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Stress and final /n/ deletion in Catalan: combining Strict CV and OT

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Abstract

In Catalan, /n/ deletes in word-final position when it is preceded by a stressed vowel. In this paper, we present an analysis that combines the representations of Strict CV and the violable constraints of Optimality Theory, two rarely combined but perfectly compatible analytical tools. We propose that final /n/ floats unassociated below its C position if it cannot be licensed by a following segment. In such circumstances, an entire CV unit is left unidentified at the right edge, a situation which is penalized by the system. Still, when stress is final, this rightmost CV unit is identified by the weak branch of a trochaic foot. As a result, the /n/ may remain afloat. However, when stress is not final, the final CV remains otherwise unidentified, and so /n/ must associate to it, even though it is unlicensed.

Keywords: Catalan; Strict CV; Optimality Theory; Stress; Final /n/ deletion

1. Introduction

All consonants in Catalan may appear in word-final position. However, two of them, /ɾ/ and /n/, can undergo a process of deletion in non-verbal forms.[1] While the deletion of /ɾ/ is largely unpredictable, with a higher number of exceptions and items showing variation, that of /n/ is the general case in the native vocabulary of the language.

A crucial aspect of the process is its conditioning factor: the application of final /n/ deletion requires the presence of stress on the vowel preceding the /n/ (1a). Indeed, /n/ does not delete if this condition is not met (2).[2]

[1] Final /n/ deletion is sporadically found in verbal forms, as in [ˈbe] '(s)he comes' *cf.* [ˈbens] 'you come' or [ˈte] '(s)he has' *cf.* [ˈtens] 'you have'. However, most verbs show no final /n/ deletion, as in [ˈprɛn] '(s)he takes' or [ˈbɛn] '(s)he sells'. We attribute final /n/ deletion in verbs to the same process found in nouns. The greater resistance of verbs to this process could be due to the higher degree of Paradigm Uniformity in verbal paradigms as compared to nominal ones. In this paper we concentrate on nominal elements, in which the process of final /n/ deletion is productive (with some lexical exceptions, which are dealt with in section 5).

[2] There is a very small set of words (Mascaró 1976 cites eleven) in which final /n/ also underwent deletion after unstressed vowels, as in [ˈʒoβə] 'young' *cf.* [ʒuβəˈnisim] 'very young', [ˈɔmə] 'man' *cf.* [umənˈnɛt] 'small man', and [ˈazə] 'donkey' *cf.* [əzəˈnɛt] 'small donkey'. In the plural, as opposed to the cases in (1b), /n/ also deleted: [ˈʒoβəs], [ˈɔməs], [ˈazəs]. We regard these cases as instances of diachronic deletion in which the scope of final /n/ deletion was not restricted to final /n/'s after stressed vowels. Evidence for the diachronic character of final /n/ deletion in these cases is the synchronic situation in other dialects of Catalan (Balearic and some Western dialects), in which /n/ does surface in the plural of such forms: [ˈʒoβəns], [ˈɔmənsˈ], [ˈazəns]). See Jiménez and Lloret (2011) for an accurate description of the dialectal variation found in Catalan with respect to the extent of final /n/ deletion.

In all cases, the presence of underlying /n/ can be retrieved from suffixed forms (1b,c) where, no longer word-final, the /n/ does surface.[3] The process is productive, as evidenced by the words in (3a), which are all taken from the standard reference dictionary of Catalan (except for *sincrotró* 'synchrotron'). We return to the issue of the productivity of the process in loan and learned words in section 3.3.6. Most of the data in this paper is taken from Mascaró (1976).

(1) Final /n/ deletion in Catalan

a. *Singular*	b. *Plural*	c. *Derivative*
[ˈpla] 'even'	[ˈplans]	[pləˈnisim] 'very even'
[kuˈzi] 'cousin'	[kuˈzins]	[kuziˈnɛt] 'small cousin'
[ʃiˈlɛ] 'Chilean'	[ʃiˈlɛns]	[ʃiləˈnizmə] 'Chileanism'
[upurˈtu] 'opportune'	[upurˈtuns]	[upurtuniˈtat] 'opportunity'
[distɾiβuˈsjo] 'distribution'	[distɾiβuˈsjons]	[distɾiβusjuˈnal] 'distributional'

(2) Blocking of final /n/ deletion in words with non-final stress

a. *Antepenultimate*	b. *Penultimate*		
[əsˈpɛsimən] 'specimen'	[ˈatun] 'atonic'	[əgˈzamən] 'exam'	[ˈkrɛmlin] 'Kremlin'
[iˈpɛrβətun] 'hyperbaton'	[ˈplatən] 'banana'	[uˈɾiʒən] 'origin'	[ˈramən] or [ˈramen] 'ramen noodles'

(3) Final /n/ deletion in loanwords

a. *Singular*	b. *Plural*	c. *Derivative*
[uˈzo] 'ozone'	[uˈzons]	[uˈzɔnik] 'ozonic'
[təliˈβa] 'Taliban'	[təliˈβans]	[təliβəˈnizmə] 'Talibanism'
[rəməˈða] 'Ramadan'	[rəməˈðans]	[rəməðəˈnɛt] 'small Ramadan' (Twitter)
[siŋkɾuˈtɾo] 'synchrotron'	[siŋkɾuˈtɾons]	

Nevertheless, one does find word-final nasals preceded by a stressed vowel. These are found under three conditions: (i) if [n] is the second consonant of a final /rn/ cluster (4a); (ii) if [n]

[3]For a diachronic approach to final /n/ deletion in Catalan, see Gulsoy (1997) and Sampson (1999).

is the first consonant of a nasal-stop cluster in word-final position that has been simplified by deleting the last consonant (4b); (iii) in a list of lexical exceptions within the native vocabulary (4c); and in many loan and learned words (4d) (*cf.* the loanwords in 3), although substandard forms in which the /n/ deletes *are* found, as will be shown later. Note that condition (ii) can result in the appearance of a final velar nasal. Labial and palatal nasals in coda position never delete (4e).

(4) No final /n/ deletion

a. /rn#/	b. /nC#/		
[ˈkarn]	[kəˈlen]	*cf.*	[kəˈlentə]
‘meat’	‘hot.M.’		‘hot.F.’
[kunˈtorn]	[ˈblaŋ]	*cf.*	[ˈblaŋkə]
‘contour’	‘white.M.’		‘white.F.’

c. *Lexical exceptions*	d. *Loanwords*	e. *Final* [m, ŋ]
[ˈsɔn]	[məɣəˈzin]	[ˈam]
‘sleep, sleepiness’	‘magazine’	‘fish hook’
[ʒuˈan]	[urəŋguˈtan]	[əksˈtrem]
‘John’	‘orangutan’	‘extreme’
[ˈnɛn]	[ʃərləsˈton]	[ʃəmˈpaŋ]
‘boy’	‘Charleston’	‘champagne’
[əˈran]	[ʃəˈman]	[ˈboŋ]
‘close’	‘shaman’	‘bump’

If so, it seems that Catalan usually avoids [n] in word-final coda position. This is curious because cross-linguistically nasals are ideal coda consonants; [n] is a sonorant and has default place of articulation (a claim we motivate below for Catalan). If a language allows coda consonants, it is very likely to have nasal codas.[4] In light of this, one may ask why in Catalan, of all the consonants that may appear in word-final position, /n/ undergoes synchronic deletion. Indeed, this process is the opposite of what one would expect from the point of view of markedness: labial and palatal nasals are allowed in coda position, as are all non-coronals, but coronal nasals are banned from this position. In addition, final stress in Catalan is most commonly found in consonant-final words (Serra 1996, Vallverdú 1997, Bonet & Lloret 1998). The deletion of final /n/ renders this metrical generalization non-surface true, that is, opaque.

[4]See VanDam (2004) and Blevins (2004, 2006) on the typology of word-final coda consonants in the world’s languages. Both authors coincide in showing that nasals are among the most common sounds in word-final coda position. The next quote is from Blevins (2006), who, although challenging a sonority-based account of the typology of word-final coda consonants, explicitly says that nasals are preferred codas: “Sonority has also been taken to play a role in limiting single member onsets to low sonority segments, and single member codas to high sonority segments. However, there is ultimately no secure empirical basis for such generalizations (Blevins 2004). No language limits onsets to obstruents, nor does any known language ban all sonorants from onset position. Although there are some languages in which single codas are limited to particular sonorants, these patterns do not cover contiguous ranges on the sonority scale. For example, in Manam, and Oceanic language, where only nasals are possible codas, liquids l and r must be prohibited from coda position, which raises problems for a sonority-based account. *See Blevins (2004), where convergent evolution is shown to account for the preponderance of nasal codas in the world’s languages*.”

For all these reaons, Bonet *et al.* (2004) call /n/ deletion a "crazy" rule. In this paper, we show that there is nothing "crazy" about final /n/ deletion. In fact, final /n/ deletion is only expected once we formalize the reason why /n/ is such a good coda in Catalan. In addition to the motivation for final /n/ deletion (Q1 below), the analysis also provides answers to questions 2-5 in (5).

(5) Research questions

Q1. Why is /n/ the only nasal coda to be systematically deleted? And why only word-finally?

Q2. Why must stress immediately precede the deleted /n/?

Q3. Why is final /n/ deletion blocked when /n/ is the second element in a consonant cluster?

Q4. Why does final cluster simplification counterfeed final /n/ deletion?

Q5. What is the status of lexical exceptions?

The analysis makes use of two theories that have rarely been combined, although they are completely compatible: the representations employed are those of Strict CV (Lowenstamm 1996, Scheer 2004), whereas the computation is formalized within Optimality Theory (Prince & Smolensky 1993/2004). (For previous attempts at combining these two theories see, for instance, Polgárdi 1998 and Rowicka 1999.)

The outline of the paper is as follows. In section 2, we briefly present the relevant aspects of Government Phonology and Strict CV. We also provide the basic facts and analysis of stress assignment in Catalan nominal elements. In the analysis in section 3, it is proposed that /n/ needs to be licensed by a following segment in order to be associated. Word-finally, this is not possible because there is no licensor to its right. This non-association creates the problem of an unidentified CV unit. However, when stress is final, the segmentally unidentified CV structure is nevertheless engaged by the metrical structure. If so, only when stress is not final does the final CV remain unidentified at any level; and only in those cases must the /n/ be associated to its C position even though the nasal is unlicensed. The analysis is also extended to the rest of the data, that is, to those cases in which final /n/ does not delete because it is the second element of a final /rn/ cluster or because it is the first element of an /nC/ cluster, and to lexical exceptions. Section 4 includes a brief discussion of previous approaches and the paper concludes with section 5.

2. Background

2.1. Government Phonology and its Strict CV version

In this subsection, we introduce Government Phonology (henceforth GP, Kaye *et al.* 1990) and its offspring Strict CV (Lowenstamm 1996, Scheer 2004). The introduction is very brief, focusing on the aspects of GP and Strict CV that are relevant to our purposes.

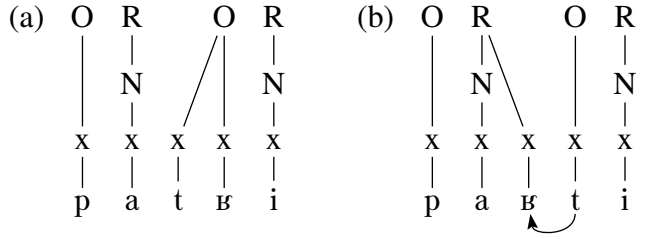
2.1.1. Government Phonology

GP is principally a theory of autosegmental representations. Its main tenet is the existence of empty positions in the syllabic structure. The theory's starting point is that the phonetic adjacency of two sounds may realize more than one phonological structure. Three possible

structures are proposed for two adjacent consonants: (i) branching onset; (ii) coda-onset; and (iii) onset-onset.

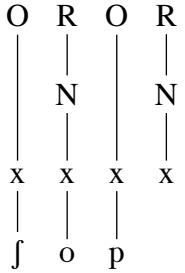
To illustrate, consider the case of French, where the sequence /tʁ/ has a similar distribution to that of a simple onset: it can appear word-initially [tʁuv] 'find' or word-medially after a consonant [mistʁal] 'Mistral wind'. Such clusters are thus represented as branching onsets (6a). The inverse cluster /ʁt/, on the other hand, is never found word-initially or word-medially after a consonant. In that case, /ʁ/ is therefore syllabified as a coda, [paʁti] 'party' (6b).

(6) Branching onset *vs.* coda-onset cluster in GP



Codas are managed by the principle of *coda licensing* (Kaye 1990), which states that codas must be licensed by a following onset. This relation of licensing is represented in (6b) by an arrow. The principle explains the impossibility of *VCʁtV: an onset can license only one preceding consonant, and so no other consonant can precede the coda. The same principle has another effect, namely that final consonants cannot be codas, because they are not licensed in this position. This is a welcome result, since there is much empirical support for final consonants behaving as onsets (Harris & Gussmann 1998, 2002). Lastly, if final consonants are in fact onsets, then the final constituent of the word is an empty nucleus. The consonant-final Catalan word [ʃop] 'drenched' is thus represented as in (7).

(7) Final consonant as onset of an empty nucleus in GP



The concept of licensing, it must be added here, is not limited to coda-onset clusters. Rather, it has been proposed that an analogous relation exists between a realized nucleus and its onset, the nucleus licensing the preceding onset.[5]

2.1.2. Strict CV and the licensing conditions for nasal 'codas'

In this paper, we adopt a more radical view of GP, namely the Strict CV version proposed in Lowenstamm (1996) and developed in Scheer (2004). In this version, the skeleton and the

[5]This of course raises the issue of how the final onset is licensed. Standard GP assumes a parametric approach to this issue: final empty nuclei either license the preceding onset or not. A parameter like this can be easily formalized as the result of constraint interaction in OT. With respect to coronal nasals, however, the final empty nucleus does not provide place, and therefore the nasal is still unlicensed in this position.

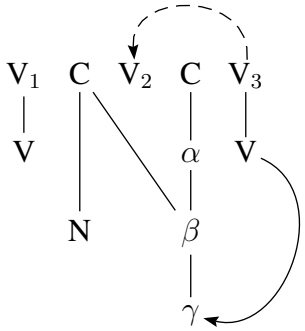
syllabic constituents of GP are collapsed into one flat sequence of CV units; CV is in fact the only skeletal unit recognized by the theory. In order to integrate branching onsets and coda licensing in this version of GP, we assume, together with Scheer (2004), that two segments may entertain relations that rid the grammar of the need to take care of intervening empty nuclei. Thus, the segments of the branching onset in Spanish [ˈblaŋko] 'white.MASC' in (8) have an empty V-slot between them, but because of the infrasegmental relation symbolized by the arrow ← this empty slot does not pose a problem.

(8) Branching onset in Strict CV

C	V	C	V	C	V	C	V
|		|	|	|		|	|
b	←	l	a	ŋ		k	o

The word in (8) illustrates a well-known cross-linguistic empirical fact, namely that nasals assimilate in place of articulation to a following obstruent. This fact was expressed in standard GP through coda licensing and the adjacency of the coda and onset positions. But in Strict CV, all sonorant-obstruent clusters are in fact separated by an empty nucleus. How can the homorganicity of nasal-obstruent clusters be accounted for? Strict CV recognizes two lateral forces: government and licensing. Both operate from right to left. Government inhibits the pronunciation of segments while licensing allows for their pronunciation. Now consider the nasal in (9). V_3 governs the preceding empty nucleus V_2 (the dashed arrow) and licenses its immediately preceding onset. The empty nucleus, in contrast, does not have any lateral force, and thus cannot license the preceding nasal. The position that the nasal occupies is therefore weak. Due to this weakness, the nasal "pirates", in Scheer's (2004) terms, the feature of the following obstruent. The result is a kind of "nasal geminate", in which the primes or features of the obstruent are shared by the position that the nasal occupies. Under this view, nasal homorganicity in Strict CV is a consequence not of adjacency, as in Standard GP, but of positional weakness.

(9) Structure resulting from homorganization (Scheer 2004:709)



In the final position, however, a weak nasal cannot be saved through place sharing, because there is no consonant after the nasal. As a consequence, another process applies in nasal neutralizing languages, namely lenition, which consists of setting the nasal place specification to their unmarked value (coronal or velar depending on the language).[6]

In Catalan, medial pre-consonantal /n/ assimilates in place of articulation to the following consonant, and thus a place-sharing configuration like the one presented above suffices.

[6]Scheer (2004) proposes that the syllabic status of final nasals in Germanic is driven by the same force.

Word-final /n/, however, takes a radical turn. As the weakness of the nasal in word-final position cannot be rescued by a sharing configuration, which would license the nasal, it is simply deleted. In the sections devoted to the formal analysis, we are more explicit about the process of /n/ deletion, and why word-final labial nasals do not delete, just like coronal and velar nasals that come to be word-final due to final consonant cluster simplification. For now it suffices to say that in Catalan, only the presence of a consonant can license a nasal if it occupies a weak position, i.e. when not followed by a full V that licenses it.

A final issue concerns final empty nuclei (FEN). If empty nuclei are inhibited by government, what inhibits the FEN in Catalan [ʃop] above? In GP, FEN are parametrically licensed. For our purposes, we may simply say that FEN's are not governed, but remain unrealized for a different reason.

We have introduced all the concepts of Strict CV that are necessary for the ensuing analysis. Let us now summarize them in (10).

(10) Summary of Strict CV concepts

i. The skeleton and syllabic constituents are conflated into a sequence of CV units.

ii. Final consonants occupy an onset position followed by an empty nucleus.

iii. Assimilated preconsonantal nasals are licensed by place sharing above an intervening empty nucleus.

iv. Word-final nasals cannot be licensed because they are not followed by any consonant; therefore, they undergo different processes of lenition, or even deletion as in Catalan (which can be understood as an extreme case of lenition).

With these tools in hand we may turn to a description of the Catalan stress system in the next subsection.

2.2. Stress in Catalan

In Catalan, nominal forms have either regular or lexical stress. Regular stress falls on the last vowel if the word is consonant-final (11a) and on the penultimate vowel if the word is vowel-final (11b).[7] Words with final /n/ deletion behave like consonant-final words in this respect (11c). Most words ending in a non-alternating [n] (11d) behave like irregularly stressed words, that is, consonant-final words with penultimate stress. (Here we must exclude the exceptional non-alternating cases in 4c,d with final /n/ and immediately preceding stress). Lexical stress can appear on any vowel within a right-oriented three-syllable window. Penultimate stress is exceptional in consonant-final words (12a), final stress is exceptional in vowel-final words (12b), and there are also words ending in a vowel or a consonant that show antepenultimate stress (12c). The examples in (11) and (12) contain both monomorphemic and derived words. Morphological structure is in most cases irrelevant for stress assignment.[8]

[7] The plural morph [-s] does not trigger final stress.

[8] There is in Catalan a set of derivational suffixes that are stress-attracting but that must remain unstressed, as in [ənˈʒɛlik] 'angelical' *cf.* [ˈanʒəl] 'angel' (Mascaró 1976, Wheeler 2005) (see also the examples in 12a).

(11) Stress in Catalan

a. [-C#]	b. [-V#]	c. /-n#/	d. [-n#]
[əlməˈnak]	[nəˈɣɔsi]	[kəˈmi]	[miˈzɔʒin]
‘almanac’	‘business’	‘path, way’	‘misogynist’
[pəˈtit]	[kəˈnaɾi]	[sulˈta]	[ˈkrɛmlin]
‘small’	‘canary’	‘sultan’	‘Kremlin’
[nəsjuˈnal]	[munˈtaɲə]	[uɾɣənidzəˈsjo]	[ˈkɔlun]
‘national’	‘mountain’	‘organization’	‘colon’
[bunˈdat]	[biˈɣɔti]	[əməɾiˈka]	[əβuˈɾiʒən]
‘goodness’	‘mustache’	‘American’	‘aboriginal’

(12) Lexical stress in Catalan

a. [-C#]	b. [-V#]	c. *Antepenultimate stress*
[kəˈpitul]	[təˈβu]	[məˈtɾɔpuli]
‘chapter’	‘tabu’	‘metropolis’
[ˈʎapis]	[ʃimpənˈze]	[ˈpaʒinə]
‘pencil’	‘chimpanzee’	‘page’
[nuˈmɛɾik]	[kəˈfɛ]	[ˈaβitət]
‘numerical’	‘coffee’	‘habitat’
[təˈlɛfun]	[pəɾuˈne]	[ˈlawðənum]
‘telephone’	‘fibula’	‘laudanum’

Most accounts of Catalan stress are couched within moraic theory and assume a right-aligned moraic trochee (i.e. left-headed foot) to be the unmarked foot in the language (Cabré 1993, Cabré & Kenstowicz 1995, Serra 1996, Vallverdú 1997, Bonet & Lloret 1998, Bonet & Torres-Tamarit 2010). These studies would agree on the algorithm in (13).

(13) Catalan stress algorithm

a. Project a mora from every vowel

- In the absence of lexical stress:

b. Project a mora from a final consonant

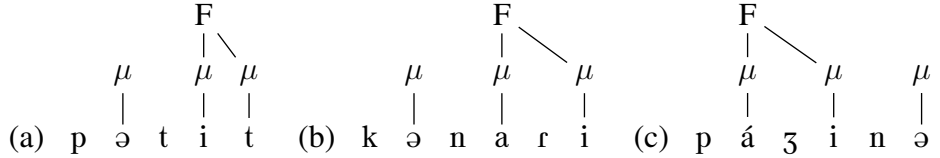
c. Build a right-aligned moraic trochee

- If a vowel is stressed lexically:

d. Build that foot with its strong branch on the lexically stressed vowel.

Some representations appear in (14). In (14a), the word ends in a consonant, so a mora is projected and the right-aligned trochaic foot is built. In (14b), the right-aligned trochaic foot is built similarly onto two vowels. In (14c), the word has lexical stress on the first vowel, marked with an accent, so the final mora is ignored and the foot is built on top of the lexically stressed vowel.

(14) Catalan stress with moras and feet



This account is not easily extended to cases of final /n/ deletion. One needs to assume that final /n/, like all other final consonants, projects a mora even when it is not realized. An alternative would be to assume that, even though the final /n/ is not realized, its position projects a mora. However, combining skeletal positions with moras is quite unorthodox, as moras were precisely posited to get rid of skeletal slots (among other goals). Finally, this account has nothing to say about the relation between final /n/ deletion and stress, which we saw was systematic: /n/ is not deleted when the preceding vowel is unstressed (though see footnote 2).

But even independently of /n/ deletion, the moraic account faces a conceptual problem. Its reasoning is circular: the moraic status of final consonants is used to explain final stress, which is also the only reason to accord final consonants moraic status. Therefore, if an account of Catalan stress can be provided that relies not on moras but rather on some other independently-motivated aspect of phonology, it would be preferable to a moraic account. Working within Strict CV, Scheer and Szigetvári (2005) show that empty nuclei, an independently motivated aspect of their theory, can replace moras. Moras, they say, can be gotten rid of. We will now see that this is true for the Catalan system. Moreover, such an account of Catalan stress paves the way to a better understanding of final /n/ deletion.[9]

3. Analysis

3.1. Stress with empty nuclei rather than moras

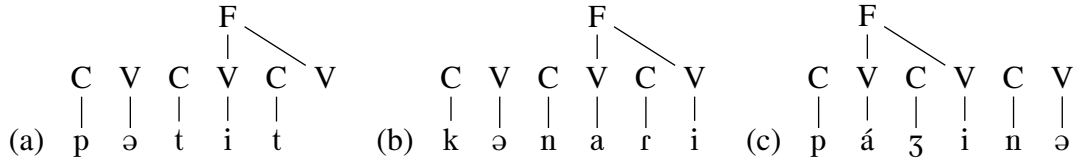
We ended the preceding section by stating the need for something that would explain the special status of final consonants. In the section on GP, we saw how that theory provides exactly this something: final consonants are a special kind of onset. They are followed by an empty nucleus.The theory therefore provides the generalization for Catalan regular stress in (15).

(15) Catalan stress algorithm in GP
- In the absence of lexical stress:
  a. Build a right-aligned trochaic foot based on nuclei, empty or full; only full nuclei can be foot heads
- If a vowel is stressed lexically:
  b. Build that foot with its strong branch on the lexically-stressed vowel.

The results of the algorithm for stress assignment in Catalan are represented in (16). In (16a), a right-aligned foot is built whose dependent is the FEN. In (16b), the dependent is now a full vowel. This way, final and penultimate stress are derived with the same type of foot. In (16c), the foot is not right-aligned because the first vowel is lexically stressed.

[9]See Ulfsbjorninn (2014) for an elaboration on Scheer and Szigetvári's (2005) model.

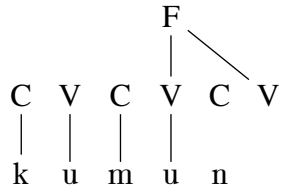
(16) Catalan stress with empty nuclei and no moras



This proposal does not suffer from the circularity of the mora-based view because FEN are an independently motivated phonological tool. The use of FEN's in stress assignment is not *ad hoc* and therefore not problematic methodologically.

Furthermore, since stress is now tied not to final consonants but rather to the FEN, the non-realization of the /n/ is not as problematic as in the moraic account. To anticipate our analysis, consider the representation in (17), which depicts a final /n/ as floating below its C position. Since the CV structure is still there, the stress algorithm is perfectly able to take it into account. We will explain the generation of the skeleton and the floating /n/ in the next section.

(17) Stress with unrealized final /n/ and FEN



The FEN-based, mora-less account in Strict CV is superior to the mora-based account because it relies not on the realization of /n/ but just on the presence of the CV structure that is related to the final /n/. Of course, the structure in (17) is quite abstract, in the sense that there is an entire "syllable" that is not associated to any segmental material. This fact, as we will see in the next subsection, is the key to understanding the interaction of the process of final /n/ deletion with stress. Note that from now on, we use the term deletion descriptively: we assume that the underlying /n/ is not deleted, but floats below its C position.

3.2. Final /n/ deletion

We claim that /n/ in Catalan is placeless. This is why it undergoes place assimilation to a following consonant. In such circumstances, /n/ is, in the terms used by Scheer (2004), a kind of "partial" or "nasal geminate" that is protected from deletion. The nasal is licensed because the place node of the following consonant branches and links to the position occupied by the nasal, as previously shown in (9). In a non-final onset position followed by a full vowel, the nasal is also licensed—recall that all onsets are licensed by an immediately following realized nucleus. This leaves one position where /n/ is not licensed: before the FEN. This is exactly the position where final /n/ is usually deleted. We may now understand why final /n/ is not realized: as stated in the generalization in (18), /n/ in Catalan must be licensed by a following segment, either a full vowel or a following onset from which to receive place of articulation.

(18) Catalan /n/
In Catalan, /n/ must be licensed by a following segment. Otherwise, it floats.

A look at (17) above shows that no such licensing is available when /n/ is the last consonant of the word.[10]

If so, we have a hypothesis regarding why /n/ remains afloat word-finally. Still, we have seen that floating is possible only when the preceding vowel is stressed. If it is not, for some reason we do find final [n]'s (e.g. *origen* [uˈɾiʒən]). This implies that our generalization regarding Catalan /n/ in (18) is not always met, that is, it is sometimes violated, and violability is best dealt with within the framework of OT. Therefore, the OT constraint in (19a) is proposed. The second constraint (19b) concerns the justification of CV units. As for any other piece of representation, we assume that if there is no way to engage a CV unit, its inclusion in the representation is dispreferred. We term this constraint *UNENGAGED-CV[11]; by "engaged" we mean "associated to material from another level of representation".

(19) Constraints

a. *UNLICENSED[n]
An /n/ linked to its C unit must be licensed by a following segment.

b. *UNENGAGED-CV
Every CV unit must be engaged by some other level of representation (either segmental or metrical).

Before we present our analysis, it is crucial to make our assumptions about the generation of CV units explicit. We assume a Containment theory of faithfulness (Prince & Smolensky 1993/2004) by which no segmental material present in the input can be deleted in the output.[12] Given the fact that the Strict CV structure is universal, it is an unviolable property of the GEN function of the grammar to project a uniform CV structure from any segmental string. For instance, an input form ending in a consonant will project in all languages a CV unit. What GEN can manipulate is the specific association of the segmental string with the universally-projected CV structure. As a consequence of this, GEN is able to leave segments afloat, or add association lines. The set of candidates generated is evaluated by the function EVAL according to the language-particular hierarchy of universal constraints as in standard OT.

Now consider the tableau in (20), with an input containing a final /n/. According to the general algorithm of Catalan stress in (15), the FEN is engaged by the foot and parsed as its dependent. The constraint *UNLICENSED[n] is not violated by candidate (a), the winning candidate, because final /n/ remains afloat. Associating the final /n/ is unwarranted because it would be unlicensed, as [n] would not be followed by any segment (candidate b), and inserting a vowel to occupy the final V position violates DEP-V, the anti-insertion constraint (candidate c).[13] This evaluation demonstrates that both DEP-V and *UNLICENSED[n] dominate *FLOAT-

[10] An interpretation along these lines was also suggested in Jiménez and Lloret (2011), according to which coronal nasals, which are typologically less marked and perceptually weaker than labial or dorsal nasals, can be deleted at a lesser cost. This idea of preservation of the marked was previously considered in Bonet *et al.* (2004, 2005) and Wheeler (2005) (see section 3.3.4 for more details).

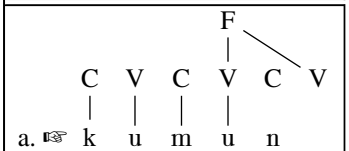
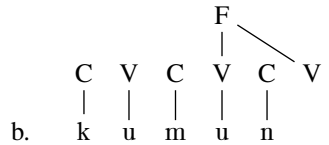
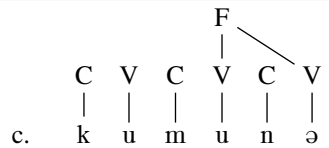
[11] *UNENGAGED-CV could also be named PARSE-CV. This constraint expresses a widespread idea in phonological theory that phonological structure must be parsed at appropriate levels of representation.

[12] The choice of Containment is motivated by what is seen in Catalan: words with final deleted /n/ are regularly stressed like C-final words, which require the nasal to be contained in the output even though it is unrealized.

[13] One reviewer argues that assuming a violation of DEP-V by epenthetic vowels is incompatible with the basic management of empty nuclei in Strict CV, whereby realizing ungoverned empty V's is not costly. However, this is not precise. In this case we are dealing with a final empty nucleus. FEN's in Strict CV are parametrically licensed. In other words, like governed empty nuclei, they should remain unrealized. Therefore, realizing them does come with a cost under any view. Let us also clarify that we use the constraint name DEP, characteristic of Correspondence theory, instead of FILL, although we assume Containment (see the paragraph after 19).

ING, a constraint against floating segments. In sum, the foot parses the last CV unit and this is precisely what allows /n/ deletion in a position in which it would otherwise be unlicensed.

(20) Tableau for [kuˈmu]

/kumun/	DEP-V	*UNENGAGED-CV	*UNLICENSED[n]	*FLOATING
a. ☞ 				*
b. 			*!	
c. 	*!			

If so, representing the right-aligned foot with a FEN dependent, allows one not only to get rid of moras but also to leave afloat the weak final /n/. We will now see that when the FEN is not engaged by metrical structure, /n/ cannot remain afloat.

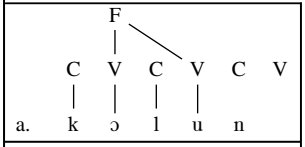
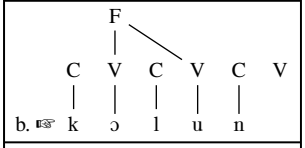
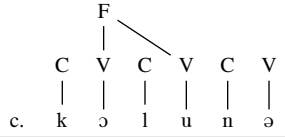
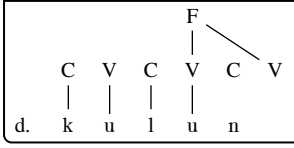
3.3. Instances of word-final [n]

3.3.1. Blocking of final /n/ deletion before unstressed vowels

The situation in words with final /n/ that have lexical, non-final stress is different. Now consider the tableau in (21) for the word [ˈkɔlun] ‘colon’. In this case, if /n/ does not associate to its C position and the final CV unit is not engaged by any level of representation because the foot is not right-aligned, thus violating *UNENGAGED-CV (candidate a). The final /n/ must associate to its C position in order to engage the otherwise unengaged CV unit, and the candidate violating *UNLICENSED[n] wins out. This evaluation demonstrates that both DEP-V and *UNENGAGED-CV dominate *UNLICENSED[n]. The constraint FAITHFULNESS-STRESS must also dominate *UNLICENSED[n] in order to ensure adherence to lexical stress (which appears marked as a standard IPA stress diacritic in the underlying representation).[14]

[14]One reviewer wonders how lexical stress can be encoded in our model if CV units are absent from underlying representations. We assume that lexical stress can be modeled by associating the relevant vowel with a V slot which is a foot’s head in the lexical representation, rather than through the algorithm (that is, by assuming underlying prosodic structure).

(21) Tableau for [ˈkɔlun]

/ˈkɔlun/	FAITH-STRESS	DEP-V	*UNENGAGED-CV	*UNLICENSED[n]	*FLOATING
a. 			*!		*
b. ☞ 				*	
c. 		*!			
d. 	*!				*

The ranking of DEP-V above *UNLICENSED[n] ensures that unlicensed [n]'s are not repaired through realization of the FEN as a full vowel through vowel epenthesis, which is schwa in Catalan (compare candidates b and c in tableau 20). The ranking of *UNENGAGED-CV above *UNLICENSED[n] expresses the fact that [n] can be unlicensed only in those cases in which the metrical structure cannot engage a CV unit due to a lexical stress that pushes the foot far from the right word edge (compare candidates a and b in tableau 21). Finally, the ranking of *UNLICENSED[n] above *FLOATING derives the fact that when the last CV unit is engaged by the metrical structure, a floating segment is preferred over an unlicensed, associated [n] (compare candidates a and b in tableau 20). Thus, our analysis captures not only final /n/ deletion, but also its non-application when the preceding vowel is not stressed.

3.3.2. Final /n/ deletion counterfed by final consonant cluster simplification

Catalan displays a process of consonant cluster simplification in final position by which a word-final stop deletes when preceded by a homorganic nasal (22). We therefore assume that underlyingly the words in (23a) are /dent/, /kanp/ and /sang/.

(22) Final /nC/ cluster simplification in Catalan

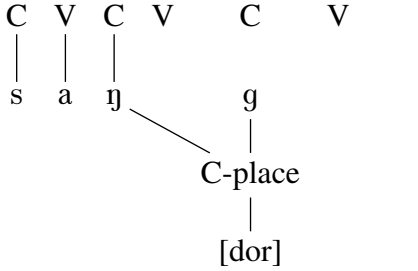
a. *Underived*	b. *Derived*
[ˈden]	[dənˈtal]
'tooth'	'dental'
[ˈkam]	[kəmpəˈɾɔl]
'field'	'peasant'
[ˈsaŋ]	[səŋguˈnos]
'blood'	'bloody'

A word like [ˈden] illustrates the fact that [n] surfaces word-finally when it has come to stand in this position due to cluster simplification. Although the underlying /t/ in /dent/ is not realized—it remains afloat below its C position—we claim that it has the ability to license the

preceding nasal. This is evident from the fact that the nasal acquires the place of articulation of the following non-realized stop.

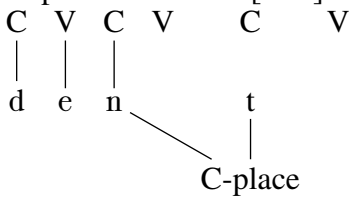
First, consider the example ['saŋ]. The nasal surfaces as velar because it acquires the velar place of articulation of the following underlying velar stop, and therefore the non-realized stop licenses the preceding nasal. We propose, following Containment, that the velar stop is not deleted in the output, but is only delinked from its C position. This allows for a branching structure at the C-place node (Clements & Hume 1995) originally linked to the final stop. This C-place node branches and links to the V position occupied by the nasal, as in (23).

(23) Nasal-obstruent cluster in ['saŋ]



The same structure as in (23) can be attributed to ['den]-type cases. We assume that /t/, like /n/, is underspecified for place because it also undergoes place assimilation in pre-consonantal position (['sɛk 'kazəs] 'seven houses' *cf.* ['sɛt] 'seven'). However, it is a fact of Catalan that, unlike /n/, /t/ does not need to be licensed in final position. We formalize this by representing /t/, but not /n/, as having an unspecified C-place node, that is, with no terminal feature. The nasal in ['den] can be associated to its C position in order to satisfy *FLOATING without violating *UNLICENSED[n] because the /t/ still has a C-place node, which allows for the same branching structure found in ['saŋ] (24). The only difference with respect to ['saŋ] is that in ['den], the underlying /t/ has no terminal place feature.

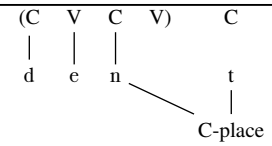
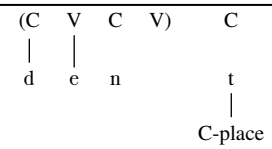
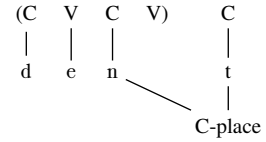
(24) Representation for ['den]



The fact that /t/ is not linked to C and is therefore left unpronounced certainly violates *UNENGAGED-CV. However, this violation is motivated because *UNENGAGED-CV is dominated by an independent markedness constraint against homorganic nasal-stop clusters in word-final position, which we refer to as *NT#, as seen in the tableau in (25). Both candidates (a) and (b) satisfy *UNLICENSED[n]: candidate (a) because of the C-place branching node, and candidate (b) because the nasal is unassociated. Candidate (b), with non-realization of /n/,

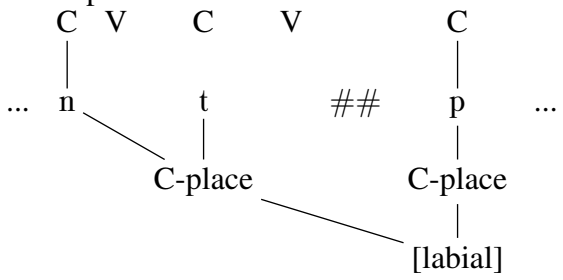
violates *FLOATING twice, and this is why candidate (a) wins. Foot boundaries are marked in (25) with parentheses.

(25) Tableau for [ˈden]

/dent/	*NT#	*UNENGAGED-CV	*UNLICENSED[n]	*FLOATING
a. ☞ 		*		*
b. 		*		**!
c. 	*!			

One reviewer raises two relevant empirical facts about [ˈden]-type cases. First, when cluster simplification counterfeeds final /n/ deletion, the nasal is alveolar, as are all final [n]'s in Catalan. However, when coronal nasals precede a realized [t] or [d], which are always dental in Catalan, the nasal is also dental ([dən̪ˈt̪al]). If /t/ is assumed to be only specified for a C-place node without a terminal feature, and final [n] is licensed by an association to that C-place node both in [ˈden] and in [dən̪ˈt̪al], why is the final [n] in [ˈden] not dental? We claim that only *realized* /t/ (and /d/) is dental in Catalan. This claim can be expressed as a markedness implicational constraint of the type "if realized [t], then [dental]" (see Levelt & van Oostendorp 2007, van Oostendorp 2014 and Torres-Tamarit *et al*. 2016 for implicational constraints of the if-then-type). Such output-oriented constraints are independently needed to account for how certain classes of segments, such as rhotics, are interpreted by the phonetics on a language-particular basis. This constraint would not affect unrealized /t/'s, which would explain the alveolar realization of [ˈden]. The second empirical fact is the following: when a word like [ˈden] is followed by a consonant-initial word, the /n/ acquires the place of articulation of that following consonant, as in [ˈdem pəˈtitə] 'small tooth' (*cf*. *[ˈden pəˈtitə]). How can /n/ assimilate to a following labial through an intervening /t/? We consider this to be a case of indirect place assimilation. The /t/ is present in the representation, and its C-place node licenses the previous nasal. The fact that the C-place node associated to the /t/ is empty triggers a place-sharing configuration between the feature associated to the following word-initial consonant and the C-place node of the /t/ (recall that this also happens when /t/ is realized and precedes a consonant, as in *set cases* [ˈsɛk ˈkazəs] 'seven houses'). Because the nasal is linked to the C-place node of the /t/ for independent reasons, the nasal indirectly inherits the place specification of the following word-initial consonant, as illustrated in (26). This analysis is non-stratal (*cf.* the analysis of Catalan in Kiparsky 1985, in which dentalization only takes place postlexically), and does not violate Containment.

(26) Nasal place assimilation across word-boundaries



The absence of final /n/ deletion in plurals as in ['pans] 'breads' (*cf.* ['pa] 'bread') receives the same explanation as ['den]. The only difference is that in ['pans], as opposed to ['den], the licensor [s] surfaces because *NT# exclusively refers to homorganic nasal-stop clusters. An evaluation of the form ['pans] is given in (27). Note that [s], the result of applying final-obstruent devoicing to the plural morph /z/, is specified for [coronal]. We assume this representation because /z/ is a perfect pre-consonantal "coda" in Catalan and does not undergo place assimilation. The result is a licensed nasal specified for [coronal], a redundant specification for nasals in Catalan.

(27) Tableau for ['pans]

/pan+z/	*NT#	*UNENGAGED-CV	*UNLICENSED[n]	*FLOATING
a. ☞ (C V C V) C V p a n s C-place [cor]				
b. (C V C V) C V p a n s C-place [cor]				*!
c. (C V C V) C V p a n s C-place [cor]		*!		**

With the addition of the constraint *NT#, we have easily extended our account to another case where final /n/ deletion is blocked.

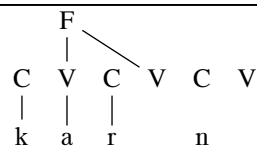
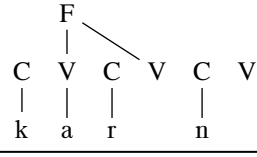
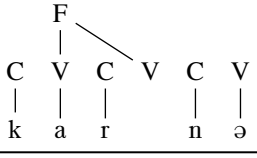
3.3.3. No final /n/ deletion in final /rn/ clusters

A distinct case of realization of word-final /n/ is represented by the cases in (4a), like ['karn] "meat". Word-finally, /n/ surfaces if it is preceded by [r], the most sonorous among sonorant consonants.[15] A theory in which /n/ is a coda in both /kumun/ and /karn/ will run into

[15]Final [n] can also marginally surface before the glide [j]. The only Catalan words with a word-final [-jn] cluster, however, are the following three technical loanwords: *ain* ['ajn], or ['ain], *zain* ['zajn], or ['zain], Aramaic

difficulties in explaining deletion in the former yet retention in the latter. Strict CV, in contrast, offers an independently motivated solution. Although appearing in final position, the segment preceding /n/ in a Strict CV representation is not a stressed vowel but rather an internal empty nucleus. As shown in (28), because feet can only be headed by full vowels, this empty nucleus cannot head a right-aligned foot with a dependent FEN. Instead, the V associated to /a/ heads the foot. The CV unit above the /n/ is not engaged in the metrical structure. This configuration is parallel to the one found when /n/ precedes an unstressed vowel due to lexical stress seen above in (2). Thus, the same mechanism that we propose to explain the blocking of final /n/ deletion before unstressed vowels explains the ['karn]-type cases. This is a clear advantage of our analysis. As can be seen in tableau (28), the need to satisfy the constraint *UNENGAGED-CV, which dominates *UNLICENSED[n], triggers the realization of final /n/.

(28) Tableau for ['karn]

/karn/	DEP-V	*UNENGAGED-CV	*UNLICENSED[n]	*FLOATING
a. 		*!		*
b. ☞ 			*	
c. 	*!			

This concludes the account of the phonological deletion of coronal nasals in word-final position. We can now move to the retention of other related segments.

3.3.4. A note on the non-deletion of non-coronal nasals and non-nasal coronals

One important question is why /n/ deletes in word-final position whereas non-coronal nasals like labial /m/ or palatal /ɲ/ do not. Unlike /n/, these nasals are specified for place.[16] This simple fact makes them automatically licensed. In OT terms, this could be seen as an effect of preservation of place features.

However, there are other non-nasal coronals that are never deleted. For example, the coronal obstruents /t, s/ and the non-nasal coronal sonorant /l/ are never deleted in word-final position. We already discussed /t/ in 3.3.2 and showed that although it is underspecified it does have a C-place node, and therefore it does not require licensing and is not expected to delete in final position. However, unlike /t/, the coronal fricative [s] and the non-nasal coronal sonorant [l] never assimilate the place of articulation of a following consonant. We take this as evidence

and Hebrew alphabet letters; *einstein* ['ajnstajn], the energy unit; and foreign place names like Main ['mɛjn] or borrowings like *airlines* ['ɛrlajns]. A final cluster like [-ln], whose profile is also sonority-falling, is not found; Lincoln is pronounced as ['liŋkon] or ['liŋkən]. However, we do find words with final [-lm], as in *elm* ['ɛlm] 'type of helmet', *(p)salm* ['salm] 'psalm', *film* ['film] 'film'.

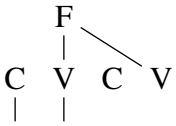
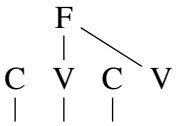
[16]Recall that the velar nasal is always the result of place assimilation to a velar stop and is rendered in word-final position due to the application of final cluster simplification. The reason why it is preserved is therefore distinct from what we see with labial and palatal nasals and has to do with sharing place with the unassociated velar stop.

that /s/ and /l/ are specified for [coronal] place, as opposed to /n/ and /t/, and therefore they never require the licensing that /n/ requires.[17]

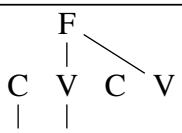
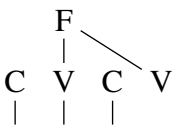
3.3.5. Lexical exceptions

Some items in Catalan surface with a final [n] even though a stressed vowel precedes the nasal, as in ['sɔn] 'sleep, sleepiness' (4c). This word creates a minimal pair with ['sɔ] 'sound' (*cf.* [sunuri'tat] 'sonority'), which undergoes regular final /n/ deletion after stressed vowels. These are clear cases of lexical exceptionality. Lexical exceptions in OT can be easily modeled through lexically-indexed constraints (Pater 2009). Lexically-indexed constraints, or morpheme-specific constraints, are general constraints that apply to a subset of the lexicon of a language. In words such as ['sɔn], it is more important to avoid the floating nasal than to avoid an unlicensed /n/. Therefore, we propose that a lexically-indexed constraint *FLOATING$_I$ outranks *UNLICENSED[n], which in turn dominates unindexed *FLOATING by transitivity. The tableaux in (29) and (30) show how unindexed ['sɔ] and indexed ['sɔn] are selected as the most optimal candidates, respectively, despite having the same underlying representation /sɔn/: the only difference between the two is the index.

(29) Tableau for ['sɔ]

/sɔn/	*FLOATING$_I$	*UNLICENSED[n]	*FLOATING
a. ☞ 			*
b. 		*!	

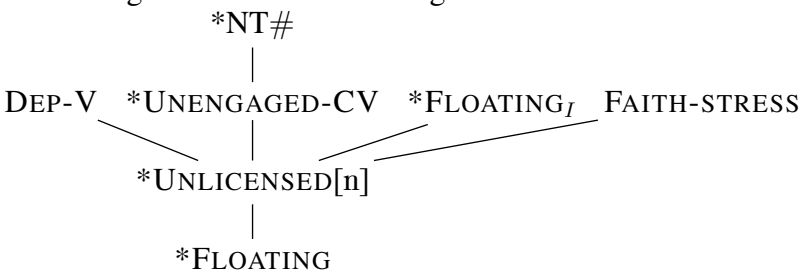
(30) Tableau for ['sɔn]

/sɔn/$_I$	*FLOATING$_I$	*UNLICENSED[n]	*FLOATING
a. 	*!		*
b. ☞ 		*	

The final OT grammar proposed in this paper is illustrated in (31).

[17]This interpretation of the facts, which is based on the idea that some coronal consonants are specified for place ([s, l]) and others are not ([n, t]), does not necessarily conflict with OT's Richness of the Base Hypothesis. By assuming a set of feature co-occurrence markedness constraints of the type *[nasal,coronal] for [n] and *[−son,−cont,coronal] for [t], an input nasal or stop specified for place will never surface. These features can only co-occur in place-sharing configurations in order to avoid unlicensed segments. This is achieved if *UNLICENSED dominates *[nasal,coronal] and *[−son,−cont,coronal], which in turn dominate MAX[coronal].

(31) Final OT grammar as a Hasse diagram



Having covered the native vocabulary of Catalan, we move on to discuss loanwords very briefly.

3.3.6. The behavior of loanwords

As we noted in section 1, the process of final /n/ deletion extends to some loanwords (3), repeated here in (32).[18]

(32) Final /n/ deletion in loanwords

a. *Singular*	b. *Plural*	c. *Derivative*
[uˈzo] 'ozone'	[uˈzons]	[uˈzɔnik] 'ozonic'
[təliˈβa] 'Taliban'	[təliˈβans]	[təliβəˈnizmə] 'Talibanism'
[rəməˈða] 'Ramadan'	[rəməˈðans]	[rəməðəˈnɛt] 'small Ramadan'
[siŋkruˈtro] 'synchrotron'	[siŋkruˈtrons]	

Nevertheless, as was illustrated in (4d), most loanwords do pattern with lexical exceptions in the sense that final /n/ is realized. In (33), we provide more such loanwords. We also add a few foreign place names, as well as a few words that have entered the language more or less recently.

[18] In Mascaró (1976), the word *ozó* 'ozone' is given as [uˈzon], without final /n/ deletion, as opposed to the current standard form. A reviewer notes that Mascaró was probably using an older edition of Pompeu Fabra's *Diccionari general de la llengua catalana* in which the spelling was *ozon*. This fact demonstrates the relatively unstable situation of loanwords with respect to the process of final /n/ deletion over time.

(33) Final /n/ deletion blocked in loanwords

[məɣəˈzin]	[urəŋguˈtan]	[ʃərləsˈton]
‘magazine’	‘orangutan’	‘Charleston’
[ʃəˈman]	[kəjˈman]	[diˈβan]
‘shaman’	‘caiman’	‘divan, couch’
[tuβuˈɣan]	[pəkisˈtan]	[ˈklɔn]
‘slide’	‘Pakistan’	‘clone’
[duˈβlin]	[bərˈlin] or [bɐrˈlin]	[pəˈkin] or [peˈkin]
‘Dublin’	‘Berlin’	‘Peking’
[suˈðan]	[sinˈtron]	[fuˈton]
‘Sudan’	‘Sintrom’	‘futon’

However, some of these words do undergo final /n/ deletion in colloquial Catalan, although not for all speakers, as already noted in Jiménez & Lloret (2011).[19] We therefore contend that although final /n/ deletion is generally blocked in loanwords, the productivity of the process cannot be denied. This concludes our analysis of the exceptions to /n/ deletion.

4. Previous approaches

Before concluding, we briefly review some previous work on final /n/ deletion in Catalan.

Kikuchi (2002, 2009) proposed to relativize the margin sonority constraint hierarchy of Prince & Smolensky (1993/2004) according to the stressed syllable (34).

(34) Margin sonority constraint hierarchy relativized to stressed syllables
*M-ˈσ/vowel ≫ *M-ˈσ/glide ≫ *M-ˈσ/liquid ≫ *M-ˈσ/nasal ≫ *M-ˈσ/obstruent

Ranking *M-ˈσ/nasal above the anti-deletion constraint MAX-IO selects the candidate with final /n/ deletion only when the nasal is parsed as a margin of a stressed syllable. Otherwise, the candidate without final /n/ deletion is selected, because MAX-IO dominates the more stringent constraint *M/nasal, which is not relativized to the stressed syllable. In order to block final /n/ deletion in plural forms, another constraint is introduced, JUNCTURE-CONTIGUITY, which requires adjacent segments across a morpheme boundary in the input to be adjacent in the output. This constraint outranks *M-ˈσ/nasal. Kikuchi’s (2002, 2009) approach suffers, however, from a fundamental problem. Stressed syllables are metrically prominent positions, and there is ample typological evidence that prominent positions are more faithful to the input than non-prominent positions, that is, prominent positions preserve contrast and avoid neutralization (Smith 2004, 2008). Relativizing the margin sonority constraint hierarchy for stressed

[19] According to Zuraw (2016), in cases of exceptionality most words undergo a certain process, a smaller set of words shows the exceptional pattern, and an even smaller set of words behave variably. This situation is referred to as polarized variation, that is, a situation in which only a small number of items shows variation while the vast majority of items behaves in a consistent way. The situation found in Catalan for final /n/ deletion seems to be a case of this sort. It is not our purpose, however, to model this scenario: we address the interested reader to Zuraw (2016).

syllables seems therefore unjustified from a typological perspective.[20] Moreover, specifically in comparison to the present account, Kikuchi's analysis references morphological boundaries, a move that our account manages to avoid.

Bonet *et al.* (2004, 2005) suggested two possible ways to model what they see as a crazy rule: first, the use of parochial constraints like *ˈVn##, which prohibits a word-final configuration of a stressed vowel followed by [n]. However, the use of parochial constraints contradicts the universality of constraints postulated for OT, which should be simple and general. Second, they proposed to use the mechanism of local constraint conjunction and suggested the constraint NON-FINALITY&*n, which is violated by those outputs with final stress that contain [n]. Although this constraint receives a general formulation, it fails to explain why NON-FINALITY locally conjoins precisely with the general markedness constraint *n, and not, for instance, *k or *ʎ, which can be seen as more marked segments. The universality of this locally conjoined constraint is again dubious.

Wheeler (2005) proposed instead an analysis based on allomorphy, where the allomorph without final /n/ is selected in final position, and the allomorph with final /n/ is selected elsewhere. However, such an analysis does not explain why there are no allomorphs and subsequent allomorph selection if stress is not final. In addition, the account is extremely inelegant: for every alternating word, the analysis would have to assume two lexical representations which are identical in all respects except for the final /n/. Thus, several hundreds of cases with two stems differing only in the final consonant will have to be assumed for Catalan.

In sum, it is clear that no previous account has provided a fully satisfactory explanation for the facts. By way of a conclusion, let us now enumerate the several advantages of our own account.

5. Conclusion

In this paper we have carried out an analysis of the extent of final /n/ deletion in Catalan combining the representational assumptions and stress assignment principles of Strict CV and OT computation. The basic idea of our analysis is that final /n/ remains unassociated below its C position in order to satisfy a constraint against associated, but unlicensed nasals. The nasal can stay unassociated insofar as its CV is identified by metrical structure, as is the case when stress is final. When stress is non-final, however, the last CV unit of the phonological string is not engaged by either the melodic tier or the metrical tier. Therefore, in order to satisfy a constraint against unengaged CV structure, final /n/ is associated to its C position. Our analysis is simple and constitutes the first attempt to find a unified explanation for final /n/ deletion and its conditioning factor, stress. Under this analysis, phonological opacity disappears.

Now we are in the position to give a concise answer to the research questions posed at the beginning of this paper:

(35) Research questions

Q1. Why is /n/ the only nasal coda to be systematically deleted? And why only word-finally?

A1. /n/ is the only coda to be systematically deleted because it is the weakest of consonants: it lacks a place node and therefore seeks to associate to the place node of a following consonant. In word-final position, however, the nasal is not followed by any other consonant to whose place node it could be associated.

[20] On top of that, Kikuchi's analysis cannot in principle block final /n/ deletion in [ˈkarn]-type cases, and does not account for the opaque [ˈden]-type cases, those counterfed by final cluster simplification.

Q2. Why must stress immediately precede the deleted /n/?

A2. When stress precedes the deleted /n/, the latter's CV structure is still interpreted by the metrical structure. If the nasal does not immediately follow the stress, the CV unit is outside the domain of the foot. In these cases, the interpretability of the CV unit takes precedence over solving the problem posed by the unlicensed /n/, and the nasal ends up linked to its C position.

Q3. Why is final /n/ deletion blocked when /n/ is the second element in a word-final consonant cluster?

A3. For the same reason as Q2. In such a configuration, there is an empty nucleus standing between the two consonants. Because a foot's head can only be placed on full vowels, the foot does not engage the last CV unit, and therefore the /n/ is linked to its C position in order to allow its interpretability.

Q4. Why does final cluster simplification counterfeed final /n/ deletion?

A4. This opaque interaction is solved if a Containment theory of faithfulness is assumed. The unrealized obstruent is delinked from its C position but never deleted. The presence of a C-place node on that obstruent is sufficient to create a place-sharing configuration and therefore license the nasal.

Q5. What is the status of lexical exceptions?

A5. Lexical exceptions in which final /n/ is not deleted even though it follows stress are dealt with by means of the lexically-indexed constraint *FLOATING$_I$, which is ranked above the constraint against unlicensed nasals.

Beyond the specific issue of final /n/ deletion in Catalan, we emphasize that the success of our account lies in the link between skeletal position and stress assignment. It thus illustrate the claim that a skeleton-based metrical analysis is a worthy opponent to the mora-based one. From a more general perspective, we hope that this paper inspires other phonologists in pursuing a compromise between the need to take serious care of representations, as allowed by GP or Strict CV, and at the same time benefiting from OT as a general theory of phonological computation through constraint interaction.

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