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The Ibero-Romance rhotics: Of fake geminates, weight and sonority

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Abstract

The two rhotic consonants of Ibero-Romance languages are characterised by their very specific distribution and by the prosodic weight of one of them. Data has hitherto suggested a geminate-to-single contrast for the pair of rhotics. It will be shown here that this view must be rejected in favour of another which sees these putative geminates as complex syllabic onsets. But this hypothesis only holds if it can be shown that sonorants and only sonorants are likely to have weight in onset position in these languages. The Alignment theory of sonority makes this possible since sonority and weight appear as particular cases of the behaviour of the nucleus in that framework.

Keywords: rhotics, trills, sonority, prosodic weight, Ibero-Romance phonology.

1. Introduction

Ibero-Romance (henceforth IR) languages show a wide variety of rhotics. However, they can all be shown to obey a common system that comprises only two types of rhotics, a "strong" and a "weak" one. The latter is generally a coronal flap/tap [ɾ], with rare exceptions in coda position like the voiceless dorsal fricative [x] of *Carioca* Portuguese, the retroflex flap [ɽ] of other southern Brazilian varieties (Cristófaro-Silva 2010, Rennicke 2015), and Dominican Spanish [ɦ] (Willis & Bradley 2008). It is the strong type that shows the greater variation, ranging from a coronal trill [r] to uvular [ʁ ʀ] and laryngeal realizations (as in most Portuguese varieties and in Caribbean Spanish). The distribution of these two types is shown under (1) (C_d = coda, V = nucleus, O = onset, T = obstruent).[1]

(1) Distribution of rhotic consonants in Ibero-Romance languages

	{#,C_d}_V	V_V	V_{#,O}	T_V
Strong rhotic	+	+	–	–
Weak rhotic	–	+	+	+

These types come from a system preserved in most Spanish (and Catalan) and in some Portuguese varieties where the strong rhotic is a coronal trill, and the weak one is a coronal flap/tap. For this reason, and for the sake of simplicity, I will refer to them as "trills" and "flaps", instead of "strong" and "weak" rhotics, and note them with the respective IPA symbols [r] and [ɾ]. It should be emphasized, however, that, in accordance with Kaye's (2005: 283) principle that "the only source of phonological knowledge is phonological behaviour", these two types refer to *phonemes;* hence the distribution in (1) is not supposed to change whatever their phonetic realization. Thus, the strong rhotic (our "trill") may be either a coronal sonorant or a dorsal fricative; it remains "strong" *vis-à-vis* its "weak" counterpart; also, the latter remains "weak" whether it is a coronal or a retroflex.

The only problem possibly encountered by this analysis might be the dorsal fricative realization of the rhotic in coda found in some Brazilian varieties. However, as pointed out by Zhou & Jesus (2022), "it is the weak-r that surfaces after morphological alternation (*e.g. ma*[x] ['sea'] ~ *ma*[ɾ]*es* ['seas'] […]), suggesting that [x] is an allophone of /ɾ/." The same holds true for the Dominican Spanish [ɦ] in coda position.[2]

1 Trills may be occasionally allowed in coda, especially as emphatic allophones: cf. Lipski (1990: 159–162).

2 Another apparent problem follows from there being cases in Brazilian Portuguese of alternations between a posterior fricative, i.e. a putative strong rhotic, and a tap, a weak one, after a lateral coda as in *melro* (Oliveira & Cristófaro-Silva 2013). However, this results from Brazilian *l*-vocalization in coda: while [l] involves a following strong rhotic, both strong and weak rhotics are allowed after diphthong (cf. *bairro* 'neighbourhood' vs. *Cairo* 'Cairo'), the latter being far more frequent in this position.

As can be seen in (1), complementarity prevails except between vowels: cf. Sp., Port. *carro* 'car' vs. *caro* 'expensive', but Sp. *al*[r]*ededor* 'around', Port. *guel*[r]*as* 'gills', Sp. and Port. *hon*[r]*a* 'honour', *Is*[r]*ael*, *amo*[ɾ] 'love', *a*[ɾ]*ma* 'weapon', *p*[ɾ]*ado* 'prairie'.[3] No other consonants display such a distribution in IR languages. This idiosyncrasy needs explanation.

Moreover, trills (along with the palatal sonorants [ɲ] and [ʎ]) cannot occur in the onset of the last syllable of proparoxytonic words in Portuguese and in Spanish: for example, Port. *<u>cá</u>taro* 'cathar' and *ca<u>ta</u>rro* 'phlegm' are possible, not a word like **<u>cá</u>tarro*.[4] (The stressed syllable is underscored; the acute accent comes from spelling.)

Thus, the questions under (2) arise. Why is it that:

(2) a. intervocalic trills, unlike flaps, constrain word stress placement?
b. complex onsets and codas disallow [r]?
c. the word-initial and post-coda positions disallow [ɾ]?

Only the problems posed specifically by trills, that is the answers to questions (2a,b), will be dealt with in this article. These problems are discussed in section 2. It will be argued, firstly, that the commonly accepted answer to these questions involves a representation of the trill which faces a number of typological and markedness-related difficulties, even if it seems to provide a satisfactory response to questions (2a,b); and secondly, that there is an alternative solution, which avoids the problems encountered by the first, but faces the issue of weight in (2a). It will be seen that a revised version of the Strict CV theory, called Alignment Theory of Sonority (AT), is able to overcome this last problem. The general philosophy of AT will be introduced in section 3, where the technical aspects that are relevant for the analysis in the article will be discussed. In section 4, it will be shown that the answers to questions (2a,b) ensue from AT-based representations, and illustrate one of its main features: that, far from being separate aspects, sonority and weight follow from the same structure.

2. Two hypotheses

2.1. Trills as geminates

The data reported above has inspired a fairly widespread hypothesis, based on the assumption that there is only one /r/ phoneme: see *e.g.* Núñez-Cedeño (1989) for Spanish.[5] IR trills are then viewed as coda-onset clusters while flaps are singletons.

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3 [lr] is unattested in Spanish where it underwent epenthesis: cf. Old Sp. *valrá* > *valdrá* ‘worth$_{\text{FUT3P}}$’.

4 The same holds for the prepalatal consonants /ʃ/ and /ʒ/ in Portuguese, and the velar /x/ in Spanish.

5 A weak version of this idea consists in assuming that strong and weak r’s contrast in intervocalic position as a consequence of an earlier opposition between single and complex rhotics (the strong r being a sequence of a syllable-final flap plus a strong post-consonantal rhotic), and that this contrast is neutralized elsewhere, giving place to a single phoneme whose phonetic realization is strong in strong positions and weak in (the remaining) weak positions. However, the question (2a) is left unexplained, unless it is argued that there is no active ban

More specifically, trills are (lexical or derived) geminates that require two slots – cf. for Portuguese Câmara Jr. (1953), López (1979), Monaretto (1997), Wetzels (1997), Mateus & Andrade (2000), Abaurre & Sandalo (2003) – or "mirror consonants" based on two CV's, the first remaining empty while giving /r/ a strong position according to the Strict CV framework (Ségéral & Scheer 2008) – see Souza (2019).

Diachronically, intervocalic trills come, indeed, from the Latin geminate /rr/. This hypothesis has two benefits. First, if the trill is still a geminate, it cannot occur in complex onsets nor in coda position: neither triple onsets nor double codas are allowed in IR languages.[6] Secondly, this may be the reason why trills cannot occur in the onset of the last syllable of proparoxytones in Portuguese and Spanish, assuming, with Carvalho (1989, 2023) and Wetzels (2007) for Portuguese, that default stress is placed on the penultimate mora of the word, and that stress cannot fall before the antepenultimate one.

However, trills can hardly be viewed as geminates in modern IR languages for at least four reasons. I will list them in increasing order of importance.

First, as trills are given preference in word-initial position, this single geminate would be possible word-initially, a highly marked context for a geminate.[7] Admittedly, there are several languages with both initial and medial geminates (*e.g.* Trukese, Okinawan, Cypriot Greek), and in some cases, this is the only position for geminates, as in Pattani Malay and Leti (see Topintzi & Davis 2017 and references therein); the same holds for Ngada, Yapese and Nyaheun (see Kraehenmann 2011). Let us then accept that word-initial position may not be a crucial argument against the IR trill being a geminate.

Secondly, as opposed *e.g.* to Latin, Italian, Arabic, Finnish or Gascon (which shows Lat. R- > *arr-*: see Labrune & Miró-Lozano 2022) where all consonants can be geminates, trills and the palatal sonorants [ɲ ʎ] (Wetzels 1997) would be the only geminates in the language, which runs counter to the facts of length typology: gemination generally involves a natural class of phonemes. There are certainly cases where this class is extremely restricted. Thus, according to Blevins (2005), only the liquids /l r/ have geminate counterparts in Palauan. Indeed, Bradley (2001: 206-266) draws analogies between IR and Palauan among other languages about durational contrasts between rhotics. Nonetheless, unlike Palauan /l r/, /r ɲ ʎ/ can hardly be viewed as a natural class: it does not allow the generalisation that all coronal sonorants may be geminates since neither /n/ nor /l/ are concerned.

More importantly still, this putative word-initial geminate lacks its unmarked counterpart in IR languages contrary to what I could verify in most of the languages mentioned above: for example, in Palauan, the tap and the trill are in contrast intervocalically and word-initially (Bradley 2001: 229); Pattani Malay has geminate-to-single contrasts word-initially, and Arop-Lokep contrasts singleton and geminate rhotics initially and medially (Raymond & Parker 2005). Geminates being the marked term of the contrast, its absence word-initially in IR violates the expected Jakobsonian

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of strong rhotics in the last syllable of proparoxytones in modern IR languages, where their absence would be a matter of historical legacy.

[6] Double codas are apparently found in a few loanwords like *perspectiva*, but they can be analysed differently.

[7] Note that Italian trills, which are true geminates, do not regularly occur word-initially except in cases of *raddoppiamento sintattico*.

universal implication whereby the marked presupposes the existence of the unmarked but not the other way around.[8] I think that this condition needs to be taken seriously; if markedness were a mere synonym for frequency, it would be a circular notion.

Finally, assuming that they are geminates, post-consonantal trills, as in *honra* and *melro*, would involve a double coda which is disallowed in Portuguese and Spanish as stated above: no rhyme of the type /VNɾ/ or /Vlɾ/ is possible in both languages, neither before consonant nor word-finally.

2.2. Trills as complex onsets

The facts mentioned so far suggest that IR trills may differ from flaps in that they are *bipositional*, *fortis* and *heavy* segments, albeit not geminates, for the reasons mentioned in (3).

(3) a. They are bipositional as they are disallowed in TR onsets and codas.
b. They are fortis as they are the only rhotic admitted in "strong position", that is word-initially and after a coda.
c. They are heavy as they cannot occur in the last syllable of proparoxytones.

Leaving aside the question of weight for the moment, I wish to point out that IR has bipositional and, as will be seen, fortis onsets: TR clusters, whose liquid element (= R) can be a rhotic. I will then hypothesise, developing and refining an idea by Lipski (1990), that the trill is a complex "RR" *onset*. If this claim holds true, this is an interesting example of phonological reanalysis: a geminate is reinterpreted as a complex onset in a system that has lost all geminates.

An interesting fact is provided by historical evolution, which shows that trills and TR's play the same role in avoiding clusters that violate the SSP (Selkirk 1984; Clements 1990; see also Bonet & Mascaró 1997 for the distribution of rhotics in terms of the SSP). This can be shown by comparing Portuguese rhotic fortition to French plosive epenthesis in (4a) and (4b) respectively – Carvalho (2008).[9]

(4)	a.	Lat. MER(U)LU	> **me*[ɾl]*u*	> Port. *mel*[r]*o*	*melro*	'blackbird'
		Lat. HON(O)RARE	> **ho*[nɾ]*ar*	> Port. *hon*[r]*ar*	*honrar*	'honour$_{INF}$'
		Lat. GEN(E)RU	> **ge*[nɾ]*u*	> Port. *gen*[r]*o*	*genro*	'son-in-law'
	b.	Lat. MOL(E)RE	> **mo*[lɾ]*e*	> Fr. *mou*[dɾ]*e*	*moudre*	'grind$_{INF}$'
		Lat. CIN(E)RA	> **ce*[nɾ]*e*	> Fr. *cen*[dɾ]*e*	*cendre*	'ash'
		Lat. GEN(E)RU	> **ge*[nɾ]*u*	> Fr. *gen*[dɾ]*e*	*gendre*	'son-in-law'

The facts in (4) bring additional evidence (cf. section 2.1) for the claim that both [Tɾ] and [r] involve two timing slots. If TR and RR are two possible repair strategies for the same input, this should not be exclusively attributed to the inherent strength of the trill and that of the TR's occlusive element, but may also follow from

[8] Within Strict CV, word-initial (and post-coda) trills could be argued to be derived segments owing to the presence of a preceding "empty CV" (Souza 2019). However, nothing explains why only rhotics are likely to involve this extra CV and spread to it, except the fact that a /r/ : /ɾ/ contrast does exist between vowels, which brings us back to my first objection.

[9] Metathesis is also possible: **merlu* > Port. *melro*, **ge*[nɾ]*u* > Sp. *yerno* vs. **ho*[nɾ]*ar* > *hon*[r]*ar*.

their common bipositionality. Either way, as trills cannot be geminates in IR (cf. 2.1), their being complex onsets becomes the null hypothesis in these languages.

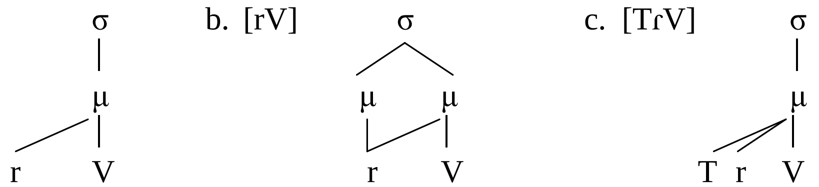
And yet, the phonologist is faced with a problem here, as one thing differentiates RR from TR: while both seem to be bipositional, only the former is supposed to have weight, not the latter (cf. Sp., Port. *cátedra* 'chair' vs. **cáterra*). This raises two questions. First, what can this novel object be that we have called an "RR onset" which retains a property usually assigned to heterosyllabic geminate consonants but cannot be a geminate (cf. section 2.1)?

Secondly, while sonorants, and especially liquids, are the best consonantal candidates to be associated with weight (see Hyman 1985; Gordon 2006), the latter is by no means a universal property of sonorants. Thus, while strong rhotics have weight in IR languages, this does not mean that the same holds for trills or posterior fricatives elsewhere; indeed, this is not the case. Similarly, while weak rhotics are weightless in IR, they can have weight elsewhere, as in Samothraki Greek (Topintzi 2007, 2010). TR onsets show the same picture: they can be either weightless as in IR languages, or heavy as they were at some stage of Latin evolution: cf. changes like TENĔBRA > Sp. *tiniebla* 'darkness' or TONĬTRU > Fr. *tonnerre* 'thunder' where the penultimate syllable was heavy despite its short vowel in Classical Latin.

These typological facts lead to a formalisation problem: an appropriate theory should be able to explain *simultaneously* (i) why sonorants are given preference over the other consonantal types for weight assignment, and (ii) why weight assignment can vary from language to language and within the same language. Furthermore, an appropriate theory should also explain why obstruents may convey moraicity as well though less frequently, in both coda and onset positions.

Moraic phonology (Hyman 1985) provides the representations in (5) for IR languages, where trills (5b) are linked to one additional mora contrary to flaps (5a) and TR onsets (5c).

(5) a. [ɾV] b. [rV] c. [TɾV]



However, why, then, should rhotics be the only consonants to be moraic in onset position? In a way, the association of /r/ with a specific mora in (5b) suffers from the same flaw as *SPE*'s rules (Chomsky & Halle 1968: §9): although we know that sonorants are more likely to be moraic than obstruents, those representations do not make any formal link between weight and sonority; writing a "μ" is sufficient. Hence, any consonant in onset position should have the same probability of being moraic.

Here we come to the heart of the problem: these issues suggest that the current representation of two phonological dimensions, weight and sonority, is not appropriate. In (5), the two aspects are formalised separately: weight is expressed by the moraic skeleton while sonority is based on features like [±consonantal], [±sonorant] or [±continuant] (generally represented by means of IPA symbols). It will be proposed here that sonority is not pure melody; it is not based on features but, just like weight, on *structure* (Carvalho 2017, 2023). To this end, an overview of what was called Alignment Theory of sonority (henceforth AT) is necessary.

3. Unifying sonority and weight

3.1. C/V alignments and sonority

AT combines the features under (6).

(6)
a. Consonants and vowels are universally segregated,
b. and involve two parallel ONON sequences, on the C-plane and on the V-plane, which interact across an x-skeleton.
c. Different C/V alignments give rise to the several sonority-based categories (plosives, fricatives, liquids, glides etc.),
d. The two ONON sequences on the C-plane and on the V-plane may differ in length.

C/V segregation rests on a large body of evidence: acoustic (Öhman 1966), articulatory (Fujimura 1992), acquisitional (McDonough & Myers 1991; Macken 1992) and cognitive (Obleser *et al.* 2010) data support the view that consonants and vowels belong to separate channels in the speech "plan", but must interact through implementation in the same vocal tract.

The periodic ONON…ON sequence is based on what constitutes the foundation of Strict CV (Lowenstamm 1996; Scheer 2004), whose earlier version, classic Government Phonology (see *e.g.* Charette 1991), distinguished between the sequence of syllable constituents and the skeleton made of x-slots (Vergnaud 1982; Levin 1983).

Given (6a,b), words like Port. /ˈpatu/ *pato* 'duck' and /'paktu/ *pacto* 'pact' will be assigned the representations under (7), where O and n stand for the onset and the nucleus in the C-plane, and o and N represent the same entities in the V-plane. Geminates are supposed to have the same structure as the cluster in (7b), as suggested by such changes as Lat. NOCTE > Italian *notte*, where O_2 and O_3 are simply linked to one single melody.

(7) a.

p		t		Melodies
|		|		
O_1	n_1	O_2	n_2	C-plane
|	|	|	|	
x	x	x	x	Skeleton
|	|	|	|	
o_1	N_1	o_2	N_2	V-plane
	|		|	
	a		u	Melodies

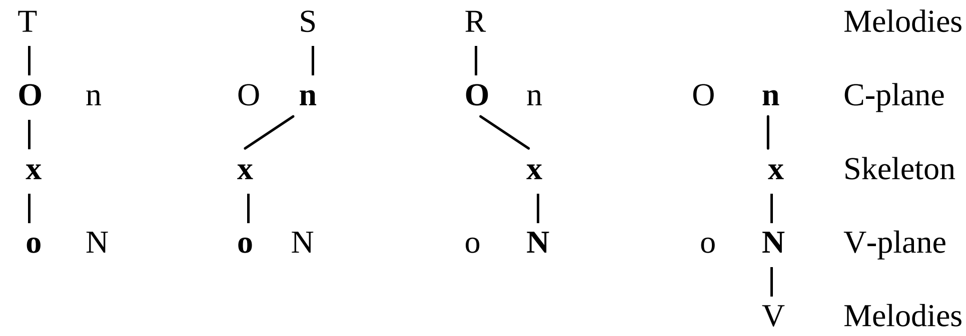
b.

p		k		t		Melodies
|		|		|		
O_1	n_1	O_2	n_2	O_3	n_3	C-plane
|	|	|	|	|	|	
x	x	x	x	x	x	Skeleton
|	|	|	|	|	|	
o_1	N_1	o_2	N_2	o_3	N_3	V-plane
	|				|	
	a				u	Melodies

It follows from (6c) that the C- and the V-planes interact in such a way that several alignments are allowed. As shown in (8), these C/V alignments (in bold) define various sonority categories according to which elements of the two planes are synchronized. These categories are supposed to primarily include most manner of articulation distinctions on the basis that their defining properties have a remarkable property for features: they do not spread, unlike place of articulation melodies (and nasality), which will be assumed to be the sole true consonantal features in phonological representations.

Three consonantal categories are represented in (8a-d): T = plosive, S = fricative and R = sonorant, V in (8e) being a vowel.

(8) a. /T/ b. /S/ c. /R/ e. /V/

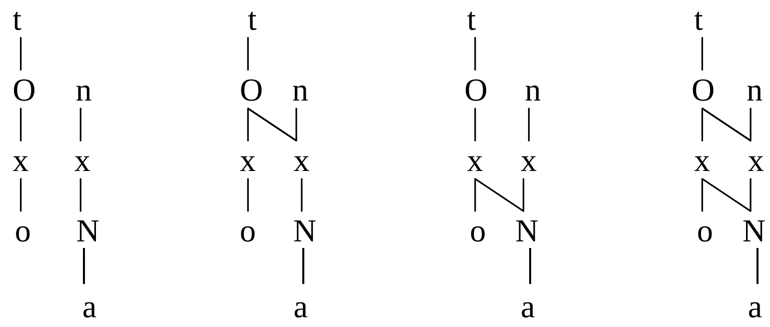


Consonantal nasality is a melody that will be assumed to associate with the *onsets* of the C-plane. Nasal consonants therefore behave sometimes as obstruents (T = O-o alignment) as in (8a), sometimes as sonorants (R = O-N alignment) as in (8d), especially in the coda (where, like the other sonorant consonants, it is generally unspecified as to place).

Note that the alignments in (8) have their vocalic counterparts in the V-plane. These alignments give place to several types of glides (see Carvalho 2023: 11–12), but will not be discussed here because they are not relevant for the analysis in this article.

The alignments in (8) are said to be *free*. In turn they can interact with one another in such a way that other putative features prove to be based on structure as well. This is shown in (9) for VOT categories which emerge from O-N *bound* alignments (Carvalho 2008). Here I take /t/ (= coronal) as a representative of plosives, and /a/ as a representative of vowels: /ta/ = unmarked configuration, /t^{h}a/ = aspirated or *fortis*, /da/ = voiced or *lenis*, /d^{ɦ}a/ = breathy voice.

(9) a. /ta/ b. /t^{h}a/ c. /da/ d. /d^{ɦ}a/



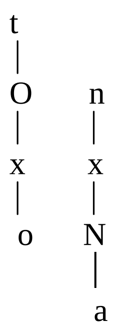
As this will be a relevant aspect of our topic, let us specify the formal difference between free and bound alignments. Let us assume that the number of free alignments equals the number of x-slots within a given configuration. Hence, the number of free alignments in, say, (9c) /da/ is 2. As (9c) shows a total of 3 alignments (O-o, O-N and n-N), it also contains one bound alignment. But what tells us that O-N is the bound alignment in (9c)?

The answer to this question lies on markedness. In AT, markedness follows from *violation of biunivocity*, as defined in (10).

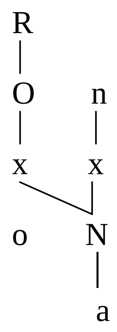
(10) Biunivocity constraint:
There must be one-to-one correspondence between the components of the C-plane and those of the V-plane so that each element of each set is associated once to one and only one element of the other set.

A representation will then be said to be the unmarked term of a given contrast if it respects biunivocity better than its marked counterpart. Hence, /da/ in (9c), with its bipositional N, is marked in relation to /ta/ in (11a) but crucially not to /Ra/ in (11b), which cannot be argued to be its unmarked counterpart as it contains a floating o in the V-plane. On the other hand, /Ra/ is marked for that reason with respect to /ta/. Indeed, liquids appear as marked consonants, typologically and acquisitionally, in relation to voiceless plosives.

(11) a. /ta/



b. /Ra/

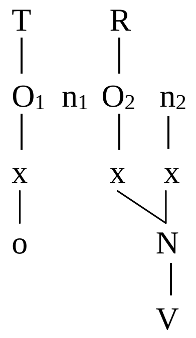


In sum, an alignment is bound when it confers an additional, marked feature to a free alignment.

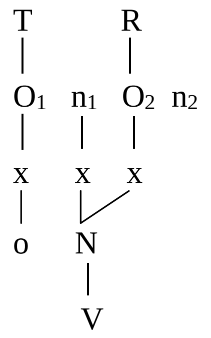
3.2. C/V asymmetry and phonotactic constraints

Representations as those in (7a,b) prevail in systems having only unmarked CV syllables where C and V may be any segment and even melodically empty, as in Semitic languages. In systems that exhibit significant phonotactic constraints, *e.g.* TR onsets and/or restrictions on the coda, (6d) is crucial: for example, it follows from (6d) that AT can generate, among other structures, the two *asymmetric* syllable types under (12) where the C-plane is longer than the V-plane.

(12) a. TRV



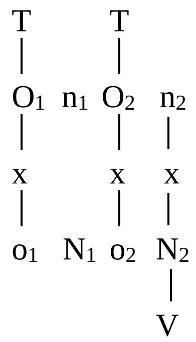
b. TVR



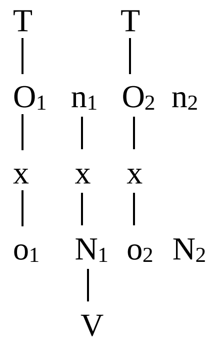
(12a) represents clusters of the type *muta cum liquida*, and (12b) rhymes with sonorant codas; (12b) is particularly interesting in IR languages, where most (true) codas are sonorants.

It follows from (6b,c) that languages with TT clusters and/or plosive codas will show the symmetric configurations under (13), where the C- and V-planes are of equal length.

(13) a. TTV

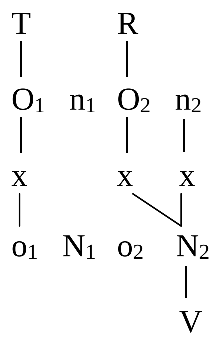


b. TVT

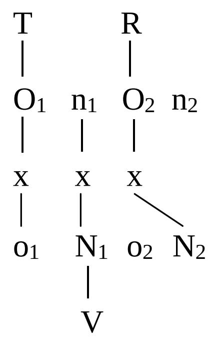


Such languages will have similar representations with sonorants, as shown in (14). Thus, Italian /sa.kra/ ‘sacredFEM’, with its TR onset, and Hebrew /sak.ra/ ‘she scrutinized’ differ in that the former has (12a) above while the latter has (14a).

(14) a. TRV



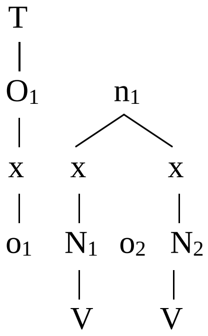
b. TVR



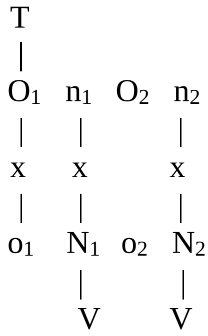
In other words, since asymmetric structures like those in (12) are typical of languages which satisfy strong phonotactic constraints, it follows that these constraints are at least partly encoded in the representations.

Similarly, if the V-plane is longer than the C-plane, alignments can lead for example to (heavy) diphthongs as in (15a). The symmetric counterpart of this structure, in (15b), underlies hiatuses, which show much weaker phonotactic constraints than diphthongs.

(15) a. TVV̯



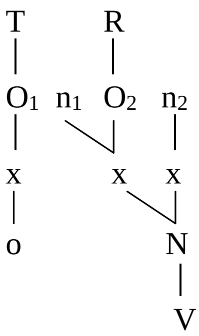
b. TVV



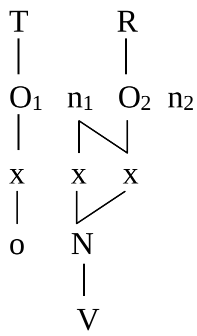
3.3. Alignments and weight

Let us assume that "moras" are *N-n alignments*. Hence, not only are the diphthongs in (15a) bimoraic, but the configurations in (12a,b) can be reformulated as in (16a,b) where both syllables worth two moras as they contain two N-n alignments as well. Thus, while vowels are generally moraic, moraicity does not imply voweliness.

(16) a. TR$_\mu$V



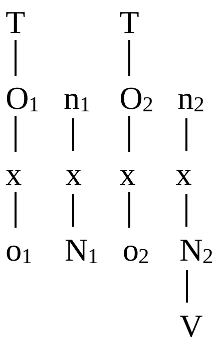
b. TVR$_\mu$



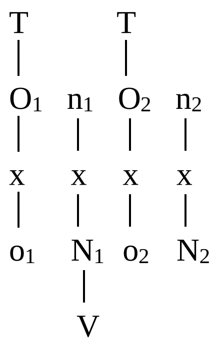
Note that (16a) cannot represent TVRV as n_1-N is a bound alignment (cf. section 3.1).

Of course, moraicity can also be associated, though less frequently, to obstruents. This is allowed in AT by symmetric structures as those in (13a,b). Languages with weak phonotactic constraints may thus show plosive clusters and codas that have weight, as in (17a,b).

(17) a. T$_\mu$TV



b. TVT$_\mu$

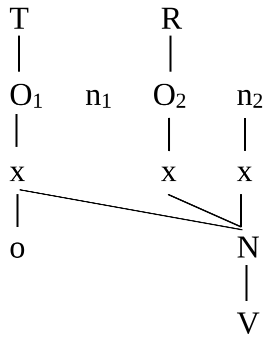


4. The alignment-based phonology of IR trills

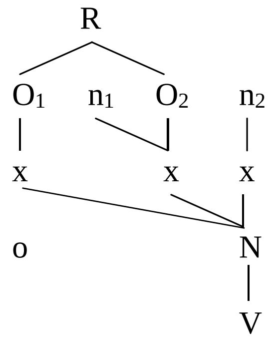
Let us keep in mind that IR trills cannot be geminates, at least for the last two of the four reasons adduced in section 2.1. Word-initially, they do not have a singleton counterpart, which violates a universal markedness condition. Word-medially, a rhotic geminate would entail the only cases of otherwise ill-formed codas in Spanish and Portuguese: /VNR/ and /VlR/.

On the other hand, IR trills must be bipositional because they cannot occur in coda position nor in complex TR onsets. As seen in section 2.2, this apparent dilemma motivates the hypothesis that they are complex onsets. Given what has been set out in section 3, this is made possible by AT in the following form: (18a) represents a (voiced) complex TR onset, while (18b) represents its "geminate" counterpart.

(18) a. /dɾV/



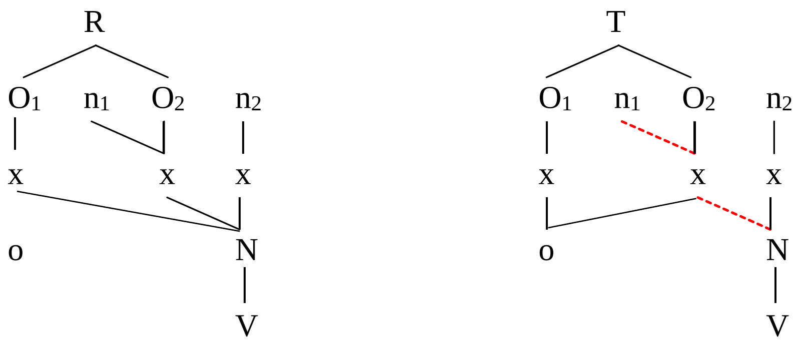
b. /rV/



As can be seen, (18a) and (18b) display the very same structure: that of a bipositional cluster in the C-plane which has no reflection in the V-plane. Note that the change [r] > [dɾ], i.e. from trills to complex onsets, is attested, albeit rarely, in Spanish varieties after coda: cf. *e.g. Endrique* for *Enrique* (Lipski 1990: 166–167). The only difference between (18a) and (18b) is that the latter, like (16a), has a bound n_1-N alignment that confers moraicity to the trill. Interestingly, this might be seen as a trace of the old Latin geminate.

Let us now compare the representation in (18b) – reiterated in (19a) – and the one in (19b). The trill in (19a) is bimoraic as it can contain two n-N alignments. The structure in (19b) is identical to the one in (19a) except that it involves a long plosive (with two O-o alignments). Crucially, (19b) cannot be moraic. Had an n_1-N alignment existed in (19b), the representation would be ill-formed since alignments – in this case n_1-N and O_2-o – *do not cross* for the very same reason as classic association lines: to avoid linearity violation.

(19) a. $/R_{\mu}RV_{\mu}/$ *b. $/T_{\mu}TV_{\mu}/$



Hence, not only can RR onsets be moraic, but *only* RR onsets can be so with such a structure.

Let us however recall the point made in section 2.2 about what an appropriate theory should do. In this case, it must simultaneously explain not only why trills are moraic in IR languages, but also why they are not elsewhere; likewise, it should account for the impossibility of $/T_{\mu}TV_{\mu}/$ in IR as well as for its existence in other languages. The first point is simple: (19a) may lack its bound n_1-N alignment; in this case, RR will still be bipositional but without weight.

As to (19b), its ill-formedness does not mean that, say, moraic long onsets made of plosives do not exist; they do, even word-initially, for example in Berber (cf. Ridouane 2010) or Trukese (cf. Topintzi & Davis 2017). It simply means that, wherever they exist, they require a different, symmetric structure, the one under (17a) in section 3.3, which is unavailable in IR languages (if we put aside loanwords like *pacto* in (7b), *pterodáctilo* etc., where no geminate is attested anyway).[10]

5. Concluding

In sum, if IR trills involve the same configuration as TR onsets, then (i) there can be bipositional sonorants in a language that lacks geminates; (ii) moras being n-N alignments, only sonorants are allowed to be moraic in onset position. Point (i) avoids the problems raised by the geminate (or "mirror consonant") hypothesis (cf. section 2.1), while point (ii) solves the mystery of moraic trills in syllable onsets (cf. section 2.2).

I have left what I believe to be the most important issue to the end: how does AT eventually succeed in unifying sonority and weight? The answer is simple: thanks to N! The coplanar representations provided by the theory are rich enough to allow N to play several roles: (i) free N-O alignments underlie sonorants, (ii) free or bound N-n alignments involve moraicity, (iii) bound N-O alignments are the source of voicing.

To take a last example, points (i) and (ii) are clearly reflected in the well-known compensatory lengthening process attested in Samothraki Greek (see *e.g.* Topintzi

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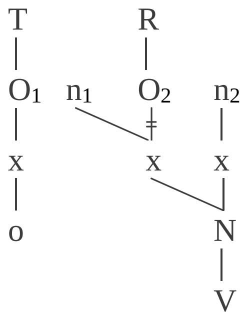
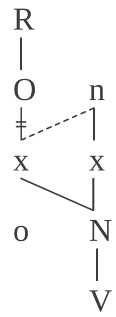
[10] The structure in (17a) also allows a large array of complex onsets containing obstruents in Berber: see Dell & Elmedlaoui (2002) for Tashlhiyt as well as for Moroccan Arabic. Moraic /SC/ clusters where the second member may be an obstruent or sonorant – see *e.g.* Lubera (2024) for Iron Ossetian – involve the same symmetric structure.

2007, 2010), as shown in (20). Assuming that a constraint on structure preservation prevents loss of x-slots, the delinking of the O position bearing R simply changes the former bound n_1-N alignment conveying moraicity in (20a) into a free alignment causing vowel lengthening; in (20b), however, it necessarily entails vowel lengthening through a second n-N alignment, in which the N-x association was part of the former liquid. Note that, contrary to Topintzi's account, the /r/ in (20b) need not originally have been moraic.

(20) a. $T_{\mu}RV_{\mu} > TV_{\mu\mu}$



b. $RV_{\mu} > V_{\mu\mu}$



I contend that this is an interesting aspect of AT. Its representations may seem highly complex. But, as John Goldsmith once said when comparing autosegmental with classic unilinear phonologies, this is mainly because more ink is necessary. Conceptually, AT brings simplicity on some aspects. One of these is certainly that it might help eliminate an endless dilemma: should we prefer a timing skeleton or a moraic tier? Both have their strengths. In a way, AT preserves both, but crucially not by piling them up: moras are not primitives; like sonority, they emerge from structure and from the same kind of interactions.

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