Segmental similarity and voice assimilation in Catalan

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Catalan is a well-known example of language with voice neutralization among obstruents. It shows voice contrasts in onset position but voice neutralization in pre-consonantal coda position --word-internally and across words-- (1a), in absolute word-final position (1b), and in word-final position before vowel-initial words (1c). Neutralization in the first context, (1a), is an instance of voice assimilation and does not show variation. Neutralization in the second context, (1b), is a case of devoicing and does not show variation either. The last context, however, involves two different phenomena, i.e., voiceless maintenance of word-final devoicing (1c*i*) and voicing across words (1c*ii*), which show variation as far as their scope is concerned (2). The general situation studied in the literature is that of central Catalan, with voiceless maintenance affecting stops and voicing affecting sibilants (1c); the case of the word-final labiodental fricative (i.e., *f*) is somehow controversial, since, although it is reported with variable voicing (Recasens 1993), previous works generalize the facts by assuming either devoicing maintenance (e.g., Llach 1998, Wheeler 2005) or voicing (e.g., Wheeler 1979, Mascaró 1987, Bermúdez-Otero 2001, 2006).

The debate in the recent literature on voice neutralization has focused on two issues: *a*) whether in contexts (1a-b) voice neutralization is an instance of licensing by cue (Steriade 1997, Llach 1998, Bermúdez-Otero 2001, 2006) or an instance of licensing by prosody (Beckman 1998, Jiménez 1997, Wheeler 2005, Beckman and Ringen 2007), and *b*) whether in context (1c) word-final voiceless maintenance, (1c*i*), is an instance of surface correspondence relations (within serial OT in Jiménez 1997 and within parallel OT in Wheeler 2005) or an instance of constraint re-ranking at different levels (within serial OT in Bermúdez-Otero 2001, 2006, Beckman and Ringen 2007, following Mascaró's 1987 derivational approach). A much less studied issue is the phonological reason for the voicing of word-final obstruents in pre-vocalic context, (1c*ii*). There are two different approaches to this phenomenon, which impinge on the debate on the nature of final devoicing as well as on the debate on parallel vs. serial approaches to OT: it has been analyzed as voice assimilation to the following vowel by Jiménez (1997) and Bermúdez-Otero (2001), within serial OT (along the traditional derivational view), and as a weakening, laziness effect by Wheeler (2005), within parallel OT; in Bermúdez-Otero and Wheeler, though, the constraints responsible for the voicing are *ad-hoc* restricted to sibilants (for central Catalan), and in Jiménez' approach voicing over-applies.

In this paper we focus on the word-final pre-vocalic context, (1c*ii*), and provide additional dialectal data, (2), that sustain a general assimilatory interpretation of voicing, within a prosodic and parallel OT approach to voice neutralization. Our analysis departs from Wheeler (2005)'s conclusions --based on work by previous researchers--, according to which the facts of Catalan indicate that the context of voice neutralization relevant to Catalan is ineluctably prosodic since there are not surface exceptions to voice neutralization "*provided the obstruent is in a coda*" (p. 161). Under parallel OT, voiceless maintenance can be accounted for through the ranking of OO correspondence constraints that enforce corresponding voicing between words and phrases below the constraint responsible for voicing across words and above constraints that favor IO faithfulness in strong (onset)

positions and general voice agreement (AGREE(voice): An obstruent agrees in voicing with a following segment). In our view, the constraint responsible for voicing across words is the positional faithfulness version of AGREE(voice) limited to the strong word-initial position: $\text{AGREE(voice)}_{\text{WIn}}$ (on the saliency of word-initial position, see, e.g., Nooteboom 1981, Byrd 1986, Barnes 2002, Hawkins&Cutler 1988, Chitoran *et al.* 2002). The general ranking at work is: $\text{AGREE(voice)}_{\text{WIn}}$ >> OO-IDENT(voice) >> $\text{IO-IDENT(voice)}_{\text{Onset}}$ >> AGREE(voice) >> *VOICEOBSTRUENT . The scope of $\text{AGREE(voice)}_{\text{WIn}}$, though, is limited by the gradual role of *VC-LINK (*apud* Itô *et al.* 1995, applied to Catalan by Jiménez 1997), which avoids the linkage of [±voice] between vowels and consonants in accordance with their degree of similarity; i.e., the linkage between a vowel and a stop is worst than the linkage between a vowel and a fricative, and the latter is worst than the linkage between a vowel and a sonorant consonant. The divergent behavior of stops and fricatives (except *f*) with respect to voicing across words in different dialects depends on the ranking of *VC-LINK for each series (see (2): central Catalan, with voicing in fricatives but not in stops, $\text{*VC-LINK}_{\geq\text{STOP}}$ >> $\text{AGREE(voice)}_{\text{WIn}}$ >> $\text{*VC-LINK}_{\geq\text{FRICATIVE}}$; central Valencian, with no voicing in stops and fricatives, $\text{*VC-LINK}_{\geq\text{STOP}}$ >> $\text{*VC-LINK}_{\geq\text{FRICATIVE}}$ >> $\text{AGREE(voice)}_{\text{WIn}}$; and southern Valencian, with voicing in stops and fricatives, $\text{AGREE(voice)}_{\text{WIn}}$ >> $\text{*VC-LINK}_{\geq\text{STOP}}$ >> $\text{*VC-LINK}_{\geq\text{FRICATIVE}}$). The distinct behavior of affricates in different dialects is explained by their dual 'stop+fricative' nature: they group with fricatives in dialects like central Catalan and with stops in dialects like Alghero Catalan (see (2)). The variable voicing of *f* is related to the relative degree of sonority that this obstruent has due to its low intensity in friction (e.g., Wright 2004), which therefore can potentially pattern with stops or fricatives. As for the voicing phenomenon under study, *f* clearly patterns with stops and affricates in Alghero Catalan and ambiguosly patterns with stops or fricatives in central Catalan (see (2)).

(1) Voice neutralization (data from central Catalan)

a. *Voice neutralization in pre-consonantal coda position*:

examen	[əg.zá.mən]	'exam'	actual	[ək.tu.ál]	'current'
Islàndia	[iz.lán.djə]	'Iceland'	pasta	[pás.tə]	'pasta'
sóc bo	[sog. bɔ́]	'I'm good'	sóc trist	[sok. tɾíst]	'I'm sad'
és bo	[ez. βɔ́]	'it's good'	és pa	[es. pá]	'it's bread'
migdia	[mid͡ʒ.ðíə]	'midday'	mig pa	[mit͡ʃ.pá]	'half loaf of bread'

b. *Voice neutralization in absolute word-final position*:
sóc [sók] 'I am'; és [és] 'it is'; mig [mít͡ʃ] 'half'

c. *Voice neutralization in word-final position before vowel-initial words*:
(i) sóc aquí [so.kə.kí] 'I'm here'
(ii) és aquí [e.zə.kí] 'it's here' mig any [mi.d͡ʒáɲ] 'half year'

(2) Voicing across words in pre-vocalic context (inter- and intra-dialectal variation)

	Stop # V	*f* # V	Affricate # V	SibilantFricative # V
Southern Valencian	Yes	Yes	Yes	Yes
Central Catalan	No	Var.	Yes	Yes
Alghero Catalan	No	No	No	Yes
Central Valencian	No	No	No	No