in which if a process fails to apply in a given stratum it will also fail to apply in more peripheral strata, but not the other way around.

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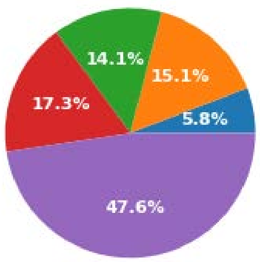
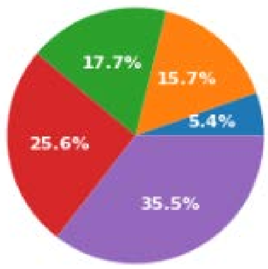
APPENDIX

a. *Judgment test. Patterns A (unstressed vowels considered altogether)*

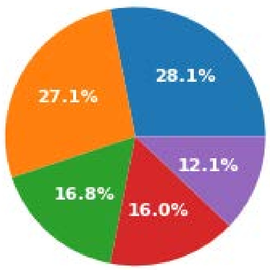
PATA1 t[o]b[o]ga[n]



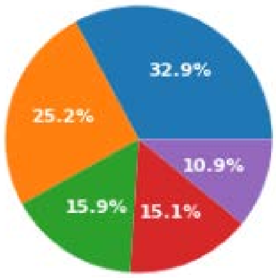
PATA2 t[u]b[u]ga[n]



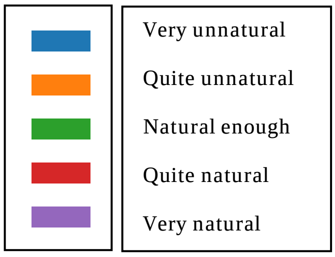
PATA3 t[u]b[u]ga[∅]



PATA4 t[o]b[o]ga[∅]

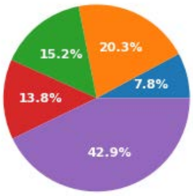
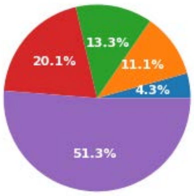


Legend



b. *Judgment test. Patterns A (distinguishing between unstressed* a *and* e /o*)*

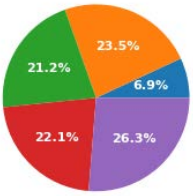
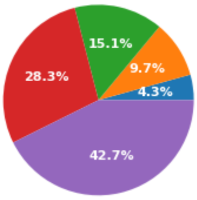
Pattern A1

a. A1.a: t[o]b[o]ga[n]	b. A1.b: c[a]ima[n]
	

Legend

Very unnatural
Quite unnatural
Natural enough
Quite natural
Very natural

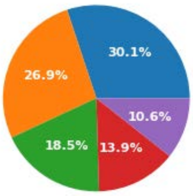
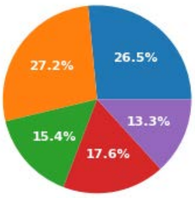
Pattern A2

a. A2.a: t[u]b[u]ga[n]	b. A2.b: c[ə]ima[n]
	

Legend

Very unnatural
Quite unnatural
Natural enough
Quite natural
Very natural

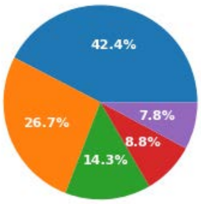
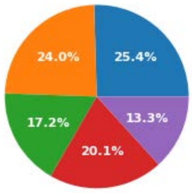
Pattern A3

a. A3.a: t[u]b[u]ga[∅]	b. A3.b: c[ə]ima[∅]
	

Legend

Very unnatural
Quite unnatural
Natural enough
Quite natural
Very natural

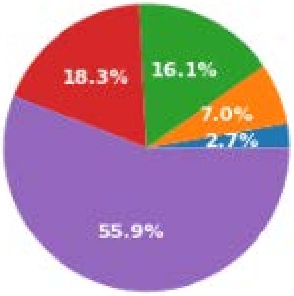
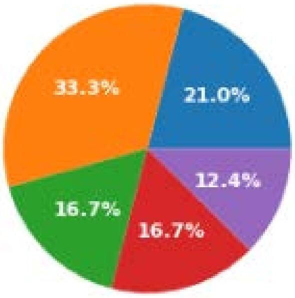
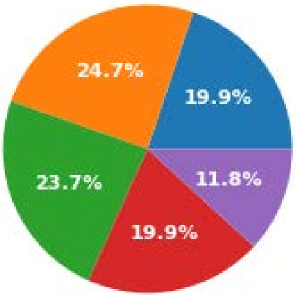
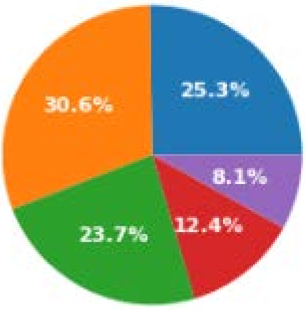
Pattern A4

a. A4.a: t[o]b[o]ga[∅]	b. A4.b: c[a]ima[∅]
	

Legend

- Very unnatural
- Quite unnatural
- Natural enough
- Quite natural
- Very natural

b. *Judgment test. Patterns B*

PatB1 p[ó]st[e]r	PatB2 p[ɔ́]st[ə]r
	
PatB3 p[ó]st[ə]r	PatB4 p[ɔ́]st[e]r
	

Legend

- Very unnatural
- Quite unnatural
- Natural enough
- Quite natural
- Very natural