

In †Ivan Fónagy, Yuji Kawaguchi, Tsunekazu Moriguchi (eds.). 2006. *Prosody and Syntax*. Amsterdam: Benjamins, p. 157-174.

Abstract

Dealing with the morphology of the Portuguese verb, Carvalho argues that phonologically-based constraints are independent from morphologically-based ones, much in the line of the old structuralist postulate of ‘separation of levels’, and that both types of constraints interact in such a way that phonology is actually *exploited* by morphology. As a result, all inflected forms of the verb can be ranked within a markedness scale according to violation of either constraint. This clashes with both *SPE*- and OT-based views: on the one hand, phonology cannot be said to be a mere interpretative component of grammar; on the other hand, morphological and phonological constraints cannot be said to play symmetrical parts either. While phonology is blind with respect to morphology, the latter is fully sensitive to phonological primes, structures and markedness, and this is the reason why it can use them for its own purposes.

Markedness gradient in the Portuguese verb: How morphology and phonology interact

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1 Introduction

Since the advent of generative grammar, phonology has long been assumed to be a mere interpretative component of the grammar. As such, the phonological module has been viewed as a unidirectional algorithm ‘translating’ the underlying representations supplied by the syntax and the lexicon into phonetic surface forms. Thereby, as opposed to the old structuralist postulate of ‘separation of levels’, phonological rules can be sensitive to morphological information, phonology being at liberty to work, but, so to speak, under a legal restraint, and always likely to obey orders given by the morphosyntactic core of the grammar.

However, the last twelve years have seen an interesting drift. If Optimality theory (henceforth OT) can be said to have brought any real welcome evolution in phonological research, this might follow from its focusing on a bidirectional relationship between phonology and morphosyntax. Indeed, much in the line of the neogrammarian views on the *interaction* of phonetic and analogical changes, OT assumes that surface forms result from the possibly conflicting interplay of phonological constraints proper such as ONSET, NO-CODA, etc., and of constraints which refer to the morphemic structure of words, such as ALIGN and FAITHFULNESS in the earlier versions of the theory (cf., for example, McCarthy & Prince 1994).

In what follows, I wish to show that the structure of inflectional paradigms may be based on the *exploitation* of phonology by morphology, whereby morphological markedness uses stress placement and phonological markedness in order to build a five-degree scale of the complexity of inflected forms. This will be illustrated by the ‘weak’ and productive verbal paradigms of Portuguese. Should such facts be corroborated by additional evidence from other languages, interactions of this kind might be viewed as strong arguments for the non-interpretative status of phonology in linguistic theory.

The article is organized as follows. In § 2, I will recall Carvalho’s (1989) arguments for quantity-sensitive stress in Portuguese. In § 3, following on from Carvalho (2004), it will be shown how syllabic quantity is used by morphology within a two-mora dissyllabic template characterizing the unmarked forms of the verb. In § 4, it will be seen how this phonologically-based constraint (henceforth Ph-constraint) interacts with an independent morphological constraint (M-constraint) on stress placement, in such a way that all inflected forms of the verb can be ranked within a markedness scale according to violation of either constraint. The conclusion (§ 5) will deal with the type of relationship between phonology and morphology that this interaction suggests; as will be seen, it ultimately diverges from both *SPE*- and OT-based views.

2 The basis of the Ph-constraint : quantity-sensitive stress

In European Portuguese (henceforth EP), vowels generally undergo a process of reduction in unstressed syllables, which is described and exemplified in (1):

- (1) a.
- b. *Tonic / pretonic alternations:*
- | | | |
|-----------|-----------------------|----------------------|
| [i] ↔ [i] | <i>t̄iro / t̄irar</i> | ‘I / to take off’ |
| [e] ↔ [e] | <i>m̄eto / m̄eter</i> | ‘I / to put’ |
| [ε] ↔ [e] | <i>l̄evo / l̄evar</i> | ‘I / to take away’ |
| [a] ↔ [a] | <i>b̄ato / b̄ater</i> | ‘I / to strike’ |
| [ɔ] ↔ [ɔ] | <i>v̄oto / v̄otar</i> | ‘I / to vote’ |
| [o] ↔ [ɔ] | <i>c̄ozo / c̄ozer</i> | ‘I / to cook’ |
| [u] ↔ [u] | <i>f̄uro / f̄urar</i> | ‘I / to form a hole’ |
- c. *Tonic / post-tonic internal alternations:*
- | | | |
|-----------|---------------------------------|-----------------------------|
| [i] ↔ [i] | <i>s̄upl̄ica / s̄úp̄lica</i> | ‘he implores’ / ‘request’ |
| [ε] ↔ [e] | <i>h̄osp̄ede / h̄ósp̄ede</i> | ‘he house’ (subj.) / ‘host’ |
| [a] ↔ [a] | <i>n̄auf̄rago / n̄áūf̄rago</i> | ‘I wreck’ / ‘shipwrecked’ |
| [ɔ] ↔ [ɔ] | <i>ânc̄ora / ânc̄ora</i> | ‘he anchors’ / ‘anchor’ |
| [u] ↔ [u] | <i>mac̄ula / mac̄ula</i> | ‘he maculates’ / ‘spot’ |
- d. *Tonic / post-tonic final alternations:*
- | | | |
|-----------|-----------------------|------------------------------------|
| [a] ↔ [a] | <i>m̄atar / m̄ata</i> | ‘to kill’ / ‘he kills’, ‘kill!’ |
| [e] ↔ [e] | <i>com̄er / com̄e</i> | ‘to eat’ / ‘he eats’, ‘eat!’ |
| [i] ↔ [i] | <i>fer̄ir / fer̄e</i> | ‘to wound’ / ‘he wounds’, ‘wound!’ |

Now, two points are to be outlined. Firstly, unstressed vowel reduction takes place in syllabic rhymes of the type /V(s)/ and, in pretonic position, /Vr/, but fails to occur when the vowel is associated to a nasal element (henceforth /VN/), or is followed either by a glide or by /-l/ or, word-finally, by /-r/.¹ Secondly, word-final /V(s)-rhymes are generally unstressed, as exemplified in (2a), while diphthongs, /VN/, /Vr/ and /Vl/-rhymes are normally stressed in word-final position, as illustrated in (2b).

¹ Note that /s, r, l, y, w/ and nasality (nasal diphthongs such as [ẽw̃] and [ẽỹ], spelled *-ão* / *-am* and *-em* respectively, being also possible) are the only phonological objects which can be added to the vowel within the rhyme, /s/ being the only possible obstruent allowed in coda position (leaving aside loanwords, namely those borrowed from Latin and Greek). Concerning the variable role of /r/, I will assume here that it follows from its being a ‘true’ coda word-internally, as is syllable-final /s/ in all positions, while it actually behaves as an onset preceding an empty nucleus word-finally. Indeed, final /r/, unlike final /s/, currently triggers vowel epenthesis : cf. *cantar*[^ə] ‘to sing’. Nevertheless, final /Vr/-sequences will be seen as tautosyllabic in what follows.

(2)	a.	Paroxytones:		b.	Oxytones:	
		cola	‘glue’		colar	‘collar’
		soma	‘sum’		pomar	‘orchard’
		alta	‘high’ (fem.)		altar	‘altar’
		molhe	‘mole’		colher	‘spoon’
		figo	‘fig’		vigor	‘strength’
		casa	‘house’		casal	‘couple’
		pomba	‘pigeon’		pombal	‘pigeonry’
		porra	‘mace’		corral	‘corral’
		corte	‘court’		cordel	‘string’
		lenço	‘handkerchief’		lençol	‘sheet’
		erva	‘grass’		carvão	‘coal’
		pera	‘pear’		verão	‘summer’
		erma	‘deserted’ (fem.)		irmão, irmã	‘brother, sister’
		vale	‘valley’		além	‘beyond’
		casas	‘houses’		casais	‘couples’
		porras	‘maces’		corrais	‘corrals’
		cortes	‘courts’		cordéis	‘strings’
		lenços	‘handkerchiefs’		lençóis	‘sheets’

In other words, two classes of syllables can be defined in EP: one is both likely to undergo reduction, and generally unable to attract stress word-finally; the other shows the opposite behaviour. Following on from an idea originally formulated by Lüdtké (1953), Carvalho (1989) suggested that these properties characterize a type of syllabic weight, where the distinction between full and reduced vocalism plays the same role as vowel length in Classical Latin, syllables that can undergo the process in (1a) being ‘light’ while those that cannot are ‘heavy’. The accentual patterns of (2a,b) depend, thus, on whether the last syllable is light or heavy respectively. Hence, assuming, in the line of most research in generative phonology, that syllable weight can always be expressed in quantitative terms, stress can be said to fall in EP on the penultimate mora of the word. This naturally accounts for the long-recognised ‘unmarked’ character of paroxytones in Portuguese, which, as is shown in (3), are but a particular case of a more general pattern also comprising oxytones. (The stressed mora is in bold.):

(3) *Unmarked stress pattern: / $\mu_2 \mu_1$ /*



However, EP differs from Latin in that the former shows many exceptions to this unified pattern. As illustrated in (4), such words are either proparoxytones, if their last syllable is light, or paroxytones, if their last syllable is heavy:

(4)	a.	Proparoxytones:		b.	Marked paroxytones: ²	
		púcaro(s)	‘pot’		açúcar	‘sugar’
		estômago(s)	‘stomach’		alcácer	‘castle’
		ótimo(s)	‘excellent’		Vítor	‘Victor’
		pálpebra(s)	‘eyelid’			
		vínculo(s)	‘link’		Setúbal	(toponym)
		histórico(s)	‘historical’		possível	‘possible’
		abóbora(s)	‘gourd’		álcol	‘alcohol’
		cátedra(s)	‘chair’			
		mácula(s)	‘spot’		sótão	‘attic’
		tráfego(s)	‘traffic’		órfão, órfã	‘orphan’
		súplica(s)	‘request’		homem	‘man’
		hóspede(s)	‘host’			
		náufrago(s)	‘shipwrecked’		fáceis	‘essay’ (pl.)
		âncora(s)	‘anchor’		possíveis	‘possible’ (pl.)

Thus, stress may also, and exceptionally, fall on the antepenultimate mora:³

(5) *Marked stress pattern: /μ₃ μ₂ μ₁/*



That the patterns in (2) are unmarked, in EP, *vis-à-vis* those in (4) follows firstly from statistics, paroxytones ending in /V(s)/ and oxytones undoubtedly representing the vast majority of the lexicon, though I am not aware of any existing study on that matter. Furthermore, there are numerous phenomena of dialectal and/or diachronic variation that affect only the marked patterns in (5a,b), and turn them into the unmarked pattern in (3a), while the converse case is not attested. Consider, for example, the facts in (6):

(6)	a.	cântaro	>	dial. cantro	‘pitcher’	truncation
		víbora	>	dial. vibra	‘viper’	”
		abóbora	>	dial. abobra	‘gourd’	”
		córrego	>	dial. corgo	‘gully’	”
		paciência	>	dial. paciência	‘patience’	”
		família	>	dial. família	‘family’	assimilation
		côdea	>	dial. coida	‘crust’	metathesis
		tábua	>	dial. tauba	‘board’	”

² The oral post-tonic vowels in (4b), which resist reduction, are realized as slightly open ([a ε ɔ]) in standard EP.

³ The few oxytonic words ending in /V(s)/ (most of which are loanwords), such as *café*, *paxá*, *Pará*, *rapaz*, *cortês*, etc., fall into the (2b)-category, and should be given the same explanation as the rare exceptions to reduction of pretonic /V(s)/-rhymes (Carvalho 1994): all components of their final vowel are lexically associated; thereby, the syllable cannot undergo vowel reduction, and is therefore heavy.

b.	homem	>	dial. home	‘man’	denasalization
	viagem	>	dial. viage	‘journey’	”
	órfã	>	dial. orfa	‘orphan’ (fem.)	”
	sótão	>	dial. soto	‘attic’	”
	faceis	>	dial. faces	‘easy’ (pl.)	contraction
	possíveis	>	dial. possives	‘possible’ (pl.)	”
	cadáver	>	dial. cadavre	‘corpse’	metathesis
	condestável	>	arch. condestabre	‘counstable’	”

Finally, the inflectional morphology of Portuguese brings a third piece of evidence for the existence of an unmarked bimoraic stress pattern, as is revealed by the mechanism of verbal metaphony.

3 The Ph-constraint: the bimoraic template

3.1 One striking feature of the Portuguese verbal morphology (Harris 1974, López 1979, Redenbarger 1981, Quicoli 1990, Wetzels 1995, Carvalho 2004) is that the last vowel of the root undergoes, in the 2nd and 3rd regular conjugations (cf., e.g., *meter*, *comer* and *ferir*, *tossir*), a metaphonic alternation which: (a) depends on the nature of the thematic vowels /e/ and /i/ respectively; and (b) affects the 1st person of the present indicative and all the present subjunctive forms. This is illustrated in (7), where the 1st conjugation (*levar*, *morar*) is added for comparative purposes:⁴

(7)	a.	<i>levar</i> ‘take away’	<i>meter</i> ‘put’	<i>ferir</i> ‘wound’
		<i>Present indicative</i>		
		l[é]v[u]	m[é]t[u]	f[í]r[u]
		l[é]v[^o]s	m[é]t[^o]s	f[é]r[^o]s
		l[é]v[^e]	m[é]t[^e]	f[é]r[^e]
		l[^o]v[é]mos	m[^o]t[é]mos	f[^o]r[í]mos
		l[^o]v[á]is	m[^o]t[é]is	f[^o]r[í]s
		l[é]v[ẽw̃]	m[é]t[ẽỹ]	f[é]r[ẽỹ]
		<i>Present subjunctive</i>		
		l[é]v[^o]	m[é]t[^o]	f[í]r[^o]
		l[é]v[^o]s	m[é]t[^o]s	f[í]r[^o]s
		l[é]v[^e]	m[é]t[^e]	f[í]r[^e]
		l[^o]v[é]mos	m[^o]t[é]mos	f[í]r[é]mos
		l[^o]v[é]is	m[^o]t[á]is	f[í]r[á]is
		l[é]v[ẽỹ]	m[é]t[ẽw̃]	f[í]r[ẽw̃]

⁴ The hypothesis of a [low]-metaphony caused by the theme vowel *a* in the 1st conjugation is, at the best, trivial, since the mid underlying vowels are necessarily low within verbal roots in the other conjugations (see Carvalho 2004); at the worst, it is simply false, as suggested by the verb *chegar* ‘to arrive’, which shows [e] throughout its conjugation.

- b. *morar* ‘reside’ *comer* ‘eat’ *tossir* ‘cough’

Present indicative

m[ɔ̃]r[^u]	c[ó]m[^u]	t[ú]ss[^u]
m[ɔ̃]r[^ɐ]s	c[ɔ̃]m[^ɐ]s	t[ɔ̃]ss[^ɐ]s
m[ɔ̃]r[^ɐ]	c[ɔ̃]m[^ɐ]	t[ɔ̃]ss[^ɐ]
m[^u]r[é]mos	c[^u]m[é]mos	t[^u]ss[í]mos
m[^u]r[á]is	c[^u]m[é]is	t[^u]ss[í]s
m[ɔ̃]r[ẽw̃]	c[ɔ̃]m[ẽỹ]	t[ɔ̃]ss[ẽỹ]

Present subjunctive

m[ɔ̃]r[^ɐ]	c[ó]m[^ɐ]	t[ú]ss[^ɐ]
m[ɔ̃]r[^ɐ]s	c[ó]m[^ɐ]s	t[ú]ss[^ɐ]s
m[ɔ̃]r[^ɐ]	c[ó]m[^ɐ]	t[ú]ss[^ɐ]
m[^u]r[é]mos	c[^u]m[é]mos	t[^u]ss[é]mos
m[^u]r[é]is	c[^u]m[á]is	t[^u]ss[á]is
m[ɔ̃]r[ẽw̃]	c[ó]m[ẽw̃]	t[ú]ss[ẽw̃]

The root vowels occurring in unstressed syllables follow from the process of vowel reduction in (1), which is totally independent from metaphony.⁵ The latter can be described as follows: the mid-open vowel of the root is assimilated to the theme vowel, if the latter is in prevocalic position, i.e. before 1st person *-o* or the subjunctive *-a*:

- (8) a. $\varepsilon + e \rightarrow e$ /mɛte/ + *o* → [mét]o /mɛte/ + *a* → [mét]a
 $\circ + e \rightarrow o$ /kɔme/ + *o* → [kóm]o /kɔme/ + *a* → [kóm]a
- b. $\varepsilon + i \rightarrow i$ /fɛri/ + *o* → [fír]o /fɛri/ + *a* → [fír]a
 $\circ + i \rightarrow u$ /tɔsi/ + *o* → [tús]o /tɔsi/ + *a* → [tús]a

As seen in Carvalho (2004), explanations based on vowel truncation are unable to provide a straightforward answer to the simple following question: why does the theme vowel ‘fall’ before the 1st p. (*-o*) and the subjunctive (*-a*)? Actually, either glide formation, as in *fere-o* ([férj^u]) ‘wound it!’, or stress placement, as in *feriu* ([f^ɐríw̃]) ‘he wounded’, both with theme vowel preservation, are available solutions to the putative impossibility of unstressed hiatus. Now, another type of theory allows us to give a unified explanation to the (unmarked) paroxytonic and rhizotonic⁶ character of the basic forms exhibiting metaphony, such as *meto*, *meta*, *firo*, *fira*, etc..

The theme vowels, the 1st p. *-o* and the subjunctive vowel suffix will be seen as floating melodies. The basic idea is that floating material is associated to the skeleton whenever, and only whenever, it can. Now, since it is the presence of either of two additional morphemes (the 1st p. *-o* or the subjunctive suffix) that prevents the realization of the theme vowel, it will be assumed that there is *only one* slot available for these additional morphemes *and* the theme vowel, so that there is ‘not enough place’

⁵ Also note that /a/ is normally realized as [ɐ] before nasals.

⁶ I.e. stressed on the (last syllable of the) root.

for two vowels to be linked and thus to be phonetically realized. In this case, and only in this case, the height feature of the floating theme vowels /e/ or /i/ spreads to the root vowel, yielding the observed alternations. On the other hand, assuming that this clearly templatic constraint is dictated by the unmarked bimoraic pattern in (3a), stress is naturally expected to fall on the last vowel of the root.

Thus, if the suffixes in (9) are supposed to lack any skeletal basis of their own, and if roots are lexically associated to the template in (3a), there is only one syllable left for the two vowel sets in (9), which are, thus, in complementary distribution:

- (9) a. The thematic vowels *a, e, i*.
 b. The 1st p. suffix *o*, and the subjunctive suffixes *e* (1st conj.), *a* (2nd, 3rd conj.).

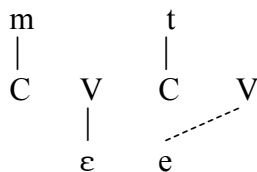
Vowel alternations become entirely predictable by means of a single parameter which can be formulated as follows:

- (10) *Linking directionality parameter:*

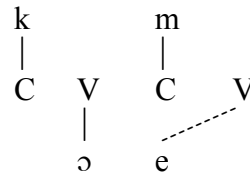
Floating melodies associate from right to left.

As illustrated in (11, 12), the theme vowel is associated to the final syllable of the verbal template if, and only if, there is no (9b)-type morpheme in the verb; otherwise, the theme vowel's height feature spreads onto the root vowel:⁷

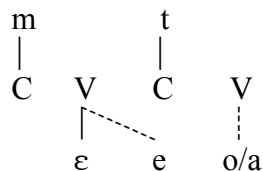
- (11) a. *mete*: [mɛt^ə]



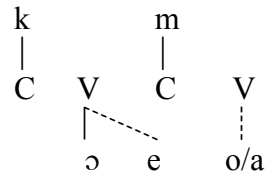
- b. *come*: [kɔm^ə]



- a'. *meto / meta*: [mɛt^{u/ɐ}]

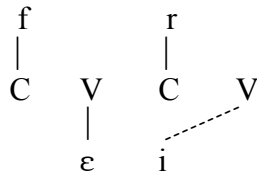


- b'. *como / coma*: [kɔm^{u/ɐ}]

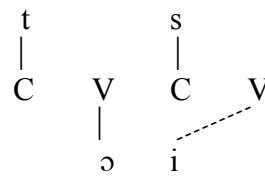


⁷ The CV notation of the verbal template in (11, 12) may be viewed as a shorthand for a sequence of moraic slots associated to nuclei, as in (3a). Likewise, the melodies /e/ and /i/ represent either whole segments, as in (11a,b) and (12a,b), or only vowel height features, as in (11a',b') and (12a',b'), which results from the constraints on segmental structure: since there are no front rounded vowels in EP, *[kɔm^u] and *[tɥs^u] are disallowed, and only the theme vowel's height feature is compatible with both root vowels. Finally, unstressed vowel reduction, which can be captured by floating segmental components (cf. Carvalho 1994), is not represented in (11, 12).

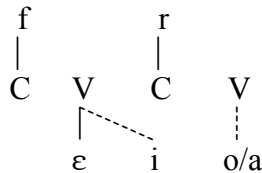
(12) a. *ferē*: [fɛr^ə]



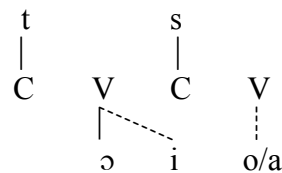
b. *tosse*: [tɔs^ə]



a'. *firo* / *fira*: [fir^{u/ɐ}]



b'. *tusso* / *tussa*: [tus^{u/ɐ}]



3.2 As was stated above, forms such as those in (11, 12) are both paroxytonic and rhizotonic. Indeed, given the bimoraic template in (3a), whose last syllable is open and hence light, this is exactly what we expect according to EP stress placement rules (cf. § 2). The adjunction of the suffixes in (9) does not affect stress placement, and *levo*, *leve*, *meto*, *meta*, etc., with two underlying suffixes, remain paroxytonic and rhizotonic, just like *leva*, *mete*, etc., with only one suffix. Clearly, assuming that stress is CV- and not melody-sensitive, the claim that the suffixes in (9) lack any skeletal basis provides the simplest way to explain such a fact. But why, then, are certain suffixes able to attract stress, giving place to arhizotonic forms?

In the line of the present approach, this raises no difficulty if *two classes* of affixes are assumed in EP: those in (13a), which do not affect stress placement in the verb, do not involve a moraic slot of their own ('CV-less affixes'); those in (13b), which affect stress placement, will be seen as lexically associated at least to a mora ('CV affixes').

(13) a. *CV-less affixes*:

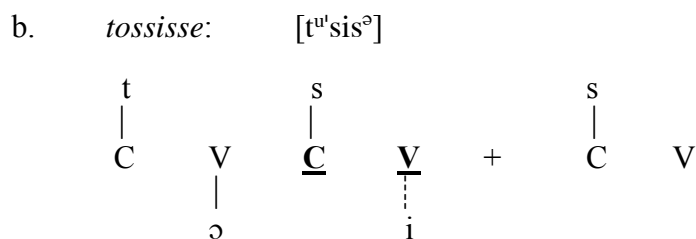
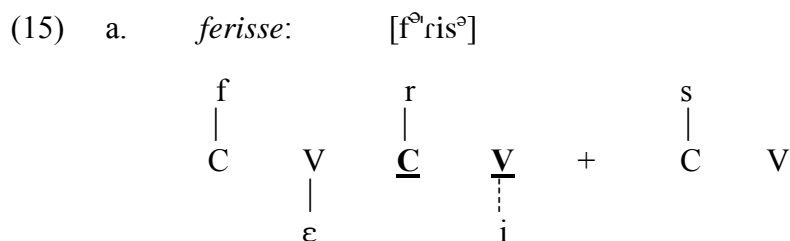
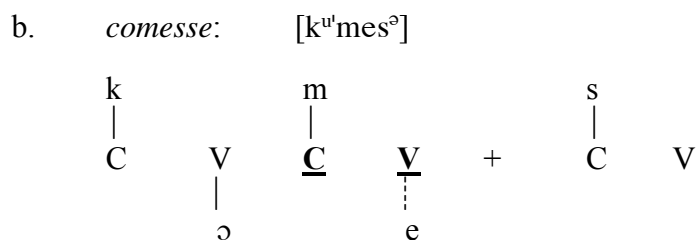
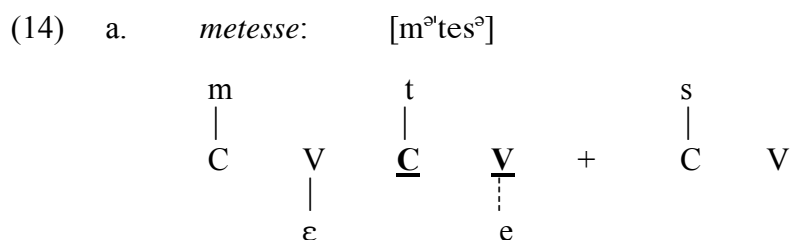
<i>o</i>	'1 st person singular'	
<i>s</i>	'2 nd person singular'	
<i>e</i>	'subjunctive' (1 st conj.)	(+ <i>s</i> , <i>N</i> , <i>mos</i> , <i>es</i>)
<i>a</i>	'subjunctive' (2 nd , 3 rd conj.)	(+ <i>s</i> , <i>N</i> , <i>mos</i> , <i>es</i>)
<i>a</i>	thematic vowel (1 st conj.)	(+ <i>s</i> , <i>N</i> , all CV affixes)
<i>e</i>	thematic vowel (2 nd conj.)	(+ <i>s</i> , <i>N</i> , all CV affixes)
<i>i</i>	thematic vowel (3 rd conj.)	(+ <i>s</i> , <i>N</i> , all CV affixes)

b. *CV affixes*:

<i>N</i>	'3 rd person plural'
<i>mos</i>	'1 st person plural'
<i>is</i> , <i>des</i>	'2 nd person plural'
<i>i</i>	'1 st person singular' + 'perfect'
<i>s]te(s)</i>	'2 nd person singular/plural' + 'perfect'
<i>u</i>	'3 rd person singular' + 'perfect'

<i>ram</i>	‘3 rd person plural’ + ‘perfect’	
<i>(v)a</i>	‘imperfect’	(+ <i>s, N, mos, es</i>)
<i>sse</i>	‘imperfect subjunctive’	(+ <i>s, N, mos, es</i>)
<i>ra</i>	‘pluperfect’	(+ <i>s, N, mos, es</i>)
<i>r</i>	‘infinitive’	(+ <i>s, N, mos, es</i>)
<i>r</i>	‘future subjunctive’	(+ <i>s, N, mos, es</i>)
<i>n]do</i>	‘gerund’	

Since the affixes in (13b) have their own skeletal basis, stress falls immediately after the last syllable of the root, according to the unmarked bimoraic pattern in (3a), whenever they are added to the stem. For the same reason, this stressed syllable is left available for the theme vowel. Hence the imperfect subjunctive forms in (14, 15) (where the underlined CV stands for the stressed syllable), but also the imperfect indicative (*-va* for the 1st conj., *-a* elsewhere), the pluperfect indicative (*-ra*), the gerund (*-ndo*), the future subjunctive and the infinitive (both with /r/ followed by a final empty nucleus):



4 The M-constraint: stress the root/stem

A more detailed phonological argumentation for the templatic basis of EP verbal metaphony (and possibly of any lexical metaphony) is provided by Carvalho (2004). I shall now be concerned with the morphological aspect of the theory developed so far.

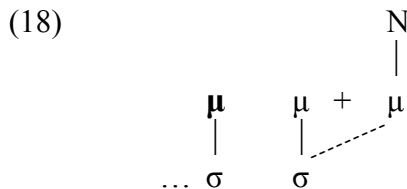
It follows from the adjunction of a CV affix in (14, 15) that the verbal form is no longer rhizotonic while still being paroxytonic, i.e. preserving an unmarked bimoraic stress pattern. Conversely, forms such as *levam*, *metem*, *ferem*, etc., with a CV suffix (3rd p. plural present), remain rhizotonic while becoming marked trimoraic paroxytones. Finally, forms like *levássemos*, *metêssemos*, *feríssemos*, *levaram*, *meteram*, *feriram*, etc., with two CV-associated morphemes, are both arhizotonic and accentually marked. This amounts to saying that the templatic morphology exhibited by the EP verb, and exposed in § 3, results from the conjunction of two independently motivated constraints:

- (16) a. BIMOR: Inflected forms obey a bimoraic pattern.
 b. STRESS(S): Inflected forms are stressed on the root (strong version);
 STRESS(W): Inflected forms are stressed on the stem (weak version).

Both constraints in (16) are satisfied, by the recourse to CV-less affixes, whenever the verb is associated to the morphological content in (17). (Unless otherwise indicated, STRESS(S) is the violated constraint; ‘X!’ means ‘X violation’.)

- (17) a. Singular: *levo*, *levas*, *leva* vs. *levamos*, *levais*, *levam* (BIMOR!)
leve, *leves*, *leve* vs. *levemos*, *leveis*, *levem* (BIMOR!)
 b. Present: *levo*, *levas*, *leva* vs. *levei*, *levaste*, *levou*, *levava*, etc.
leve, *leves*, *leve* vs. *levasse*, *levasses*, etc.

A further degree in markedness is reached by adding the 3rd person plural suffix /N/ to the unmarked paroxytonic pattern, whence *levam*, *metem*, *ferem*, etc.. Associated to a mora, but lacking any syllabic basis of its own, this suffix causes BIMOR violation, but still satisfies STRESS(S) and, trivially, STRESS(W):



Conversely, such forms as *levei*, *meti*, *feri*, *levou*, *meteu*, *feriu*, *levamos*, *metemos*, *ferimos*, *levava*, *metia*, *levasse*, *metesse*, *levar*, *meter*, etc., violate STRESS(S), but satisfy both BIMOR and STRESS(W): cf. (14, 15).⁸

⁸ Though the perfect suffixes *-i* and *-u* have an underlying syllabic basis (stress falling after the root vowel), their adjunction leads to vowel contraction.

Going on along the markedness scale, in forms like *levávamos, metíamos, feríamos, levássemos, metêssemos, feríssemos, levavam, metiam, feriam, levassem, metessem, ferissem, levaram, meteram, feriram*, etc., both BIMOR and STRESS(S) are violated; only STRESS(W) is satisfied. Likewise, the future and conditional forms *levarei, levará, levaremos, levarão, levaria, meterei, meterá, meteremos, meterão, meteria*, etc. violate STRESS(W) and, trivially, STRESS(S); only BIMOR is satisfied.

Finally, conditional plurals such as *levaríamos, meteríamos*, etc. involve violation of all constraints. Interestingly, future and conditional forms are perhaps the least frequent in terms of usage, and those that show the greatest propensity to suppletion (by present and imperfect forms respectively).

Six classes of verbal forms can, thus, be defined thanks to the constraints in (16). Assuming for the sake of simplicity that each version of STRESS has the same weight as BIMOR, only four markedness degrees are sufficient to characterize all verbal inflections of EP, according to the ratio of violated / satisfied constraints. This is summarized in Figure 1 (where brackets stand for trivial violation or satisfaction):

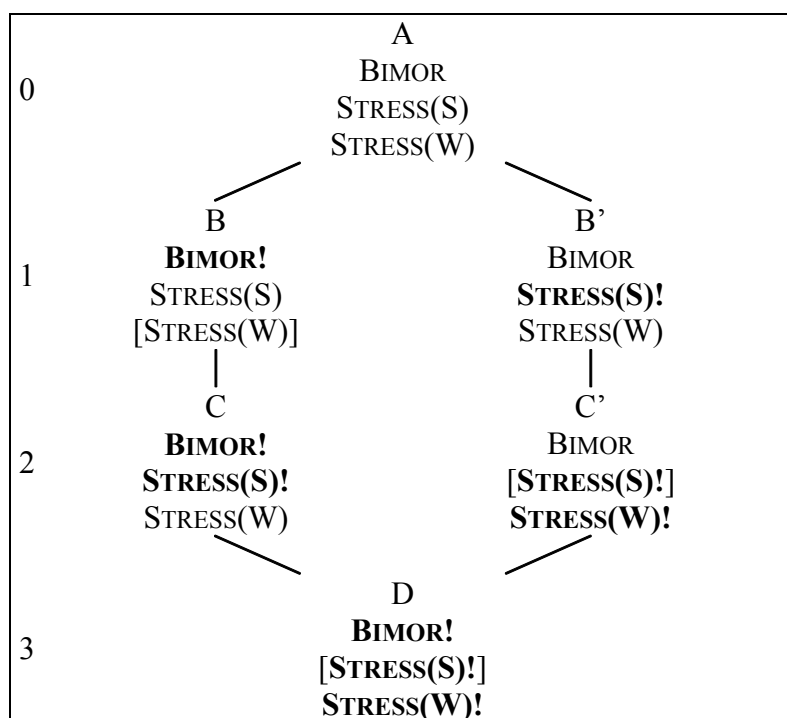


Figure 1. Markedness hierarchy of EP verbal forms (version 1).

Class A: *levo, levas, leva, leve, meto, metes, mete, meta, firo, feres, fere, fira...*

Class B: *levam, levem, metem, metam, ferem, firam...*

Class B': *leveí, metí, ferí, levou, meteu, feriu, levamos, metemos, ferimos, levava, metia, feria, levasse, metesse, ferisse, levar, meter, ferir...*

Class C: *levávamos, metíamos, feríamos, levássemos, metêssemos, feríssemos, levavam, metiam, feriam, levassem, metessem, ferissem, levaram, meteram, feriram...*

Class C': *levarei, levará, levaremos, levarão, levaria, meterei, meterá, meteremos, meterão, meteria...*

Class D: *levaríamos, meteríamos...*

Let us explore for a moment the question of whether there is a hierarchy between these constraints. Two facts seem to suggest a complex interaction between both types of constraints. On the one hand, in dialectal and popular styles, (6b)-type phenomena lead to denasalization of the 3rd p. plural suffixes *-am* and *-em*, whence such forms as *levaram*, *meteram*, etc. pass from class C to the less marked class B'. Now, the preference for BIMOR instead of STRESS(S) satisfaction follows from phonology: the ill-formed **lévaram* would be an impossible member of class B, since stress cannot go beyond the antepenultimate mora in EP. Thus, it should not be inferred from such changes that BIMOR dominates STRESS(S). Only cases of forms passing from class B to B', or from B' to B, would prove that these constraints are ranked. Now, interestingly, I am not aware of any example of such cases. If denasalization affects perfect forms like *levaram* (and perhaps even like *levassem*, though this leads to homophony with the singular *levasse*), it does never occur in rhizotonic forms such as *levam*, etc.. Likewise, stress shifts that would change *leveí*, *levamos* (class B') into **lévei*, **lévamos* (B), which, contrary to **lévaram* above, would be phonologically well-formed, are not attested.

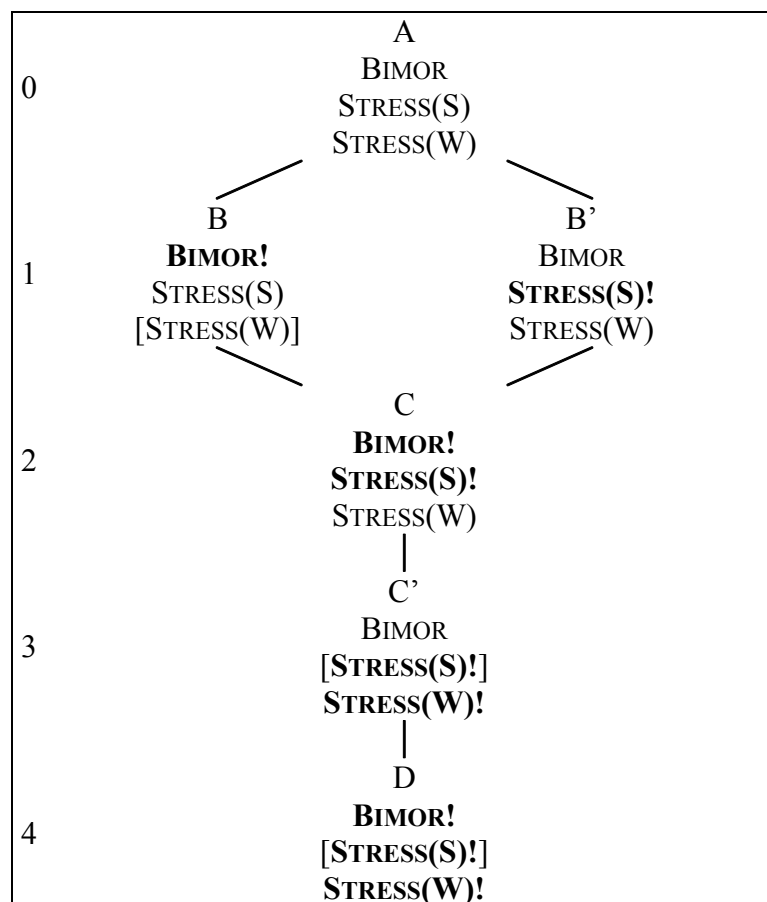


Figure 2. Markedness hierarchy of EP verbal forms (version 2).

On the other hand, however, at a higher markedness level, there is a change that moved stress place in imperfect forms such as Old Port. (and Galician) *levavamo* (C'), and gave modern EP *levávamos* (C). Of course, this change is due to analogical pressure (*levava*); nevertheless, the fact that the product of leveling, unlike the original form, is accentually marked needs further explanation. Now, this seems to prove that constraints do not have equal weight, and that satisfaction of STRESS(W) is, *ceteris paribus*, more important than that of BIMOR, class C being less marked than C', whence the hierarchy of verbal forms must be revised (see Figure 2 above).

5 Conclusion: the Ph/M-asymmetry

BIMOR and STRESS seem to be rather different constraints: the former is based on phonological stress rules which apply to all EP words; the other is a purely morphological constraint, which requires grammatical information such as 'root' and 'stem'. In both cases, however, phonology does not act as it is supposed to do according to the derivational views of classical generative theory, but also to most OT-based accounts. It does not work as a mere interpretative component of grammar, 'translating' morphosyntactic outputs into phonetic forms, and, therefore, being strongly constrained by the structure of the former, nor does it follow from a (potentially) symmetrical interaction between Ph-constraints proper (ONSET, NO-CODA, etc.) and M-constraints (based on Input/Output correspondences: ALIGN, FAITHFULNESS or MAX, DEP). Indeed, phonology and morphology seem to maintain an asymmetrical relationship, where the former behaves as a 'provider', and the latter much as a 'client'.

As was seen in § 2, stress and stress patterns are 'products' supplied by phonology. They are made, in EP, independently of any morphological influence, as is shown by BIMOR and/or STRESS violation in most verbal classes. Morphology plays here an opportunist part. It must choose phonological 'clothes' for its own patterns. EP verbs, for example, show the four following linearly-ordered morphological sites in (19), which constitute the *signifié* pattern:

(19) Stem[Root + Theme] + Tense/Aspect/Mood + Number/Person
 1 2 3 4

For 'dressing' the sequences in (19), morphology just exploits phonology. In particular, it is not allowed to cause any true violation of phonological constraints, as would be the case, for example, if such forms as the above mentioned **lévaram* were attested among verbs, but not elsewhere. Actually, STRESS uses prosodic prominence for enhancing the prosodic weight of the lexical stem; in conjunction with STRESS, BIMOR uses the bimoraic unmarked pattern of EP as a verbal template serving for the *signifiant* of the underspecified forms of the verb, in which 'present' and 'singular' are but the unmarked states of sites 3 and 4 in (19).

Hence the main feature of this asymmetrical relationship between phonology and morphology, which distinguishes the present thesis not only from classical generative views, but also from the mainstream of contemporary research in phonological theory: while, in the line of the neogrammarian conception of phonetic changes, phonology can be said to be generally 'blind' *vis-à-vis* morphology, morphology 'sees' phonological

objects, structures and markedness, and this is the reason why it can exploit them. Though based on constraint interaction, OT remains under the influence of its generative ancestor in that it still operates with the same type of input, that is with underlying representations deduced from the comparison of allomorphs. Thus, [fir^u] will be said to derive from /f^{ér}+i+o/, as is the case in a *SPE*-based approach. It will be added that the candidate [fir^u] is preferred to, say, *[f^{ér}^u] because the thematic vowel is (minimally) conserved in the former, but not in the latter. Furthermore, an additional constraint will be necessary for ruling out an output such as *[f^{érj}^u], which is phonologically well-formed in EP. Now, the relationship suggested in this article is not between /f^{ér}+i+o/ and the set of surface candidates ; it is between the *signifié* pattern in (19), and the *signifiant* patterns provided by EP phonology in (20):

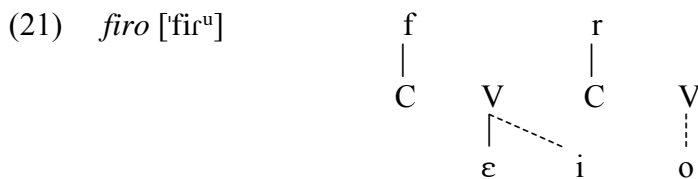
(20) a. Stress unmarked patterns: / $\mu_2 \mu_1$ /



b. Stress marked patterns: / $\mu_3 \mu_2 \mu_1$ /



The ‘optimal’ solutions chosen by verbal morphology for its unmarked forms are of the (21)-type: multilinear representations which capture both the three specified morphemes of the word (cf. /f^{ér}+i+o/), and its dissyllabic shape ([fir^u]), and thus conciliate the former with the latter through metaphony:⁹



In sum, the present proposal diverges from OT in at least two ways: (a) there are no Input/Output correspondences, but only relationships between inputs,¹⁰ since lexical entries are necessarily twofold, and comprise both types of patterns in (19) and (20); (b) the set of candidates might not be infinite; ill-formed structures, i.e. those that do not obey the morphological and/or the phonological patterns in (19, 20), are irrelevant to linguistic analysis.

⁹ Note that this divergence is not a matter of formalism: most OT-based research is actually agnostic with respect to representations, and the linear form /f^{ér}+i+o/ might as well be replaced with the multi-tiered structure in (21); my point is that, far from being a possible input, (21) is the winning candidate.

¹⁰ As well as relationships between outputs, giving place to analogical phenomena that have long been neglected within the generative tradition.

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