

# Syncope and apocope in the history of Catalan: an Optimality Theory approach<sup>1</sup>

Max W. Wheeler  
Department of Linguistics & English Language  
University of Sussex  
Falmer, Brighton BN1 9QN, UK  
m.w.wheeler@sussex.ac.uk

## 1. Introduction

The facts of Catalan historical phonology have been established for a long time. More than half a century ago these were presented in detail in the manuals of Badia i Margarit (1951) and of Moll (1952), and they are illustrated in the entries in Coromines's *Diccionari Etimològic i Complementari de la Llengua Catalana (DECLC)*. These works display the great achievements of the neogrammarian theory of sound change and of the positivist methods that dominated in historical linguistics from 1875 till a generation or so ago. And the more recent contributions of Gulsoy (for example, 1993) and of Rasico (for example, 1982) demonstrate the continuing value of that methodology in the historical phonology of Catalan.

The neogrammarian theory of sound change can be summarized in the following way: the fundamental mechanism of change is cumulative articulatory deviation among speakers. This deviation is unconscious or mechanical, and for that reason, is unaffected by lexical or grammatical distinctions. That entails the regularity of sound laws: each word displaying the relevant conditions is affected at the same time. The articulatory deviation is gradual, and therefore is imperceptible to the speech community. Alongside regular sound change, which is gradual, there are other types of non-gradual change, such as metatheses or distant dissimilations. For the neogrammarians these latter changes, not being gradual, could not fail to be perceived by speakers, and thus could not be mechanical, unconscious, or regular. Apart from sporadic changes, frequently observed diachronic phonetic irregularities could be due, in neogrammarian theory to two causes: first, to interlinguistic or interdialectal borrowing, and second, to the forces of analogy. The lexical store of a speech community is often not homogeneous; the community may acquire lexical elements from related communities which have experienced different sound changes. The presence of such elements gives the appearance of irregularity in phonological evolution. As for analogy, the human mind tends to reorganize inflectional paradigms so as to reduce the number of variants of a morpheme that may have arisen in the different phonological contexts that it appears in. The subsequent redistribution of allomorphs will give the appearance of having avoided, or deviated from, the effects of a regular sound law.

The facts that neogrammarian theory sought to explain were generally forms given in texts as established by philological methods, and forms to be found in current speech as established by dialectological methods. These philological and dialectological methods are also those that have been dominant in Catalan historical linguistics.

Despite the acknowledged successes of neogrammarian theory in general, and of its application to Catalan in the works mentioned above, a certain explanatory inadequacy can be

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<sup>1</sup> This article is an English version of chapter 10, 'La síncope i l'apòcope en la història del català: una aproximació des de l'Optimitat', in Max W. Wheeler (in press 2007) *Morfologia i fonologia catalana i romànica: estudis diacrònics*, València: Universitat de València.

observed, and is often observed by students of language history. In the case of historical phonology in particular, I suggest three reasons why the historical phonology handed down to us may seem insufficiently explanatory at the present time. The first reflects directly the positivist approach that was dominant, if not among the *Junggrammatiker* themselves, then among the philologists of the first half of the twentieth century, and indeed beyond. These scholars were more concerned to establish ever more precisely what happened, and when, than to explore how or why it happened. When a reason was offered, it was often at the level of detail, and rather ad hoc. What may now seem to us inadequacy of explanation in traditional historical phonology was, to a degree, intentional, or at best reflected extreme scientific prudence.

The second reason for explanatory inadequacy, in my view, is that some scholars, possibly conscious of the lack of explanatory principles offered by post-neogrammarian theory, began to introduce explanatory elements incompatible with neogrammarian tenets. In the case of the history of Catalan, three such elements may be mentioned: first, the recourse to substratum accounts insufficiently supported by the data; second, to the idea that a regular sound law could be violated with the objective of avoiding homonymic clash; and third, to the idea that a sound law could fail to operate because of the prestige of archaic forms. These explanatory approaches can be found in Badia's and Moll's manuals, and in Coromines's etymological dictionary, even though these authors were not their originators.

The third reason why traditional historical phonology may nowadays seem insufficiently explanatory derives from the conceptual limitations of the theory it grew out of. To remark on this is not to make a criticism; rather, one observes that science progresses. To mention just one example, neogrammarian theory was established before the concept of the phoneme was developed. Historical grammars expound a phonemic perspective only occasionally, and have not assumed the profound consequences of phoneme theory. Twenty-first century linguistics provides a vastly deeper understanding of language in general, of phonetics and phonology, and of linguistic change than was available to those who established the foundations of Catalan historical phonology. And with this more recent understanding many questions arise which in earlier decades could not even have been formulated. Such questions prompt us to reconstitute the database of facts that we seek to explain while at the same time stimulating explanation at a deeper level.

In an earlier paper (Wheeler 1998) I reviewed three areas in which scientific progress can help in the search for more satisfying explanation of language change. The three I mentioned were phonetics (articulatory, acoustic and perceptual), sociolinguistics, especially of the Labovian kind, and phonology. Phonology is the focus in this paper, in particular, Optimality Theory, which is in origin a theory of synchronic linguistics, but which is increasingly contributing to historical linguistics (see, for example, the collection of papers, and the bibliography, in Holt 2003).

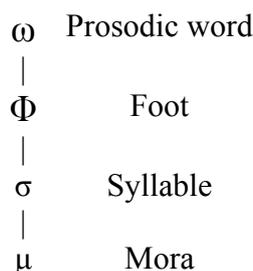
Optimality Theory was devised as a theory of synchronic grammar of homogeneous languages. More recently attempts have been made to interpret both sociolinguistic variation and language change in Optimality terms. Essentially both social and diachronic variation would correspond to differences in the dominance ranking of constraints (Nagy & Reynolds 1997, Zubritskaya 1997, Holt 2003). In the diachronic context it is supposed, among other things, that the variable data available to the language learner—the words and phrases that the learner hears—are in certain respects ambiguous with respect to the constraint ranking that generates them. Diachronic OT precursors to the present approach to apocope and

syncope in Catalan can be seen in the works of Hartkemeyer (1997) who offers an approach to the development of post-tonic vowels in Romance, and Lleó (2003) who offers a detailed account of the evolution of unstressed vowels in Spanish.

## 2. Prosodic structure

Possibly the most important feature of second-generation generative phonology (or post-generative) is the development of prosodic theory. Alongside segments and subsegmental features, phonologists now take account of the fundamental role of suprasegmental systems, structured in a prosodic hierarchy of moras, syllables, feet, and prosodic words (1).

### (1) Prosodic hierarchy



These elements of prosodic organization were not completely ignored in traditional historical phonology —certainly the concept of syllable was often invoked— but they were not structured in a coherent and explanatory way (Macken & Salmons 1997: 31). The elements of the prosodic hierarchy, especially the foot and the syllable, play a central role in Optimality Theory.

Optimality Theory differs from other linguistic theories in having abandoned the concept of rule of grammar, and in putting in its place a system of constraints that govern possible surface forms. These constraints are not inviolable, but in a particular language a constraint may be violated only in order to satisfy another constraint, placed higher in the particular constraint ranking that characterizes the grammar of that language. Phonological constraints are, in principle, universal, and express (among other things) typological patterns of markedness and implication. In (2) I present a series of constraints that express unmarked properties of the syllable.

### (2) Unmarked properties of the syllable (Archangeli 1997: 7)

	Constraint name
a. A syllable begins with a consonant.	ONSET
b. A syllable has a nucleus.	PEAK
c. A syllable lacks a coda.	NOCODA
d. A syllable has no more than one consonant in a margin.	*COMPLEX

Another essential element of syllable structure is the universal sonority scale that governs the grouping of consonants either side of the nucleus, which is the element in a syllable with greatest sonority (Clements 1990, Blevins 1995: 211). According to Blevins the sonority scale is as in (3), and an OT formulation of the sonority constraint is as in (4).

## (3) Universal sonority scale

Low vowel – Mid vowel – High vowel – Glide – Liquid – Nasal – Voiced fricative –  
Voiceless fricative – Voiced plosive – Voiceless Plosive

(Blevins 1995: 21)

## (4) Sonority sequencing constraint (Hammond 1997: 40; see also Clements 1990: 285, Serra i López 1996: 34–35, Wheeler 2005: 79)

SONORITY SEQUENCE (SONSEQ): Sonority must increase from the beginning of an onset to the nucleus of a syllable, and must decrease from the nucleus to the end of the syllable.

Many languages, in addition to respecting the SONSEQ constraint, require a certain sonority distance between the elements of a complex onset or a complex coda ('Minimum Sonority Distance': see Clements 1990: 317–9; for modern Catalan, see Wheeler 2005: 255 from which table (5) is adapted).

(5)

Proto-Catalan sonority ranking					
7	6	3	2		0
tap	laterals, trill	nasals	obstruent voiced non- sibilant continuants	sibilants	plosives + non- sibilant voiceless continuant
r	l ʎ r	m n ɲ	v ð γ	ts s ʃ ʒ ʒ z	b d g   f p t k

The sonority ranking in (5) with its associated scale of numerical values, permits the establishment of a Minimal Sonority Distance (MSD) constraint, as in (6).

(6) MSD6: In an onset with a sequence of consonants  $C_1C_2$ , the value of  $C_2 - C_1 \geq 6$ .

Sequences of syllables are governed by a Syllable Contact Law (Clements 1990: 287; cf. Vennemann 1988: 40) formulated here as (7) following Wheeler (2005: 83).

## (7) SYLLABLE CONTACT LAW

SYLCON: The final element of a syllable is not less sonorous than the initial element of an immediately following syllable.

In Vennemann's version of the syllable contact law, the greater the positive difference in sonority between  $C_1$  and  $C_2$  the better the contact; thus the sequence *an.ta* is preferred (more natural, less marked) to *ap.ta*, which is preferred to *at.na*. (The best syllable contact is of the type *a.ta*.)

### 3. Syncope and apocope processes in the history of Catalan

Having set out the foundations of a prosodic theory of the syllable, I now turn to an important process in Catalan historical phonology, the rule of vocalic apocope–syncope. This process, which operated in the pre-literary period of the language, made a major contribution to the characteristic phonological structure of the Catalan lexicon. The process eliminated the majority of cases of the post-tonic central vowel ([ə]) deriving from /e/, /i/, /o/, /u/ of Vulgar Latin, and thereby vastly reduced the number of syllables in lexical entries. For example, the process converted almost all masculine paroxytones to oxytones, and almost all proparoxytones to paroxytones. The process of apocope–syncope was subject to constraints

on syllable structure such as have been explained in the previous section. The forms marked with a double asterisk \*\* in (8) are intermediate forms that must be assumed as antecedents of the attested Catalan forms. These forms display the tonic vowel system of Western Vulgar Latin/Romance and also the results of the processes of lenition, simplification of geminates, vowel reduction of post-tonic non-low vowels to [ə], and other relevant sound changes. The quality of tonic vowels is that of Vulgar Latin before the changes that differentiated eastern and western Catalan.<sup>2</sup>

(8) Historical apocope–syncope:

a. Apocope	GATTO > **[ <sup>1</sup> gatə]	> <i>gat</i> ‘cat’	
	IUVENES > **[ <sup>1</sup> ɟovənəs]	> <i>jóvens</i> ‘youths’	
	CRESCERE > **[ <sup>1</sup> kreʃərə]	> <i>créixer</i> ‘to grow’	
b. Syncope	CAMERA > **[ <sup>1</sup> kaməra]	> <i>cambra</i> ‘room’	
	LEPORE > **[ <sup>1</sup> ləbərə]	> <i>llebre</i> ‘hare’	
	COPULA > **[ <sup>1</sup> kobəla]	> <i>cobla</i> ‘stanza, band’	
	VIVERE > **[ <sup>1</sup> vivərə]	> <i>viure</i> ‘to live’	
c. No apocope	FEBRE > **[ <sup>1</sup> fəbrə]	> <i>febre</i>	*[ <sup>1</sup> fəbr] ‘fever’
	LATRO > **[ <sup>1</sup> ladrə]	> <i>lladre</i>	*[ <sup>1</sup> ladr] ‘thief’
	LEPORE > **[ <sup>1</sup> ləbərə]	> <i>llebre</i>	*[ <sup>1</sup> ləbr] ‘hare’
	POPULO > **[ <sup>1</sup> pəbələ]	> <i>poble</i>	*[ <sup>1</sup> pəbl] ‘people’
d. No syncope	IUVENES > **[ <sup>1</sup> ɟovənəs]	> <i>jóvens</i>	*[ <sup>1</sup> ɟo.vnəs]    *[ <sup>1</sup> ɟov.nəs] ‘youths’
	CRESCERE > **[ <sup>1</sup> kreʃərə]	> <i>créixer</i>	*[ <sup>1</sup> kre.ʃrə]    *[ <sup>1</sup> kreʃ.rə] ‘to grow

In the forms (8c) without apocope one observes the maintenance of the final vowel when the preceding consonants do not form an acceptable coda according to SONSEQ. In the forms of (8d) without syncope one observes the retention of a post-tonic internal vowel when the post-tonic consonants could be redistributed neither as a complex onset, nor as a coda-onset sequence.

This important and complex process of apocope–syncope is not treated as such in the traditional historical grammars; rather, its effects are customarily mentioned separately in the presentation of the evolution of individual vowels. The scholars who do devote extensive discussion to it are Duarte and Alsina (1984: 108–116), arguing that apocope and syncope are not independent changes, a view with which I concur. In particular, it can be noted that no word is subject to both processes. As Duarte and Alsina say:

Si veritablement els mots proparoxítons que perden la vocal posttònica [interna] no perden la final i només els que mantenen la posttònica perden la final, no pot ser que l’elisió de la vocal posttònica sigui un procés anterior a l’apòcope; car, llavors, els mots sincopats abans de l’apòcope rebrien en l’aplicació d’aquesta regla el mateix tractament que els mots paroxítons llatins i que els proparoxítons sincopats per la regla [de síncope del mateix llatí POSITUM > posto > *post*]. Així, de la mateixa manera que CALCEM > *calç*, CENTUM > *cent* o LARGUM > *llarg* han perdut la vocal final, també CALICEM (> *calze*), LIMITEM (> *llinda*)...o CLERICUM (> *clergue*) haurien donat \**calz*, \**llind* i \**clerg*. [If it is true that proparoxytone words that lose the post-tonic internal vowel retain the post-tonic final and only those that retain the post-tonic

<sup>2</sup> That is to say, oversimplifying, /e/ > /ə/ (> /ɛ/) in eastern Catalan, and /ɛ/ > /e/ generally.

internal lose the final, it cannot be the case that post-tonic syncope is an earlier change than apocope, for then words subject to earlier syncope would be subject to apocope in exactly the same way as Latin paroxytones and the proparoxytones that were subject to syncope within Latin such as POSITUM > posto > *post* ‘set’. Thus in the same way as CALCEM > *calç* ‘lime’, CENTUM > *cent* ‘hundred’ or LARGUM > *llarg* ‘long’ lost the final vowel, so should CALICEM (> *calze* ‘chalice’), LIMITEM (> *llinda* ‘lintel’)...or CLERICUM (> *clergue* ‘cleric’) have given \**calz*, \**llind* and \**clerg*. (Duarte and Alsina 1984: 110–11)

The problem that first requires an explanation is how any post-tonic vowel comes to be lost; then we wish to know why apocope occurs in certain cases (8a), syncope in others (8b), and no post-tonic loss in others (8c, the examples of *febre* ‘fever’ and *lladre* ‘thief’). In the subsequent pages of their book Duarte and Alsina establish a classification of contexts in which a post-tonic internal or final vowel is retained. Their treatment identifies the nature of the consonants adjacent to the retained vowel, but they do not link their observations to a theory of syllable structure such as I have set out above. The basic problem can be set out as in (9).

- (9) a. Are apocope and syncope distinct processes, or are they mutually exclusive? If they are distinct, we should expect to see both changes applying in the same words, for example:
- HOSPITE > \*\*[<sup>h</sup>ɔspədə] > *hoste* > \**host* ‘guest’, cf. *host* < HOSTE ‘army’  
 SALICE > \*\*[<sup>h</sup>saləɰə] > *salze* > \**salz* > \**salç* ‘willow’, cf. *falç* < FALCE ‘scythe’
- b. In words subject in principle to either syncope or apocope, that is, having two cases of post-tonic [ə], what principles determine the application of one process or the other?

In order to resolve the primary problem, a couple of related issues need to be addressed:

- (10) Which vowels are subject to syncope? All of them, or only non-low vowels as in the case of apocope?
- (11) Certain words are subject to ‘early syncope’ (pan-Romance syncope, or syncope within Vulgar Latin), and consequently apocope is applicable in principle. Which words exactly are these, and what is the context of syncope? (For example: COLAPHO > Italian *colpo*, French *coup*, Catalan *colp* ~ *cop* ‘blow’.)

### 3.1. Which vowels are subject to syncope?

The answer to the question in (10) of whether all vowels are subject to syncope, or only non-low vowels, is controversial. Some scholars affirm that all vowels are subject to syncope, vowels deriving from Latin -*ā*- as well as [ə] deriving from /e/ or /o/.

- ‘l’a pénult. atone est soumis aux mêmes lois d’amuïssement que les autres voyelles’ [atonic penultimate *a* is subject to the same laws of elision as the other vowels] (Fouché 1924: 80).
- According to Ronjat (1930: 205–284), in Occitan which is similar to Catalan in relevant respects, though displaying greater dialect variation, all post-tonic vowels are subject to syncope. Other factors may intervene to hinder the regular operation of sound laws.

- ‘en català...el manteniment o caiguda de la vocal en aquesta posició [posttònica interna] no tenia res a veure amb el seu timbre en llatí, sinó únicament amb l'entorn’ [in Catalan...the retention or loss of a vowel in this [post-tonic internal] position had nothing to do with its quality in Latin, but only with its environment] (Duarte & Alsina 1984: 118, also 108).

Other scholars affirm that the reflex of Latin -Ā- is not subject to syncope:

- ‘Los romances occidentales, y entre ellos el catalán, generalizan la síncope de la postónica, menos en el caso de A, que acostumbra a mantenerse.’ [Western Romance, including Catalan, generalizes syncope of the post-tonic, except in the case of A which is usually retained.] (Badia 1951: 165)
- ‘Postónicas internas:... la A se ha mantenido ... Las demás vocales por regla general desaparecen.’ [Post-tonic internal ... A is retained ... The other vowels are lost as a general rule.] (Moll 1952: 98)

Observe that Badia’s affirmation is qualified: ‘is *usually* retained’. What, then do the data show (12) with respect to Latin post-tonic -Ā-?

(12)	Syncope <i>barbre</i> (Old Cat.) ‘barbarian’ < BARBARO <i>ruibarbre</i> ‘rhubarb’ < REUBARBARO (also Old Cat. <i>riubàrber</i> ) <i>cartre</i> ‘basket’ < Greek kartalon <i>dissabte</i> ‘Saturday’ < DIE SABBATO /-i <i>timbre</i> ‘seal, bell’ < TYMPANO <i>gaire</i> ‘little’ < Frankish waigaro <i>segle</i> ‘rye’ < SECALE (also > <i>sègol</i> )	No syncope <sup>3</sup> <i>ànet</i> ‘duck’ < ANATE <i>àlber</i> ‘ <i>Populus alber</i> ’ < ALBARO (also <i>arbre</i> XVI c.) <i>cànter</i> ‘pitcher’ < CANTHARO <i>espàr(r)ec</i> ‘asparagus’ < ASPARAGO <i>tàlem</i> ‘marriage bed’ THALAMO
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Evidently, the post-tonic internal vowel derived from -Ā- is lost in some examples and is retained in others, without it being possible to speak of a rule and exceptions. It is more appropriate to speak of a tendency, subject to variation within Catalan itself, or to lexical diffusion. It is of interest to note that syncope of -Ā- is regular in French; it is more widely attested in Occitan than in Catalan (for example, Occitan *canbe*, *carbe* < CANNABE; Catalan *cànem* ‘hemp’), and it is absent from Spanish. It is natural that /a/, the most sonorous vowel, should tend to be retained when less sonorant vowels are lost. This is the major theme of Hartkemeyer’s paper (1997: 107–114).

### 3.2. Pan-Romance syncope

Early pan-Romance (or Vulgar Latin) syncope (question (11)) affects a relatively small proportion of words. Its effect is observed in Italian as well as in western Romance. It is not inconsistent with apocope, understood to be a later change. Very often we find in the sequence -VC<sub>1</sub>VC<sub>2</sub>V either C<sub>1</sub> as a liquid, glide or /s/ followed by C<sub>2</sub> less sonorous (13a) (and C<sub>1</sub>C<sub>2</sub> arenaturally syllabified as coda+onset), or C<sub>1</sub> as /k/ followed by a lateral C<sub>2</sub> (13b). In (13c) are some miscellaneous cases including some with doublets with and without pan-Romance syncope.

<sup>3</sup> I include only examples in which the surrounding consonants would permit syncope.

## (13) Early pan-Romance syncope

- a. VIRIDE > It. *verde*, Cat. *verd* ‘green’; SOLIDO > It. *soldo*, Cat. *sou* ‘shilling’; DIGITO > It. *dito*, Cat. *dit* ‘finger’; FRIGIDO > It. *freddo*, Cat. *fred* ‘cold’; \*VOGIDO/VOGIDA > Oc. *vuech/vueja*, Fr. *vide*, Cat. *buit/buida* ‘empty’; POLYPO > It. *polpo*, Cat. *polp* ~ *pop* ‘octopus’; COLAPHO > It. *colpo*, Cat. *colp* ~ *cop* ‘blow’; POSITO > It. *posto*, Cat. *post* ‘set’; EREMO > It. *ermo*, Cat. *erm* ‘uninhabited’.
- b. OCULO > It. *occhio*, Cat. *ull* ‘eye’; SPECULO > It. *specchio*, Cat. *espill* ‘mirror’
- c. DICERE > It. *dire*, Cat. *dir* ‘to say’  
also NITIDO > It. *netto*, Cat. *net* ‘clean’ beside Old Cat. *nèdeu*; PUTIDO > Fr., Oc. *put* ‘stinking’, Old Cat. *gat put* ‘polecat’, beside Cat. *\*púdeu* > *púdol* ‘*Rhamnus alpina*’; PUTIDA > *\*púdea* > (*la*) *Puda* (toponym, see DECLC VI, 851b)

## 4. Towards an interpretation of Catalan apocope–syncope

As I observed earlier, many scholars of Catalan historical phonology do not explicitly deal with the relation between apocope and syncope. Gulsoy (1977: 82) mentions in passing that syncope preceded apocope. Meyer-Lübke (1925: 20–21) proposes the order apocope – syncope, at least in specified cases, but does not offer a reasoned theory. According to Ronjat (1930: 205–284), explaining Occitan changes, both processes are in principle applicable, so that words affected by syncope may have variants with or without a final vowel (variants originally conditioned by syntactic phonetic environments). But the majority of Ronjat’s forms with loss of both post-tonic vowels—that is displaying the effects of both syncope and apocope—are in fact unattested. Ronjat’s account is considered and ingenious, but it appears to reflect the presupposition that syncope and apocope must be successive changes. He does not explicitly reject the idea that they might be mutually exclusive. As mentioned previously, it is Duarte and Alsina who recognize that there is a theoretical problem, and they do so because their model of generative phonology obliges them to give attention to rule ordering.

In Optimality Theory the grammar of a language is not a set of ordered rules, but a ranking of faithfulness and markedness constraints. I argue here that the processes of syncope and apocope in the history of Catalan reflect the promotion at a certain period of some markedness constraints above faithfulness constraints. One of the markedness constraints promoted is that banning the realization of a central vowel (\*SCHWA in Nagy & Reynolds 1997: 42, 49). The elision of unstressed schwa is a very frequent process in the history of languages, such as French, German, and English to mention only proximate languages. Schwa [ə] is usually shorter than other vowels, and also less distinct—more likely not to be perceived. The historical process must be just this: a central vowel present in the mind of a speaker in a given word is uttered with so little force that the language learner discounts it, building a representation of the word without the schwa. In OT terms, the \*SCHWA constraint is promoted above the constraint requiring faithfulness to underlying vowels (MAXV). Historically, the ranking of the two constraints is inverted as in (14).

## (14) MAXV » \*SCHWA &gt; \*SCHWA » MAXV

The other important constraint that is active in the process of syncope and apocope is a prosodic one: the head foot is the rightmost foot (15).

- (15) HEAD FOOT RIGHT (HDFT-R): The head foot is not followed by another foot within the prosodic word.<sup>4</sup>

HEAD FOOT RIGHT is a constraint disfavouring proparoxytone words: structures (16a) are preferred to those of (16b).<sup>5</sup>

- (16) a. ('σσ) (σ'σ) ('σ)                      σ = syllable  
       b. ('σσ)(σ) (σ'σ)(σ) ('σ)(σ)

In Ibero-Romance the preference expressed in HEAD FOOT RIGHT (15) is never achieved by shifting stress to a later syllable, which indicates that HEAD FOOT RIGHT is ranked below FAITHFULNESS TO PROSODIC HEADS (FPH) as in (17) (Wheeler 2005: 282, after Beckman 1998 and others).

- (17) FAITHFULNESS TO PROSODIC HEADS » HEAD FOOT RIGHT

Now the fundamental question is, given the activity in the grammar of \*SCHWA, why are not all post-tonic schwas eliminated, provided deletion is permitted by syllable-structure constraints, namely SONSEQ (4), MSD6 (6) and SYLCON (7)? The fact that of two post-tonic schwas one is always retained shows that there must be a faithfulness constraint that preserves *some* post-tonic schwas. On the one hand, observe that to avoid violation of HEAD FOOT RIGHT it is sufficient to remove one syllable from a word with a dactylic pattern at the right edge. In such dactylic words one can ask, as in (9a), whether syncope or apocope is preferred. The facts show that syncope is preferred to apocope in examples like *salze* 'willow', *calze* 'chalice', *hoste* 'guest', *clergue* 'cleric' (\**sàledz* > \**sàleu*, \**càledz* > \**càleu*, \**hòsped*, \**cléreg*) where the surrounding consonants offer no violation of SONSEQ or SYLCON. Thus one must infer that with two post-tonic syllables, *ceteris paribus*, it is the vowel of the prosodically weaker syllable that is lost, that is, the syllable that is nearer to the tonic, as displayed in the grid (18).

- (18)
- |           |           |           |   |           |
|-----------|-----------|-----------|---|-----------|
| *         |           |           |   | *         |
| *         |           |           |   | *         |
| *         | *         |           |   | *         |
| V         | C         | V         | C | V         |
| [+accent] | [-accent] | [-accent] |   | [-accent] |

This interpretation according to which the second of two post-tonic vowels is prosodically stronger is foreshadowed in Meyer-Lübke (1925: 19). In the Optimality context, I am supposing that a form like [*'saləɖzə*] (> *salze* 'willow') has the prosodic structure displayed in (19).

- (19) ('σσ)(σ)  
       '*saləɖzə*

The form in (19) consists of two feet (trochaic according to the constraint in 20a). The first syllable is the head of the first foot, and this foot is the head foot of the prosodic word. The

<sup>4</sup> ENDRULE-R in Wheeler (2005: 282) following McCarthy (2003: 111). Forms in (16) and the subsequent discussion rely on the ranking PARSE-σ » FOOTBINARITY, or, more generally, that PARSE-σ is undominated.

<sup>5</sup> Lleó's analysis (2003) of syncope in Spanish gives great importance to the Stress-to-Weight principle (SWP), requiring that a stressed syllable be heavy. This principle, however, would fail to explain why syncope occurs when the output is not a heavy syllable, as is the case in Catalan *lletra* 'letter' < LITTERA or *pebre* 'pepper' < PIPERE.

third syllable is the head of the second, final foot. I assume that PARSE- $\sigma$  (20b) is active, that is, that every syllable must be linked to the higher prosodic level. Every non-head foot is unstressed, in accord with the constraint HEAD(PROSODICWORD) (20c). The faithfulness constraint that protects a final vowel from elision is the one proposed in (20d) MAX(PROSODICHEAD), a more specific version of the well known constraint FAITHFULNESS TO PROSODIC HEADS (FPH) (Wheeler 2005: 89, 282, after Beckman 1998 and others). FPH does not penalize the elimination of a syllable that is not the head of a foot.

- (20)
- a. TROCHEE: The head of a foot is aligned with its left edge (see Kager 1999: 184).
  - b. PARSE- $\sigma$ : Every syllable is assigned to a foot (Kager 1999: 162).
  - c. HEAD(PROSODICWORD): Every prosodic word has a unique head (Wheeler 2005: 282; McCarthy 2002: 78).
  - d. MAX(PROSODICHEAD): Do not delete a prosodic head.

When ranked above \*SCHWA, MAX(PROSODICHEAD) favours syncope, provided the syllable structure constraints set out in (4), (6) and (7) are not violated.

#### 4.1. General syncope

In the following examples I again represent in a phonetic transcription what I suggest to have been the pronunciation of the period at which syncope–apocope was operative. In many cases this is a pronunciation intermediate between orthographic Latin and orthographic Catalan. In (21) are displayed some examples of syncope with input forms of the pattern  $-VC_1VC_2V$ . Contact between  $C_1$  and  $C_2$  is permitted by the SYLLABLE CONTACT LAW (SYLCON) (7). In accord with ONSET (2a)  $C_2$  is attached to the onset of the final syllable. SONSEQ (4) does not allow both consonants to be in the onset. For the case of possible contact between two nasals /m.n/ or /n.m/, see below (§4.2.3).

(21) C.C Syncope permitted by SYLCON (7)

m.t	<i>femta</i> ‘dung’ < *FEMITA; <i>comte</i> ‘earl’ < COMITE	n.g	<i>monja</i> ‘nun’ < MONICA; <i>diumenge</i> <sup>7</sup> ‘Sunday’ < DIE DOMINICO
v.t	<i>malalta</i> ‘sick’ < *malauta < MALE HABITA; <i>deute</i> ‘debt’ < DEBITO	ð.g	<i>jutja</i> <sup>8</sup> ‘judge.3SG.IND.PRS’ < IUDICAT; <i>metge</i> ‘physician’ < MEDICO
p.d	<i>dissabte</i> ‘Saturday’ < DIE SABBATO/-I <sup>6</sup>	d.g	<i>heretge</i> ‘heretic’ < HAERETICO
m.d	<i>senda</i> ‘path’ < SEMITA	r.g	<i>clergue</i> ‘cleric’ < CLERICO
ɖ.d	<i>lleuda</i> ‘market toll’ < LICITA		
l.ɖ	<i>polze</i> ‘thumb’ < POLLICE; <i>salze</i> ‘willow’ < SALICE		
ð.ɖ	<i>dotze</i> ‘twelve’ < DUODECIM; <i>sutze</i> ‘soot’ < ** <i>suðæɖə</i> < ** <i>suɖæðə</i> < SUCIDO		

<sup>6</sup> I assume /bb/ > /p/ and /pd/ > /pt/; or alternatively the /t/ of SABBATO escapes lenition as in the examples above it.

<sup>7</sup> This treatment is also seen in *granja* ‘farm’ < GRANICA, *monge* ‘monk’ < MONICO, *canonge* ‘canon’ < CANONICO. The development seen in *mànega* ‘sleeve’ < MANICA, *mànec* ‘handle’ < MANICO, *Domènec* ‘Dominic’ < DOMINICO, Old Cat. *monçónega* ‘lie’ < \*MENTIONICA, with retention of the post-tonic vowel despite the acceptability of the group [n.ɖʒ] remains surprising and unexplained; compare Sp., Ptg. *manga*, Fr. *manche* < MANICA ‘sleeve’.

- r.l *merla* ‘blackbird’ < MERULA; *Carles* ‘Charles’ < CAROLUS  
 l.n *Elna* < HELENA (toponym); *alna* ‘ell’ < Gothic *álina*  
 r.n *arna* ‘beehive’ < \*\**árona*; *arna* ‘moth’ < \*\**árena*  
 r.m *merma* ‘lessen.3SG.IND.PRS’ < \*\**merəma* < MINIMAT; *arma* ‘soul’ <  
 \*\**arəma* < ANIMA

In tableau (22) I illustrate the proposed analysis with the example *salze* ‘willow’ at the stage when \*\*[*salɔ̃zə*] is preferred to \*\*[*saləɔ̃zə*]. I assume high ranking of TROCHEE, PARSE-σ, and HEAD(PROSODICWORD) and ignore candidates that violate them. The faithful candidate (22a) is eliminated because its head foot is not the rightmost foot (contra HdFT-R). Candidates (22b) and (22f) are eliminated because the head vowel of a foot is not retained. candidates (22c) and (22e) have the same segments as the winner (22d), but worse linked to the syllable structure, with gratuitous violations of ONSET or of SONSEQ. (As usual, each violation of a constraint is marked with \*, and a fatal violation with !)

(22)

SALICE > **/( <i>salə</i> ) <sub>φ</sub> ( <i>ɔ̃zə</i> ) <sub>φ</sub> /	ONSET	SONSEQ	HdFT-R	MAX(PROSODICHEAD)	*SCHWA	MAXV
a. ( <i>sa.lə</i> )( <i>ɔ̃zə</i> )			*!		**	
b. ( <i>sa.ləɔ̃z</i> )				*!	*	*
c. ( <i>sa.lɔ̃zə</i> )		*!			*	*
d. <sup>σ</sup> ( <i>sal.ɔ̃zə</i> )					*	*
e. ( <i>salɔ̃z.ə</i> )	*!				*	*
f. ( <i>salɔ̃z</i> )				*!		**

Ranking demonstrated:

ONSET, SONSEQ, HdFT-R, MAX(PROSODICHEAD) » \*SCHWA » MAXV

In (23) are some examples of syncope with input forms of the type -*VC<sub>1</sub>C<sub>2</sub>VC<sub>3</sub>V*. Consonant contact is permitted in accord with the syllable-structure constraints seen previously. The three consonants are distributed C.CC, in conformity with the maximization of syllable onsets (\*COMPLEXCODA » \*COMPLEXONSET).

<sup>8</sup> Here I assume *ð.g* > *d.g* with subsequent development as in *heretge*; similarly in *dotze* ‘twelve’, *sutze* ‘soot’, I assume *ð.ɔ̃z* > *d.ɔ̃z*, before the change of post-vocalic *ɔ̃z* to *ð* and thence to /v/ [v] ~ [w] as in the case of *lleuda* ‘market toll’ < LICITA. It would make no difference if one were to represent in (21) a somewhat later stage showing one or more of these changes.

(23) C.CC Syncope permitted by SYLCON (7) together with the maximization of onsets.

<b>m.pr</b>	<i>compra</i> ‘buy.3SG.IND.PRS’	<b>n.tr</b>	<i>mentre</i> ‘meanwhile’ <	<b>r.kr</b>	<i>dime(r)ces</i>
	< **COMPERAT		(DU)M INTERIM		‘Wednesday’ < DIE
	<i>rompre</i> ‘to break’ <	<b>r.dr</b>	<i>perdre</i> ‘to lose’ <		MERCURI
	RUMPERE		PERDERE	<b>r.kl</b>	<i>cercle</i> ‘ring’ < CIRCULO
<b>s.pr</b>	<i>vespre</i> ‘evening’ <			<b>n.kl</b>	<i>vincl</i> ‘link’ < VINCULO
	VISPERO				<i>oncle</i> ‘uncle’ <
<b>s.pl</b>	<i>nespla</i> ‘medlar’ <				AVUNCULO
	NESPULA			<b>s.kl</b>	<i>mascle</i> ‘male’ <
<b>r.br</b>	<i>arbre</i> ‘tree’ < ARBORE				MASCULO
				<b>n.gl</b>	<i>cingle</i> ‘crag’ <
					CINGULO

The examples in (24) resemble in certain respects those in (23), since the inputs are of the form  $-\acute{V}C_1C_2VC_3V$ . Here, however, SONSEQ does not permit complex onsets, but it does permit complex codas, consisting of a sonorant or a fricative and a plosive. Subsequently in the pre-literary history of Catalan, I suggest, these complex codas were simplified by the elimination of the second consonant, or by fusion of the second and third consonants in cases such as *porxe* [ˈportʃe] ‘arcade’ and *manxa* [ˈmantʃa] ‘bellows’. I suppose here that this simplification of complex codas is a process subsequent to apocope–syncope, though it could be contemporary (with \*COMPLEXCODA dominating MAXC).<sup>9</sup> I am also supposing that the regular sound change /nd/ > /nn/ is later than apocope–syncope. In the case in which  $C_1C_2$  already formed an onset, the sequence  $C_1C_2C_3$  cannot be redistributed between a coda and an onset, and the post-tonic vowel is retained, as in *llòbrec* ‘gloomy’ < LUBRICO, Old Cat. *llàgrema* ‘tear’ < LACRIMA.

(24) CC.C Syncope permitted by SYLCON (7), syllabified in accord with SONSEQ.

<b>sk.b</b>	<i>bisbe</i> ‘bishop’ < EPISCOPO	<b>rd.ɖ</b>	<i>catorze</i> ‘fourteen’ < QUATTUORDECIM
<b>sp.d</b>	<i>hoste</i> ‘guest’ < HOSPITE	<b>nd.ɖ</b>	<i>onze</i> ‘eleven’ < UNDECIM
<b>mp.d</b>	<i>compte</i> ‘account’ < COMPUTO	<b>rt.g</b>	<i>porxe</i> ‘arcade’ < PORTICO
<b>nd.d</b>	<i>venda</i> ‘sale’ < *VENDITA	<b>nt.g</b>	<i>manxa</i> ‘bellows’ < MANTICA

The situation in the case of examples (25), with a structure  $-\acute{V}C_1VC_2V$  in which  $C_1$  is a plosive and  $C_2$  is a liquid, is less straightforward than might be expected. According to the principles mentioned so far, we should expect the two consonants to be assigned to the onset of the final syllable.

(25)	<b>.tr</b>	<i>lletra</i> ‘letter’ < LITTERA, <i>batre</i> ‘to strike’ < BATT(U)ERE	<b>.bl</b>	<i>cobla</i> ‘stanza, band’ < COPULA, <i>poble</i> ‘people’ < POPULO
	<b>.dr</b>	<i>Morvedre</i> < MURO VETERE (toponym)	<b>.gl</b>	<i>regla</i> ‘rule’ < REGULA, <i>segle</i> ‘century’ < SAECULO
	<b>.br</b>	<i>recobra</i> ‘recovers’ < RECUPERAT, <i>pebre</i> ‘pepper’ < PIPERE		

At least, that would be the result if SYLCON were ranked above \*COMPLEXONSET. In the example *pebre* ‘pepper’ the syllabification [ˈpe.bre] would have a complex onset consistent with SONSEQ (7) and MSD6 (6). This syllabification also respects SYLCON in that the first

<sup>9</sup> Observe that, except in the case of *bisbe* ‘bishop’ < EPISCOPU ([ˈbizbe] at the stage after apocope–syncope), the result of the simplification of a coda cluster is a voiceless obstruent if there was a voiceless consonant in the proto-Catalan input.

syllable ends with a vowel and the second begins with a plosive (less sonorous). Syllabified as [ˈpeb.re], \*COMPLEXONSET would be respected, but SYLCON would be violated, in that the first syllable now ends with a plosive and the second begins with an approximant (more sonorous). The syllabification of medial /Cr/ in present-day Catalan is /C.r/: [ˈpe.bre]. However in the case of the /Cl/ sequence the pronunciation of most modern varieties has a geminate plosive which seems to presuppose a syllabification /C.l/ in the post-syncope period (/C.l/ or /C<sub>i</sub>.C<sub>i</sub>l/ in current pronunciation). Supposing that the post-syncope syllabification /C.l/ is correct, either we must assume the corresponding syllabification for /C.r/, in which case we need to explain how and why /C.r/ has been resyllabified as /C.r/ in the development of Catalan, or we must suppose that the syllabification of a voiced plosive + liquid is governed by a different principle when the liquid is a lateral from when the liquid is a rhotic (tap). The latter approach seems preferable, bearing in mind that voiced plosives /b, d, g/ on account of their voicing, are somewhat more sonorous than the voiceless /p, t, k/, according to the sonority scale in (3). This effect could be modelled by modifying the proto-Catalan sonority ranking in (5) so that voiced plosives are of sonority 1. Thus, the sonority distance between a voiced plosive and a lateral (less sonorous in Catalan than a tap /r/) would be a little less than the distance between a voiceless plosive and a lateral (pl, kl), or between a voiced plosive and a tap (br, dr, gr), specifically, insufficiently distant with respect to the MINIMUM SONORITY DISTANCE constraint (6) to permit a complex onset *in a case where there is an alternative solution available*. (There would not be an alternative, of course, for word-initial /bl/, /gl/, as in *blau* ‘blue’, *glaç* ‘ice’.) Such a solution, however, faces the difficulty that the syllabification -Vb.IV-, -Vg.IV- implies a violation of the SYLLABLE CONTACT LAW, such that we might expect apocope to be preferred over syncope so as to avoid this bad contact. Thus *POPULO* and *SAECULO* would give \**pòbel* (or \**pòbol*)<sup>10</sup> and \**sèguel* (or \**sègol*) rather than *poble* ‘people’ and *segle* ‘century’. I leave this matter aside for the moment. We shall see that the treatment of cases in which a bad syllable contact is a possible outcome is complicated and subject to some variation.

#### 4.2. Competition between syncope and the SYLLABLE CONTACT LAW

I now examine cases in which syncope might give rise to violation of the SYLLABLE CONTACT LAW (SYLCON). The types of contact, all *less sonorous+more sonorous*, are listed in (26).

- (26)
- |                      |                   |               |             |
|----------------------|-------------------|---------------|-------------|
| a. Plosive+fricative |                   |               |             |
| b. Plosive+nasal     | Fricative+nasal   |               |             |
| c. Plosive+lateral   | Fricative+lateral | Nasal+lateral |             |
| d. Plosive+tap       | Fricative+tap     | Nasal+tap     | Lateral+tap |

The cases of plosive+fricative (26a) are those in which the evolution of the Latin adjectival suffix -IDUS is involved, for example, Old Cat. *tébeu* ‘lukewarm’ < \*\*[ˈtebəð] < *TEPIDO*. I take up these clusters, and those of (26b) involving a consonant+nasal, after establishing the more general pattern.

##### 4.2.1. Consonant+lateral

When the consonant C<sub>1</sub> in the sequence -VC<sub>1</sub>VC<sub>2</sub>V is a plosive, a fricative or a nasal, and C<sub>2</sub> is a lateral /l/ we observe a distribution of apocope and syncope noted by Fouché.

<sup>10</sup> In Old Occitan, both *pòbol* and *poble* are attested.

‘La voyelle finale peut être un indice précieux pour la chronologie de la réduction des pénultièmes atones. En effet la chute de la voyelle pénultième est intimement liée à l’état de la voyelle finale. La pénultième tombe d’autant plus tôt que la finale est plus solide, c’est à dire plus ouverte’ [The final vowel may be a valuable clue to the chronology of the loss of unstressed penults. In fact the loss of the penultimate vowel is closely linked to the fate of the final vowel. The stronger the final vowel, that is, the more open it is, the earlier the loss of the penult vowel.] (Fouché 1924: 81).

I do not share Fouché’s conclusion that the difference has a chronological interpretation; rather, I infer that what is evidenced is a difference in phonological conditioning, such as observed above (in the case of *salze* ‘willow’), together with the SYLLABLE CONTACT LAW (SYLCON) (7) itself. Consider the example *neula* ‘mist’ < NEBULA (with a final low vowel /a/) contrasted with *frévol* ‘frail’ < FLEBILE (with a non-low final vowel [ə] pre apocope–syncope). I am supposing that, at the period of the elision of unstressed vowels, the reflex of Latin intervocalic /b/ was a fricative /v/ in all cases. If it had already shifted to [w] in codas, the contact -Vw.IV- would not have violated SYLCON and would have permitted syncope in all cases, whether the final vowel was /a/ or /ə/. Other examples of the *neula* type are those in (27a), while those in (27b) match the model of *frévol*.

- (27) a. C.1 Syncope with final /a/: *faula* ‘tale’ < FABULA, *paraula* ‘word’ < PARABOLA, *taula* ‘table’ < TABULA, *xiula* ‘whistles’ < SIBILAT, *vetla* ‘stays awake’ < VIGILAT, *illa* [‘iɫa] ‘island’ < INSULA, *sembla*<sup>11</sup> ‘seems’ < SIMULAT, *ametla* ‘almond’ < AMIDDULA, *espatla* ‘shoulder’ < SPATULA.
- b. C.1 Apocope of final /ə/, *fonèvol* ‘ballista’ < FUNDIBULO, *àvol* ‘wicked’ < HABILE, *núvol* ‘cloud’ < NUBILE, *grèvol* ‘holly’ < \*ACRIFOLO, *trèvol* ‘clover’ < Greek triphyllon, *mújol* ‘grey mullet’ < MUGILE, *estrijol* ‘curry comb’ < STRIGILE, *pèsol* ‘pea’ < PISULO, *trèmol* ‘aspen’ < TREMULO, *còdol* ‘pebble’ < COTULO, *-ívol* ‘-ible’ < -IBILE, etc.

In tableau (28) the interaction of the constraints recently mentioned is illustrated. I suppose the intermediate input forms for *neula* and *frévol* are \*\*/(<sup>l</sup>nɛvə)(lɑ)/ and \*\*/(<sup>l</sup>frevə)(lɑ)/. The outputs I assume are correct at the period in question are \*\*<sup>l</sup>nɛv.lɑ (subsequently > [<sup>l</sup>nɛwla] *neula*) and \*\*<sup>l</sup>fre.vəl (subsequently *frévol* ~ *frèvol*).

<sup>11</sup> *Sembla* with epenthesis of /b/ avoiding the bad contact /m.l/ shows that SYLCON dominates the constraint DEPC (Do not insert a consonant). In the example *illa* the assimilation of /s.l/ to /l.l/ (> ɫ) giving an intermediate form \*\*<sup>l</sup>il.lɑ also avoids a bad contact. It may be noted that in modern Catalan all the words in (27a) have developed in such a way as to avoid violation of SYLCON. (Orthographic *tl* = [l.l].)

(28) a. NEBULA >  
\*\*/('nɛvə)(lɑ)/

	MSD6	SONSEQ	HdFT-R	SYLCON	MAX(PROSODICHEAD)	*SCHWA	MAXV
i. ('nɛ.və)(lɑ)			*!			*	
ii. ('nɛ.vlɑ)	*!						*
iii.  ('nɛv.lɑ)				*			*

b. FLEBILE >  
\*\*/('fɾevə)(lə)/

i. ('fɾe.və)(lə)			*!			**	
ii. ('fɾe.vlə)	*!					*	*
iii. ('fɾev.lə)				*!		*	*
iv.  ('fɾe.vəl)					*	*	*

Ranking demonstrated: MSD6, SONSEQ, HdFT-R » SYLCON » MAX(PROSODICHEAD)  
» \*SCHWA » MAXV

The faithful candidates (28a.i) and (28b.i) are eliminated because they violate HdFT-R, having a foot at the right that is not the head foot. Candidate (28a.ii) is eliminated because it displays an onset /vl/ that is impermissible by MSD6. In (28) the form ['fɾev.lə] (28b.iii), which resembles the (28a.iii) winner ['nɛv.lɑ], is eliminated because there remains here in the competition a superior candidate: (28b.iv) ['fɾe.vəl], despite the fact that it deletes the vowel which is the head of an input foot.

Alongside the examples of (27b) can be observed a certain number of words displaying syncope where the general model predicts apocope: *retaula* 'altar-piece' < RETABULO instead of \**retàvol*, *batle* ~ *batlle* 'mayor' < BAIULO instead of \**bàjol*, *rotle* 'roll' < ROTULO instead of \**ròdol*, *cabitle* 'chapter' < CAPITULO<sup>12</sup> and *siule* 'whistle' < SIBILO (the last perhaps to be interpreted as a postverbal derivative of *siular* 'to whistle'). The problem of the syllabification of /VbIV/, /VgIV/ has already been mentioned. Apart from the so-called learned forms in *-able* < -ABILE, *-ible* < -IBILE, the problematic cases with /bl/, /gl/ are few: *poble* 'people', *segle* 'century', *restoble* 'second crop' < \**RASTUPULO*. (The regular example would be *espígol* 'lavender' < SPICULO.) Maybe we should admit some variability in the relative positions of SYLCON and MAX(PROSODICHEAD).

<sup>12</sup> In no variety of Catalan are onsets [tɫ], [dɫ] well formed. The issue is discussed in Wheeler (2005: 82–83). Here the effect of some constraint ruling out these onsets is assumed. In the context of apocope–syncope two 'repairs' are observed: [-l.le] as here *cabitle*, observing MAX(PROSODICHEAD) but with a violation of IDENT[–lateral], and [-dɔl] as in (27b) *còdol*, violating MAX(PROSODICHEAD). The development in the case of *motle* 'mould' < MODULO is unclear, assuming an intermediate \*\*mɔðələ, which should have given \**moule* \*['mɔw.le].

#### 4.2.2 Consonant+fricative

I return now to the case of plosive+fricative (26a). The examples are few (29) —and all now obsolete— but they display a consistent pattern of treatment, rejecting syncope. The evolution of the post-tonic syllable must involve  $**[-\text{ə}\delta] > **[-\text{ə}\nu] > [-\text{əw}] \sim [-\text{ew}]$ .

- (29) [plosive]. $\delta$     *nèdeu* ‘clean’ < NITIDO, *ràbeu* ‘fast’ < RAPIDO, *tèbeu* ‘lukewarm’ < TEPIDO, *règeu* ‘stiff’ < RIGIDO. There is no syncope either in the corresponding feminine forms of these adjectives: *nèdea* <  $**[{}^1\text{nedə}\delta\text{a}]$ , *ràbea*, *tèbea*, *règea*, etc.

The total absence of syncope in the contexts of (29) shows that a syllable contact constraint more specific than SYLCON dominates HDFT-R, here labelled \*PLOSIVE.FRICATIVE. It remains to be investigated whether typological evidence supports the idea that this type of contact is more marked than others that violate SYLCON.

#### 4.2.3 Consonant+nasal

The situation of the plosive+nasal and fricative+nasal sequences of (26b) is similar to that set out in §4.2.2, inasmuch as inter-syllabic consonantal contacts are always avoided. When there is not a final /a/, that means apocope is observed, with retention of the internal vowel (30a). The sole plosive+nasal example with original final /a/ seems to be *cotna* [{}^1konna] ‘rind’ < \*CUTINA, with syncope in line with the general model, displaying also voicing and nasal assimilation.

- (30) C.n    apocope of final  $\text{ə}$  (and with subsequent loss of final /n/) , *ase* ‘ass’ < ASINO, *calitja* ‘mist’ < CALIGINE, *cove* ‘basket’ < COPHINO, *diaca* ‘deacon’ < DIACONO, *freixe* ‘ash tree’ < FRAXINO, *imatge* ‘image’ < IMAGINE, *jove* ‘youth’ < IUVENE, *marge* ‘edge’ < MARGINE, *orde* ‘order’ < ORDINE, *pruija* ‘itch’ < PRURIGINE, *verge* ‘virgin’ < VIRGINE

The sequence /m.n/ does not violate the version of SYLCON established in (7): two nasals are equal in sonority. However, this contact too is always avoided in the inherited vocabulary, which suggests that a constraint \*mn barring a specific marked contact is active. Its motivation is a matter for further investigation. Probably place distinctions are marked in adjacent nasals. When final /a/ is not present, the structure  $-\dot{V}C_1VC_2V$  is subject to apocope as seen in the examples of (31a). When /a/ is present, three patterns can be seen (31b–d).

- (31) a. *home* ‘man’ < HOMINE, *lleme* ‘nit’ < LENDINE, *víme(t)* ‘osier’ < VIMINE  
 b. *entràmenes* ‘intestines’ < INTRAMINA  
 c. *fembra* ‘woman’ < FEMINA, *sembra* ‘sow.3SG.IND.PRS’ < SEMINAT (dissimilation of nasality /m/ ... /n/ > /m/ ... /r/)  
 d. *llauna* ‘tinplate’ < LAMINA (dissimilation of nasality /m/ ... /n/ > /b/ ... /n/, with subsequent lenition of /b/ to /v/ (> [w]))

Among (31b–d) there are too few examples to enable one to identify one of the three patterns as regular. In (32) I choose the examples *home*, *fembra*, and *llauna* to show the interaction of the \*mn constraint with the other constraints proposed so far. I do not attempt to show why *fembra* was preferred to \**feuna*, or *llauna* to \**llambra*. To accommodate the preference for *entràmenes* over \**entrambres* or \**entraunes*, IDENTNasal should dominate HDFT-R.

(32) a. HOMINE >  
\*\*/('ɔmə)(nə)/

	*mn	MSD6	SONSEQ	HdFT-R	SYLCON	IDENTNas	MAX(PROSODICHEAD)	*SCHWA	DEPC	MAXV
i. ('ɔmə)(nə)				*!				**		
ii.  ('ɔmən)							*	*		*
iii. ('ɔm.nə)	*!							*		*
iv. ('ɔm.rə)					*!	*				*
v. ('ɔm.brə)						*!		*	*	*

b. FEMINA >  
\*\*/('femə)(na)/

	*mn	MSD6	SONSEQ	HdFT-R	SYLCON	IDENTNas	MAX(PROSODICHEAD)	*SCHWA	DEPC	MAXV
i. ('femə)(na)				*!				*		
ii. ('fem.na)	*!									*
iii. ('fem.ra)					*!	*				*
iv.  ('fem.bra)						*			*	*

c. LAMINA > **/( <sup>l</sup> λamə)(na)/		*mn	MSD6	SONSEQ	HdFT-R	SYLCON	IDENTNas	MAX(PROSODICHEAD)	*SCHWA	DEPC	MAXV
i.	( <sup>l</sup> λamə)(na)				*!				*		
ii.	( <sup>l</sup> λavə)(na)				*!				*		
iii.	( <sup>l</sup> λam.na)	*!									*
iv.	☞ ( <sup>l</sup> λav.na)					*	*				*
v.	( <sup>l</sup> λa.vna)		*!				*				*

Ranking demonstrated: \*mn, MSD6, SONSEQ, HdFT-R » SYLCON » IDENTNas »  
MAX(PROSODICHEAD) » \*SCHWA, DEPC » MAXV

In (32) the faithful candidates (32a.i, b.i, c.i) are eliminated because their head foot is not the rightmost foot. Also eliminated are candidates with the unacceptable sequence /mn/ (32a.iii, b.ii, c.iii). While the candidate in (32a) with consonant epenthesis (32a.v: <sup>l</sup>om.brə) is eliminated because it violates IDENTNas (and DEPC), in (32b) the candidate with similar dissimilation and epenthesis (32b.iv: <sup>l</sup>fem.bra) wins because there is no better candidate remaining. It is to be noted that the only type of consonant epenthesis permitted as a repair to the syllable contacts discussed here is that in which the epenthesized consonant shares place features and [-continuant] with the preceding consonant. In (32c) I claim that the candidate with a bad inter-syllable contact (32c.iv) \*\*<sup>l</sup>λav.na also wins because the alternative candidates are worse. (If at the period under consideration /v/ had already evolved to [w] in syllable codas, then among the cases in (30), instead of *cove* ‘basket’ and *jove* ‘youth’, \**coune*, \**joune* would have won.

Just as inter-syllable contact of a bilabial nasal followed by an alveolar one \*m.n is barred, so is contact of an alveolar nasal followed by a bilabial one \*n.m. The sole examples identified of the etymological sequence /n.../m/ are those cited in (21) *merma* ‘lessen.3SG.IND.PRS’ < \*\*<sup>l</sup>merəma < MINIMAT; *arma* ‘soul’ < \*\*<sup>l</sup>arəma < ANIMA. These examples also show dissimilation of nasals, followed by syncope. Evidently \*nm belongs alongside \*mn in the constraint ranking.

It is a curious fact that when the second consonant in the pattern -<sup>l</sup>VC<sub>1</sub>VC<sub>2</sub>V is /m/, syncope always takes place (33), whatever the nature of C<sub>1</sub>. This result is inconsistent with the model of constraint ranking developed here in which SYLCON dominates MAX(PROSODICHEAD). I refrain from proposing a formal solution. It will be seen that not a few of the examples in (33) display in addition other anomalies of historical phonology<sup>13</sup>, and/or they may be borrowings from other languages, particularly French or Occitan. For these reasons, thus, it is difficult to identify general principles appropriate to C.m sequences in Catalan.

<sup>13</sup> Notably, /t/ > [z] < s > and /ks/ > [z] are irregular.

- (33) C.m syncope: *altisme* ‘Almighty’ < ALTISSIMO, *delme* < \**deume* ‘tithe’ < DECIMO, *Jacme* ~ *Jaume* ‘James’ < IACOMO, *lledesme* ‘legitimate’ < LEGITIMO, *maresme* ‘sea marsh’ < MARITIMO, *pruixme* ~ *proïisme* ‘nearest’ < PROXIMO.

#### 4.2.4. Consonant+tap

The last group of consonants to be considered is that of (26d): plosive+tap, fricative+tap, nasal+tap, lateral+tap. It can be seen that in many of the examples the tap /ɾ/ is the exponent of the infinitive morpheme; consequently, morphological pressures may intervene, in the direction of removing surface alternations of this morpheme. The examples in (25) show that sequences of a true plosive and a tap are consistent with constraints on complex onsets (SONSEQ, MSD6), with the result that syncope is the regular outcome. In the case of the affricates of Proto-Catalan the expected result of an affricate+tap sequence is apocope, which is the result seen in *càrcer* ‘gaol’ < \*\**kartsərə* < CARCERE, *vèncer* ‘to conquer’ < VINCERE, and in the place name *Àger*. Thus the infinitive \*COCERE (Classical Latin COQUERE ‘to cook’) should have given Proto-Catalan \*\**[kɔtʃər]* analogous to Occitan *còzer*. I suggest the reflex of such a form was replaced by the analogical *coure* after the root developed in non-prevocalic environments to *cou-* < \*\**kɔv* < \*\**kɔð* < \*\**kɔtʃ*.<sup>14</sup> In the fricative+tap sequence, forms with a sibilant fricative display the expected apocope: *ésser* ‘to be’; *conèixer* ‘to know’, *créixer* ‘to grow’, *merèixer* ‘to deserve’, *nàixer* ‘to be born’, *pàixer* ‘to graze’, *parèixer* ‘to seem’. With non-sibilant fricatives /v/ or \*\*/ð/, we observe forms with final /a/ and the expected syncope: *llaura* ‘plough.3SG.IND.PRS’ < LABORAT, *lliura* ‘deliver.3SG.IND.PRS’ < LIBERAT, *heura* ‘ivy’ < HEDERA. The infinitives of roots ending in /v/ or \*\*/ð/ all show syncope, which, however, may well be due to morphological analogy, especially after the regular change of /v/ and \*\*/ð/ to [w] in codas accommodated a syncopated infinitive without any SYLCON violation: *beure* ‘to drink’ < BIBERE, *viure* ‘to live’ < VIVERE; *creure* ‘to believe’ < CREDERE, *ociure* ‘to slay’ < OCCIDERE. There are some nominal examples, however, for which an analogical explanation will not work, and which display syncope inconsistent with the principles so far established: *lliure* ‘free’ < LIBERO, *suro* ‘cork’ < \*\**suwɾə* < SUBERO, *roure* ‘oak’ < ROBORE (not \**llíver*, \**súver*, \**róver*). I return to this matter below.

In the case of a nasal+tap sequence, we find in the majority of cases syncope with epenthesis of a homorganic stop—in the cases of the nasals /m/ (34a) and /n/ (34b); with a palatal nasal, apocope is found (34c).

<sup>14</sup> Other verbs with root-final \*\**tʃ* belonged to the Latin second conjugation. Thus they did not display the sequence -VC<sub>1</sub>VC<sub>2</sub>V in the infinitive, but were paroxytone, at the period of apocope-syncope. The development will have been NOCÈRE > \*\**no'tʃer* ‘to harm’, IACÈRE > \*\**tʃa'tʃer* ‘to lie’ (attested *jaser* second half of 13th century), LICÈRE > \*\**le'tʃer* ‘to give leisure, opportunity’ (attested *leser* second half of 13th century), which infinitive forms were also replaced in due course by analogical *noure*, *jaure*, *lleure*, respectively. The Old Catalan form *vençre* ‘to conquer’ may also be analogical, in this case preferring the more frequent allomorph *-re* of the infinitive of the Catalan e-conjugation, despite the bad inter-syllable consonant contact /ts.ɾ/ > /s.ɾ/. The variant *carçre* for *càrcer* ‘gaol’ could not be analogical, though. Still, *càrcer* is considerably more frequent than *carçre* in medieval Catalan, overwhelmingly so before 1300.

- (34) a. m.r with final /a/: *cambra* ‘room’ < CAMERA; without final /a/: *cogombre* ‘cucumber’ < CUCUMERE, *nombbre* ‘number’ < NUMERO and the Old Catalan infinitive *rembre* ‘to redeem’ < REDIMERE (*tembre* ‘to fear’ < TIMÈRE shows analogical change of conjugation; the modern form *témer* is also analogical).
- b. n.r with final /a/: *engendra* ‘beget.3SG.IND.PRS’ < INGENERAT; without final /a/: *cendra* (< \*\**cendre*) ‘ash’ < CINERE, *divendres* ‘Friday’ < DIE VENERIS, *gendre* ‘son-in-law’ < GENERE, *pondre* ‘to set’ < PONERE, *tendre* ‘tender’ < TENERE; and with /n/ < /nd/: *atendre* ‘to await’ < ATTENDERE, *fendre* ‘to split’, *prendre* ‘to take’, etc.
- c. p.r *atènyer* ‘to reach’ < ATTINGERE, and similarly *empènyer* ‘to push’ < IMPINGERE, *estrènyer* ‘to squeeze’ < STRINGERE, *fènyer* ‘to knead’ < FINGERE, *júnyer* ‘to yoke’ < IUNGERE, *pertànyer* ‘to belong’ < \*PERTANGERE, *plànyer* ‘to pity’ < PLANGERE.

The attested forms in (34) are those that follow from the constraint ranking presented in (27) and (32), with SYLCON » MAX(PROSODICHEAD) » DEPC. The ‘irregular’ form *prémer* ‘to press’ < PREMERE would require DEPC » SYLCON. In (35) the general constraint ranking is illustrated again with *cambra* ‘room’ and *gendre* ‘son-in-law’.

(35) a. CAMERA >  
\*\*/(<sup>1</sup>kamə)(ra)/

	SONSEQ	HdFT-R	SYLCON	IDENTNas	MAX(PROSODICHEAD)	*SCHWA	DEPC	MAXV
i. ( <sup>1</sup> kamə)(ra)		*!				*		
ii. ( <sup>1</sup> kam.ra)			*!					*
iii. ☞ ( <sup>1</sup> kam.bra)							*	*

b. GENERE >  
\*\*/(<sup>1</sup>ʤɛnə)(rə)/

i. ( <sup>1</sup> ʤɛnə)(rə)		*!				**		
ii. ( <sup>1</sup> ʤɛnər)					*!	*		*
iii. ( <sup>1</sup> ʤɛn.rə)			*!			*		*
iv. ☞ ( <sup>1</sup> ʤɛn.drə)						*	*	*

In the case of lateral+tap sequences, the examples *coldre* ~ *colre* ‘to venerate’, *molldre* ~ *molre* ‘to grind’, *toldre* ~ *tolre* ‘to remove’ show that syncope and consonant contact can be resolved with epenthesis of homorganic /d/, as with the nasal clusters in (34)–(35), or via fortition of tap [r] to trill [r̄], making a consonant contact VL.rV involving elements of equal sonority.<sup>15</sup>

<sup>15</sup> Possibly likewise in the case of variants like *genre* ‘son-in-law’, etc. with [n.r], /n/ and /r/ are treated as being of equal sonority.

Earlier in this section I mentioned a difficulty in the account of the evolution of the sequence  $-\acute{V}C_1VC_2V$  when  $C_1$  is /v/ (from Latin -v- or -B-, or from Proto-Catalan -ð- from -D- or -C<sup>E/I</sup>-) and  $C_2$  is /r/. When in the sequence  $-\acute{V}C_1VC_2V$ ,  $C_1$  is /v/ and  $C_2$  is /l/ ((27) above) or /n/ ((30) above), the pattern is syncope before final /a/ and apocope in the absence of final /a/ (with a couple of previously mentioned exceptions such as *retaula* ‘altar-piece’ and *siule* ‘whistle’). That is consistent with what I have been presenting as the regular pattern. When  $C_1$  is /v/ and  $C_2$  is /r/, the sequence is consistently realized with syncope. This problematic issue may involve an interaction between the apocope–syncope process in focus in this chapter and the distribution of allophones of the phoneme /v/: nowadays, obstruent [v] in syllable onsets and approximant [w] in codas. In an attempt to present the matter from a different viewpoint I have constructed a system of hypothetical transitional stages, in which the key lies in a stage involving syllabic realizations of post-tonic consonantal sonorants. Table (36) represents these stages in certain of the post-tonic sequences that are of interest. Stage 1 is the stage assumed throughout this chapter, displaying lenition and primary vowel reduction. At stage 2, each sequence of post-tonic schwa plus a sonorant consonant becomes a syllabic sonorant; that is,  $-\acute{V}C_1VC_2V > -\acute{V}C_1\zeta_2V$ . Stage 3 displays the changes in focus in this chapter which correspond to the promotion of the constraint HDF<sub>T</sub>-R which favours outputs in which the head foot is the rightmost foot.

(36)	Stage 1	Stage 2 syllabic sonorants	Stage 3 apocope- syncope and ð > v, etc.	Stage 4 development of syllabic sonorants to non-syllabic	Example
a.	-.və.la	-.v a	-w.la		<i>neula</i> ‘mist’
b.	-.və.lə	-.v ə	-.v	-.vol	<i>frévol</i> ‘frail’
c.	-.və.na	-.v na	-w.na		<i>llauna</i> ‘tinplate’
d.	-.və.nə	-.v nə	-.v n	-.ven	<i>jove</i> ‘youth’
e.	-.va.na	-.va.na	-.ve.na		<i>Isàvena</i> (river name)
f.	-.va.nə	-.va.nə	-.van	-.ven	<i>rave</i> ‘radish’
g.	-.və.ra	-.v ra	-w.ra		<i>llaura</i> ‘ploughs’
h.	-.və.ra	-.v rə	-.v r	-w.re	<i>roure</i> ‘oak’
i.	-.ðə.ra	-.ð rə	-w.ra		<i>heura</i> ‘ivy’
j.	-.ðə.rə	-.ð rə	-.v r	-w.re	<i>creure</i> ‘to believe’
k.	-.ɲə.rə	-.ɲ rə	-.ɲ r	-ɲer	<i>atènyer</i> ‘to reach’

The main effect of the stage 3 change in (36) is that the syllabic sonorant deriving from əC<sub>2</sub> would become consonantal before a vowel that cannot be suppressed by apocope (/a/), and C<sub>1</sub> adapts as best it can to the pre-sonorant position (36a, 36c, 36g, 36i). The phoneme /v/ adopts the observed allophonic distribution [v] preceding a nucleus (including a consonantal one) and [w] elsewhere. At stage 4 the syllabic sonorants remaining in final position are resolved differently according to the nature of the sonorant. I suppose here that final -C<sub>1</sub>| becomes -C<sub>1</sub>ol (36b), developing a back vowel that absorbs backness inherent in the Catalan velarized [l]. At the same time final -C<sub>1</sub>n becomes -C<sub>1</sub>en (36d), and follows the same path as -C<sub>1</sub>en derived from post-tonic final -C<sub>1</sub>an as in (36f). In final position -C<sub>1</sub>r becomes -C<sub>1</sub>re if the C<sub>1</sub> would accommodate it (either -C<sub>1</sub>re or -C<sub>1</sub>.re); otherwise, -C<sub>1</sub>r becomes -C<sub>1</sub>ər

> -C<sub>1</sub>er (36k).<sup>16</sup> A consequence of this interpretation is that a final non-low vowel after a liquid (as in *roure* ‘oak’) is not a direct reflex of the final vowel of stage 1, nor is [o] in -C<sub>1</sub>ol (*frèvol* ‘frail’) or [e] in -C<sub>1</sub>en (*jove* ‘youth’) a direct reflex of the internal post-tonic vowel of stage 1. Thus it is possible that a syllabic consonant such as [ŋ] in the hypothesized intermediate form *\*\*'ɟovŋ* < *\*\*'ɟovənə* < IUVENE is the fused reflex of the three elements of the sequence [ə<sub>1</sub>n<sub>2</sub>ə<sub>3</sub>], so that *\*\*'ɟovŋ*<sub>123</sub> would not strictly involve a violation of MAX(PROSODICHEAD), inasmuch as the nucleus (ə<sub>3</sub>) of the original final syllable would be fused in the syllabic sonorant.

The explanation put forward in the preceding paragraph contains a good dose of unverifiable historical hypotheses. Its main purpose is to demonstrate that the problem in the apparent inconsistency of the apocope-syncope process when C<sub>2</sub> is a sonorant consonant does not mean that the general approach outlined in this chapter runs into a dead end. Rather, it is precisely the attempt to formulate historical processes establishing general conditions that forces us to address problems not previously identified.

### 5. Conclusion

To summarize the main claim of the present analysis, syncope and apocope of post-tonic vowels in the evolution of Catalan both reflect two preferences that overcame faithfulness to the syllabic and prosodic structures inherited from late Latin. The first was the preference for trochaic over dactylic feet (reflected here in the constraint HEADFOOT-RIGHT); the second was the preference not to realize the least distinct vowel of the inventory /ə/ (reflected in the constraint \*SCHWA). The effect of these two preferences (constraints) was countered by a faithfulness constraint (MAXPROSODICHEAD) that favoured retaining a vowel that in the inherited form had been the head of a foot, namely the vowel of the final syllable of proparoxytone words. All the constraints favouring syncope were subject to prosodic constraints governing the distribution into coda and/or onset of a sequence of consonants that might result from the elimination of an internal post-tonic vowel; these constraints are the sonority sequencing constraint SONSEQ, the Syllable Contact Law (SYLCON), and the Minimum Sonority Distance constraint. Dominated by HEAD FOOT RIGHT, the faithfulness and syllable structure constraints could not require the retention of two post-tonic central vowels. In certain contexts where Proto-Catalan had had two post-tonic central vowels, the result —apocope or syncope— is not completely general. While several interpretations accounting for ‘irregularity’ are proposed, there is insufficient data (absence of texts of the period of most interest, and lack of suitable relevant lexical examples to establish precise phonological conditions) to allow all of the details to be satisfactorily resolved.

<sup>16</sup> Observe that this proposal invoking syllabic sonorants offers a pathway to the explanation of apparent metathesis in the development of SEMPER > *sempre* ‘always’ and INTER > *entre* ‘among’. The transcription [ɟ] need not be taken literally as a syllabic tap. It stands for any appropriate type of syllabic rhotic.

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