

## **The phonological role of paradigms: The case of insular Catalan**

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### **Abstract**

This paper argues that the apparent exceptional behavior that is found in insular Catalan verbs is due to paradigm uniformity effects. The emphasis is on the failure of epenthesis in suffix-less forms that violate the sonority constraints, but a preliminary treatment of other interesting facts (final devoicing, gliding, dialectal variation) is also given. It is argued that the Optimal Paradigms model (McCarthy 2001), which establishes intra-paradigmatic symmetric correspondence relations, captures these facts through output-output faithfulness constraints that level paradigms unless they are ruled out by high-ranked markedness requirements. The differences between nouns and verbs are derived from the organization of their paradigms.

**Keywords:** paradigms, uniformity, epenthesis, markedness, under-application, Catalan

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### **1. *Introduction***

Over the years, many cases have been brought to light in which the regular phonology misapplies in certain morphological environments. This issue was dealt with by means of morphologically conditioned rules in standard generative phonology, while later approaches made use of cyclic organization. Yet another approach has been to resort to structural differences encoded in the representations, such as the display of phonologically null elements with special concomitant phonological effects. The formal problems associated with these approaches have been discussed at length in the literature, but this kind of morphology-phonology interaction remains as a challenge for alternative views.

In the parallel version of Optimality Theory, the notion of output-output correspondences is applicable to these cases. Within this view, there have been different proposals. The first one goes back to the notion of Metrical Consistency (“Every morpheme must be as metrically consistent as possible”, Burzio 1994:228). Burzio’s (1994 et seq.) work and Kenstowicz’s (1996, 2002) work on paradigmatic uniformity and contrast share the idea that morphologically related forms create a network of possible phonological influences, in symmetric relation. Another approach is Benua’s (1997) Transderivational Correspondence Theory, which is an asymmetric model. In this case, influences run in one direction only: from the morphologically simplex form to the derived complex form. More recently, McCarthy (2001) has put forward a new theory of surface resemblance, the Optimal Paradigms model, which evaluates forms that are related inflectionally in symmetric relation.

The goal of this paper is to show that the Optimal Paradigms model better captures the fact that in some languages nouns and verbs may differ phonologically in a way that is somehow connected with differences in their paradigms. I will illustrate this issue by reviewing the behavior of the inflected forms of insular Catalan with respect to

vowel insertion. Insular Catalan designates the varieties spoken in the Sardinian town of Alguer (Italy) and in the Balearic Islands.

## 2. *The data*

In insular Catalan, i.e. Alguerese (A) and Balearic (B), the first person singular present indicative (1sPRIND) has no inflectional affix, like the system found in Old Catalan. Other dialects show a vocalic suffix in these forms, which is *-[u]* in Central Catalan (C) (the variety spoken in the area of Barcelona) (1a). Null affixation is also seen in regular masculine (MASC) singular nouns, which do not have any overt marker in either insular or Central Catalan (1b).

(1)	A & B	C	
a.	[mát]	[má.tu]	“kill.1sPRIND”
	[pás]	[pá.su]	“pass.1sPRIND”
	[kánt]	[kán.tu]	“sing.1sPRIND”
b.	[dít]	[dít]	“finger.MASC”
	[ós]	[ós]	“bone.MASC”
	[kánt]	[kán]	“song.MASC”

Insular Catalan --and Old Catalan as well-- shows a rather puzzling fact for which no satisfactory explanation has been given so far: stems with final clusters that are ill-formed at the phonetic level are expected to undergo epenthesis, but 1sPRIND forms do not (2). In the same context, other words insert a vowel (underlined henceforth for expository reasons) (3). The examples in (a) show sonority increasing or plateau rhymes; the examples in (b) show [glide+liquid] rhymes, a type of rhyme that is always rejected in Catalan, except in these verbal forms, is always rejected. (See more examples in the *Appendix*.)

(2)	A	B	C	
a.	[an.sófr]	[ən.sófr]	[ən.só.fru]	“sulfurate.1sPRIND”
	[éutr]	[éutr]	[én.tru]	“enter.1sPRIND”
	[úmpr]	[úmpl]	[óm.plu]	“fill.1sPRIND” <sup>1</sup>
		[pát:]	[pák.tu]	“agree.1sPRIND” <sup>2</sup>
b.	[res.táwr]	[rəs.táwr]	[rəs.táw.ru]	“restore.1sPRIND”
	[an.táwl]	[ən.táwl]	[ən.táw.lu]	“sit down to table.1sPRIND”
(3) a.	[só.fra]	[só.frə]	[só.frə]	“sulfur.MASC”
	[sén.tra]	[sén.trə]	[sén.trə]	“center.MASC”
	[ám.pra]	[ám.plə]	[ám.plə]	“wide.MASC”
b.	[líw.ra]	[líw.rə]	[líw.rə]	“free.MASC”
	[ra.táw.la]	[rə.táw.lə]	[rə.táw.lə]	“altarpiece.MASC”

It is worth noting that Catalan shows vowel reduction in unstressed positions. Low and mid front vowels (a, e, ε) merge as [a] in Alguerese and as schwa in Balearic and Central Catalan. Non-low back vowels also merge: in Majorca Balearic mid back vowels (o, ɔ) merge as [o], while in other dialects all non-low back vowels (o, ɔ, u) merge as [u]. These unstressed systems are responsible for setting [a] or [ə] as the default epenthetic vowel in each dialect. There are also cross-dialectal differences in the lexical distribution of stressed vowels; however, these differences are irrelevant for the aim of this paper.

Table 1 provides the full paradigm of the present indicative tense for the sake of comparison. I have included the three conjugations, although most verbs belong to conjugation I (84%). In regular verbs, all other inflectional suffixes begin with a vowel except in a-thematic verbs for conjugation II, where the stem is followed by *-r/* in the infinitive, the future, and the conditional. These infinitives display regular epenthesis (e.g. /káv-r/: [káv.ra] in Alguerese, [káv.rə] in Balearic “fall.INF”).<sup>3</sup> As mentioned earlier, only in insular Catalan 1sPRIND forms do not have inflectional suffixes. In conjugations II and III, however, there are other forms without vocalic suffixes, which

may cause syllabification problems too. I will later return to this issue (non-vocalic suffixes appear in shaded cells in Table 1).

Table 1: Present indicative inflectional suffixes (s = singular, p = plural)

	CONJUGATION I			CONJUGATION II			CONJUGATION III		
	A	B	C	A	B	C	A	B	C
1s	∅	∅	[u]	∅	∅	[u]	∅	∅	[u]
2s	[as]	[əs]	[əs]	[s]	[s]	[s]	[is]	[s]	[s]
3s	[a]	[ə]	[ə]	∅	∅	∅	[i]	∅	∅
1p	[ém]	[ám]	[ém]	[ém]	[óm]/[ém]	[ém]	[ím]	[ím]	[ím]
2p	[áw]	[áw]	[éw]	[éw]	[ów]/[éw]	[éw]	[íw]	[íw]	[íw]
3p	[an]	[ən]	[ən]	[an]	[ən]	[ən]	[in]	[ən]	[ən]

Former analyses of the insular Catalan verbal system are based on the observation that the odd consonantal endings of 1sPRIND forms are possible onsets and thus their interpretation is related to this syllabic position (Mascaró 1983; Dols 1993, 2000; Dols & Wheeler 1996; Serra 1996). However, among other problems, onset analyses cannot offer a straightforward account for the overwhelming majority of coda phenomena that do take place in these verbal forms (for a review of previous analyses, see Lloret 2003).<sup>4</sup>

### 3. *The phonological evidence*

1sPRIND forms undergo many phonological phenomena that are associated with the coda position, summarized in Table 2. To begin with, they undergo word-final obstruent devoicing, a general phenomenon that applies to Catalan without exceptions (a).<sup>5</sup> Interestingly enough, /v/ undergoes lenition in some Majorca Balearic varieties but devoicing in all other insular varieties, as is the case in any other coda position (b). Both facts, though, are instances of coda phenomena. In addition to this, in Algerese 1sPRIND forms ending in /d/ show final devoicing, as expected, although in this dialect /d/ becomes a flap between vowels, that is, in the onset position (c).<sup>6</sup> Notice that the change to a flap would be expected if the final /d/ of the verb was interpreted as the

onset of an empty nucleus (in line with Dols' 1993 and Serra's 1996 analyses). Likewise, in Alguerese /l/ becomes a flap between vowels, but 1sPRIND forms maintain the lateral in this position (d). The examples in (e) show that in Alguerese the 1sPRIND forms that end in /ʎ/ or /ɲ/ lose their palatal character, as they do in any other coda position. Finally, the examples in (f) illustrate that the insular dialects that show /r/-tension in coda position also strengthen the rhotic in 1sPRIND.<sup>7</sup>

Table 2: Coda effects

	1sPRIND	OTHER CODA CONTEXTS
a. Word-final obstruent devoicing	acab [p] / acabar [b] “I/to finish” destorb [p] / destorbar [b] “I/to hinder” cobr [p] / cobrar [b] “I/to charge”	tub [p] / tubet [b] “tube / tube (diminutive)” verb [p] / verbal [b] “verb / verbal”
b. Coda v-lenition: /v/ → [w]	prov [w] / provar [v] “I/to prove” (Majorca B) but prov [f] / provar [v] (other insular dialects)	neu(s) [w] / nevar [v] “snow(s) / to snow” viu(s) [w] / vivim [v] “he, you / we live”
c. /d/ → [r]/ V__V (A) (/d/ → [t]/ __##)	enfad [t] / enfadar [r] “I/to get angry”	fred [t] / freda [r] “cold (masculine/feminine)”
d. /l/ → [r]/ V__V (A)	engul [l] / engolir [r] “I/to swallow”	sal [l] / saleta [r] “salt / salt (diminutive)”
e. Coda depalatalization: /ʎ, ɲ/ → [l, n] (A)	bull [l] / bullir [ʎ] “I/to boil” engany [n] / enganyar [ɲ] “I/to deceive”	ull(s) [l] / ullada [ʎ] “eye(s) / look” any(s) [n] / anyada [ɲ] “year(s) / annuity”
f. Coda r-tension: /r/ → [r] (A, Minorca B)	prepar [r] / preparar [r] “I/to prepare” cobr [r] / cobrar [r] “I/to charge”	carta [r] “letter” per [r] “by”

1sPRIND forms show two further phonological peculiarities that demand an explanation. First, the 1sPRIND forms that end in postvocalic /r/ and /n/ maintain these consonants (4a), while in other cases these two consonants undergo deletion word-finally after a stressed vowel (4b). This misapplication of the regular phonology, though, is not restricted to the first person: /r/ and /n/ are also maintained in the third suffix-less persons of conjugations II and III in Balearic and Central Catalan.<sup>8</sup>

- (4) a. *prepa*[r/r] “prepare.1sPRIND”    *prepa*[r]es “prepare.2sPRIND”  
       *mo*[r/r] “die.1sPRIND”            *mo*[r]im “die.1pPRIND”  
       *ma*[n] “order.1sPRIND”          *ma*[n]es “order.2sPRIND”
- b. *pape*[Ø] “paper”                    *pape*[r]era “wastepaper”  
       *prepara*[Ø] “prepare.INF”        *prepara*[r]-ho “prepare.INF-it”  
       *ma*[Ø] “hand”                        *ma*[n]ada “handful”
- c. *mo*[r/r] (B & C) “die.3sPRIND” (conjugation III)

Second, in Majorca Balearic there are no surface trills in the coda because /r/ is always realized as a flap in this position; however, the 1sPRIND forms of verbs with an underlying -/rr/ stem display final trills due to misapplication of epenthesis (5a). This exceptional phonotactic distribution of the trill --and misapplication of epenthesis-- also occurs in the second and third persons of the conjugation II verb *corr*- “run” (5b), which is the only existing -/rr/ verb of conjugations II and III which have vocalic-less suffixes in the present indicative singular series.<sup>9</sup>

- (5) a. *ente*[r] “bury.1sPRIND”        *ente*[r]-es “bury.2sPrInd”  
       *co*[r] “run.1sPRIND”            *co*[r]-em “run.1pPRIND”
- b. *co*[r]-s “run.2sPRIND”            *co*[r] “run.3sPRIND”

#### 4. *Analysis*

The explanation I propose for the previous data is based on the following insights. First, the consonantal endings of the finite verbal forms with vocalic-less suffixes are codas because they mainly undergo typical coda phenomena. Second, the exceptional phonological behavior found in these insular verbal forms is a paradigm-uniformity effect. These two facts can be accounted for in a general view of phonology in which surface forms may violate some syllabic constraints and in which paradigms are taken into account. These are good reasons for framing the analysis within Optimality Theory, in its version of Correspondence Theory.

Before analyzing the inflected forms, we will look at a couple of cases in which paradigms do not play any role. I will use the well-known constraints stated in (6).<sup>10</sup>

- (6) a. Input-Output (IO) faithfulness constraints:
- (IO-)DEP-V: A vowel in the O corresponds to a vowel in the I.
  - (IO-)MAX-C: A consonant in the I corresponds to a consonant in the O.
- b. Constraints on syllable well-formedness:
- \*P/C: Consonants may not associate with Peak (Nucleus) nodes.
  - S(ONORITY) S(EQUENCING): Complex onsets rise in sonority, and complex codas fall in sonority.

Since in the regular phonology inputs violating SONORITY SEQUENCING trigger epenthesis, and not deletion, nor syllabification of C as a nucleus, the constraint ranking at work is \*P/C, SS » MAX-C » DEP-V. Two further remarks are in order here. First, consonantal cluster reduction is not driven by the sonority constraint and thus will be ignored.<sup>11</sup> Second, in Catalan, as in many other languages, the sibilant *s* has a special status in codas and does not entail epenthesis when it violates the sonority constraint. A formal solution to this well-known problem is controversial and does not shed any light on the issue here, so for the sake of expository convenience I will consider that clusters with *s* do not violate the sonority constraint. (See Bonet & Lloret 2002a for discussion on the OCP cases, which do entail epenthesis.)

Tableaux (7) and (8) depict how this ranking works in the case of non-inflected words. Tableau (7) shows that, in insular Catalan, consonantal clusters that satisfy the sonority constraint are allowed. Tableau (8) shows that MAX-C is ranked above DEP-V, because the form undergoes vowel insertion when a sonority problem arises. Note that in this example Richness of the Base would provide two possible inputs: one with the final vowel and one without it. Lexicon Optimization would choose the input with the final vowel, because it gives a more harmonic mapping. But Minimal Redundancy favors the input with least underlying material, that is, the one without the final vowel, as has been assumed in (8) for the sake of illustration.



(7) *davant* “in front”

/dəvánt/ (B)	SS	MAX-C	DEP-V
☞ a. də.vánt			
b. də.ván		*!	
c. də.ván.tə			*!

(8) *entre* “between” (Minimal Redundancy)

/əntɾ/ (Majorca B)	*P/C	SS	MAX-C	DEP-V
a. əntɾ		*!		
b. ən.tɾ	*!			
c. ənt			*!	
☞ d. ən.tɾə				*

In a one-by-one analysis of the words, this ranking can explain the case of epenthesis in nouns for syllabification reasons (as in *centre* /séntɾ/: [sén.tɾə], *centre-s* /séntɾ-s/: [sén.tɾəs] “center(-s)”; cf. *cèntr-ic* “centr-al”), but obviously it cannot also explain the failure of epenthesis in the verbal morphology of insular Catalan (as in *entr* /əntɾ/: [əntɾ] “enter.1sPRIND” in Majorca Balearic). I am now in a position to show how under-application of epenthesis follows from paradigm effects.

I will first consider the possibility that misapplication of epenthesis is due to Paradigmatic Contrast (PC), which prohibits identical forms in a paradigm (Kenstowicz 2002). Under this view, put forward in Pons (2001) for Balearic Catalan, epenthesis could be blocked in 1sPRIND forms in order to avoid homophony between the first- and third-person singular of conjugation I verbs. As shown in (9), for example, in the paradigm of /kómptɾ/- “buy” the epenthesis first person would be homophonous with the third person, which displays the unstressed *-a* suffix.

(9)		A	B
	1sPRIND	<i>compr</i> [kómpr]	[kómpr]
		* <i>compre</i> *[kóm.pra]	*[kóm.prə]
	3sPRIND	<i>compr-a</i> [kóm.pra]	[kóm.prə]

There are several problems, though. To begin with, there are instances of homophony between first and third persons in tenses other than the present indicative (e.g. *compr-ava* “1s&3s.PAST”, *compr-aria* “1s&3s.CONDITIONAL”, *compr-i* “1s&3s.PRSUBJUNCTIVE”). This problem could be resolved by appealing to the fact that in these tenses the lexicon --and not the repair strategies provided by the phonology-- is responsible for the similarity; but there are other examples that cannot be handled in the same way. First, this approach cannot account for the facts of conjugation III in Alguerese (10a). Here, epenthesis in 1sPRIND does not apply, although PC is already satisfied because conjugation III verbs display the vocalic suffix *-i* in the third person. Second, in Balearic there are verbs of conjugations II and III where epenthesis fails to apply in all singular persons that do not have vocalic suffixes (10b). Note that in this set epenthesis in 1sPRIND could resolve the homophony issue, but epenthesis misapplies. Epenthesis under-application in the second persons (with alternative simplified realizations) is not related to the homophony issue either.<sup>12</sup> Third, paradigmatic contrast cannot explain the cases of non-deletion of final /r/ and /n/ in conjugation I verbs (10c). Here, under-application of consonant deletion in 1sPRIND cannot be attributed to homophony, because the third person displays a vocalic suffix. The same applies to under-application of final /r/ deletion in conjugation III verbs in Alguerese (10d). As for Balearic, the deletion of /r/ would in fact destroy the homophony between the first and third persons, but /r/ is also maintained (10e).

(10)	a. A:	“fill”	“open”	“run”
		1sPRIND [úmpr]	[ópr]	[kúr]
		3sPRIND [úm.pr-i]	[ó.br-i]	[kú.r-i]
	b. B:	1sPRIND [úmpl]	[ópr]	[kór]
		2sPRIND [úmpl-s]~[úm/n-s]	[ópr-s]~[ót-s]	[kór-s]
		3sPRIND [úmpl]	[ópr]	[kór]
	c. A & B:	“look at”	“order”	
		1sPRIND [mír/r]	[mán]	
		3sPRIND [mí.r-a/ə]	[má.n-a/ə]	
	d. A:	“die”		
		1sPRIND [mór]	3sPRIND [mó.r-i]	
	e. B:	1sPRIND [mór/r]	3sPRIND [mór/r]	

The overall question that remains to be answered is why the regular phonology misapplies precisely in these verbal forms. One way of answering this question is to resort to the Optimal Paradigms (OP) model (McCarthy 2001). OP is a model that incorporates elements of Metrical Consistency (Burzio 1994 et seq.), Uniform Exponence (Kenstowicz 1996), and Transderivational Correspondence Theory (Benua 1997). All these theories try to capture similarities among morphologically related words through output-output correspondences. However, as several scholars have noted, the problem is to what extent Correspondence Theory is able to impose restrictions on logically possible relations, especially within inflection, where it is not clear which form should be selected as the base for attraction. OP tries to solve this problem, and its central premises are the following (McCarthy 2001:5):

- a. Candidates consist of entire inflectional paradigms.
- b. Markedness and input-output faithfulness constraints evaluate all members of the candidate paradigm. The violation-marks incurred by each paradigm member are added to those incurred by all the members.
- c. The stem (shared lexeme) in each paradigm member is in correspondence relation  $\mathfrak{R}_{OP}$  with the stem in every other paradigm member. (That is, for every

candidate paradigm P there is a relation  $\mathfrak{R}_{OP}$  on  $P \times P$ .) There is no distinctive base --rather, every member of a paradigm is a base of sorts with respect to every other member.

In OP, stems standing in correspondence relation are in the output because OP establishes output-output correspondences. Thus, whether the input stem loses a segment or adds a segment in the phonetic form, the part of the surface inflected form that precedes the inflectional suffixes is identified as the base of paradigmatic relations. A similar distinction between input stems and prosodized output stems is proposed in Itô & Mester 1997 for composition and in Downing 1999 for truncation.

The OP model presupposes that nominal and verbal morphology may play a different role in determining their phonological shape because they inflect differently (McCarthy 2001:11). In languages like Catalan, where nominal inflection (with a maximum of four inflected forms) is quite limited when compared to verbal inflection (with forty-five inflected forms), this thesis suggests that paradigms have the potential to explain the phonological differences between nouns and verbs. This is the line of research that I will pursue next.

The OP approach adds a new type of constraints, those that govern the correspondence relation between the output stems of the inflected forms of a paradigm. The differences between output stems regarding the presence or absence of segments are governed by OP-MAX, which penalizes members of a paradigm with deleted segments, and OP-DEP, which penalizes members with inserted segments. For the purposes of this paper, the relevant constraint is OP-DEP-V, which controls alternations within the paradigm with respect to vowel insertion (the output stem in each paradigm member is in correspondence relation  $\mathfrak{R}_{OP}$  with the output stem in every other paradigm member with respect to DEP-V). In insular Catalan, the ranking of OP-DEP-V above SONORITY SEQUENCING is responsible for the blocking of epenthesis in 1sPRIND. Tableau (11) illustrates this point (for expository reasons, I only evaluate the present indicative; the evaluation of the full verbal paradigm would not alter the results). In (11), OP-DEP-V overrides the imperatives of the sonority constraint. It penalizes five times candidate (11c), with epenthesis, because the first member of this candidate paradigm (i.e. 1sPRIND) contains a final vowel in the stem, while the other five members do not.<sup>13</sup> Candidate (11d), which satisfies the sonority constraint as well as

OP-DEP-V by optimizing epenthesis, is discarded because of the highly ranked markedness constraint \*AA, which militates against certain hiatus. Although the syllabification of adjacent vowels is a complex issue in Catalan, for the purpose of this paper I consider that \*AA prohibits unstressed [ə.ə]/[a.a] sequences, which is categorical in insular Catalan. That is, in the paradigm candidate (11d), the members with [ə.ə] sequences violate \*AA but not the ones with [ə.á] sequences. Significantly, this provides evidence for a prediction made by OP, namely that there are no true cases of under-application but instances of over-application blocked by a highly ranked markedness constraint (in the tableaux below the right margin of the output stems standing in correspondence is marked with ‘]’).

(11) Basic ranking: \*P/C, \*AA, OP-DEP-V » SS » DEP-V

/əntɾ/ “enter (conjugation I)” (Majorca B)	*P/C	*AA	OP-DEP-V	SS	DEP-V
a. <əntɾ], ən.tr]əs, ən.tr]ə, ən.tr]ám, ən.tr]áw, ən.tr]ən>				*	
b. <əntɾ], ən.tr]əs, ən.tr]ə, ən.tr]ám, ən.tr]áw, ən.tr]ən>	*!				
c. <əntɾə], ən.tr]əs, ən.tr]ə, ən.tr]ám, ən.tr]áw, ən.tr]ən>			5*! (1x5)		*
d. <əntɾə], əntɾə].əs, əntɾə].ə, əntɾə].ám, əntɾə].áw, əntɾə].ən>		*,* *!			*,*,* *,*,*

Nouns, with a paradigm of two inflectional forms (<singular, plural>), undergo epenthesis because epenthesis levels the paradigms in the other direction (12). Here, candidate (12c), with epenthesis in both forms, satisfies OP-DEP-V because all members of the paradigm contain a vowel, where it is needed to satisfy the sonority constraint. Candidate (12c) wins although it violates twice the IO constraint DEP-V.

(12)

/séntɾ/ “center.MASC” (Balearic)	*P/C	OP-DEP-V	SS	DEP-V
a. <séntɾ], séntɾ]s>			*,*!	
b. <sén.tɾ], sén.tɾ]s>	*,*!			
☞ c. <sén.trə], sén.trə]s>				*,*

The nominal paradigms of adjectives raise further complications. Adjectives have a maximum of four inflected forms (<masculine singular, masculine plural, feminine singular, feminine plural>). The regular feminine suffix is *-a* ([ə] in Balearic, [a] in Alguerese). The full paradigm of an adjective like /áspr/ “rough” contains two masculine forms that cause syllabification problems (/áspr/, /áspr-s/) and two feminine forms without syllabification problems (/áspr-ə/, /áspr-ə-s/ in Balearic; /áspr-a/, /áspr-a-s/ in Alguerese). At this point, the analysis wrongly chooses candidate (13a) as the winner, instead of the grammatical candidate (13d), with epenthesis in the masculine forms (the grammatical candidate is indicated with the symbol ‘☞’ in the tableau).

(13)

/áspr/ “rough” (Balearic)	*P/C	*AA	OP-DEP-V	SS	DEP-V
☞ a. <aspr], áspr]s, ás.pr]ə, ás.pr]əs>				*,*	
b. <ás.pɾ], ás.pɾ]s, ás.pɾ]ə, ás.pɾ]əs>	*,*!				
c. <ás.prə], ás.prə]s, ás.prə]ə, ás.prə]əs>		*,*!			
☞ d. <ás.prə], ás.prə]s, ás.pɾ]ə, ás.pɾ]əs>			4*! (2x2)		*,*

One possible explanation is to relax the family of OP constraints by acknowledging specific subsets of the paradigms, e.g. <masculine singular, masculine plural> and <feminine singular, feminine plural>. This is in fact the solution put forward in Bonet et al. (2003). Although this would act as a solution and would not alter the results in verbal morphology, it needs sufficient independent empirical support. A more challenging proposal is to relate singular and plural forms with an output-output ‘asymmetric’ correspondence relation, BASE-Identity(singular→plural) (after Kenstowicz 1996, Benua 1997), based on the fact that plurals --but not other inflected forms-- are formed over free-standing output forms, i.e. the singular words. However,

the BASE must also contain a subset of the grammatical features of the derived form (Kager 1999:282), and, according to the traditional view, singular and plural forms are not compositionally related because of a conflict of inflectional features ([–plural] vs. [+plural]). Presumably, though, it is also possible to analyze singular forms (which never show overt inflectional markers) as being not marked for the number category; adopting this approach, there is a single feature for number, i.e. [plural]. The main issue here is morphological, and for this reason I will not discuss it further.

The role of OP is to homogenize the output members of a paradigm, but it was previously shown that several coda phenomena that apply to 1sPRIND destroy complete uniformity. The OP model predicts that the high ranking of certain markedness constraints should ensure that OP faithfulness is not always perfect. I will illustrate this point next with the case of final devoicing. The analysis of final devoicing in terms of positional markedness has been developed in the literature according to the ranking in (14) (after Itô & Mester 1998; see also Kager 1999).<sup>14</sup>

- (14) Final devoicing: \*VOICEDCODA » IDENT(voice) » \*VOICEDOBSTRUENT
- \*VOICEDCODA (\*VDCODA): Coda obstruents are voiceless.
  - (IO-)IDENT(voice): The specification for voice of an I must be preserved in its O correspondent.
  - \*VOICEDOBSTRUENT (\*VCDOB): Voiced obstruents are prohibited.

The tableau in (15) shows this ranking at work with the OP constraints in the case of nouns. For the purposes of this paper, the ranking of the IO constraint DEP-V above the IO constraint IDENT(voice) discards candidate (15b), with a possible epenthesis to satisfy OP-IDENT(voice), which controls alternations within the paradigm with respect to voicing.<sup>15</sup> Candidates (15a,c,d) are presented with additional stop place assimilation (resulting in an affricate), which is categorical in insular Catalan. The OP-IDENT(voice) constraint enforces the same voice feature in all paradigm members, but its effects are not visible due to its low ranking (see 16).<sup>16</sup>

(15)

/túb/ “tube” (masculine)	*VCD CODA	OP- DEP-V	SS	DEP-V	ID(vc)	OP- ID(vc)	*VCD OB
a. <túb], túd]s>	*,*!						*,*
b. <tú.bə], tú.bə]s>				*,*!			*,*
c. <túp], tút]s>					*,*		
d. <túb], tút]s>	*!				*	2* (1x1x2)	

In the verb, the high ranking of the markedness constraint \*VOICEDCODA ensures final devoicing in 1sPRIND (16). This is so because OP-IDENT(voice) is ranked low, at least below the IO constraint IDENT(voice). This can be seen by comparing the evaluations of candidates (16d) and (16e), which fare even with respect to the sonority constraint. The crucial domination of OP constraints reinforces the idea that “OP faithfulness constraints are true OT constraints, in the sense that they are ranked within a hierarchy and are violable under crucial domination ” (McCarthy 2001:32).

(16)

/kóbr/ (Majorca B) “charge” (conj I)	*VCD CODA	*AA	OP- DEP-V	SS	DEP-V	ID(vc)	OP- ID(vc)	*VCD OB
a. <kóbr], kó.br]əs, kó.br]ə, ko.br]ám, ko.br]áw, kó.br]ən>	*!			*				*,*,* *,*,*
b. <kó.brə], kó.br]əs, kó.br]ə, ko.br]ám, ko.br]áw, kó.br]ən>			5*! (1x5)		*			*,*,* *,*,*
c. <kó.brə], kó.brə].əs, kó.brə].ə, ko.brə].ám, ko.brə].áw, kó.brə].ən>		*,* *!			*,*,* *,*,*			*,*,* *,*,*
d. <kópr], kó.br]əs, kó.br]ə, ko.br]ám, ko.br]áw, kó.br]ən>				*		*	10* (1x5x2)	*,* *,*,*
e. <kópr], kó.pr]əs, kó.pr]ə, ko.pr]ám, ko.pr]áw, kó.pr]ən>				*		*,*,* *,*,*!		

Similar analyses can be provided for other coda effects, such as depalatalization in Alguerese (17a), r-tension in some insular dialects (17b), and /d/ and /l/ not turning



to [r] in Alguerese (17c). The examples in (17) are from Alguerese.

- (17) a. /búʎ/ “boil”: <búʎ], búʎ]is, búʎ]i ...>  
 b. /mír/ “look at”: <mír], mír]as, mír]a ...>  
 c. /púd/ “stink”: <púd], púr]is, púr]i ...>  
 /aŋgúl/ “swallow”: <aŋgúl], aŋgúr]is, aŋgúr]i ...>

Paradigmatic effects also play a crucial role in the exceptional behavior of the verbal forms that was previously mentioned with respect to word-final /n/ and /r/ (see 5), and the distribution of the trill (see 6). In general, consonant deletion and the distribution of rhotics entail further complications in the system of insular Catalan, and for this reason I leave these issues open to further research.

### 5. *OP and dialectal variation*

The analysis in this section illustrates a case of dialectal variation due to differences in the ranking of OP constraints. The example comes from stems ending in /v/. In Catalan, postvocalic voiced labial fricatives weaken in coda position (18a). In nominal inflection this change takes place straightforwardly (18b). However, in insular Catalan, verbs with a final /v/ stem show 1sPRIND forms either with the glide or with devoicing (18c). This is not free variation but is conditioned geographically and across time. Old people in Majorca show lenition; other insular varieties show final devoicing.<sup>17</sup>

- (18) a. Regular phonology /v/: [w] in postvocalic coda (A & B & C)  
       /név/: [néw] “snow”  
               [né.v-i] “snow.3sPRSUBJUNCTIVE”  
 b. Nominal morphology /v/: [w] in postvocalic coda (A & B & C)  
       /kráv/: [kráw], [kráw-s] (A) “nail(-s)”  
       /kláv/: [kláw], [kláw-s] (B & C) “nail(-s)”

- c. 1sPRIND in postvocalic coda: variation (A & B)
- /v/: [w] (old Majorca B)
 

/kláv/:	[kláw]	“knock in.1sPRIND”
	[klá.v-əs]	“knock in.2sPRIND”
/próv/:	[prów]	“prove.1sPRIND”
	[pró.v-əs]	“prove.2sPRIND”
  - /v/: [f] (A & other B)
 

/kráv/:	[kráf], [krá.v-as] (A)
/kláv/:	[kláf], [klá.v-əs] (B)
/próv/:	[próf], [pró.v-as] (A) / [pró.v-əs] (B)

The weakening of the voiced labial fricative into a glide involves a minimal change: a change in obstruency (19a). The other potential candidate to undergo this minimal change is the voiced palatal fricative, which could turn into the palatal glide (19b). But this does not happen because Catalan undergoes a process of word-final tension (turning the palatal fricative into an affricate), and in insular Catalan this is a lexicalized change (19c).<sup>18</sup>

- (19) a.  $v \rightarrow w$ :  $\pm$ sonorant                       $*f \rightarrow w$ :  $\pm$ sonorant,  $\pm$ voice
- b.  $*\mathfrak{z} \rightarrow j$ :  $\pm$ sonorant                       $*\mathfrak{f} \rightarrow j$ :  $\pm$ sonorant,  $\pm$ voice
- c.  $\mathfrak{z} \rightarrow \overline{d\mathfrak{z}} \rightarrow \overline{t\mathfrak{f}}$  (word-final tension and final devoicing)

It is no mere coincidence that lenition only applies to the voiced labial fricative, and the same applies to the different phonological behavior between nouns and verbs. Under the analysis proposed in this paper, lenition implies a violation of the faithfulness constraint IDENT(sonorant) and the differences between noun and verbs are due to differences in their paradigms.

I propose the ranking in (20) to account for the facts of old Majorca Balearic (i.e. the variety spoken by old people). In this variety, postvocalic  $-/v/$  undergoes coda lenition in both nouns and 1sPRIND, because the IO constraint IDENT(sonorant) is ranked below the IO constraint IDENT(voice) and the OP constraints OP-IDENT(voice)

and OP-IDENT(sonorant), which control alternations within the paradigm with respect to voicing and obstruency respectively. In this variety, the aforementioned OP-IDENT constraints do not play any decisive role due to their low ranking.

- (20) Old Majorca B: /név/: [néw] “snow”, /próv/: [prów] “prove.1sPRIND”  
 /báf/: [báf] “steam”, /rəzérv/: [rəzérf] “reserve.1sPRIND”  
 Ranking: ID(voice) » ID(sonorant), OP-ID(voice), OP-ID(sonorant)

Tableaux (21) and (22) illustrate the case of nouns. Tableau (21) shows that the IO constraint IDENT(voice) is ranked above the IO constraint IDENT(sonorant). Candidate (21b) wins because candidates (21a,e) violate \*VOICEDCODA and (21d,f) violate IO-IDENT(voice) (once again for reasons of expository convenience I consider that the addition of *s* to a well-formed coda does not provoke a sonority problem). Candidate (21c), with epenthesis, is eliminated because it violates IO-DEP-V.

(21)

/név/ “snow”	*VCD CODA	OP- DEP-V	SS	DEP-V	ID(vc)	ID(snt)	OP- ID(vc)	OP- ID(snt)
a. <név], név]s>	*,*!							
☞ b. <név], név]s>						*,*		
c. <né.və], né.və]s>				*,*!				
d. <néf], néf]s>					*,*!			
e. <név], név]s>	*!					*		2* (1x1x2)
f. <név], néf]s>					*!	*	2* (1x1x2)	2* (1x1x2)

For DEP-V » ID(vc), see (15); for OP-DEP-V » SS, see (11).

(22)

/báf/ “steam”	*VCD CODA	OP- DEP-V	SS	DEP-V	ID(vc)	ID(snt)	OP- ID(vc)	OP- ID(snt)
☞ a. <báf], báf]s>								
b. <báw], báw]s>					*,*!	*,*		

Tableau (23) illustrates a case of postvocalic *-/v/* verbs. Here, candidate (23b), with epenthesis in 1sPRIND, is discarded because it violates OP-DEP-V. Candidate (23d) shows one violation of the constraint \*VOICEDCODA. Candidate (23f), with over-application of lenition for the sake of paradigmatic uniformity, is eliminated because it violates the highly ranked markedness constraint \*ONSET/w (no onsets associated to the labial glide), which is a fact for insular Catalan where there are no exceptions. At this point, candidate (23c), with over-application of devoicing, and candidate (22a), with final devoicing in 1sPRIND, are discarded because they violate the IO faithfulness constraint IDENT(voice). Thus, candidate (23e), with lenition in 1sPRIND, wins.

(23)

/próv/ “prove” (conjugation I)	*ON/w	*VCD CODA	OP- DEP-V	SS	DEP- V	ID(vc)	ID(snt)	OP- ID(vc)	OP- ID(snt)
a. <próf], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ən>						*!		10* (1x5x2)	
b. <pró.və], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ən>			5*! (1x5)		*				
c. <próf], pró.f]əs, pró.f]ə, pro.f]ám, pro.f]áw, pró.f]ən>						*,*,* *,*,*!			
d. <próv], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ən>		*!							
e. <prów], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ən>							*		10* (1x5x2)
f. <prów], pró.w]əs, pró.w]ə, pro.w]ám, pro.w]áw, pró.w]ən>	*,* *,*,*!						*,*,* *,*,*!		

The tableau in (24) shows that verbs with post-consonantal *-/v/* undergo final devoicing in 1sPRIND, because candidate (24d), with lenition in 1sPRIND, violates the sonority constraint.

(24)

/rəzérv/ “reserve” (conjugation I)	*VCD CODA	OP- DEP-V	SS	DEP-V	ID(vc)	ID(snt)	OP- ID(vc)	OP- ID(snt)
a. <rə.zérv], rə.zér.v]əs, rə.zér.v]ə, rə.zər.v]ám, rə.zər.v]áw, rə.zér.v]ən>	*!							
☞ b. <rə.zérf], rə.zér.v]əs, rə.zér.v]ə, rə.zər.v]ám, rə.zər.v]áw, rə.zér.v]ən>					*		10* (1x5x2)	
c. <rə.zérvǫ], rə.zér.v]əs, rə.zér.v]ə, rə.zər.v]ám, rə.zər.v]áw, rə.zér.v]ən>		5*! (1x5)		*				
d. <rə.zérw], rə.zér.v]əs, rə.zér.v]ə, rə.zər.v]ám, rə.zər.v]áw, rə.zér.v]ən>			*!			*		10* (1x5x2)
e. <rə.zérf], rə.zér.f]əs, rə.zér.f]ə, rə.zər.f]ám, rə.zər.f]áw, rə.zér.f]ən>					*,*,* ,, , *,*,*! ,, ,			

For the varieties in (25), with devoicing in 1sPRIND, I propose to re-rank OP-IDENT(sonorant) above the IO constraint IDENT(voice) and, crucially, above the IO constraint IDENT(sonorant). What emerges from this analysis is that OP constraints do not have to preserve the ranking of their corresponding IO faithfulness constraints.

(25) A & other B: /név/: [néw]      /báf/: [báf]  
/próv/: [próf]      /rəzérv/: [rəzérf]

Ranking: OP-ID(sonorant) » ID(voice) » ID(sonorant), OP-ID(voice)

The ranking of OP-IDENT(sonorant) above the IO constraint IDENT(sonorant) does not change the results for nouns (cf. tableaux 21 and 22) and verbs with post-consonantal -/v/ (cf. tableau 24). However, the high ranking of OP-IDENT(sonorant) forces faithful outputs through paradigms in verbs with postvocalic -/v/ (26).

(26)

/próv/ “prove” (conjugation I)	*ON/w	*VCD CODA	OP- DEP-V	SS	DEP- V	OP- ID(snt)	ID(vc)	ID(snt)	OP- ID(vc)
a. <próf], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ə̀n>							*		10* (1x5x2)
b. <pró.və], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ə̀n>			5*! (1x5)		*				
c. <próf], pró.f]əs, pró.f]ə, pro.f]ám, pro.f]áw, pró.f]ə̀n>							*,*,* ,, *,*,*! ,,		
d. <próv], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ə̀n>		*!							
e. <prów], pró.v]əs, pró.v]ə, pro.v]ám, pro.v]áw, pró.v]ə̀n>						10*! (1x5x2)		*	
f. <prów], pró.w]əs, pró.w]ə, pro.w]ám, pro.w]áw, pró.w]ə̀n>	*,* ,, *,*,*! ,,							*,*,* ,, *,*,* ,,	

On the whole, this dialectal variation is a typical instance of differences in the ranking of certain constraints. The fact that re-ranking involves an OP constraint that functions to block the wrong kind of identity within a paradigm reinforces the need to assess complete paradigms as output candidates.

## 6. Conclusion

The contrast between nouns and verbs, typical of insular Catalan as far as epenthesis is concerned, is not an odd idiosyncrasy of 1sPRIND, but it is related to other peculiar contrasts between nouns and verbs that the language shows. The OP model succeeds in grasping these differences in a way that is somehow connected with differences in the organization of their paradigms. In addition to that, some preliminary results reported in McCarthy (2001) are fully supported by the data presented in this paper, namely, the impossibility of true under-application within paradigms and the possibility of OP unfaithfulness for markedness reasons. This analysis further provides a novel type of evidence for the OP model: dialectal variation due to the re-ranking of OP constraints.

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## Appendix

Table 3: Examples of word-final consonant syllabification  
(Data are taken from Majorca Balearic Catalan)

	1sPRIND VERBAL FORMS		MASC SINGULAR NOMINALS	
SAME SYLLABIFICATION	-VC	trob [p] “find” mat [t] “kill” neg [k] “deny” pos [s] “put” agaf [f] “take” estim [m] “love” sal [l] “salt” ball [ʎ] “dance”	-VC	tub [p] “tube” petit [t] “small” sec [k] “dry” cos [s] “body” tuf [f] “stink” fum [m] “smoke” sal [l] “salt” ell [ʎ] “he”
	-VC <sub>1</sub> C <sub>2</sub>	cant [nt] “sing” romp [mp] “break” enfang [ŋk] “muddy” allarg [rk] “lengthen” salt [lt] “jump” port [rt] “bring” fix [ts] “fix”	-VC <sub>1</sub> C <sub>2</sub>	pont [nt] “bridge” camp [mp] “field” fang [ŋk] “mud” llarg [rk] “long” alt [lt] “tall” port [rt] “harbor” índex [ts] “index”
DIFFERENT SYLLABIFICATION	-V[r] (/rr/) -VC <sub>1</sub> C <sub>1</sub>	corr [r] “run” adopt [t:] “adopt” inject [t:] “inject” design [n:] “design” condemn [n:] “condemn” vetl [l:] “watch over”	-V.[r]ə (/rr/) -VC <sub>1</sub> .C <sub>1</sub> ə	esquerre [r.ə] “left” apte [t.tə] “apt” acte [t.tə] “act” signe [n.nə] “sign” solemne [n.nə] “solemn” batle [l.lə] “mayor”
	-VCL	obr [pr] “open” logr [kr] “achieve” ensofr [fr] “sulfurate” camufl [fl] “camouflage” arregl [kl] “arrange”	-VC.Lə	pobre [br.ə] “poor” alegre [gr.ə] “happy” sofre [fr.ə] “sulfur” rifle [fl.ə] “rifle” cicle [kl.ə] “cycle”
	-VC <sub>1</sub> C <sub>2</sub> L	entr [ntr] “enter” sembr [mpr] “sow” umpl [mpl] “fill” vincl [ŋkl] “bend” filtre [ltr] “filter” mostr [str] “show” mescl [skl] “blend”	-VC <sub>1</sub> .C <sub>2</sub> Lə	centre [n.tr.ə] “center” timbre [m.pr.ə] “bell” ample [m.pl.ə] “wide” vincl [ŋ.kl.ə] “link” filtre [l.tr.ə] “filter” mestre [s.tr.ə] “teacher” mascle [s.kl.ə] “male”
	-VGL	enlair [jr] “raise” lliur [wr] “hand over” m’entaul [wl] “sit down to table”	-VG.Lə	aire [j.r.ə] “air” lliure [w.r.ə] “free” retaul [w.l.ə] “altarpiece”

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**Notes**

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<sup>1</sup> In Alguerese, a historical rhotacism process applied in obstruent+lateral clusters; there is no actual r~l alternation in this context (cf. Loporcaro 1997).

<sup>2</sup> In Balearic, codas with two stops share the same point of articulation due to regressive assimilation. In Alguerese, these clusters have been historically simplified. The same applies to laterals and nasals (e.g. *vetl* “sit up with.1sPRIND”, -[l:] in Balearic but -[l] in Alguerese; *condemn* “condemn.1sPRIND”, -[n:] in Balearic but -[n] in Alguerese). See Lloret (2002) for an overall description of the syllable structure in Catalan.

<sup>3</sup> In general, conjugation II is fairly problematic in Catalan, since most verbs present some kind of irregularity (cf. Wheeler 2002). Several authors suggest that, on synchronic bases, this conjugation should be withdrawn from regular paradigms (Mascaró 1986, Viaplana 1986). This interpretation is further supported by the fact that there is a clear tendency to turn conjugation II verbs to conjugation III, especially in Alguerese (e.g. *prometre* > *empromitir* “to promise”, *córrer* > *corrir* “to run”).

<sup>4</sup> For several crucial phenomena, the onset approaches mentioned above are based on incomplete data. The data in this paper are taken from different sources: the *Corpus Oral Dialectal* of the University of Barcelona (partially available on the web under <<http://www.ub.es/bdlinca>>); Bibiloni (1983) and Pons (in prep.) for Balearic Catalan;

Loporcaro (1997), Bosch (2002), and Scala (2003) for Alguerese Catalan, and the literature cited above. I have also checked some of the issues in Recasens (1991) and through additional interviews to native speakers.

<sup>5</sup> Dols & Wheeler (1996) claim that in Majorca Balearic there is a systematic distinction of voicing in post-consonantal stop+liquid clusters. According to them, the underlying voicing of the stop is maintained in 1sPRIND (as in *sebr* [sómbr] “sow.1sPRIND” vs. *empr* [ómpr] “use.1sPRIND”). This is not the usual way in which these data are reported in the literature. Recasens (1991) describes all these stops as voiceless and further mentions a low-level phonetic effect of partial devoicing of the liquid. The data of the *Corpus Oral Dialectal* also supports the voiceless character of these stops.

<sup>6</sup> There is one single lexical exception: /r/ in the verbal stem of “spin” (e.g. 1sPRIND *fi[r]*, 3sPRIND *fi[r]a*); but /l/ in the nominal related words, with the expected [l]~[r] alternation (e.g. *fi[l]* “thread”, *fi[r]adora* “spinner”). (See note 1 also.)

<sup>7</sup> The phonetic realization of /r/ in coda position presents significant cross-dialectal differences. For the purposes of this paper, the relevant facts are that /r/ is realized as [r] in Minorca Balearic, Alguerese, and Central Catalan, while it is realized as [r] in the other Balearic varieties. In word-final position these realizations are stable unless they are deleted (see 4). In word-medial position more variation is found in fast speech ([r], [r], and [ɾ]). Underlying /rr/ occurs phonetically as [r] and only between vowels, whether they are lexical or epenthetic, except in the verbal forms under study (see 5).

<sup>8</sup> The verb “die” shows the innovative form [mó] for 3sPRIND in the city of Palma, in Majorca. In other varieties there are alternative paradigms with suffix allomorphy.

<sup>9</sup> The verb “run” shows alternative paradigms with suffix allomorphy in some varieties.

<sup>10</sup> The glide+liquid rhymes illustrated in (3b) would be avoided by means of a specific minimum-sonority-distance constraint. I will not examine this case further here.

<sup>11</sup> Within the framework of OT, more information on consonant deletion in Catalan can be found in Bonet & Lloret (2002b) and Pons (in prep.). Partially different solutions can be found in Colina (1995), Jiménez (1999), and Dols (2000).

<sup>12</sup> I will not discuss here the fact that the simplified forms [úms]/[úns] (with nasal place assimilation in Majorca Balearic) and [óts] (with general stop place assimilation

in insular Catalan) are preferred to the more complex [úmpls] and [óprs]. This issue is related to other coda cluster conditions, not driven by the sonority constraint, involving substantial reduction and assimilation in Balearic (see Pons in prep.).

<sup>13</sup> OP-DEP-V scores one violation for each pair of forms within a paradigm and the correspondence relation is fully symmetric. Thus, in (11c) there is one violation for each of the five [ón.trə]  $\mathfrak{R}_{OP}$  [óntr] relations where the final vowel of [ón.trə] does not have a correspondent in [óntr]. Its symmetric counterpart, [óntr]  $\mathfrak{R}_{OP}$  [ón.trə], incurs in five OP-MAX-V violations, which are not considered here for expository reasons.

<sup>14</sup> Despite the Too-Many-Solutions problem entailed by the positional markedness analysis of final devoicing, I follow this view based on the observations made by different scholars about existing changes in strong positions (e.g. onsets), which are not expected to occur under positional faithfulness (Zoll 1998, Steriade 2001). An alternative positional faithfulness analysis in line with Lombardi's (2001) work, though, is possible here and will not alter the results. (See also note 17.)

<sup>15</sup> Although for the sake of this paper I assume that the ranking of IO-DEP-V above IO-IDENT(voice) penalizes epenthesis as a repair strategy to maintain voicing, in a more thorough analysis FINAL-C can do the same job. In this case, IO-DEP-V could be ranked lower (cf. Bonet & Lloret 2002b).

<sup>16</sup> In (15d) there are two violations of OP-IDENT(voice): one for the [túb]  $\mathfrak{R}_{OP}$  [tút] relation with respect to [-voice] and another one for its symmetric counterpart, [tút]  $\mathfrak{R}_{OP}$  [túb], with respect to [+voice].

<sup>17</sup> These data contribute to Steriade's (2001) perceptual P-map approach in two ways. First, P-map predicts that "modifications of voicing, especially final devoicing, should matter less than modifications of obstruency" (p. 32) because stricture differences play a major role in generating dissimilarity, but in the data under study gliding is preferred to devoicing except for paradigmatic reasons. Second, P-map assumes that innovations aim to improve a sound system in the safe regions of confusability (p. 51). The data show that speakers sacrifice devoicing by gliding, except for paradigmatic reasons. In my view, the reason is language internal: the Catalan lexicon contains very few words with [f] as coda; thus, speakers exploit their knowledge of the system and favor the more common pattern. I nevertheless leave the issue of the specific nature of the labial fricatives open to further investigation (cf. Padgett 2002).

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<sup>18</sup> In Balearic there are some limited lexical exceptions (e.g. *fuiġ* [fuitʃ] “flee.1sPRIND”, but *fugir* “flee.INF” and *fugitiu* “fugitive.MASC” with medial [ʒ]).