MORE ON ALIGNMENT AS AN ALTERNATIVE TO DOMAINS: THE SYLLABIFICATION OF CATALAN CLITICS

Eulàlia Bonet   **Maria-Rosa Lloret**
(Universitat Autònoma de Barcelona)   (Universitat de Barcelona)
eulalia.bonet@uab.es   lloret@lincat.ub.es

Abstract

Catalan has fourteen pronominal clitic forms, each with different realizations depending on the context. Vowel epenthesis and consonant deletion, which are common in Catalan, seem to have a different conditioning in simple words, in Verb-clitic or clitic-Verb sequences, and in clitic-clitic sequences (where an emergence of the unmarked effect with respect to syllable structure is found). In this paper, devoted mainly to the phonological behavior of pronominal clitics in Catalan (specifically, the variety spoken in the Barcelona area) and framed within Optimality Theory, it is argued that, in spite of the apparent need for an analysis that resorts to levels, all the facts concerning epenthesis and deletion can be accounted for without them and with a single constraint hierarchy. The differences in behavior are the consequence of the different ranking of morphological Alignment constraints and an Alignment constraint that makes reference to subsyllabic constituents.

1. Introduction

Catalan has fourteen pronominal clitic forms, and each of these forms can surface with several different realizations depending mostly on the phonological context. In addition, most clitics can combine with each other, and sequences can have more than four clitics at the same time. In (1) the variation in clitic shape is illustrated for the variety of Catalan spoken in the Barcelona area (Barceloní, from now on), which is the dialect that is examined in this paper. Given the relevance of syllable structure in determining the shape of clitics, we indicate syllable boundaries throughout.[1]

(1) a. Partitive clitic: *tira'n* [t"@.R´n]   [n]   'throw some!'
                            en tira [´n.t"@.R´]   [´n]   '(s/he) throws some'
                            tirar-ne [ti.Ra@r.n´]   [n´]   'to throw some'

     b. 1st person pl.: *tiri'ns* [t"@.Rins]   [ns]   'throw to us! (pol.)[2]'
                          ens tira [´ns.t"@.R´]   [´ns]   '(s/he) throws to us'
                          ens salva [´n.z´.sa@l.B´]   [´nz´]   '(s/he) saves us'

---

[1] The realization of clitics shows a lot of dialectal variation. Due to the complexity of the subject and the length of the paper, we avoid comparing Barceloní Catalan with other dialects.

[2] (pol.) stands for 'polite'. This is a form that is semantically second person (singular or plural). Morphologically, however, it is third person (singular or plural). This form is normally used when talking to an adult with no close relationship to the speaker.

tireu-nos [ti.RE@wn.z´]	[nz´]	'throw (2nd pl.) to us!'
tirem-nos [ti.RE@m.z´]	[z´]	'let us throw ourselves'

In (1a) there is a fixed consonant, [n]; a schwa appears in two of the examples but in different positions. In (1b) there is also a variable appearance of schwa; it can be absent, it can appear in initial position, in final position, or in both. In addition, and leaving aside the voicing alternation in the sibilant, which is due to general phonological processes of the language that are orthogonal to the paper, it can be seen that in the last example of (1b) the [n] that appears in other examples is absent. As we shall see, the appearence of schwa, due to epenthesis (as will be argued), can be connected in some cases to problems with syllabification, as is the case with simple words with an epenthetic vowel. With respect to deletion, it will be seen that some cases are related to a process of deletion that is general in Catalan. In other cases, however, both epenthesis and consonant deletion seem to be specific to clitic-verb or verb-clitic sequences, or even to clitic-clitic sequences, in which the insertion of a schwa between non-vocalic clitics causes the appearence of the unmarked CV syllable structure. The main goal of this paper is to give an account of vowel epenthesis and consonant deletion in clitic/verb combinations and in combinations of two or more pronominal clitics.

The paper is organized as follows: section 2 provides a basic description of the pronominal clitic system of Catalan. In section 3 it is argued that the schwas that appear associated to clitics in different contexts and in different positions have to be attributed to epenthesis, rather than allomorphy. Section 4 contains a brief review of epenthesis in earlier generative approaches. Section 5 addresses the specific problems that need to be accounted for. Section 6 is devoted to the analysis, within Optimality Theory. It is argued that a single constraint hierarchy can account for epenthesis and deletion, both in those cases where general processes of the language apply and those cases that are apparently specific to clitics, and that there is no need to resort to levels. The "domain" effect is caused by the role played by morphological Alignment constraints, which are ranked differently in the hierarchy, and another Alignment constraint, ALIGN(SUB-σ), that makes reference to subsyllabic constituents. Further support for this constraint comes from general facts related to syllabification in Catalan. Finally, section 7 provides the final ranking, discusses some of the consequences of the analysis and comments on one remaining problem.

2. Basic facts about pronominalization in Catalan

2.1. Single clitics

The pronominal clitics of most dialects of Catalan appear as enclitics after an imperative, an infinitive or a gerund, and appear as proclitics before other forms of the verb (except participials, which do not admit clitics). In (2) we show the pronominal clitics of Catalan, with their pronunciations in Barceloní, their standard spelling, and one example of their use. Although the orthography often reflects the pronunciation in Barceloní, this is not always the case. For instance, even though in the standard language the third person dative plural clitic is identical to the third person accusative masculine plural clitic (*els, -*

los, and *'ls*), in the colloquial language they differ: the dative plural clitic is parallel to the dative singular clitic, *li* [li], except for the presence of a [z], which is the plural morph, and the presence or absence of a schwa: [lzi] and [´lzi]. For expository reasons, we use "*elzi*" as the citation form for this clitic even though this is not an accepted spelling. As for other orthographical issues, the hyphen that appears in front of certain clitics is used only with enclitics in the standard spelling, and the apostrophe indicates the orthographical deletion of a vowel. In (2), the clitics appear grouped according to their phonological (and in some cases morphological) behavior. In certain cases, the inclusion of a clitic in a specific group might seem surprising at first sight. For instance, the second person plural clitic, often spelled *us*, appears with the clitics that contain two consonants. Later it will be argued that the *u* is underlyingly a glide, /w/, at least in most instances. The label for each clitic has been used for convenience, and does not always reflect all the functions a clitic can have; this is the case, for example, of the clitic *hi*, here labeled locative, even though it can also represent a prepositional phrase selected by the verb, it can be a predicative or an inanimate dative.[3] Given the wide range of contributions a clitic might add to a sentence, the translations we provide to the examples are simplified. Below the label for each clitic we include the citation form we use for each one in the rest of the paper.

(2) Pronominal clitics in Barceloní Catalan:
  a Clitics with one consonant, and variable appearance of schwa, spelled *e* (C-clitics)
     3rd reflexive   Pronunciation: [´s], [s´], [s]
       es   Standard spelling: *es*, (-)*se*, *s'*, *'s*
                            Example: *Es trenca* '(it) breaks (itself)'

     1st person sing.   Pronunciation: [´m], [m´], [m]
       em   Standard spelling: *em*, -*me*, *m'*, *'m*
                            Example: *m'irrita* '(it) irritates me'

     2nd person sing.   Pronunciation: [´t], [t´], [t]
       et   Standard spelling: *et*, -*te*, *t'*, *'t*
                            Example: *portem-te* 'let's take you'

     partitive   Pronunciation: [´n], [n´], [n]
       en   Standard spelling: *en*, -*ne*, *n'*, *'n*
                            Example: *tiri'n* 'throw some (pol.)!'

  b Clitics with two adjacent consonants, and variable appearence of schwa
     (CC(i)-clitics):
     1st person pl.   Pronunciation: [´nz], [nz], [nz´], [z´]
       ens   Standard spelling: *ens*, -*nos*, *'ns*
                            Example: *tirem-nos* [z´] 'let us throw ourselves'

     3rd person dative pl. Pronunciation: [´lzi], [lzi]
       "*elzi*"   Standard spelling: *els*, -*los*, *'ls*

---

[3] For a more detailed description of Catalan clitics in English, the reader can take a look at Wheeler (1979), Hualde (1992) and Wheeler, Yates and Dols (1999), for instance.

Example: "*elzi*" [´lzi] *tira allò* '(s/he) throws that to them'

2nd person plural   Pronunciation: [uz], [´wz], [wz], [wz´], [z´]
us   Standard spelling: (-)*us*, -*vos*
     Example: *tirant-vos* [´wz] *aquí* 'throwing yourselves here'

c   Vocalic clitics (V-clitics)
   Locative   Pronunciation: [i]
     hi   Standard spelling: (-)*hi*
     Example: *Hi compro* '(I) shop there'

   Neuter   Pronunciation: [u]
     ho   Standard spelling: (-)*ho*
     Example: *Vol tirar-ho* '(S/he) wants to throw it out'

d   Clitics with one consonant, followed by a vowel representing a morpheme, and with an optional additional plural morph (CV(C)-clitics):
   3rd person dative sg.   Pronunciation: [li]
     li   Standard spelling: (-)*li*
     Example: *li tira allò* '(s/he) throws that to him/her'

   3rd pers. acc. fem. sg.   Pronunciation: [l´], [l]
     la   Standard spelling: (-)*la*, *l'*
     Example: *la tiro* '(I) throw it (fem.)/her'

   3rd pers. acc. fem. pl.   Pronunciation: [l´z]
     les   Standard spelling: (-)*les*
     Example: *les dic* '(I) say them (fem.)'

e   Third person masculine accusative clitics, with gender allomorphy
   3rd acc. masc. sg.   Pronunciation: [´l], [lu], [l]
     el   Standard spelling: (-)*el*, -*lo*, *l'*, *'l*
     Example: *el tirem* '(we) throw it(masc.)/him'

   3rd acc. masc. pl.   Pronunciation: [´lz], [luz], [lz]
     els   Standard spelling: (-)*els*, -*los*, *'ls*
     Example: *tirem-los aquí* 'let's throw them here'

The clitics presented in (2) can show up with some additional phonetic differences due to general phonological processes of the language. In Catalan, high vowels (/i/ and /u/) are often subject to glide formation, and this process might affect the locative clitic *hi*, the neuter clitic *ho* and the third dative clitics *li* and *"elzi"* (which can, therefore, appear also as [j], [w], [lj], and [(´)lzj], respectively; cf. *ho imita* [wi.m"€.t´] '(s/he) imitates it'). Final devoicing and voicing assimilation apply to all obstruents in Catalan, and there is also a process that voices word final fricatives (and affricates) before a vowel; through one of these processes the /t/ of the second person singular clitic *et* might become [d], all the instances of /z/, present in many clitics, might become [s], and the /s/ of the third person reflexive clitic *es* might be pronounced [z] (cf. *et dic* [´d.d"€k] '(I) tell you', *les tiro* [l´s.t"€.Ru] '(I) throw them (fem.)', *tirem-los* [ti.RE@m.lus] 'let's throw them', *es diu*

[´z.D"€w] 'it is said'). A place assimilation might affect the /t/ of the second person singular clitic *et* and the /n/ of the partitive clitic *en*, and a manner assimilation (of stops to homorganic nasals and laterals) might also affect the /t/ of *et* (cf. *et compro* [´k.ko@m.pRu] '(I) buy you', *et necessito* [´n.n´.s´.s"€.tu] '(I) need you'. In addition, Catalan has vowel reduction. In the variety being considered here, unstressed /a/, /E/ and /e/ are realized as [´], and unstressed /ç/ and /o/ are pronounced [u]. Differences in the spelling as *a* or *e* do not always reflect a phonological difference. This is the case of the third person accusative feminine clitics. *La* in the singular and *les* in the plural differ, phonologically and phonetically, only in the presence or absence of the plural morph ([l´] or [l´z]), not in the quality of the vowel, the feminine morph, which is always [´] (underlyingly /a/). All these phonological processes are ignored in the rest of the paper. In all the examples we keep the shape of the clitics as constant as possible (except for the voicing distinctions).[4]

As mentioned above, the clitics in (2) appear ordered according to their phonological behavior. The paper focuses especially on the phonetic forms adopted by the clitics in (2a), C-clitics, and (2b), CC(i)-clitics. Their distribution is outlined in table (3). (3a) includes all these cases, except for CC(i)-clitics in enclisis when the verb does not end in a vowel. As shown in (3b), the realization of these clitics depends on the segmental make-up of the clitic involved and the last segments of the verb (/w/, the second person plural morph; /m/, the first person plural morph; other single consonants, found with certain second person singular imperative forms; and /nt/, the gerund morph). We underline the schwas that are relevant to the analysis (the ones that have a variable appearence) and cross out the consonants that are deleted (advancing the conclusion that will be arrived at in section 6 as to what consonants are deleted in certain cases).

---

[4] We exclude from (2) the realization with a final schwa adopted by all the clitics otherwise ending in a sibilant (*es*, *ens*, *us*, *les*, *els*) when the following verb starts with a sibilant, the pronunciation in this context being [s´], [´nz´], [uz´] or [wz´], [l´z´] and [´lz], respectively (cf., e.g., *ens tira* [´ns.t"€.R´] '(s/he) throws to us' vs. *ens salva* [´n.z´.sa@l.B´] '(s/he) saves us', given in (1b)). The appearence of the schwa avoids the contact between two sibilants, a clear OCP effect. This "strategy" is restricted to pronominal clitics; it does not affect, for instance, the plural definite article, which has the same shape as the third person plural pronominal clitic: *els* and *les*. In the case of the article, as elsewhere in the language, the sibilants are fused (cf. *els sostres* [´l.sç@s.tR´s] 'the ceilings', *les sopes* [l´.so@.p´s] 'the soups'; also *coses senzilles* [kç$.z´.s´n.z"€.¥´s] 'simple things'). Given this additional wrinkle to the problem at hand, we don't include these cases in the analysis.

(3)   a. [´] ~ Ø alternation only

PROCLISIS		
clitic type	context	realization
C-clitics	__#V	C (cf. *n'imita* [ni.m"€.t´] '(s/he) imitates some')
	__#C/G	´C[5] (cf. *en tira* [´n.t"€.R´] '(s/he) throws some')
CC(i)-clitics	__#V	´CC(i) (cf. *ens obre* [´n.zç@.BR´] '(s/he) opens for us'; *"elzi" obre* [´l.zi.ç@.BR´] '(s/he) opens for them')
	__#C/G	´CC(i) (cf. *ens tira* [´ns.t"€.R´] '(s/he) throws (to) us'; *"elzi" tira* [´l.zi.t"€.R´] '(s/he) throws to them')
ENCLISIS		
clitic type	context	realization
C-clitics	V#__	C (cf. *tiri'n* [t"€.Rin] 'throw some (pol.)!')
	C/G#__	C´ (cf. *tirem-ne* [ti.RE@m.n´] 'let's throw some')
CC(i)-clitics	V#__	CC(i) (cf. *tiri'ns* [t"€.Rins] 'throw (to) us (pol.)!'; *tiri'"lzi"* [t"€.Ril.zi] 'throw to them (pol.)!')
	C/G#__	see (3b)

b. [´] ~ Ø alternation and/or C ~ Ø alternation in CC(i) clitics

	ENCLISIS		
context	*ens*	*"elzi"*	*us*
/w/#__	[ti.RE@wn.z´] *tireu-nos* 'throw (pl.) to us!'	[ti.RE@wl.zi] *tireu'"lzi"* 'throw (pl.) to them!'	[ti.RE@w.~~w~~z´] *tireu-vos* 'throw (pl.) yourselves!'
/m/#__	[ti.RE@m.~~n~~z´] *tirem-nos* 'let's throw ourselves'	[ti.RE@.m´l.zi] *tirem-"elzi"* 'let's throw to them'	[ti.RE@.m´ws] *tirem-vos* 'let's throw you (pl.)'
C#__	[fe@.z´ns] *fes-nos* 'do to us!'	[fe@.z´l.zi] *fes-"elzi"* 'do to them!'	non-existing
/nt/#__	[ti.Ra@n~~tn~~z´] *tirant-nos* 'throwing (to) us'	[ti.Ra@n.t´l.zi] *tirant-"elzi"* 'throwing to them'	[ti.Ra@n.t´ws] *tirant-vos* 'throwing (to) you'

The fact that the distribution of the clitic forms depends on the nature (consonant, glide or vowel) of the segment of the verb closest to the clitic indicates that the choice is driven by phonological factors, mostly related to syllable structure. The fact that the second person plural clitic *us* surfaces with an initial schwa in forms like *tirant-vos* [ti.Ra@n.t´ws] 'throwing (to) you' shows that the underlying form of this clitic contains a glide (/wz/) and, thus, behaves like the clitics that have two adjacent consonants, like

---

[5] There are few lexicalized expressions where the clitic has kept the etymological form CV before a verb starting with a consonant: *Com te* [t´] *dius?* 'What's your name' or *Tant me* [m´] *fa* 'I don't care'. We leave these cases aside.

"elzi" in *tirant-"elzi"*. If *us* had a vowel underlyingly (/uz/) its behavior should not differ from the one found with the vocalic clitic *ho*, /u/, which never surfaces with a schwa (cf. *tirant-ho* [ti.Ra@n.tu] 'throwing it').

V-clitics, in (2c), and CV(C)-clitics in (2d) are not central to this study precisely because they don't pose any specific syllabic problems. As for vocalic clitics, they surface as glides for instance in initial position when the verb starts with a vowel (cf. *ho tira* [u.t"€.R´] '(s/he) throws it' vs. *ho imita* [wi.m"€.t´]). As mentioned above, this glide formation is not specific to clitics. CV(C)-clitics, in (2d), have an underlying form which results in an unmarked syllable structure; for this reason they always surface faithful to their input (leaving aside the modifications caused by general processes of the language, of the types mentioned above). The clitics in (2e), the third person accusative masculine clitics *el* and *els*, surface, in this variety, with the masculine allomorph [u] in enclitic position when the verb ends in a consonant. In Catalan, the masculine morph is most commonly Ø (cf. *gat* [ga@t] 'cat', *cel* [sE@l] 'sky', *nas* [na@s] 'nose'), and has a marked allomorph *-o* [u], present in few words (cf. *toro* [tç@.Ru] 'bull', *gitano* [Zi.ta@.nu] 'gypsy', *maco* [ma@.ku] 'pretty'); the allomorph *-o* is the one that appears in the third person masculine enclitics [lu] and [luz]. Leaving aside the allomorphy issue, the third person masculine clitics have the same phonological behavior as clitics belonging to other groups: the singular form has a single consonant, /l/, and has basically the same behavior as C-clitics (it surfaces as a single [l], C, before a verb starting with a vowel, and as [´l], VC, before a verb starting with a consonant; its plural counterpart, *els*, which shows the typical plural morph /z/, behaves like CC(i)-clitics (like *ens*, *els* surfaces with an initial schwa before any verbal form). The presence of the allomorph [u], which nevertheless interacts with the phonological behavior of the clitics (it appears under the same phonological conditions as the schwa in other clitics), raises an issue different from the one we are dealing with in this paper: it can be no accident that the choice of the [u] allomorph in forms like *tirem-lo* [ti.RE@m.lu] 'let's throw him/it (masc.)' —instead of having a schwa (*[ti.RE@m.l´]), as is the case in sequences like *tirem-ne* [ti.RE@m.n´] 'let's throw some'— avoids the homophony with its feminine counterpart; cf. *tirem-la* [ti.RE@m.l´] 'let's throw her/it (fem.)' (see, in this line of work, Viaplana 1980). Because of the interaction between phonological constraints and constraints related to the choice of gender allomorphs (a rather different issue), we leave the analysis of third person masculine accusative clitics (the ones in (2e)) for further research.

2.2. Clitic sequences

In Catalan, two or more clitics can cooccur in one and the same clitic group.[6] As can be observed in the examples in (4), a schwa appears between the consonants that belong to different clitics, independently of their status as proclitics or enclitics:

---

[6] In this paper we use the term 'clitic group' only in a descriptive sense, to refer to a sequence of one or more clitics followed by a verbal form, or to a verbal form followed by one or more clitics. In fact, only concepts like lexical vs. functional word and prosodic word will be used in the analysis.

(4) a *Se li crema*   [s´.li.kRe@.m´]
         'Something of his/hers burns'
     b *Ens n'imita*   [´n.z´.ni.m"€.t´]
         '(s/he) imitates some of ours'
     c *se'nz "elzi" crema*   [s´n.z´l.zi.kRe@.m´]
         'it burns on them and it affects us'
     d *Se us n'obren*   [s´w.z´.nç@.BR´n]
         'Some of yours (pl.) open'
     e Vol *quedar-se-te-me'n* tres [k´.Da@r.s´.t´.m´n]
         '(s/he) wants to keep three, and it affects you and me somehow'
     f *Quedem-nos-les*   [k´.DE@m.z´.l´s]
         'Let's keep them (fem.) (for ourselves)'
     g. *Tiri-se-n'hi*   [t"€.Ri.s´.ni]
         'throw (sg., pol.) to yourself some there'

At this point it is interesting to note that in a sequence like (4a) the schwa appears after the *s* of the third person reflexive pronoun ([s´]), while the schwa appears before the *s* of the reflexive clitic if it is the only proclitic and the verb starts with a consonant (cf. *es tira* [´s.t"€.Ra]). The example in (4d) provides an additional argument for the underlying status of the glide in the second person plural clitic *us*: when any consonantal clitic is followed by a vocalic clitic, like *ho*, no schwa appears between the two clitics (*s'ho creu* [su.kRE@w], *[s´w.kRE@w], '(s/he) believes it'; *ens ho creiem* [´n.zu.kR´.jE@m], *[´n.z´w.kR´.jE@m]); the fact that a schwa appears between the *s* of the reflexive clitic and the glide in (4d) shows that the clitic *us* must be non-vocalic. Notice, finally, that the presence of the schwa between clitics simplifies syllable structure, which becomes (leaving aside the final consonant of the sequence) as close as possible to the unmarked (CV) syllable structure; two adjacent consonants appear only when they belong to the same clitic.

3. The underlying form of clitics

From the description of the clitics of Barceloní in section 2 it could be seen that each clitic surfaces with a generally fixed consonant (or more than one consonant), while schwas might be present or not and, when they are present, they might occupy different positions (recall, for instance, that the partitive clitic might surface without a schwa, [n], with a schwa to its left, [´n], or with a schwa to its right, [n´]). So, a first question that needs to be answered is whether the schwas are the product of a phonological "process" of epenthesis or they are present underlyingly. Under the first hypothesis, the partitive clitic has a single underlying form, /n/, and the different phonetic outputs are derived through the application of processes or constraints to be determined. Under the second hypothesis, the partitive clitic has three underlying forms, /n/, /´n/, and /n´/, and what needs to be decided then is how to choose among the three allomorphs in different contexts.[7] The choice between the two hypotheses is not immediately evident, but our

---

[7] The number of allomorphs could be reduced to two, /´n/ and /n´/, by attributing the realization [n] to phonological deletion. Given that this hypothesis would present further

conclusion will be that for Barceloní the epenthesis hypothesis is preferable, both empirically and on general grounds (since it is more restrictive).

Under the allomorphy hypothesis, there are two possibilities with respect to the choice of allomorphs. One possibility is to attribute the choice to mere stipulation and the other one is to derive the choice from independently needed constraints in the language (along the lines of the analysis of external allomorphy found, for instance, in Tranel 1996, Mascaró 1996 and Perlmutter 1998). As shown above, the choice of forms depends on phonological factors; it could be assumed, then, that the choice of allomorph interacts with constraints related to syllabification. Under this hypothesis, the choice of /n/ in an example like *n'imita* [ni.m"€.t´] '(s/he) imitates some' could be attributed to syllabification issues because the other options, *['.ni.m"€.t´], with the allomorph /´n/, and *[n´.i.m"€.t´], with the allomorph /n´/, lack an onset, and *[n´j.m"€.t´], also with the allomorph /n´/, has a coda (absent in the actual output [ni.m"€.t´]). An output like *imita'n* [i.m"€.t´n] 'imitate some!', with the allomorph /n/, could be favored over *[i.m"€.t´.n´], with the allomorph /n´/, because the language prefers prosodic words ending in a consonant (something that will be argued for later). However, this reasoning would not explain why, then, [i.mi.tE@m.n´] (*imitem-ne* 'let's imitate some'), with the final vowel of the allomorph /n´/, would be favored over a candidate like *[i.mi.tE@.m´n], with the allomorph /´n/ (notice that both candidates have a coda). Furthermore, in an example like *en tira* ['n.t"€.R´] '(s/he) throws some', it would be impossible to resort to syllabification factors for the choice of the allomorph /´n/ (which causes the lack of an onset and the presence of a coda) over the allomorph /n´/, given that the allomorph /n´/ would provide a much better syllabification: *[n´.t"€.R´] (presence of onsets, lack of codas, all syllables with a CV structure). So, in these cases, the choice of one allomorph over another would have to be a mere stipulation (and also the choice of allomorph for the other C-clitics). As shown in (3a), all C-clitics have exactly the same type of outputs. The consonant is always constant: /s/ for the reflexive third person, /m/ for the first person singular, /t/ for the second person singular, and /n/ for the partitive. Such a parallel behavior would be just a coincidence under the allomorphy hypothesis. As we shall see in section 6, the facts follow naturally under the epenthesis hypothesis.

When we take a look at clitics with two adjacent consonants, CC(i)-clitics, we also see that they behave alike, as illustrated by the comparison between the first person plural clitic *ens* and the third person dative plural clitic *"elzi"* (see also (3b)).

(5) a. *tiri'ns* [t"€.Rins]   [ns]   'throw (to) us (pol.)'
         tiri'"lzi" [t"€.Ril.zi]   [lzi]   'throw to them (pol.)'

     b. *ens tira* ['ns.t"€.R´]   ['ns]   'throws (to) us'
         "elzi" tira ['l.zi.t"€.R´]   ['lzi]   'throws to them'

     c. *tireu-nos* [ti.RE@wn.z´]   [nz´]   'throw (2nd pl.) (to) us'
         tireu'"lzi" [ti.RE@wl.zi]   [lzi]   'throw (2nd pl.) to them'

---

complications related to the deletion of ['] in other contexts, we do not consider it in the text.

In (5a) the two enclitics are next to a verb ending in a vowel and they surface with no schwa; both clitics start with two adjacent consonants. In (5b) both proclitics start with a schwa. Without those schwas, the sequences could not be properly syllabified (*[nst"€.R´], *[lzi.t"€.R´]); in these two examples, it is also important to note that the schwa appears exactly in the same position, before the two consonants of the clitics, not between them, for example (something like *[n´s.t"€.R´], with the schwa between the two consonants of the clitic would have a better syllabification, and could have been a possible allomorph). Finally, in (5c), the two enclitics surface without an initial schwa and, given the appearence of a schwa after the two consonants of the first person plural clitic ([nz´]), both clitics end up having the structure CCV. Although this type of cases will be discussed in greater depth in section 6, let us note here that the output syllabification of the sequences [RE@wn] (in *tireu-nos*) and [E@wl] (in *tireu'"lzi"*) does not violate the sonority hierarchy but contains a coda with a glide plus a sonorant consonant, something extremely rare in Catalan. Under an allomorphy hypothesis, given that there would be allomorphs of the type /´nz/ and /´lzi/ (the ones that would appear in (5b)), there would be no syllabification related justification for not choosing them; sequences like *[ti.RE€.w´ns] and *[ti.RE@.w´l.zi] would have a much better syllabification than [ti.RE@wn.z´] and [ti.RE@wl.zi], respectively (the syllabification is simpler, and a complex coda like [ns], present in *[ti.RE€.w´ns] is fairly common in Catalan; cf. *nens* [nE@ns] 'children', *constar* [kuns.ta@] 'to consist'). Here, again, the choice of /nz´/ over /´nz/ and the choice of /lzi/ over /´lzi/ would have to be stipulated, while the facts follow naturally under the epenthesis analysis to be presented. As we shall see, the analysis explains why the insertion of an epenthetic vowel improves the syllabification, even though in many cases it does not yield the syllabically optimal form.

A final point that can be made in favor of the epenthesis hypothesis is that schwa, the vowel that might be present (with different locations) or absent in clitics, is the epenthetic vowel in the dialect of Catalan under discussion. This vowel is the one that appears, for instance, in clear cases of initial epenthesis, as the ones illustrated in (6), with English clear cognates.

(6)   English example   (Barceloní) Catalan pronunciation
      slip   [´z.l"€p]
      stop   [´s.tç@p]
      squash   [´s.kwa@S]
      Springsteen   [´s.pR"€Ns.tin]
      Sputnik   [´s.pu@n.nik]

The idea that the schwas that appear with clitics (and cannot be attributed to gender) are epenthetic is present, among others, in Wheeler (1979), Viaplana (1980), Mascaró (1986), and DeCesaris (1987). Among these authors, only Wheeler (1979) offers a detailed analysis of all the contexts in which epenthesis might take place.

Assuming, then, the epenthesis analysis, the underlying forms of the clitics to be assumed are the ones given in (7).

(7)   Underlying forms for Barceloní pronominal clitics

    a   Monoconsonantal clitics (C-clitics)   Citation form

third person reflexive:	/s/	*es*
first person singular:	/m/	*em*
second person singular:	/t/	*et*
partitive :	/n/	*en*

    b   Biconsonantal clitics (CC(i)-clitics)

first person plural:	/nz/	*ens*
third person dative pl.:	/l+z+i/	*"elzi"*
second person plural:	/wz/	*us*

    c   Vocalic clitics (V-clitics)

locative :	/i/	*hi*
neuter :	/u/	*ho*

    d   Monoconsonantal clitics with a vowel representing a morpheme (and with an optional plural morph) (CV(C)-clitics)

third person dative sg.:	/l+i/	*li*
third pers. acc. fem. sg.:	/l+a/	*la*
third pers. acc. fem. pl.:	/l+a+z/	*les*

    e   Third person accusative non-reflexive clitics, with gender allomorphy

singular:	/l/, /l+u/	*el*
plural:	/l+z/, /l+u+z/	*els*

Viaplana (1980) and Mascaró (1986) argue that the /i/ found in the third person dative clitics ([li] in the singular and [(ˊ)lzi] in the plural) is the dative morph; the /l/ is the morph common to all third person non-reflexive clitics, and the /z/ of [(ˊ)lzi] is the plural morph. We assume their analysis here. In the third person accusative feminine clitic the /a/ is the feminine morph.

There are two possible analyses for the underlying structure of the first and second person plural clitics, *ens* and *us*. One possibility, followed by Wheeler (1979), Mascaró (1986) and Bonet (1991), is to assume that the final /z/ of these clitics is the plural morph, and that /n/ and /w/ are allomorphs of the first and second person morphemes (which have the form /m/ and /t/, respectively, in the singular). The other possibility, assumed in this paper, is that these clitics do not have an internal morphological structure: /nz/ is an unanalyzable form corresponding to the first person plural clitic, and /wz/ is an unanalyzable form corresponding to the second person plural clitic. This assumption is crucial when dealing with consonant deletion in the clitic group, as will be shown in section 6.4. Moreover, as argued earlier, there are reasons to believe that the second person plural clitic has a glide underlyingly, at least when it is not initial in the clitic group; recall that it causes the appearence of schwa when it is preceded by a consonantal clitic (cf. *Se us n'obren* [sˊw.zˊ.nç@.BRˊn] 'Some of yours (pl.) open', given in (4d)), and that it behaves like CC(i)-clitics in enclitic position (*tirant-vos* [ti.Ra@n.tˊws] 'throwing you' has a schwa, like *tirant-"elzi"* [ti.Ra@n.tˊl.zi] 'throwing to

them'). If /wz/ were the only underlying form for the second person plural clitic, however, it is not clear why the output would be [uz], instead of *['ˈwz] (parallel to *ens* [ˈnz]) when the clitic is initial in the clitic group (cf. *us dono* [uz.Do@.nu] '(I) give to you' and *us la dono* [u.z´.l´.Do@.nu] '(I) give it (fem.)/her to you (pl.)'). A constraint forcing the vocalization of the underlying glide would have to be very specific because, otherwise, it would apply in unwanted contexts, like in non-initial position in the clitic group, for instance (a form like *tirant-vos* /tiRant+wz/ could become *[ti.Ra@n.tus] instead of [ti.Ra@n.t´ws]). For the time being, and in order to avoid having to posit non-universal constraints, we prefer to assume the existence of two allomorphs, and stipulate the choice between the two (/uz/ at the beginning of a clitic group, /wz/ elsewhere). In the analysis we concentrate only on the cases with /wz/, given that it is in these contexts that vowel insertion and consonant deletion might take place.

As mentioned earlier, in the analysis that we present in section 6 we ignore, in spite of its interest, the fate of the third person masculine accusative clitics, the ones that show gender allomorphy (cf. (2e) or (7e)). Our analysis focuses on insertion and deletion, the "processes" caused by the presence of C-clitics in (7a) and CC(i)-clitics in (7b), both when the clitic group contains a single clitic and when it contains two or more clitics. V-clitics, in (7c), and CV(C)-clitics, in (7d) (the third person dative singular *li*, the third person accusative feminine singular *la* and the third person accusative feminine plural *les*) will not be in the center of discussion because their "well behaved" syllabic structure rarely causes the appearance of any of the phenomena just mentioned.

4. Previous approaches

The first generative approach to the phonology of pronominal clitics appears in Wheeler (1979), who provides an SPE type of account based on a Central Catalan variety almost identical to the one analyzed in this paper. Wheeler proposes rules like the following ((8) corresponds to his rule (27), p. 168):

(8)   Ø Ø´ /   ∉ # ___ C # C ÷
                © C # C ___ # "

The first context accounts for the insertion of schwa in examples like *en dóna* [ˈn.do@.n´], from /n#don´/; the second context accounts for cases like *fer-ne* [fe@r.n´], from /feR#n/. As has repeatedly been pointed out, this type of account is basically only a descriptive device; it does not explain why there is epenthesis (another dialect could just lack the rule in (8)) and why it occurs in that specific context (another similar rule could have been posited by which vocalic epenthesis applied next to a vowel).

In later generative phonology, Itô (1989) argues for a non-rule-based theory in which epenthesis and the location of the epenthetic segment follow from requirements of prosody. Syllable templates and wellformedness conditions such as the Onset Principle, the Coda Filter or a principle of Sonority Sequencing characterize syllabic wellformedness. Under that type of account, the fact that, in Catalan, onsets are maximized over codas (cf. *petroli* [p´.tRç@.li] 'petroleum', *sublim* [su.Bl"€m] 'sublime')

should indicate that syllabic template mapping operates from right to left. A right-to-left mapping would provide the right results for a sequence like *en dóna*, but would make the wrong prediction for the epenthesis site in an example like *donem-ne*:

(9)   Right-to-left:
      /n#don´/ ∅ [´n.do@.n´]   /donEm#n/ ∅ *[du.nE@.m´n]
      '(s/he) gives some'   'let us give some'

If a left-to-right mapping were chosen instead, the results would be the opposite: we would obtain the right epenthesis site for *donem-ne* but the wrong one for *en dóna*:

(10) Left-to-right:
      /n#don´/ ∅ *[n´.Do@.n´]   /donEm#n/ ∅ [du.nE@m.n´]

Itô's directionality account fails to capture the peripherality of Catalan epenthesis (which is also found in words without clitics. Cf. /stçp/ ∅ [´s.tç@p]; /pçbR/ ∅ [pç@.BR´] 'poor (masc.)').

To our knowledge, only Colina (1995), Serra (1996) and Jiménez (1997) offer an analysis of epenthesis in the pronominal clitic system of Catalan within Optimality Theory. In Colina (1995) and Serra (1996), the analysis is fairly schematic and does not take all the data into account. Jiménez (1997) offers a more complete account based on a quite different variety, Valencian (in which epenthesis in the clitic group is usually to the right of the clitic). In the sections that follow, we discuss the most relevant aspects of these proposals in comparison to ours.

5. Questions to be answered

5.1. Syllabic motivation for epenthesis and epenthesis site

In many cases, the insertion of a schwa in the clitic group repairs an impossible syllabification in Catalan, as illustrated in (11) ((11a) with proclisis, (11b) with enclisis, and (11c) with a clitic cluster).

(11) a   *en tira*
          /n#tiR´/:   *[n.t"€.R´]   [´n.t"€.R´]) '(s/he) throws some'
                           *[nt"€.R´]

          es lesiona
          /s#l´zjon´/:   *[z.l´.zjo@.n´]   [´z.l´.zjo@.n´]) '(s/he) hurts herself/himself'
                           *[zl´.zjo@.n´]

          em perdo
          /m#pERdu/:   *[m.pE@r.Du]   [´m.pE@r.Du]) '(I) get lost'
                           *[mpE@r.Du]

          ens creu
          /nz#kREw/:   *[ns.kRE@w]   [´ns.kRE@w]) ('(s/he) believes us'
          "elzi" dono

/l+z+i#donu/:   *[lzi.Do@.nu]   [´l.zi.Do@.nu]) '(I) give to them'
                *[l.zi.Do@.nu]

b   *tirem-ne*
  /tiREm#n/:   *[ti.RE@.mn]   [ti.RE@m.n´]) 'let's throw some'
              *[ti.RE@mn]
  fes-me
  /fez#m/:   *[fe@.zm]   [fe@z.m´]) 'do to me!'
              *[fe@zm]
  tirem-"elzi"
  /tiREm#l+z+i/: *[ti.RE@.ml.zi]   [ti.RE@.m´l.zi] 'let's throw to them'
              *[ti.RE@ml.zi]

c   *se n'agafa*
  /s#n#´gafˇ/: *[z.n´.ʃa@.fˇ]   [s´.n´.ʃa@.fˇ] 'takes some for her/himself'
              *[zn´.ʃa@.fˇ]

A consonant cannot be a nucleus in Catalan, as shown, for instance, in the first example of (11a), *[n.t"€.R´]. The syllabification of consonant clusters as complex onsets (in proclisis examples like *[nt"€.R´] or *[zl´.zjo@.n´]) or complex codas (in enclisis examples like *[ti.RE@mn]) is impossible in the examples (in most cases they violate the sonority hierarchy). The insertion of a schwa, then, allows for the syllabification of an otherwise stranded consonant. Of course, in proposing an analysis one has to contemplate other possibilities, not only epenthesis; deletion of one of the consonants, for example, would also solve the syllabification problem.

Given that syllable structure plays an important role in the analysis of epenthesis, we give in (12) the possible onsets and codas in Catalan (as mentioned above, there are no syllabic consonants in the language). We exclude glides from the description in (12) because the facts are a little bit more complex and variable; we mention them only when they are relevant to the analysis. Let us only say for now that they can never cause a violation of the sonority hierarchy.

(12) Syllable structure in Catalan.
    a. Onsets: • At most 2 consonants.
                  • If one consonant, C: any consonant
                  • If two consonants, C_1: stop (possibly spirantized) or [f]; C_2: [l] or [R] (but *[tl], *[dl], *[Dl]): [pR], [pl], [bR], [BR], [bl], [Bl], [tR], [dR], [DR], [kR], [kl], [gR], [ʃR], [gl], [ʃl], [fR], [fl]).
                  (cf. *gros* [gRç@s] 'big', *cabra* [ka@.BR´] 'goat', *problema* [pRu.BlE@.m´], *inflar* [iM.fla@] 'to inflate'
                  (• Complex onsets with initial *s* are not allowed.)

    b. Codas: • At most 3 consonants, in word-final position. Normally, $C_3 = s$.
                  (cf. *arc* [a@rk] 'arc', *porcs* [pç@rks] 'pigs', *Alps* [a@lps] 'Alps', *text* [te@kst] 'text')

- At most 2 consonants, in word-medial position. Normally, C$_2$ = *s* (cf. *èxtasi* [E@<u>ks</u>.t´.zi] 'ecstasy', *instaurar* [i<u>ns</u>.t´w.Ra@] 'to establish', *marxista* [m´<u>rk</u>.s"€s.t´] 'marxist').
- The consonants have to appear ordered in decreasing sonority, except for *s*, which can violate the sonority scale.

Not all the cases of schwa epenthesis in the clitic group can directly be related to a general syllabification problem, but seem to be specific to the clitic group. The examples in (13) illustrate several cases of epenthesis where the consonant clusters (or glide plus consonant clusters) would constitute possible complex codas or complex onsets. (13a) contains most of the examples, with enclisis, and (13b) contains one example with proclisis.

(13) a *tireu-ne*
/tiREw#n/: *[ti.RE@<u>wn</u>] ([ti.RE@w.n´] 'throw (pl.) some!')
but cf. *tireu-nos* [ti.RE@<u>wn</u>.z´] 'throw (pl.) us!'
and *clown* [kla@<u>wn</u>] 'clown'

tirar-ne
/tiRaR#n/: *[ti.Ra@<u>rn</u>] ([ti.Ra@r.n´] 'to throw some')
but cf. *carn* [ka@<u>rn</u>] 'meat'

fer-me
/feR#m/: *[fe@<u>rm</u>] ([fe@r.m´] 'to do to me')
but cf. *ferm* [fE@<u>rm</u>] 'firm'

tirar-se
/tiRaR#s/: *[ti.Ra@<u>rs</u>] ([ti.Ra@r.s´] 'to throw oneself')
but cf. *quars* [kwa@<u>rs</u>] 'quartz', *cars* [ka@<u>rs</u>] 'expensive (pl.)'

tirin-se
/tiRin#s/: *[t"€.Ri<u>ns</u>] ([t"€.Rin.s´] 'throw yourselves (pol.)')
but cf. *tiri'ns* [t"€.Ri<u>ns</u>] 'throw to us (pol.)!'
and *fenòmens* [f˝.nç@.m´<u>ns</u>] 'phenomena'

tirant-se
/tiRant#s/: *[ti.Ra@<u>ns</u>] ([ti.Ra@n.s´] 'throwing (to) oneself')
but cf. *tirants* [ti.Ra@<u>ns</u>] 'straps, braces'

tireu-nos
/tiREw#nz/: *[ti.RE@wns] ([ti.RE@wn.z´] 'throw (pl.) to us!')
but cf. *clowns* [kla@wns]

b *es ioda*
/s#jçd´/: *[s<u>j</u>ç@.D´] ([´z.jç@.D´] '(it) is iodized')
but cf. *ciència* [sjE@n.sj´] 'science'

With respect to the first example in (13a), it must be said that, as mentioned earlier, complex codas with a glide followed by a sonorant consonant are very rare (although they are becoming more and more frequent through borrowings), and are totally impossible in some varieties. In Barceloní, however, they are possible and, as shown in the example, they can appear in the clitic group (cf. *tireu-nos* [ti.RE@<u>wn</u>.z´] 'throw (pl.) us!', and *tireu'"lzi"* [ti.RE@<u>wl</u>.zi] 'throw (pl.) to them!'). The example in (13b) contains a rising diphthong, and this type of diphthong is restricted to very specific contexts in

many varieties of Catalan, not so much in Barceloní. For other dialects of Catalan the example in (13b) would be irrelevant to the discussion; this is not the case for the examples in (13a). The facts in (13a) have all been noticed by Jiménez (1997), and partially by Serra (1996), who does not take into account forms like *tirin-se*, which crucially contrasts with *tiri'ns*; none of these accounts pays attention to the facts in (13b). Colina (1995) only provides an analysis for the type of cases in (11), where epenthesis repairs an impossible syllabification.[8]

A final aspect related to epenthesis that has to be accounted for is the epenthesis site. The analysis has to account for the fact that epenthesis generally occurs peripherally to the clitic group when there is only one clitic (cf. /tiREw#n/: [ti.RE@w.nˊ]) 'throw (pl.) some!'; /n#tiRˊ/: [ˊn.tˮ€.Rˊ] '(s/he) throws some'), that nevertheless there are some cases of medial epenthesis (cf. /tiREm#l+z+i/: [ti.RE@.mˊl.zi] 'let's throw to them') and that an epenthetic vowel appears systematically between non-vocalic clitics, even when it is not needed for syllabification purposes, as is the case for the second epenthetic vowel in [ˊn.zˊ.lˊ.ʃa@.fˊ], from /nz#l#ˊgafˊ/ '(s/he) takes it (fem.) from us'.

5.2. Consonant deletion

In addition to the appearence of an epenthetic vowel, one or more consonants might be deleted when clitics are combined with verbs, especially in enclisis. Again, there are two cases to be distinguished: Cluster Simplification, a well-known process that occurs independently in the language (first case), and the deletion of specific consonants, which only takes place within the clitic group (second case). Cluster Simplification, the first case, is a process that affects stops in coda position when they are preceded by a homorganic nasal or lateral (cf. *pont*: [pç@n] 'bridge' vs. *pontet*: [pun.tE@t] 'small bridge'). It is assumed to be a lexical process because it applies even when the next word

---

[8] Many imperatives from the second and third conjugations end in a consonant in isolation, but surface with a schwa, in many varieties, when a pronominal clitic follows: [ku@s] (*cus* 'sew!') but [ku@.zˊn] (*cus-ne* 'sew some!'), and even [ku@.zˊw] (*cus-ho* 'sew it!'). Given that, as pointed out in the text, epenthesis might take place when it is not strictly needed for syllabification, one might be led to think that the schwa that appears in examples like *cus* when followed by a clitic is an epenthetic vowel. Leaving aside the fact that the epenthesis site in these examples would be quite unusual (epenthesis is peripheral whenever possible), there are other imperatives ending in a consonant that do not surface with a schwa after the verbal form, as shown by examples like [fe@s] (*fes* 'do!'): [fe@z.nˊ] (*fes-ne* 'do some!'), with peripheral epenthesis, or [fe@.zu] (*fes-ho* 'do it!'), without a schwa. No phonological constraints, with a specific ranking, could give as optimal outputs both [ku@.zˊn] and [fe@z.nˊ] from inputs like /kuz#n/ and /fez#n/, respectively (or [ku@.zˊw] and [fe@.zu], from /kuz#u/ and /fez#u/). With Fabra (1913 I) and, more recently, Mascaró (1986), we believe that the [ˊ] present in forms like [ku@.zˊn] and [ku@.zˊw] has to be attributed to verbal allomorphy; the underlying forms corresponding to the outputs just mentioned are then /kuzˊ#n/ and /kuzˊ#u/, respectively, and, as we saw, when the verb ends in a vowel (in the text often illustrated with examples like *imita* or *tira*) no epenthesis takes place.

starts with a vowel (a sequence like *pont antic* [pç\$.n´n.t"€k] has Cluster Simplification in spite of the fact that the /t/, like the /n/ in the grammatical output, could have been resyllabified as an onset: *[pç\$n.t´n.t"€k]). At least with respect to this process, clitics have to be assumed to be part of the lexical phonology, given that a verb final stop remains before a clitic as long as it can be syllabified as an onset. In a sequence like *tirant-ho* /tiRant#u/ 'throwing it', for instance, the verb final /t/ can become an onset because the clitic is a vowel: [ti.Ra@n.tu]; in *tirant-ne* /tiRant#n/ 'throwing some', however, the /t/ has to remain in coda position and is deleted (resyllabification does not apply between a verb and a clitic starting with a consonant, as we shall see later, and, in any case, /tn/ is not a legitimate onset in Catalan) : [ti.Ra@n.n´].[9]   In the empirical material presented in this paper, the only context in which Cluster Simplification might potentially take place is in enclisis when the verb is a gerund, given that the gerund morph for all conjugations is /nt/.

With respect to the second case, there are four other instances of consonant deletion, which are not related to a general process of the language. In an imperative, when the second person plural verbal morph /w/ is concatenated with the second person plural (en)clitic *us* /wz/, which starts with /w/, only one glide surfaces: *tireu-vos* /tiREw#wz/ becomes [ti.RE@w.z´] 'throw yourselves', with a single [w] (but cf. *beu whisky* [bEw.w"€s.ki] '(s/he) drinks whisky'). As predicted by the analysis to be proposed, the [w] that stays belongs to the verb, not to the clitic. The other cases of deletion affect the /n/ of the first person plural clitic *ens* /nz/. A case parallel to the one mentioned with *us* involves the first person plural clitic in forms like *tirin-nos* 'throw (pl.) to us (pol.)!', underlyingly /tiRin#nz/, which has two adjacent /n/; the grammatical output keeps only one of the two /n/ (and has epenthesis): [t"€.Rin.z´] (but cf. *tenen nas* [te\$.n´n.na@s] '(they) have a nose'). When *ens* appears after a verbal form which is also first person plural (with the morph /m/), the /n/ of the clitic is deleted, as is clear from examples like *tirem-nos* /tiREm#nz/, which becomes [ti.RE@m.z´], with the /m/ of the verb but without the /n/ of the clitic (but cf. *tenim nas* [t´.nim.na@s] '(we) have a nose'). Finally, when it appears after a gerund morph (/nt/), the /n/ of the clitic is also deleted (as well as the /t/ of the gerund), although in this case it is not immediately obvious: *tirant-nos* /tiRant#nz/ 'throwing (to) us' becomes [ti.Ra@n.z´] (but cf. *pont nou* [pçn.nç@w] 'new bridge').

5.3. Summary

To summarize, the facts that have to be accounted for are the following: (1) the presence of an epenthetic vowel in otherwise unsyllabifiable clusters; (2) the presence of an epenthetic vowel when there are no apparent syllabification problems; (3) the location of the epenthetic vowel, both when there is only one clitic and when there are more clitics in

---

[9] Following Steriade (1982) and others, one could derive deletion from impossibility of syllabification. We do not think this is the best approach to deletion, among other things because in very specific cases, with morphological conditioning, a consonant cluster can be maintained even when the stop cannot be syllabified as an onset; cf. *alt* /alt/ [a@l] 'tall' vs. *resolt* /R´zçl+t/ [r´.zç@lt] 'solved', where /t/ is the participial morph. We assume, in the rest of the paper, that clusters like /nt/ (or /lt/) are legitimate codas in Catalan.

a sequence; (4) the deletion of certain consonants in specific contexts. In what follows, we provide an analysis of all these facts within OT. In section 6.1 the clear cases of epenthesis, of the type illustrated in (11), are accounted for. Sections 6.2 and 6.3 argue for the need of specific Alignment constraints to account for the apparently unmotivated epenthesis, illustrated in (13), but also for other more general facts related to syllabification in Catalan. Section 6.4 is devoted to the cases of deletion and section 6.5 deals with clitic sequences.

6. Analysis

6.1. Standard cases of epenthesis

As we saw, in many cases epenthesis repairs an impossible syllabification. From an underlying sequence like /tiREm#n/ (with the actual pronunciation [ti.RE@m.n´] 'Let's throw some'), GEN will provide, among many others, several faithful candidates without epenthesis or deletion and with an illegitimate syllabification in Catalan. For instance, one candidate will have the final /n/ as a nucleus and another one will have the /m/ as a nucleus; both candidates will fatally violate the constraint *P/C ("C may not associate to Peak (Nuc) nodes", Prince and Smolensky 1993), which is undominated in Catalan. Another illegitimate candidate will have the /mn/ cluster as a coda, violating, also fatally, the sonority related constraints. In this paper, in order not to distract the attention from the most relevant issues, we collapse all the constraints that would rule out an impossible syllabification in Catalan, all undominated constraints in the language, under the name *σ-STRUC. In the tableaux that follow, examples like /tiREm#n/ will be provided with a single totally faithful candidate ([ti.RE@mn]), which will show a fatal violation of *σ-STRUC. The specific constraints that in each case would rule out all faithful candidates in this type of cases could be, for instance, the ones proposed in Colina (1995) or Jiménez (1997, 1999), in their analyses of syllable structure in Catalan within the OT framework. *σ-STRUC, when relevant, always appears undominated in the tableaux.

In all the cases where epenthesis due to syllabification problems takes place, the optimal candidate violates the correspondence constraint DEP(ENDENCE) ("Every element of S_2 has a correspondent in S_1", McCarthy and Prince 1995), a constraint with a relatively low ranking in Catalan, as we shall justify when we take a look at clitic clusters.[10] The most important fact that needs to be accounted for is the peripheral position of the epenthetic vowel. Recall that in proclitic position the schwa appears before the clitic (cf. *en tira* /n#tiR´/: [´n.t"@.R´] '(s/he) throws some'), while in enclitic position the schwa usually appears in final position (cf. *tirem-ne* /tiREm#n/: [ti.RE@m.n´] 'let's throw some'). Notice that in both [´($_n$cl) ($_V$t"€R´)] and [(tiRE@m$_V$) ($_{cl}$n)´], the edges of V (verb) and cl (clitic) coincide, while this is not the case in candidates with non-peripheral epenthesis, like *[($_n$cl)´($_V$t"€R´)] and *[(tiRE@m$_V$)´($_{cl}$n)]. Leaving aside the constraints that force the

---

[10] In this paper, DEP refers only to vowels. DEP for consonants has to be very highly ranked in Catalan, given that consonant epenthesis is limited to very specific environments related to rhotics.

appearence of an epenthetic vowel, the crucial constraints in determining the peripheral position of this vowel are the morphological Alignment constraints ALIGN(V-CL) and ALIGN(CL-V), defined below.

(14) a   ALIGN (V-CL): Align the right edge of V(erb)[–tense] with the left edge of a pronominal clitic.

  b   ALIGN (CL-V): Align the left edge of V(erb)[+tense] with the right edge of a pronominal clitic.

These two constraints account for the position of clitics with respect to the verb; they will be enclitics after an infinitive, a gerund and an imperative, and proclitics otherwise.[11] In a form like [ti.RE@.m´l.zi] (from /tiREm#l+z+i/ 'let's throw to them'), ALIGN (V-CL) is violated because the right edge of the verb is not aligned with the left edge of the clitic due to the presence of the schwa in between. As we shall shortly see, in this case the violation of ALIGN (V-CL) is unavoidable. In the rest of the paper, given that we do not have evidence for a different ranking of the two alingment constraints, we collapse ALIGN (V-CL) and ALIGN (CL-V) under the name ALIGN (CL/V) (AL (CL/V)). As shown in the tableaux below, ALIGN (CL/V) determines the peripheral position of the schwa. We include in the tableaux the constraints related to syllable structure ONS(ET) ("Syllables must have onsets", Itô 1989, Prince and Smolensky 1993) and NO-CODA ("Syllables may not have a coda", Prince and Smolensky 1993, McCarthy and Prince 1994), whenever they are relevant. For the time being we exclude from the tableaux candidates with deletion of a consonant. The issue of deletion, both when it occurs and when it does not occur, is discussed later.

(15) *tirem-ne* /tiREm#n/: [ti.RE@m.n´] 'let's throw some'

/tiREm#n/	*σ-STRUC	AL (CL/V)	NO-CODA	DEP
ti.RE@mn	*!		*	
ti.RE@.m´n		*!	*	*
ti.RE@.m´.n´		*!		**
☞ti.RE@m.n´			*	*

(16) *en tira* /n#tiR´/: [´n.t"€.R´] '(s/he) throws some'

/n#tiR´/	*σ-STRUC	AL (CL/V)	ONS	NO-CODA	DEP
nt"€.R´	*!				
☞´n.t"€.R´			*	*	*
n´.t"€.R´		*!			*

The tableau in (16) shows that AL (CL/V) has to be ranked higher than ONS and NO-CODA, given that the optimal candidate violates the two syllabification related constraints. (16) provides an additional argument against the allomorphy approach. If the partitive clitic had three allomorphs /n/, /´n/ and /n´/, a constraint like AL (CL/V) would

---

[11] Colina (1995), Serra (1996) and Jiménez (1997) propose similar constraints.

be irrelevant because the three allomorphs would satisfy it (the edge of the clitic would always be adjacent to the edge of the verb); so, the choice would be left to the phonological constraints, but these would always favor *[nˊ.t"€.Rˊ] over [ˊn.t"€.Rˊ], given that *[nˊ.t"€.Rˊ] has a perfect syllabification (with only CV syllables), while [ˊn.t"€.Rˊ] violates two syllable related constraints, ONS and NO-CODA.

In the case of CC(i)-proclitics, like *ens*, the very high ranking of the constraint (IO)-CONT(IGUITY) (banning morpheme internal deletion or epenthesis, see Kenstowicz 1994 and McCarthy and Prince 1995) determines the choice of [ˊns.t"€.Rˊ] over *[nˊs.t"€.Rˊ] (from /nz#tiRˊ/ '(s/he) throws (to) us'), in spite of the fact that the optimal candidate violates the syllabic constraint *COMPL(EX)$^{C(ODA)}$ ("Codas are simple (no complex codas allowed)", see Prince and Smolensky 1993) and ONS, among others.

(17) *ens tira* /nz#tiRˊ/: [ˊns.t"€.Rˊ] '(s/he) throws (to) us'

/nz#tiRˊ/	*σ-STRUC	CONT	AL (CL/V)	ONS	*COMPL^C	DEP
nst"€.Rˊ	*!					
☞ˊns.t"€.Rˊ				*	*	*
nˊs.t"€.Rˊ		*!				*
ˊn.zˊ.t"€.Rˊ			*!	*		**

In some cases, the high ranking of AL (CL/V) determines the choice of an optimal candidate that not only violates *COMPL^C, but forces the appearance of a complex coda with a glide followed by a liquid, as mentioned a very unusual type of coda in Catalan (that does not violate the sonority scale, however).

(18) *tireu'"lzi"* /tiREw#l+z+i/: [ti.RE@wl.zi] 'throw (pl) to them!'

/tiREw#lzi/	*σ-STRUC	AL (CL/V)	*COMPL^C	DEP
☞ti.RE@wl.zi			*	
ti.RE@.wˊl.zi		*!		*

The tableau in (18) also shows that AL (CL/V) has to be ranked higher than *COMPL^C, in this variety.

In other cases, however, the optimal candidate violates AL (CL/V), because the other candidates violate higher ranked constraints. This is illustrated in (20) with the example [ti.RE@.mˊl.zi] (from *tirem-"elzi"* /tiREm#l+z+i/ 'let's throw to them'). One of the non-winning candidates that avoids violating *σ-STRUC, *[ti.RE@m.lˊzi], fatally violates a morphological Alignment constraint which is ranked higher than AL (CL/V), a constraint that we call ALIGN (μ−μ), given in (19) (this constraint would also rule out, for *tireu'"lzi"* in (18), the ungrammatical candidate *[ti.RE@w.lˊzi]).

(19) ALIGN (μ−μ) (AL (μ−μ)): Align the right edge of morpheme X with the left edge of morpheme Y, within a lexical item.

We believe CONTIGUITY, ALIGN (μ–μ) and ALIGN (CL/V) to be part of one and the same family of constraints, all of them favoring morphological integrity. These constraints presumably have a universally fixed ranking.

(20) *tirem-"elzi"* /tiREm#l+z+i/: [ti.RE@.m´l.zi] 'let's throw to them'

/tiREm#l+z+i/	*σ-STRUC	AL (μ–μ)	AL (CL/V)	NO-CODA	DEP
ti.RE@ml.zi	*!			*	
☞ti.RE@.m´l.zi			*	*	*
ti.RE@.m.l´.zi		*!		*	*

Before addressing the problem posed by the combinations where epenthesis is not strictly needed for syllabification, let us see the cases in which there is no epenthesis, the cases where a C-clitic appears next to a vowel of the verb. Examples with proclisis are easily dealt with given the constraints introduced so far. A candidate like [si.m"€.t´] (from /s#imit´/ '(s/he) imitates herself/himself') will win over any other candidate (like *[´.si.m"€.t´] or *[s´j.m"€.t´]), given that it has a perfect syllable structure, it does not violate any Alignment constraints, and it is maximally faithful to the input. However, given what we have said so far, an example with enclisis, like the input /tiR´#n/ 'throw some!', should give as the syllabically optimal output *[t"€.R´.n´] (in front of the grammatical, and faithful, output [t"€.R´n]), because of the ranking NO-CODA » DEP; having a coda is worse than having an epenthetic vowel. The constraint that makes of [t"€.R´n] the optimal candidate is FINAL-C, a constraint that also plays a crucial role in clitic clusters. FINAL-C, defined below, is ranked higher than NO-CODA.

(21) FINAL-C (FIN-C): Align (PrWd, R, Cons., R) (i.e., "every prosodic word ends in a consonant", from McCarthy and Prince 1994)[12]

Following Selkirk (1995), we assume that the clitic group in Catalan has the prosodic structure corresponding to what she calls internal clitics: [[X]fnc [Y]lex]PWd or [[Y]lex [X]fnc]PWd;[13] the clitic (a function word) together with its host (a lexical word, not a prosodic word) form a prosodic word. The prosodic structure of clitics plays an important role in issues to be addressed below. The tableau corresponding to [t"€.R´n] appears in (22); we include in it only the constraints that are violated by some candidate.

(22) *Tira'n* /tiR´#n/: [t"€.R´n] 'throw some!'

/tiR´#n/	FIN-C	NO-CODA	DEP
☞t"€.R´n		*	

---

[12] A trace of FINAL-C can be found in some lexical items that end in a non-etymological consonant, instead of a vowel, in some varieties: *api* 'celery' [a@.pit], *col·legi* [ku.lE@.Zit] 'school', *premi* [pRE@.mit] 'price', *així* [´.S"€s] 'like this'.
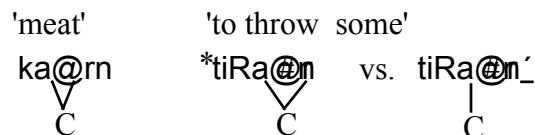[13] According to Selkirk (1995), the type of representation proposed for internal clitics "should display phonological behavior identical to that of PWd constituted of a single Lex alone" (p. 450). In fact, clitics in Catalan are affected by lexical phonological processes, like Final Devoicing, Cluster Simplification or r-Deletion; in this sense, they behave like morphemes, not like independent words.

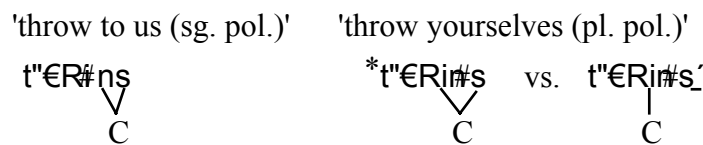|			
t"€.R´.n̩´	*!		*

6.2. Apparently unmotivated epenthesis and alignment

As was extensively exemplified in (13), there are cases in which epenthesis takes place without an apparent syllabic motivation. An underlying form like /feR#n/ 'to do some' (*fer-ne*, with the actual pronunciation [fe@r.n´], with epenthesis) would not have any syllabification problems if it remained faithful; *[fe@rn] would have the same syllabic structure as [ka@rn] (*carn* 'meat'). With clitics it is also possible to find a minimal pair: if it were faithful to its input, *tirin-se* /tiRin#s/ (with the actual output [t"€.Rin.s´] 'throw (pol., pl.) (to) yourselves!', with epenthesis) would have exactly the same syllabic structure (and pronunciation, in this case) as the output for *tiri'ns* /tiRi#nz/, [t"€.Rins] 'throw (pol., sg.) to us!' (without epenthesis). Notice that in all these cases, the most faithful candidates (grammatical or ungrammatical) would have a complex coda ([rn] for the inputs /kaRn/ and /feR#n/, and [ns] for the inputs /tiRin#s/ and /tiRi#nz/). However, as can be seen in the representations below, in the cases of epenthesis, but not in the others, the faithful candidates would have a complex coda formed with a consonant from the verb and a consonant from the clitic; in other words, the last consonant of the verb would be deeply embedded in syllabic structure, within a complex coda. The candidates with epenthesis do not have a complex coda.

(23) a

      'meat'   'to throw some'

      ka@rn   *tiRa@rn   vs. tiRa@n´

         V   V |

         C   C   C

  b

      'throw to us (sg. pol.)'   'throw yourselves (pl. pol.)'

      t"€R#ns   *t"€Rin#s   vs. t"€Rin#s´

         V   V |

         C   C   C

It is clear that the constraint responsible for the appearance of an epenthetic vowel in examples like *fer-ne* and *tirin-se* has to be an alignment constraint punishing the lack of coincidence between morphological and prosodic edges. The constraint we propose to deal with these cases is ALIGN-RIGHT(SUB-σ), defined below.

(24) ALIGN-RIGHT(SUB-σ) (AL-R(SUB-σ)): Align (Lex, R; M, N, R) (the right edge of a lexical word (Lex) has to coincide with the right edge of some subsyllabic constituent, margin (M) or nucleus (N)).

The constraint in (24) is not specific to the clitic group; it affects any lexical word of the language; and we shall see some of its consequences in domains other than the clitic group. Given that this constraint makes reference to subsyllabic constituents, it is

violated only when there is a complex coda (the right margin of a syllable). Following Bonet and Lloret (1998), we assume that nuclei can only contain a single vowel in Catalan; therefore, a verbal form like *tiri*, followed by any clitic or none, will never violate ALIGN-RIGHT(SUB-σ) (the right edge of the verb will always coincide with the right edge of a nucleus (N)). (25) shows how, with the presence of an epenthetic vowel, codas can be simplified in such a way that the right edge of the verb is not embedded in a subsyllabic constituent (from now on L stands for Lex).

(25) a. /kaRn/   ka@rn)$_{L,M}$ ALIGN-RIGHT(SUB-σ) satisfied
      /feR#n/   *fe@r)$_L$n)$_M$ ALIGN-RIGHT(SUB-σ) violated
                  fe@r)$_{L,M}$.n´   ALIGN-RIGHT(SUB-σ) satisfied

    b. /tiRi#nz/   t"€.Ri)$_{L,N}$ns   ALIGN-RIGHT(SUB-σ) satisfied
      /tiRin#s/   *t"€.Rin)$_L$s)$_M$ ALIGN-RIGHT(SUB-σ) violated
                  t"€.Rin)$_{L,M}$.s´   ALIGN-RIGHT(SUB-σ) satisfied

From examples like *fer-ne*, one could think that, more in the line of proposals made in the literature, it would be enough to resort to an alignment constraint (let us call it ALIGN-RIGHT(σ)) demanding the right edge of the verb, actually of any lexical word, to coincide with the right edge of a syllable; this constraint would be satisfied in [fe@r.n´] (and in [ka@rn]) but not in *[fe@r)$_L$n]. However, such a constraint would fail to account for the absence of epenthesis in an example like *tiri'ns* [t"€.Rins] (from /tiRi#nz/): ALIGN-RIGHT(σ) is doubly violated in the grammatical output [t"€.Ri)$_L$ns], given that two consonants ([n] and [s]) intervene between the right edge of the verb and the right edge of the syllable; this same constraint would favor the ungrammatical candidate *[t"€.Ri)$_L$n.z´], with epenthesis, because the right edge of the verb is closer to the syllable edge (only one consonant, [n], intervenes). As shown in (25b), *tiri'ns* [t"€.Ri)$_L$ns], without epenthesis, does not violate ALIGN-RIGHT(SUB-σ) (although it violates ALIGN-RIGHT(σ)), because the right edge of the verb coincides with the right edge of a nucleus. ALIGN-RIGHT(SUB-σ) and the more general constraint ALIGN-RIGHT(σ) are in a subset relation (a violation of ALIGN-RIGHT(SUB-σ) implies a violation of ALIGN-RIGHT(σ), but not viceversa: an example like *tira'n* [t"€.R´)$_L$n] violates ALIGN-RIGHT(σ) but not ALIGN-RIGHT(SUB-σ)); they have then a fixed ranking: ALIGN-RIGHT(SUB-σ) » ALIGN-RIGHT(σ). As we shall see from the tableaux that follow, in Barceloní ALIGN-RIGHT(SUB-σ) (from now on AL-R(SUB-σ)) is ranked below ALIGN (CL/V) but above ONSET. From what we have observed, ALIGN-RIGHT(σ) could be ranked below DEP, much lower in the hierarchy.[14]

The tableau in (26) corresponds to *tirar-ne*, which is compared with that of the noun *carn*, without epenthesis, in (27).

---

[14] AL-R(SUB-σ) is necessary even if AL-R(σ) were thought of as a non-gradient constraint. For a form like *tira'n*, the ranking FIN-C » AL-R(σ) would be necessary to obtain [t"€.R´)$_L$n] (vs. *[t"€.R´.)$_L$n´]), but this same ranking would give as the optimal output for *tirin-se* the ungrammatical form *[t"€.Rin)$_L$s] (vs. [t"€.Rin.)$_L$s´]).

(26) *tirar-ne* /tiRaR#n/: [ti.Ra@r.n´] 'to throw some'

/tiRaR#n/	AL (CL/V)	AL-R(SUB-σ)	FIN-C	*COMPL^C	DEP
ti.Ra@r)_L n)_M		*!		*	
☞ti.Ra@r)_L,M.n´			*		*
ti.Ra@.R)_L,M ´n	*!				*

(27) *carn* /kaRn/: [ka@rn] 'meat'

/kaRn/	AL-R(SUB-σ)	FIN-C	*COMPL^C	DEP
☞ka@rn)_L,M			*	
ka@r.n)_L,M ´		*!		*

The tableau for *carn*, in (27), is almost identical to that of *tiri'ns*, in (28).

(28) *tiri'ns* /tiRi#nz/: [t"€.Rins] 'throw (pol., sg.) (to) us!'

/tiRi#nz/	AL (CL/V)	AL-R(SUB-σ)	FINAL-C	*COMPL^C	DEP
☞t"€.Ri)_L,N ns				*	
t"€.Ri)_L,N n.z´			*!		*

In (27) and (28) it can be seen that the constraint responsible for ruling out the candidate with epenthesis is FINAL-C. As a matter of fact, FINAL-C and *COMPL^C could be unordered with respect to each other. In that case, given that the two candidates in both tableaux would fare even with respect to the mentioned constraints, DEP would be the deciding one. In any case, *COMPL^C could not be ordered above FINAL-C because that ordering would force the candidate with epenthesis to win.

As mentioned earlier, *tiri'ns*, in (28) constitutes a minimal pair with *tirin-se* in (29).

(29) *tirin-se* /tiRin#s/: [t"€.Rin.s´] 'throw (pol. pl.) (to) yourselves!'

/tiRin#s/	AL (CL/V)	AL-R(SUB-σ)	FIN-C	*COMPL^C	DEP
t"€.Rin)_L s)_M		*!		*	
☞t"€.Rin)_L,M.s´			*		*
t"€.Ri.n)_L,M ´s	*!				*

In this case, the high ranking of ALIGN (CL/V) and AL-R(SUB-σ) make of [t"€.Rin.s´], with epenthesis, the optimal candidate.

AL-R(SUB-σ) is sometimes violated in the actual output of a verb-clitic combination. This is the case of examples like *tireu'''lzi''* 'throw (pl.) to them!' [ti.RE@wl.zi], whose (partial) tableau was given in (18) in order to show how ALIGN (CL/V) forces unusual complex codas to surface in Barceloní. The higher ranking of ALIGN (CL/V) with respect to AL-R(SUB-σ) forces a candidate violating the latter constraint to be the optimal candidate. In (30) we do not include FINAL-C because it is not relevant (it is violated by

all the candidates that have a chance, given that the enclitic, and therefore the prosodic word, ends in a vowel). We also exclude from (30) the ungrammatical candidate *[ti.RE@w.l´.zi], a candidate that was already discussed in connection to (18).

(30) *tireu'''lzi''* /tiREw#l+z+i/: [ti.RE@wl.zi] 'throw (pl.) to them!'

/tiREw#l+z+i/	AL (μ-μ)	AL (CL/V)	AL-R(SUB-σ)	*COMPL^C	DEP
☞ti.RE@w)_L l)_M.zi			*	*	
ti.RE@.w)_{L,M} ´l.zi		*!			*
ti.RE@w)_{L,M} l´.zi	*!				*

As is common with Alignment constraints, AL-R(SUB-σ) is a gradient constraint; its gradiency is what causes the presence of an epenthetic vowel in examples like *tireu-nos* [ti.RE@wn.z´] (from /tiREw#nz/ 'throw (pol. pl.) (to us!'), as shown in (31).[15]

(31) *tireu-nos* /tiREw#nz/: [ti.RE@wn.z´] 'throw (pol. pl.) (to us!'

/tiREw#nz/	ALIGN (CL/V)	AL-R(SUB-σ)	FINAL-C	*COMPL^C	DEP
ti.RE@w)_L ns)_M		n s!		*	
☞ ti.RE@w)_L n)_M.z´		n	*	*	*
ti.RE@.w)_{L,M} ´ns	*!			*	*

The only way of avoiding a violation of AL-R(SUB-σ) is by inserting an epenthetic vowel between the verb and the clitic, as in the ungrammatical candidate [ti.RE@.w)_{L,M} ´ns]; but that candidate violates the higher ranked ALIGN (CL/V). Therefore, violating AL-R(SUB-σ) is unavoidable. The difference between the optimal (and grammatical) candidate [ti.RE@w)_L n)_M.z´] and the more faithful (but ungrammatical) candidate [ti.RE@w)_L ns)_M] is that the optimal candidate, [ti.RE@w)_L n)_M.z´], violates AL-R(SUB-σ) minimally, because only one consonant, [n], separates the right edge of the verb from the right edge of a subsyllabic constituent (a coda), while in the more faithful candidate [ti.RE@w)_L ns)_M], two consonants, [n] and [s], separate the right edge of the verb from

---

[15] We are implicitly assuming an interpretation of AL-R(SUB-σ) according to which, in an example like [ti.RE@wn.z´], in (31), given that the right edge of Lex, immediately to the right of [w], has to be in a coda, it wants to be at the edge of that coda (not just at the edge of any subsyllabic constituent). Notice that all the candidates fare even with respect to the right edge of the preceding nucleus, because in all the cases only [w] intervenes between the right edge of Lex and the right edge of the preceding nucleus (*[ti.RE@)_N w)_L ns], [ti.RE@)_N w)_L n.z´], and [ti.RE@.)_N w)_L ´ns]). In any case, the choice of [ti.RE@wn.z´], with epenthesis, over *[ti.RE@wns], more faithful to the input in number of segments, cannot be attributed to the degree of complexity of the complex coda (two segments in [ti.RE@wn.z´] but three in *[ti.RE@wns]) because final codas with three segments are possible in Catalan, and do not force epenthesis (e.g., the plural of *clown* is [kla@wns]; *[kla@wn.z´]).

the right edge of the coda. The grammatical form [ti.RE@w)ₗn)ₘ.z´] violates a higher number of constraints than the other candidates shown in the tableau, but it is nevertheless the best possible output.

All the examples that appeared in (13a) to illustrate the presence of an epenthetic vowel not required for syllabification purposes are accounted for with the inclusion of the constraint ALIGN-RIGHT(SUB-σ). (13b) contained a parallel example, with proclisis: *es ioda* /s#jçd´/ '(it) is iodized', which does not have the output *[sjç@.D´] (but [´z.jç@.D´], with epenthesis), in spite of the fact that in this variety there are words like *ciència* [sjE@n.sj´].[16] The constraint that decides on the choice of the candidate with epenthesis is the mirror image of ALIGN-RIGHT(SUB-σ), ALIGN-LEFT(SUB-σ).

(32) ALIGN-LEFT(SUB-σ) AL-L(SUB-σ): Align (Lex, L; M, N, L) (the left edge of a lexical word (Lex) has to coincide with the left edge of some subsyllabic constituent, margin (M) or nucleus (N)).

Parallel to AL-R(SUB-σ), the goal of AL-L(SUB-σ) is to prevent the beginning of a lexical word (here a verb) to be embedded too much in syllable structure. AL-L(SUB-σ) is violated when a complex onset (the left margin of a syllable) is formed with a consonant of the clitic and a consonant of the verb. A candidate like *[sjç@.D´] violates, like *ciència*, the constraint *COMPL(EX)^O(NSET) (Onsets are simple (no complex onsets allowed), Prince and Smolensky 1993), but it is ruled out by AL-L(SUB-σ), as shown in (33). We assume, not having evidence on the contrary, that AL-L(SUB-σ) occupies the same position in the hierarchy as AL-R(SUB-σ).[17]

(33) *es ioda* /s#jçd´/: [´z.jç@.D´] '(it) is iodized'

/s#jçd´/	AL (CL/V)	AL-L(SUB-σ)	*COMPL^O	DEP
(ₘs (ₗjç@.D´		*!	*	
s´ (ₗ,ₘjç@.D´	*!			*

---

[16] For convenience we assume that the verb *iodar* has underlyingly an initial glide, even though it is presumably a vowel. The issue of glide formation is beyond the scope of this paper, and we also believe that it is orthogonal to it (the crucial candidates under discussion all have a surface glide).

[17] It is not very easy to find examples like *es ioda* but with other combinations of segments in the potential onset. There aren't many verbs that start with a glide (few with [j], none with [w]). With respect to combinations of consonants, recall that the first consonant has to be a stop or [f], and only one clitic, the second person singular /t/ meets these conditions. Moreover, /t/ cannot be the first element of an onset if the second one is a lateral; therefore only a combination with rhotics would be possible *a priori*. In a sequence like *et recordo* '(I) remember you', one could think that the presence of an initial epenthetic vowel, reflected in the orthography, is forced by AL-L(SUB-σ) (like in *es ioda*). Although this is conceivable, the presence or absence of epenthesis also interacts with the distribution of rhotics (a rhotic in the second position of an onset has to be a flap, while in word-initial position only the trill is found), something that falls beyond the scope of this paper.

☞ˊz (L,Mjç@.Dˊ	║			*
	║			

Outside the domain of clitic-verb sequences, the effects of AL-L(SUB-σ) can be observed in the behavior of the definite masculine determiner *el*, which is underlyingly a single consonant /l/. This determiner is phonetically [l] before a word starting in a vowel (e.g., *l'indi* [l"€n.di] 'the Indian'), but is preceded by an epenthetic vowel when the next word starts with a consonant (e.g., *el nom* [ˊl.nç@m] 'the noun, name'). When a word starts with a glide, epenthesis also takes place: *el iambe* [ˊl.ja@m.bˊ] 'the iamb', *el iogurt* [ˊl.ju.ƒu@r] 'the yoghurt', *el whisky* [ˊl.w"€s.ki] 'the whisky' (cf. *valium* [ba@.ljum] 'valium', a medicine, *italià* [i.tˊ.lja@] 'Italian', possible with a glide in Barceloní).[18]

The main point we address in the next section is how ALIGN(SUB-σ) (in the way we have defined it, in its right or left version) allows for the solution of some puzzles related to clitics and their belonging to the lexical or postlexical phonology.

6.3. Further evidence for ALIGN(SUB-σ)

In Catalan, onsets are maximized word-internally (cf. *suplici* [su.pl"€.si] 'torture', not *[sub.l"€si]). Between words, a word-final consonant becomes an onset if the next word starts with a vowel (cf. *tap humit* [ta$.pu.m"€t] 'humid cork'). Resyllabification never applies if the next word starts with a consonant, even when the output could be a well-formed complex onset in the language (a sequence like *tap lila* is syllabified and pronounced [tab.l"€.lˊ], not *[ta.pl"€.lˊ], or 'purple cork').

In classical generative phonology the difference between syllabification within words and syllabification across words can be accounted for by attributing onset maximization only to the lexical phonology, while resyllabification (as an instance of onset requirement) would be postlexical.

Under the OT approach presented here there is no need to resort to levels to deal with any of the issues related to syllabification. As shown in (34), the onset maximization that takes place within words like *suplici* is obtained through the ranking NO-CODA » *COMPL[O].

---

[18] Serra (1996) and Jiménez (1997) provide an analysis for some of the cases in this section that differs from the one presented here. Serra (1996) proposes a negative Alignment constraint banning configurations in which the right edge of a clitic coincides with the right edge of a stressed syllable. This constraint can account for cases like *tirar-ne* [ti.Ra@r.nˊ] 'to through some', but not for cases like *tirin-se* [t"€.Rin.sˊ] 'throw (pol. pl.) (to) yourselves!'. In Jiménez (1997) all homosyllabic segments to the right of a nucleus except for the first one are considered to be part of an appendix (not part of a coda), and he proposes a constraint banning configurations in which a clitic is parsed as an appendix; with this constraints he avoids the problems faced by Serra's analysis. However, none of these authors could account, in a parallel way, for examples like *es ioda* [ˊz.jç@.Dˊ] 'it is iodized' (or *es iodava* [ˊz.ju.Da@.Bˊ] 'it was iodized'), or *el iogurt* [ˊl.ju.ƒu@rt] 'the yoghurt'.

(34) *suplici* /suplisi/: [su.pl"€.si] 'torture'

/suplisi/	NO-CODA	*COMPL^O
☞su.pl"€.si		*
sub.l"€.si	*!	

Onset maximization also takes place when there is final epenthesis. Words like *pobre* (masc.), [pç@.BR´], are assumed to be underlyingly /pçbR/ and have the unmarked masculine morph, Ø (see, for instance, Wheeler 1979, Mascaró 1986, 1987, Bonet and Lloret 1998); the presence of an unsyllabifiable consonant (the final /R/) causes the insertion of an epenthetic vowel. In earlier generative approaches to these facts, like the one proposed in Mascaró (1987), the initial syllabification (which includes the sequence /pçb/ and leaves the final /R/ stranded) is wiped out, epenthesis takes place and syllabification applies again maximizing the second onset. This wiping out (or alternatively some sort of resyllabification) is considered necessary because with the initial syllabification the /b/ becomes a coda while on the surface it is the first segment of a complex onset. Within OT, the account of such cases is simpler, as shown in (35), and follows from the universal constraints already established and the particular ranking Catalan imposes on them.

(35) *pobre* /pçbR/: [pç@.BR´] 'poor (masc.)'

/pçbR/	*σ-STRUC	CONT	FIN-C	NO-CODA	*COMPL^O	DEP
pç@.BR	*!					
☞ pç@.BR´			*		*	*
pç@.B´r		*!		*		*
pç@b.r´			*	*!		*

The most faithful candidate is ruled out because it violates the undominated constraints related to syllabic well-formedness (here collapsed under the name *σ-STRUC). Epenthesis is unavoidable (as mentioned earlier, the discussion of candidates with deletion is postponed; notice that candidates like *[pç@p] or *[pç@r] would also avoid the syllabification problem). Due to the high ranking of CONT (presumably also undominated), epenthesis has to be peripheral, which leaves two tied candidates, [pç@.BR´] and *[pç@b.r´]. Like in the *suplici* example, the ranking NO-CODA » *COMPL^O gives [pç@.BR´] as the optimal candidate.

As mentioned above, onset maximization does not apply across words. Within the present account this fact follows from the higher ranking of ALIGN-RIGHT(SUB-σ) with respect to NO-CODA, not from any differences with respect to levels. The lack of resyllabification is illustrated with the example *tap lila* 'purple cork'.

(36) *tap lila* /tap##lil´/: [tab.l"€.l´] 'purple cork'

/tap##lil´/	AL-R(SUB-σ)	NO-CODA	COMPL^O

☞tab)_{L,M}.l"€.l´		*	
ta.p)_L l)_M "€.l´	*!		*

The observation that resyllabification does apply across words in order to provide an onset when the next word starts with a vowel also follows from the ranking. This is illustrated in (37) with *tap humit* 'humid cork'.[19]

(37) *tap humit* /tap##umid/: [ta\$.pu.m"€t] 'humid cork'

/tap##umid/	AL-R(SUB-σ)	ONS	NO-CODA
ta\$p)_{L,M}.u.m"€t		*!	**
☞ta\$.p)_{L,M} u.m"€t			*

In (37), as opposed to (36), AL-R(SUB-σ) is not violated by any candidate (because the last segment of the verb is always the last segment of a subsyllabic constituent, onset in the grammatical candidate [ta\$.pu.m"€t], and coda in the ungrammatical candidate *[ta\$p.u.m"€t]); therefore ONS is the deciding constraint: *[ta\$p.u.m"€t] is ruled out because it does not have an onset. The grammatical output [ta\$.pu.m"€t] does violate AL-R(σ) (because the rightmost segment of the verb, the [p], is not the rightmost segment of a syllable), but this is irrelevant due to the higher ranking of ONS.

Although, as has been observed (see Mascaró 1986, Bonet and Lloret 1998), clitics behave as part of the lexical phonology with respect to some processes, they seem to belong to the postlexical phonology with respect to others.[20] With respect to

---

[19] The same holds when the first word ends in a consonant cluster: in an example like *taps humits* [ta\$b.z)_{L,M}u.m"€ts] (from /tap+z##umid+z/ 'humid corks'), the (resyllabified) last consonant of the first word (the plural morph /z/) is still aligned with the right edge of an onset.

[20] Several paradoxes, in addition to the one being discussed, arise when one tries to account for the phonology of Catalan within a Lexical Phonology-based approach. Another paradox (outside the scope of this paper) is provided by the process of Final-r deletion (thanks to Michael Kenstowicz for bringing this problem to our attention). In Lexical Phonology, inflectional morphology is generally assumed to be lexical —and in Catalan one might assume this to be the case, given that a process like Final Devoicing does not apply before a feminine morph, for instance; cf. *groc* [gRç@k] 'yellow (masc.)' but *groga* [gRç@.f´] 'yellow (fem.)'— while clitics have been assumed to be either in the lexical phonology or in the postlexical phonology (in Catalan one could think that they belong to the lexical phonology given that they are sensitive to processes like Cluster Simplification, as mentioned earlier). The process of Final-r deletion is assumed to be lexical because a final r is deleted in word-final position (cf. *dur* [du@] from /duR/ 'hard (masc.)') but not before derivational affixes (cf. *duresa* [du.RE@.z´] 'hardness') or the feminine morph (cf. *dura* [du@.R´] 'hard (fem.)'). A verb-final /R/ (typical of the infinitive) is kept before a vocalic clitic (cf. *dur-ho* [du@.Ru], from /duR#u/ 'to bring it') or a monoconsonantal clitic (cf. *dur-se* [du@r.s´], from /duR#s/ 'to bring oneself'), which would apparently support the idea that clitics are part of the lexical phonology. However,

resyllabification, they would belong to the postlexical phonology, given that, as in *tap lila*, they do not allow the final consonant of the verb to be resyllabified as part of a complex onset with a consonant of a following clitic: *rep-la* /REb#l+a/ 'receive her!' is pronounced [rE@b.l´] (*[rE@.Bl´]).[21] In the OT approach presented here, this lack of onset maximization follows from the constraints introduced so far, with the hierarchy given so far, and without having to resort to levels.

---

final r is deleted before a plural morph (cf. [du@s] 'hard (masc. pl.)'), although, as we just saw, it is kept before the feminine morph (and derivational affixes). So, final r deletes in an example like *durs* /duR+s/ ([du@s], 'hard (masc. pl.)') but not in *dur-se* /duR#s/ ([du@r.s´],'to bring oneself'). Within a Lexical Phonology-type framework, and looking only at the phenomenon of final-r deletion, this would lead us to consider the derivational morphology, clitics and gender morphology to be part of the lexical phonology, and number morphology to be part of the postlexical morphology, quite an unusual conclusion.

[21] This type of example is relevant only in the Standard pronunciation. In the colloquial language, as mentioned in footnote 8, the verbal allomorph /REb´/ is used instead before an enclitic, so the issue does not arise. "Colloquial" speakers, when using standard forms like *rep-la* as [rE@b.l´] never hesitate (no speaker pronounces *[rE@.Bl´]).

(38) *rep-la* /REb#l´/: [rE@.b.l´] 'receive her!'

/REb#l´/	AL-R(SUB-σ)	NO-CODA	*COMPL^O
☞rE@b)$_{L,M}$.l´		*	
rE@.B)$_L$ l)$_M$ ´	*!		*

AL-R(SUB-σ) rules out the ungrammatical candidate *[rE@.Bl´] because the last segment of the verb (the bilabial voiced stop that would be pronounced as an approximant in onset position after a vowel) is too embedded in syllabic structure (it is embedded in a complex onset).

6.4. Consonant deletion vs. epenthesis

In order to complete the phonological analysis of the (pronominal) clitic group, we give an account, inevitably schematic, of the cases with deletion. Deletion in consonant clusters has been the center of much research. Our account, along the lines of what we have presented so far, is fairly similar to the ones proposed by Colina (1995) and Jiménez (1999) and differs somewhat from the one presented in Côté (1997).

As mentioned in section 5.2, some consonants but not others are deleted within the clitic group. While a gerund-final /t/ is deleted before a clitic starting with a consonant in a sequence like *tirant-ne* [ti.Ra@n.n´], from the underlying sequence /tiRa@nt#n´/ 'throwing some', it is not possible to further delete one of the underlying /n/ (the one from the verb or the one from the clitic), instead of resorting to epenthesis, in order to avoid the syllabification problem caused by a candidate *[ti.Ra@nn]. The absence of the /t/ of the gerund (/nt/) is a product of (mandatory) Cluster Simplification: in Catalan, a stop is deleted in coda position when it is preceded by a homorganic nasal or lateral.[22] Some examples of this process are provided in (39):

(39) *ponts*: /pçnt+z/: [pç@ns] 'bridges'
        (cf. *pontet* [pun.tE@t] 'small bridge')
   fang: /fang/: [fa@N] 'mud'
        (cf. *fangonós* [f´N.gu.no@s] 'muddy')
   alt: /alt/: [a@l] 'tall'
        (cf. *altíssim* [´l.t"€.sim] 'very tall')
   tirant-ne: /tiRa+nt#n/: [ti.Ra@n.n´] 'throwing some'
        (cf. *tirant-ho* [ti.Ra@n.tu] 'throwing it')

As suggested in Mascaró (1984), Cluster Simplification is possible in coda position because the segments involved are essentially non-distinct; they share the place of

---

[22] Cluster Simplification is optional when the homorganic stop is preceded by a rhotic or *s* (both of them [+continuant] consonants). There are two other general processes of consonant deletion, Final-r deletion, which has been mentioned at several points, and Final-n deletion, which is irrelevant to the topic of this paper.

articulation and the feature [–continuant] (we assume, like Wheeler 1979 or Bonet and Lloret 1998, that laterals are [–continuant]). If a word like *calc* [ka@lk] 'tracing, copy' presented deletion of the final /k/, the information about its place of articulation would be unrecoverable, while this is not the case in *alt* [a@l]. The constraint responsible for faithfulness to input features is MAXFEATURE, below.

(40) MAXFEATURE (MAX-F): Input features must have correspondents in the output (see McCarthy and Prince 1999).

MAX-F is violated when featural information (in this case place of articulation being the most relevant one) is lost. MAX-F is violated in the output *[ka@l], from /ka@lk/ (because the velar place has been lost) but not in the output [a@l] from /alt/ (the coronal place of articulation is kept). In both *[ka@l] and [a@l] there is a violation of MAX(-IO) (input segments must have output correspondents; McCarthy and Prince 1995), because in both cases a segment has been deleted. We give in (41) and (42) the tableaux corresponding to *alt* [a@l] and *calc* [ka@lk]. We exclude candidates with deletion of the first consonant in the cluster (/l/ in both cases), which would violate the very highly ranked constraint CONT (and presumably a more specific version of MAX-F, given that the feature [lateral] is lost).

(41) *alt* /alt/: [a@l] 'high, tall'

/alt/	MAX-F	FIN-C	*COMPL^C	MAX	DEP
a@lt			*!		
a@l.t´		*!			*
☞a@l				*	

(42) *calc* /kalk/: [ka@lk] 'tracing, copy'

/kalk/	MAX-F	FIN-C	*COMPL^C	MAX	DEP
☞ka@lk			*		
ka@l.k´		*!			*
ka@l	*!			*	

When we look at possible deletion cases in the clitic group, another constraint becomes relevant, REALIZE-μ (definition from Walker 1998).

(43) REALIZE-μ (REAL-μ): A morpheme must have some phonological exponent in the output.

The deletion of a segment might imply the loss of a morph. For example if the final /m/ of a form like *tirem* were deleted, a morph would disappear, because /m/ is the morph corresponding to first person plural.[23] For an input like /tiRE+m#n/ 'let's throw some'

_____

[23] From now on we provide the underlying form of verbs with the morphological boundaries that are relevant to the discussion. Although different proposals have been made about the morphological make-up of verbs (see, for instance, Mascaró 1986 and, more recently, Oltra-Massuet 1999), they do not differ with respect to the morphs that are at issue here.

(see the tableau in (15)), which cannot have a faithful output due to syllabification problems, the constraints MAX-F and REAL-µ, both very highly ranked, are responsible for the elimination of candidates with deletion, like *[ti.RE@m] (without the clitic, and without the coronal place of articulation) or *[ti.RE@n] (without the first person plural verbal morph and without the labial place of articulation). The same problems would force the lack of deletion and the presence of an epenthetic vowel (violating ALIGN (CL/V) in cases like *tirem-"elzi"*, with the underlying form /tiRE+m#l+z+i/; the deletion of any of the three consonants /m/, /l/ or /z/ causes a violation of the two mentioned constraints.

In (44) and (45) we compare the tableaux for *tirant-ne* [ti.Ra@n.n´] 'throwing some', with deletion of one consonant and epenthesis, and *tirant-ho* [ti.Ra@n.tu] 'throwing it', with a faithful output.

(44) *tirant-ne* /tiRa+nt#n/: [ti.Ra@n.n´] 'throwing some'

/tiRa+nt#n/	*σ-STRUC	MAX-F	REAL-µ	AL(CL/V)	FIN-C	*COMPL^C
ti.Ra@n.t)_{L,M} n	*!					
ti.Ra@.n)_{L,M} n	*!					
ti.Ra@n)_{L,M}			*!			
ti.Ra@)_{L,M} n			*!			
☞ti.Ra@n)_{L,M}.n´					*	
ti.Ra@nt)_{L,M}.n´					*	*!
ti.Ra@n.t)_{L,M} ´n				*!		

Notice that MAX-F is not violated by any of the candidates, not even when one /n/ has been deleted; this is so because the sequence contains an adjacent /n/, which ensures the presence of the relevant features (place, [±continuant], and even nasality). Notice also that the optimal candidate does not violate REAL-µ because the deletion of the /t/ of the gerund does not imply the deletion of the morph, given that the /n/ of the gerund morph /nt/ is still in the output. For reasons of space some (not relevant) constraints have been left out from (44): ALIGN-RIGHT(SUB-σ), because it is not violated by any candidate (the last segment of the verb is never embedded within a complex coda), and MAX, because it cannot be decisive, being ranked lower than *COMPL^C.

(45) *tirant-ho* /tiRa+nt#u/: [ti.Ra@n.tu] 'throwing it'

/tiRa+nt#u/	AL(CL/V)	FIN-C	MAX	NO-CODA
☞ti.Ra@n.t)_{L,M} u		*		*
ti.Ra@n.t)_{L,M} ´w	*!			**
ti.Ra@.n)_{L,M} u		*	*!	

The ranking of the constraints determines that the most faithful candidate is also the optimal candidate. The most faithful candidate does not have syllabification problems (it does not violate *σ-STRUC) and the last consonant of the verb, as illustrated in all the

candidates, corresponds to the last segment of a subsyllabic constituent. (45) shows in addition that MAX has to be ranked above NO-CODA (the opposite ranking would give *[ti.Ra@.nu] as the optimal candidate).

Examples like *tirant-nos*, from an input /tiRa+nt#nz/ 'throwing (to) us', have a surface form that lacks two consonants, /t/ and one /n/ and, nevertheless, has epenthesis: [ti.Ra@n.z´]. As shown in the tableau in (46), this is a consequence of the constraint ranking.

(46) *tirant-nos* /tiRa+nt#nz/: [ti.Ra@n.z´] 'throwing (to) us'

/tiRa+nt#nz/	*σ-STRUC	REAL-μ	AL(CL/V)	AL-R(SUB-σ)	FIN-C	*COMPL C	MAX
a. ti.Ra@n.t)_{L,M} ns	*!						
b. ti.Ra@.n)_{L,M} ns	*!						*
c. ti.Ra@)_{L,N} ns		*!				*	**
d. ti.Ra@n)_L s)_M				*!		*	**
e. ti.Ra@n.t)_{L,M} ´ns			*!			*	
f. ti.Ra@n.t)_{L,M} ´n.z´			*!		*		
g. ti.Ra@nt)_{L,M} .z´					*	*!	*
h.☞ti.Ra@n)_{L,M} .z´					*		**
i. ti.Ra@)_{L,N} n.z´		*!			*		**

There are two candidates that coincide segmentally with the grammatical form [ti.Ra@n.z´], (46h) and (46i). The ranking of the constraints determines that the deleted /n/ has to belong to the clitic, not the the verb. The deletion in the verb, which corresponds to the candidate in (46i) causes a violation of the highly ranked constraint REAL-μ (the gerund morph is in no way represented in the candidate). The ranking of the constraints also explains why there is epenthesis in spite of the fact that two consonants are deleted. There are two candidates with deletion of the two consonants but without epenthesis; that is, with the phonetic form *[ti.Ra@ns], (46c) and (46d). The fact that in (46c) the deleted /n/ belongs to the verb causes a violation of the higly ranked constraint REAL-μ. In (46d) the deleted /n/ belongs to the clitic, which avoids a violation of this constraint; in this case, however, the surfacing [n] from the verb plus the (devoiced) [s] from the clitic form a complex coda, which causes a violation of AL-R(SUB-σ). This constraint is the one that forces the presence of an epenthetic vowel, because it allows the complex coda to be avoided, like in examples of the *tirar-ne* type (see the tableau in (26)).

The behavior of *tirant-nos* /tiRa+nt#nz/, just examined, is apparently very different from the behavior of *tirant-vos* /tiRa+nt#wz/ 'throwing (to) you (pl.)'. Although they face basically the same syllabification problems, *tirant-vos* surfaces without deletion and with medial epenthesis: [ti.Ra@n.t´ws]. As can be seen in the tableau in (47), these facts follow from the constraints proposed and their ranking (for reasons of space, in the tableau we do not include REAL-μ, which is not crucial here in ruling out unwanted candidates).

(47) *tirant-vos* /tiRa+nt#wz/: [ti.Ra@n.t´ws] 'throwing (to) you (pl.)'

/tiRa+nt#wz/	*σ-STRUC	MAX-F	AL(CL/V)	AL-R(SUB-σ)	FIN-C	*COMPL C	MAX
a. ti.Ra@n.t)$_{L,M}$ ws	*!						
b. ti.Ra@.n)$_{L,M}$ ws	*!						*
c. ti.Ra@)$_{L,N}$ ws		*!				*	**
d. ti.Ra@n)$_L$ s)$_M$		*!		*		*	**
e. ☞ti.Ra@n.t)$_{L,M}$ ´ws			*			*	
f. ti.Ra@n.t)$_{L,M}$ ´w.z´			*		*!		
g. ti.Ra@.n)$_{L,M}$ ´ws			*			*	*!

MAX-F punishes the deletion of the /n/ (but not the /t/) of the gerund because the absence of the /n/, in (47c), or the /w/, in (47d), implies the loss of featural content. Therefore the presence of medial epenthesis is forced, in spite of its violating AL(CL/V) (a candidate like *[ti.Ra@n.tw´s], not included in the tableau, violates the higher ranked constraint CONT). MAX is finally the deciding constraint: since the presence of an epenthetic vowel allows for the proper syllabification of all the input consonants, the optimal candidate remains as faithful as possible to the input.[24] If FIN-C and *COMPL^C were unranked with respect to each other, a possibility suggested earlier, the choice between the grammatical candidate [ti.Ra@n.t´ws] and the ungrammatical *[ti.Ra@n.t´w.z´] would be left to the lower ranked constraint DEP (not included in the tableau), given that each of these two candidates violates one of the two constraints mentioned above and would fare even at that point.

There are two cases where a parallel behavior is found with respect to deletion and epenthesis. In both cases there is deletion of one of two adjacent identical non-vocalic segments. In one case, the third person plural verbal morph /n/ (used in imperatives as a second person plural polite) is next to the first person plural clitic /nz/: *tirin-nos* /tiRi+n#nz/ 'throw (pl. pol.) (to) us!' is pronounced [t"€.Rin.z´], with deletion of one /n/ and final epenthesis. In the other case, the second person plural verbal morph /w/ is adjacent to the second person plural clitic /wz/: *tireu-vos* /tiRE+w#wz/ 'throw (pl) yourselves / to you!' is pronounced [ti.RE@w.z´], with deletion of one /w/ and final epenthesis. If we take the case of /tiRi+n#nz/, for example, it is easy to see that it is essentially identical to that of *tirant-nos* /tiRa+nt#nz/, which was shown in (46); the only difference between them is the absence, in the case at hand, of the /t/ present in the gerund. For /tiRi+n#nz/ the optimal candidate lacks one /n/ because its deletion does not imply a featural loss; the surviving [n] has to belong to the verb, given that, otherwise, the person morph corresponding to the verb would not surface, violating REAL-μ. However, if the final segment of the verb is the surviving [n], there must also be an

---

[24] Examples like *tirant-"elzi"* /tiRa+nt#l+z+i/ 'throwing to them', which are forced to surface with a medial epenthetic vowel (cf. [ti.Ra@n.t´l.zi]) due to their problems of syllabification and the impossibility of deleting enough segments to solve them, surface as faithful as possible to the input; that is, without violating MAX, like in the example illustrated in (47).

epenthetic vowel, in order to avoid a violation of AL-R(SUB-σ). The reasons for [ti.RE@w.z´] being the optimal candidate for the input /tiRE+w#wz/ are exactly the same.

These is one final case of deletion that has not been discussed so far, the one illustrated by examples like [ti.RE@m.z´] from an input /tiRE+m#nz/ 'let's throw ourselves'. Again, there is deletion together with final epenthesis. It is clear that the deleted segment, an /n/, is the first consonant of the clitic; it is also clear that the presence of the epenthetic vowel avoids a violation of AL-R(SUB-σ), since the final consonant of the verb, [m] avoids being embedded within a complex coda together with the last consonant of the clitic (which would surface, in isolation, as voiceless: *[ti.RE@ms]). Moreover, we assume that the deletion of the /n/ of the clitic does not imply a violation of MAX-F: the place features of the missing /n/ are present in the following segment of the clitic, the /z/ (realized as [z] or [s]), also an anterior coronal, while all the manner features are present in the last consonant of the verb, [m], also a nasal.

Although this has been a fairly sketchy account of deletion, and constraints like MAX-F should be made more precise (among other things, by establishing the exact feature-related constraints that hide under this name and deciding their ranking withr respect to other constraints), it gives an idea of the factors that motivate deletion and the ones that do not.

6.5. Clitic sequences and the emergence of the unmarked

One of the observations that was made and analyzed in accounting for epenthesis in the clitic group when there is a single clitic was that an epenthetic vowel appears between verb and clitic (or clitic and verb) only when there is no way of syllabifying one or more underlying segments, and deletion is not possible (recall examples like [tiRa@nt´lzi], from /tiRa+nt#l+z+i/ 'throwing to them'). AL(CL/V) causes epenthesis to be peripheral, whenever possible (as shown by examples like [´n.t"€.R´], from /n#tiR´/ '(s/he) throws some', or [ti.RE@m.n´], from /tiRE+m#n/ 'let's throw some'). When we look at clitic clusters, epenthesis appears between consonantal clitics, even when there does not seem to be a strong motivation for it. We reproduce in (48) the examples that were given in (4) to illustrate this point. We add the underlying forms of the sequences.

(48) a *Se li crema*   [s´.li.kRe@.m´]   /s#l+i#kRem´/
        'Something of his/hers burns'
      b *Ens n'imita*   [´n.z´.ni.m"€.t´]   /nz#n#imit´/
        '(s/he) imitates some of ours'
      c *Se'ns "elzi" crema*   [s´n.z´l.zi.kRe@.m´]   /s#nz#l+z+i#kRem´/
        'it burns on them and it affects us'
      d *Se us n'obren*   [s´w.z´.nç@.BR´n]   /s#wz#n#çbR´+n/
        'Some of yours (pl.) open'
      e Vol *quedar-se-te-me'n* tres [k´.Da@r.s´.t´.m´n]   /keda+R#s#t#m#n/
        '(s/he) wants to keep three, and it affects you and me somehow'
      f *Quedem-nos-les*   [k´.DE@m.z´.l´s]   /kedE+m#nz#l+a+z/

'Let's keep them (fem.) (for ourselves)'

g. *Tiri-se-n'hi*   [t"€.Ri.s´.ni]   /tiRi#s#n#i/
   'throw (sg. pol.) to yourself some there'

Taking, for example, (48a), *se li crema*, from /s#l+i#kRem´/, it is obvious that epenthesis is necessary, given that there is a syllabification problem ([sl], or [zl], is not a possible onset in Catalan), but it is not so obvious why the epenthetic vowel does nt appear before the reflexive clitic, giving the output *[´z.li.kRe@.m´]; this ungrammatical output would be parallel to the sequence *es crema* [´s.kRe@.m´], from /s#kRem´/ '(s/he/it) burns herself/himself/itself', with the epenthetic vowel appearing peripherally in the clitic group. [s´.li.kRe@.m´], as opposed to *[´z.li.kRe@.m´], has a more unmarked syllable structure, without violations of ONS and NO-CODA (constraints that are violated in *[´z.li.kRe@.m´]). (48b) provides an example of apparently unmotivated epenthesis: an input like /nz#n#imit´/ requires initial epenthesis for the syllabification of the first person plural clitic /nz/, which becomes [´nz], but the second epenthetic vowel in [´n.z´.ni.m"€.t´] is not necessary for syllabification; *[´nz.ni.m"€.t´] has a possible syllabification in Catalan (cf. *transmetre* [tR´nz.mE@.tR´] 'to transmit'). The difference between the grammatical [´n.z´.ni.m"€.t´] and the ungrammatical (in most varieties) *[´nz.ni.m"€.t´] is, again, that the addition of the second epenthetic vowel allows for a simplification of syllable structure: [´n.z´.ni.m"€.t´] has a simple coda (which could only be avoided by splitting the first person plural clitic /nz/ with an epenthetic vowel), while *[´nz.ni.m"€.t´] has a complex coda (therefore violating *COMPL^C, a constraint universally ranked above NO-CODA). A quick glance through the rest of the examples in (48) is enough to see (as was mentioned in section 2.2) that the presence of an epenthetic vowel between clitics simplifies syllable structure in such a way that, within the clitic sequence, it gets as close as possible to the unmarked CV structure; a sequence of two consonants occurs only when they belong to the same clitic. In other words, there is an emergence of the unmarked effect.

The fact that this emergence of the unmarked can be observed only within a clitic sequence and not elsewhere might give the impression that an analysis that makes crucial use of levels, maybe with a different ranking at each level, is needed. This would be, however, an unnecessary move. The systematic presence of epenthetic vowels between clitics follows from the analysis presented so far. The only addition that has to be made is that the constraints responsible for aligning clitics with clitics (let us group them under the name ALIGN (CL/CL)) are ranked, contrary to ALIGN (CL/V), very low in the hierarchy, as low, at least, as DEP and, therefore, lower than the constraints related to syllable structure. Let us see how the analysis accounts for the facts with a few examples, starting with (49a), *se li crema*.

(49) *se li crema* /s#l+i#kRem´/: [s´.li.kRe@.m´] 'Something of his/hers burns'

/s#l+i#kRem´/	*σ-STRUC	ONS	NO-CODA	DEP	AL (CL-CL)
sli.kRe@.m´	*!				
´z.li.kRe@.m´		*!	*	*	
☞s´.li.kRe@.m´				*	*

In examples involving a single clitic like *es crema* [´s.kRe@.m´] 'it burns (itself)', in which epenthesis is also necessary to solve a syllabification problem, the schwa appears

peripherally because the alternative candidate *[sˊ.kRe@.mˊ] violates AL (CL/V), a constraint ranked higher than the markedness constraints ONS and NO-CODA. In (49), AL (CL/V) is not relevant (it is always satisfied), and the markedness constraints take over, given the lower ranking of AL (CL-CL). In (49) and the examples below we exclude candidates with a deleted consonant; in all cases they would violate MAX-F and/or REAL-µ, both very highly ranked constraints.

As mentioned above, in clitic clusters epenthesis might appear without an apparent syllabic motivation. The second epenthetic vowel in *Ens n'imita* [ˊn.zˊ.ni.m"€.tˊ] illustrated such a case. The corresponding tableau appears in (50).

(50) *ens n'imita* /nz#n#imitˊ/: [ˊn.zˊ.ni.m"€.tˊ] '(s/he) imitates some of ours'

/nz#n#imitˊ/	*σ-STRUC	CONT	ONS	*COMPC	NO-CODA	DEP	AL (CL-CL)
nzni.m"€.tˊ	*!						
nˊz.ni.m"€.tˊ		*!			*	*	
ˊnz.ni.m"€.tˊ			*	*!	*	*	
☞ˊn.zˊ.ni.m"€.tˊ			*		*	**	*
ˊ.nˊ.zˊ.ni.m"€.tˊ		*!	*			***	*

Violating ONS is necessary in order to avoid syllabification problems (a violation of the undominated *σ-STRUC) and the violation of the very highly ranked CONT. The "extra" epenthetic schwa survives because its presence prevents a violation of the markedness constraint *COMPL^C. (50) also shows the need for the ranking *COMPL^C » DEP, given that the opposite ranking would give *[ˊnz.ni.m"€.tˊ] as the optimal candidate.

In (50) we just saw that the very low ranking of ALIGN (CL-CL) allows for the presence of an epenthetic vowel which is not strictly needed for syllabification purposes but forces an optimization of syllabic structure. The much higher ranking of ALIGN (CL/V) (crucially above the syllabic markedness constraints) prevents a schwa from appearing between the last proclitic and the verb, as illustrated in the last candidate of (51).

(51) *Se'm crema* /s#m#kRemˊ/: [sˊm.kRe@.mˊ] 'something of mine burns'

/s#m#kRemˊ/	*σ-STRUC	AL (CL/V)	ONS	NO-CODA
zmkRe@.mˊ	*!			
ˊz.mkRe@.mˊ	*!		*	*
☞sˊm.kRe@.mˊ				*
sˊ.mˊ.kRe@.mˊ		*!		

Even though *[sˊ.mˊ.kRe@.mˊ] has a more unmarked syllable structure than [sˊm.kRe@.mˊ], ALIGN (CL/V) prevents it from being the optimal candidate.

Let us see now a couple of cases with enclisis. The example in (52), [ke@.Di.sˊ.mˊn] (from /kedi#s#m#n/ 'keep (sg. pol.) some of mine!') would have a possible syllable structure with just one epenthetic vowel (*[ke@.Diz.mˊn]), but it surfaces with two.

(52) *quedi-se-me'n* /kedi#s#m#n/: [ke@.Di.sˊ.mˊn] 'keep (sg. pol.) some of mine!'

/kedi#s#m#n/	*σ-STRUC	FIN-C	NO-CODA	DEP
ke@.Diz.mn	*!		*	
ke@.Diz.m´n			**!	*
☞ke@.Di.s´.m´n			*	**
ke@.Di.s´.m´.n´		*!		***

The tableau in (52) shows the need for the ranking NO-CODA » DEP; if DEP were ranked higher, *[ke@.Diz.m´n] would be the optimal candidate. This example provides further evidence for the ranking FIN-C » NO-CODA, given that the opposite ranking would favor *[ke@.Di.s´.m´.n´], with a more unmarked syllable structure. FIN-C is the deciding constraint for outputs like [t"€.R´.m´n] vs. *[t"€.R´m.n´], from the input /tiR´#m#n/ 'throw me some': epenthesis is needed to syllabify the sequence (DEP is violated once by each candidate), and both candidates violate NO-CODA once; the only difference between the two candidates is that in the grammatical form, [t"€.R´.m´n], the prosodic word ends in a consonant, thus satisfying FIN-C, while this is not the case in the other candidate, *[t"€.R´m.n´].[25] In the tableaux from (49) to (51) FIN-C is always violated because the verb, the last element in the prosodic word, happens to end in a vowel; the constraint becomes irrelevant then (the only way of satisfying FIN-C in those examples would be to delete the last vowel, causing a violation of the higher ranked MAX-F and REAL-μ, or to epenthesize a consonant, something that is restricted to very specific, different, environments.)[26]

The cases in which a clitic cluster causes the deletion of some consonant follow from the analysis that has been presented. In fact, the deleted segments are the same independently of the number and type of additional clitics there is. We saw, for instance, that in *tirant-nos* [ti.Ra@n.z´], from /tiRa+nt#nz/ 'throwing (to) us', two consonants are deleted, and final epenthesis takes place (see the tableau in (46)). With an additional clitic, like the third person feminine plural clitic /l+a+z/, nothing really changes; the output is [tiRa@nz´l´s] (from the input /tiRa+nt#nz#l+a+z/ 'throwing them (fem.) to us'). A parallel behavior is found if the second clitic is the partitive: the grammatical output [ti.Ra@n.z´n], from an input /tiRa+nt#nz#n/ 'throwing some to us', surfaces with the same two deleted consonants as in [tiRa@nz´] (it could not be otherwise) and with epenthesis in the only possible place.

---

[25] In the case of [t"€.R´.m´n], as opposed to *[t"€.R´m.n´], one might think that some constraint related to a coda condition is the deciding one, instead of FIN-C, given that the ungrammatical form has a labial consonant in coda position and the following consonant has a different place of articulation, while the problem is avoided in the grammatical candidate. Other cases, like [t"€.Ri.s´n], from /tiRi#s#n/ 'throw (sg. pol.) some to yourself', show that this is not the right conclusion because the ungrammatical candidate *[t"€.Riz.n´] does not present such a problem.

[26] Recall that whenever we mention DEP, we are referring to it with respect to vowels; the DEP related to consonants has to be fairly highly ranked in Catalan.

7. Final hierarchy and conclusions

In (53) we give the final ranking, for Barceloní, of the constraints that have been taken into consideration in this paper.

(53) Constraint ranking in Barceloní:
   *σ-STRUC » CONT, MAX-F, REAL-μ, AL (μ–μ) » AL (CL/V) » AL (SUB-σ) » ONS »
   FIN-C » *COMPL^C » MAX » NO-CODA » *COMPL^O » DEP, AL (σ), AL (CL-CL)

In this constraint ranking, DEP, the constraint that bans the insertion of segments (here vowels), appears fairly low in the hierarchy, below the constraints that make reference to syllable structure. It is not the case, though, that in Catalan epenthetic schwas are inserted anywhere in order to simplify syllable structure. Highly ranked constraints like CONTIGUITY, ALIGN (μ–μ), or ALIGN (CL/V) prevent schwas from being inserted inside a morph, between morphs or between a verb and a clitic, except when the absence of a schwa would cause a real syllabification problem (a violation of *σ-STRUC). The emergence of the unmarked effect in clitic sequences is caused by the very low ranking of ALIGN (CL-CL), together with the higher ranking of the constraints that make reference to syllable structure with respect to DEP. In addition, the relatively high ranking of ALIGN (SUB-σ) causes the appearance of apparently unmotivated schwas in *tirin-se*, in (29), but not in *tiri'ns*, in (28), for example. It has also been shown that ALIGN (SUB-σ) is not an *ad-hoc* constraint, but keeps a subset relationship with the more general constraint ALIGN (σ); it accounts, moreover, for the fact that, in Catalan, onsets are not maximized across words or even between a verb and a following enclitic. This phenomenon and others are accounted for without having to resort to a lexical-postlexical distinction (a distinction that becomes problematic when dealing with clitics). Even though the phonology of clitics and other facts related to syllable structure have been accounted for without having to resort to levels (but with Alignment constraints that make reference to morphological and prosodic edges), this does not mean necessarily that all the phonology of Catalan can be accounted for without appealing to a lexical/postlexical distinction, for instance. However, the present account reduces some of the paradoxes noted for such a distinction.

There is one type of case, which constitutes an example of opacity (at least apparently), that cannot be accounted for with the constraint ranking in (53). This case is illustrated in (54):

(54) *tirar-nos*
    /tiRa+R#nz/: [ti.Ra@)$_{L,N}$n.z´] 'to throw (to) us'

This example surfaces with a final epenthetic schwa and without the infinitival /R/. Notice that ALIGN (SUB-σ) is not violated since the last segment of the verb, a vowel, is rightmost in a subsyllabic constituent (it is in fact the only segment of the nucleus). Given the constraint hierachy in (53), the optimal candidate would be the ungrammatical form *[ti.Ra@)$_{L,N}$ns]. It seems that the absent /R/ is what causes the appearance of the epenthetic schwa (in a rule-based account one could say that epenthesis applies prior to

deletion). It might be that the answer to this type of case depends on the analysis of *r*-deletion in Catalan. In Barceloní Catalan, this process, mentioned in footnote 20, applies word-finally (and before the plural morph) in oxytones; when an oxytone infinitival is followed by an enclitic, the /R/ is kept before vocalic clitics (cf. *tirar-ho* [ti.Ra@.Ru] 'to throw it') and monoconsonantal clitics (cf. *tirar-ne* [ti.Ra@r.n̩] 'to throw some'), but not before biconsonantal clitics, as illustrated in (54); in non-oxytone verbs (like *conèixer* 'to know') there is never a verb-final [R], in spite of the spelling. Moreover, this process has a lot of exceptions (cf. *segur* [s´ʃu@] 'certain, secure' vs. *futur* [futu@r] 'future'), and they may vary, in some cases, from speaker to speaker (*anterior* 'anterior, prior': [´nt´Rjo@] ~ [´nt´Rjo@r]. It might be, then, that a proposal about *r*-deletion (and the way exceptions to it are encoded) is needed before finding a possible solution to the case illustrated in (54).[27]

References

Bonet Alsina, M. Eulàlia (1991). Morphology After Syntax: Pronominal Clitics in Romance. PhD dissertation, Massachusetts Institute of Technology, Cambridge, MA.

Bonet, Eulàlia and Maria-Rosa Lloret (1998). *Fonologia catalana*. Barcelona: Ariel.

Colina, Sonia (1995). A constraint-based analysis of syllabification in Spanish, Catalan and Galician. PhD dissertation, University of Illinois, Urbana-Champaign.

Côté, Marie-Hélène (1997). Phonetic Salience and Consonant Cluster Simplification. In *MIT Working Papers in Linguistics 30. PF: Papers at the Interface*, Benjamin Bruening, Yoonjung Kang, and Martha McGinnis (eds.), 229-262. Cambridge, MA: Department of Linguistics, MIT.

DeCesaris, Janet A. (1987). Epenthesis in Catalan. In *Studies in Romance Languages*, Carol Neidle and Rafael A. Nuñez Cedeño (eds.), 79-92. Dordrecht: Foris (Publications in Language Sciences, 25).

Fabra, Pompeu (1913). Els mots àtons en el parlar de Barcelona. *Butlletí de dialectologia catalana* I (1913), 7-17, II (1914), 1-6.

Hualde, José Ignacio (1992). *Catalan*, London: Routledge.

Itô, Junko (1989). A Prosodic Theory of Epenthesis. *Natural Language and Linguistic Theory* 7: 217-259.

Jiménez, Jesús (1997). L'estructura sil·làbica del dialecte valencià. PhD dissertation, Universitat de València.

___ (1999). *L'estructura sil·làbica del català*, València and Barcelona: Institut Interuniversitari de Filologia Valenciana i Publicacions de l'Abadia de Montserrat.

Kenstowicz, Michael (1994). Syllabification in Chukchee: A constraints-based analysis. In *Proceedings of the Formal Linguistics Society of Mid America* 4, Alice Davidson, Nicole Maier, Glaucia Silva and Wan Su Yan (eds.), 160-181. Iowa City: Department of Linguistics, University of Iowa.

___ (1996). Base-identity and uniform exponence: alternatives to cyclicity. In *Current Trends in Phonology: Models and Methods*, volume 1, Jacques Durand and Bernard

---

[27] (54) does not constitute a problem for Serra (1996), who proposes a negative Alignment constraint forbidding the right edge of a clitic to coincide with the right edge of a stressed syllable. This constraint, that was rejected in fn. 18, would force epenthesis to take place in (54) regardless of the fate of the verb-final /R/.

Laks (eds.), 363-393. Salford, Manchester: European Studies Research Institute, University of Salford.

Mascaró, Joan (1976). Catalan Phonology and the Phonological Cycle. PhD dissertation, Massachusetts Institute of Technology, Cambridge, MA.

___ (1984). Sobre la reducció de les transformacions d'elisió. In *Estudis Gramaticals 1: Working Papers in Linguistics*, 197-216. Bellaterra: Universitat Autònoma de Barcelona.

___ (1986). *Morfologia*. Barcelona: Enciclopèdia Catalana.

___ (1987). "Syllable-Final Processes in Catalan". In *Studies in Romance Languages*, Carol Neidle and Rafael A. Nuñez Cedeño (eds.), 163-180. Dordrecht: Foris (Publications in Language Sciences, 25).

___ (1996). External allomorphy as emergence of the unmarked. In *Current Trends in Phonology: Models and Methods*, volume 2, Jaques Durand and Bernard Laks (eds.), 473-483. Salford, Manchester: European Studies Research Institute, University of Salford.

McCarthy, John and Alan Prince (1994). The emergence of the unmarked: Optimality in Prosodic Morphology. In *Proceedings of the North East Linguistic Society*, 24, Mercè Gonzàlez (ed.), 333-379.

___ (1995). Faithfulness and reduplicative identity. In *Papers in Optimality Theory*, Jill Beckman, Laura Walsh Dickey and Suzanne Urbanczyk (eds.), 249-384. University of Massachusetts Occasional Papers in Linguistics 18, University of Massachusetts, Amherst.

___ (1999). Faithfulness and identity in Prosodic Morphology. In *The prosody-morphology interface*, Rene Kager, Harry van der Hulst and Wim Zonneveld (eds.), 218-309. Cambridge: Cambridge University Press.

Oltra-Massuet, Isabel (1999). On the Constituent Structure of Catalan Verbs. In *MIT Working Papers in Linguistics 33. Papers on Morphology and Syntax. Cycle One*, Karlos Arregi, Benjamin Bruening, Cornelia Krause, and Vivian Lin (eds.), 279-322. Cambridge, MA: Department of Linguistics, MIT.

Perlmutter, David M. (1998). Interfaces: Explanation of Allomorphy and the Architecture of Grammars. In *Morphology and Its Relation to Phonology and Syntax*, Steven G. Lapointe, Diane K. Brentari and Patrick M. Farrell (eds.), 307-359. Stanford, CA: CSLI Publications.

Prince, Alan and Paul Smolensky (1993). Optimality Theory: constraint interaction in generative grammar. Ms. Rutges University and University of Colorado, Boulder. To appear: Cambridge, Mass: The MIT Press.

Selkirk, Elisabeth (1995). The prosodic structure of function words. In *Papers in Optimality Theory*, Jill Beckman, Laura Walsh Dickey and Suzanne Urbanczyk (eds.), 439-469. University of Massachusetts Occasional Papers in Linguistics 18, University of Massachusetts, Amherst.

Serra, Pep (1996). La fonologia prosòdica del català. PhD dissertation, Universitat de Girona.

Steriade, Donca (1982). Greek Prosodies and the Nature of Syllabification. PhD dissertation, Massachusetts Institute of Technology, Cambridge, MA.

Tranel, Bernard (1996). French liaison and elision revisited: A unified account within Optimality Theory. In *Aspects of Romance Linguistics*, Claudia Parodi, Carlos Quicoli, Mario Saltarelli and María Luisa Zubizarreta. (eds.), 275-291. Washington, DC: Georgetown University Press.

Viaplana, Joaquim (1980). Algunes consideracions sobre les formes pronominals clítiques del barceloní. *Anuario de Filología* 6: 459-483. Barcelona: Universidad de barcelona, Facultad de Filología.

Walker, Rachel (1998). Nasalization, neutral segments, and opacity effects. PhD dissertation, UC, Santa Cruz. To be published, New York: Garland.

Wheeler, Max (1979). *Phonology of Catalan*, Oxford: Blackwell; published version of his PhD dissertation, *Some Rules in a Generative Phonology of Modern Catalan*. University of Oxford, 1975.

Wheeler, Max W., Alan Yates and Nicolau Dols (1999). *Catalan: A Comprehensive Grammar*. London: Routledge.