

ASSOCIAÇÃO PORTUGUESA DE LINGUÍSTICA



ACTAS DO WORKSHOP SOBRE

# ***FONOLOGIA***

Proceedings of the Workshop on Phonology

COIMBRA

27-28 SETEMBRO

1993

## NOTA PRÉVIA

Este volume reúne parte das comunicações apresentadas no Workshop sobre Fonologia que decorreu na Universidade de Coimbra, nos dias 27 e 28 de Setembro de 1993. Por não nos terem sido enviadas até à data da publicação, não constam deste volume as comunicações 'The Organization of phonological features and the feature continuant' (J. Mascaró), 'Phonology in between words and phrases' (M. Nespór), 'Dinâmica fonológica e neutralização de oposições: o caso das vibrantes' (J. Morais Barbosa), 'Syllabification in Catalan: an exercise in optimality theory' (A. Byrne), 'Phonological continuant spreading and feature geometry' (B. Palmada) e 'Nasal spans, nasal diphthongs and syllable structure in Brazilian Portuguese' (L. Wetzels). O texto 'Fonologia da língua gestual' (R. Delgado-Martins) foi publicado nas Actas do IX Encontro da APL.

This volume contains some of the papers presented to the Workshop on Phonology organised by APL at the University of Coimbra (27-28 September, 1993). We regret the absence of the following papers which were not sent to APL in due time: 'The Organization of phonological features and the feature continuant' (J. Mascaró), 'Phonology in between words and phrases' (M. Nespór), 'Dinâmica fonológica e neutralização de oposições: o caso das vibrantes' (J. Morais Barbosa), 'Syllabification in Catalan: an exercise in optimality theory' (A. Byrne), 'Phonological continuant spreading and feature geometry' (B. Palmada) and 'Nasal spans, nasal diphthongs and syllable structure in Brazilian Portuguese' (L. Wetzels). The paper 'Fonologia da língua gestual' (R. Delgado-Martins) has already been published in Actas do IX Encontro da APL.

Associação Portuguesa de Linguística  
Lisboa, Setembro de 1994

## “Os Ditongos Decrescentes numa Perspectiva Fonológica”

### “Heavy Diphthongs: a Phonological View”

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#### **0. Introduction**

Grammarians have generally agreed that the union of a vowel and a semivowel is what defines a diphthong. Depending on whether the semivowel precedes or follows the vowel, diphthongs are classified as light or as heavy diphthongs. Portuguese grammars assert the existence of these two kinds of diphthongs in the Portuguese language (cf., e.g., Cunha e Cintra (1987)), although the number and the variety of such diphthongs have always been subject to some controversy. In research carried out by Delgado Martins (1986:48), she discovered a list compiled by Cândido de Figueiredo in 1915 where, depending on the grammarian, the number of oral diphthongs varies from five to twenty eight.

The non-restrictive power of this definition gives rise to this enormous discrepancy. If any semivowel following or preceding a vowel forms a group that counts as a diphthong, it shouldn't surprise us that the counting of diphthongs fluctuates so much, depending on individual observation of the facts.

Actually, grammarians have also noticed that in some circumstances, when two segments appear side by side, it is not easy to decide if they are pronounced in separate syllables or if it is possible to group them together in a single syllable. Cunha e Cintra (1987:51), for instance, give the example of the word “lua” (moon) where the two vowels belong to separate syllables, whereas in “luar” (moon shine) the separation of the vowels is not so clear to them. In the latter, they accept the possibility of building a diphthong with the two vowels.

The perception of a vowel or of a vowel and a semivowel in the speech chain cannot help us to decide what kind of phonological representation these segments should be given, i.e., you cannot decide, just by looking at your *data*, if a vowel and a

semivowel next to each else can count as a phonological constituent. The Portuguese [o] is a clear example of this. Both the diphthong [ow] and the single vowel [o] surface phonetically as [o]. However, there is phonological evidence that these two are separate entities. On the opposite side, the diphthongs [ej] and [ɐj] when analyzed from a phonetic angle give quite misleading results. Even though on the surface they appear to be different, they can emerge from the same phonological entity.

This paper is intended to shed some light on the problem of vowel and semivowel combination from a phonological point of view.

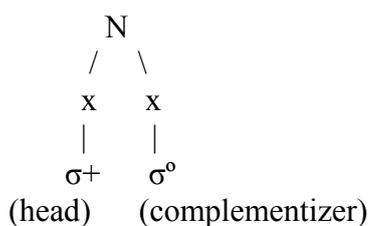
## 1. Theoretical Considerations

Before we go into the analysis of heavy diphthongs in Portuguese, we would like to outline some theoretical principles that underlie this discussion.

### *Constituent structure*

In the theory of phonological government (cf. Kaye 1990:207) a heavy diphthong is a branching nucleus where the vowel is associated to the head position, while the semivowel occupies the complementizer position, as exemplified below:

(1)



The charm principles (cf. KLV, 1985) restrict the occurrence of vowels within the branching nucleus. For internal government to take place the vowel that is attached to the head position is the governor; therefore, it must be positively charmed, while the vowel to the right, which is governed by the head, must be neutral. Consequently, a positively charmed vowel and a semivowel can occur in the same nucleus whenever the positions they occupy obey the charm conditions for the internal government of the

constituent.

### *The projection Principle*

A very important principle for the analysis at stake here is The Projection Principle, which states the following:

“Governing relations are defined at the level of lexical representation and remain constant throughout a phonological derivation” (Kaye, Lowenstamm and Vergnaud 1990:221).

According to this principle, if a skeletal point is present at the start – (Po level)-, it cannot be removed afterwards.

Bearing these principles in mind, let us now explore the problem of the Portuguese heavy diphthongs.

## **2. Portuguese heavy diphthongs**

Following the theoretical conditions mentioned above, that is, the combination of a positively charmed vowel with a semivowel, the diphthongs in (2) follow directly from the theory.

(2)

[aj] / [aw]

[oj] / [ow]

[ej] / [ew]

Grammars assert that of the six diphthongs above, the diphthong [ow] does not exist anymore, except for some varieties<sup>1</sup>, the single vowel [o] having taken the

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<sup>1</sup> Cunha e Cintra in their *Nova Gramática do Português Contemporâneo* assert the following: “Nem na pronúncia normal de Portugal nem na do Brasil se conserva o antigo ditongo [ow], que ainda se mantém vivo em falares regionais do Norte de Portugal e no galego. Na pronúncia normal reduziu-se a [o], desaparecendo assim a distinção de formas como *poupa/popa, boubá/boba*.” (p.49).

diphthong's place. And, apparently, the same is happening to the diphthong [ej] which is widely pronounced [ɐj].

First of all, we are going to demonstrate that the diphthongs of (2) are true branching nuclei. Secondly, we will demonstrate that they all still exist in Portuguese at the phonological level.

Let us first analyze the diphthongs [aj] and [aw]. We shall start by looking at the following examples:

(3.a)

[aj]

bairro [bájRu] (quarter)

baixo [báj]u] (low)

caixa [káj]ɐ] (box)

xaile [jájli] (wrap)

(4.a)

[aw]

aula [áwlɐ] (class)

cauda [káwdɐ] (tail)

fraude [fráwdi] (fraud)

pauta [páwtɐ] (list)

(3.b)

bairrista [bajRí]tɐ] (inhab. of a district)

baixio [baj]íu] (a shoal)

caixote [káj]ɔ'ti] (box)

xailinho [jajli]ɲu] (small wrap)

(4.b)

aulinha [awlí]ɲɐ] (small class)

caudal [kawdá]ɫ] (caudal)

fraudar [frawdár] (v.)

pautar [pawtár] (v.)

Portuguese vowels reduce in unstressed positions. The words chosen as examples of (3.a) and (4.a) have their diphthongs stressed, to show the stress form of the vowels. In the examples of (3.a) and (4.a), a suffix was added to the former words in order to move the stress to a suffixal position. We can remark that the groups of vowels formerly stressed remain immutable despite the dislocation of the stress.

Now, let us compare the examples above with the words in (5.a and b.):

(5.a)

faia [fáj]ɐ] (beech)

raio [Rá]ju] (ray)

(5.b)

faial [fɛ]jáɫ] (b.-grove)

raiar [Rɛ]jár] (v.)

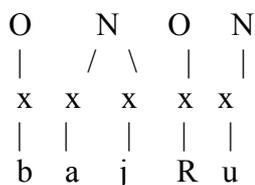
While in the former examples no change occurred in the vowels quality with the removal of the stress, in these latter examples we can observe the reduction of the vowel [a] when the stress moves forwards.

Our interpretation of the difference between the [aj] in (3.a and b.) and the [aj] in (5.a) is that while in the examples of (3.a) the vowels [a] and [j] are grouped together in a nucleus, in (5.a) there is no such liaison and the vowel [a] is free to reduce. These observations of vowel behavior lead us to conclude that the fact that a vowel and a semivowel are phonetically juxtaposed does not mean that they belong to the same syllabic constituent.

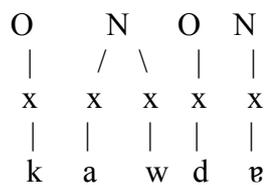
When the vowel is attached to the head of the constituent, it has to govern the complementizer (in this case, the semivowel); therefore, it cannot reduce in order to perform the function of constituent government.

According to this analysis, the words *bairro* and *cauda* will have the syllable structure shown in (6) and (7):

(6)



(7)



### 2.1. The diphthongs [oj] and [ow]/ [o]

The fact that the diphthong [ow] has practically disappeared from oral speech, except for some dialectal variation, has led some theorists to belittle its importance, and even to consider it as vanished from the language. But a deep observation of the vowel [o] reveals a secret behavior. Observe the examples below:

(8.a)

[oj]  
doido [dójdu] (crazy)  
noite [nójti] (night)  
noivo [nójvu] (groom)

(8.b)

[ow]/ [o]  
couro [kówru]/ [kóru] (leather)  
louro [lówru]/ [lóru] (blond)  
mouro [mówru]/ [móru] (moslem)

oito [ójtu] (eight)

pouco [pówku] / [póku] (little)

(8.b)

doidinho [dojdíju] (crazy)  
noitada [nojádɐ] (night out)  
noivado [nojvádu] (engagement)  
oitenta [ojtẽ'tɐ] (eighty)

(9.b)

courinho [kówríju] / [kóríju] (leather+sf.)  
lourinho [lowríju] / [loríju] (blond +sf.)  
mouraria [mowrɐríɐ] / [morɐríɐ] (place)  
pouquinho [powkíju] / [pokíju] (little+sf.)

As we can see from the forms of (8.a and b) and (9.a and b), the diphthongs [oj] and [ow] do not reduce in unstressed positions. Again, this proves to be a phonological response to government responsibilities. If we compare now the examples above in (9.a and b) with the examples in (10.a and b), a difference between the diphthong [ow] and the single vowel [o] can immediately be drawn. Compare the examples above with the following examples:

(10.a)

Coro [kóru] (choir)  
lobo [lóbu] (wolf)  
povo [póvu] (people)  
sopa [sópɐ] (soup)

(10.b)

coral [kuráf] (choral)  
lobaz [lubáf] (large wolf)  
povoado [puvuádu] (village)  
sopinha [supíjɐ] (little soup)

These examples show clearly that the vowel [o] reduces to [u] when the stress moves forwards. A difference can now be established between the phonological diphthong; that is, the branching nucleus, where the two skeletal points are engaged in the syllabic government, and the single nucleus, where the vowel is free to reduce. So, even though the diphthong [ow] and the vowel [o] can have the same phonetic interpretation - [o]-, their syllabic representation is different. The words *doido* and *couro* have their syllabic representation illustrated in (11) and (12) below:

(11)

```

O   N   O   N
|   / \ |   |
x   x   x   x   x
|   |   |   |   |
d   o   j   d   u
```

(12)

```

O   N   O   N
|   / \ |   |
x   x   x   x   x
|   |   |   |   |
k   o   w   r   u
      [o]
```

Since the vowel [o] contains the element U<sup>o</sup>, which is also contained in the vowel of the complemetizer in the diphthong [ow], OCP prevents the pronunciation of them both, and what surfaces is a single [o]; however, once the syllabic structure is defined, it doesn't change, as is predicted in the Projection Principle, and the two skeletal points remain, requiring government between the two. This explains why the diphthong surfaces as a single vowel that cannot reduce despite of the fact of being unstressed.

Compare the syllabic representation of the word *couro* (leather) in (12) with the syllabic representation of the words *coro* (choir) and *coral* in (13.a and b) bellow:

(13.a)

O	N	O	N
x	x	x	x
K	ó	r	u
	[o]		

(13.b)

O	N	A	N	A	N
x	x	x	x	x	x
K	u	r	á	l	
	[u]				

The vowel [o], attached to a single nucleus, has no government requirements upon itself; therefore, it can freely reduce when unstressed.

## 2.2. The diphthongs [ej]/ [ɐj] and [ew]

Let us now consider the diphthongs [ej] and [ew]:

[ej] / [ɐj]

(14.a)

beijo [béjʒu] / [bɐ'jʒu] (kiss)  
 cordeiro [kurdéjru] / [kurdɐ'jru] (lamb)  
 ligeiro [lizéjru] / [lizɐ'jru] (fast)  
 treino [tréjnu] / [trɐ'jnu] (exercise)

(14.b)

beijar [béjzár] / [bɐjzár] (to kiss)

[ew]

(15.a)

neutro [néwtru] (neutral)  
 feudo [féwdu] (feud)  
 celeuma [siléwmɐ] (uproar)  
 pleura [pléwrɐ] (pleura)

(15.b)

neutral [newtráf] (neutral)

cordeirinho [kurdejríɲu]/ [kurðejríɲu]	feudal [fewdáɫ] (feudal)
(little lamb)	
aligeirar [əliʒejrár]/ [əliʒəjrár]	celeumar [silewmár] (v.)
treinar [trejnár] / [trəjnár] (v.)	pleurisia [plewrizíə] (pleurisy)

The data in (14) and (15) show that vowels in these examples don't reduce after stress movement. In conformity with the analysis we have been following for the previous diphthongs, we have reasons to believe that [ej] is a branching nucleus, as the words *beijo* and *feudo* illustrate:

(16)

O		N		O	N
	/	\			
x	x	x	x	x	x
b	e	j	ʒ	u	
[ej]/[ɐj]					

(17)

O		N		O	N
	/	\			
x	x	x	x	x	x
f	e	w	d	u	

Now, the question still remains. Why do we select the diphthong [ej] and not the diphthong [ɐj] when, after all, it is [ɐj] that surfaces most of the time? A close look at the examples in (18.a) and (19.a) will suffice to show that the vowel [e] can be pronounced [ɐ] before a palatal. But before we enter into this discussion, let us compare the words in (14.a and b) with the examples given from (18.a to 19.b) below:

(18.a)

cereja	[siréʒɐ] / [sirə́ʒɐ]	(cherry)
cerveja	[sirvéʒɐ] / [sirvə́ʒɐ]	(beer)
cortejo	[kurtéʒu] / [kurtə́ʒu]	(flattery)
igreja	[igréʒɐ] / [igrə́ʒɐ]	(church)

(18.b)

cerejeira	[sirizə́ʒrɐ]	(cherry tree)
cervejinha	[sirviʒínɐ]	(small beer)
cortejar	[kurtizár]	(to flatter)
igrejinha	[igrizínɐ]	(small church)

(19.a)

abelha	[əbéλə] / [əbə´λə]	(bee)
espelho	[ʃpéλu] / [ʃpə´λu]	(mirror)
ovelha	[onéλə] / [onə´λə]	(sheep)
telha	[téλə] / [tə´λə]	(tile)

(19.b)

abelheira	[əbəlɐ´jɾɐ]	(hive)
espelhado	[ʃpəládu]	(mirrored)
ovelhinha	[onəlɨ́ɾɐ]	(small sheep)
telhado	[təládu]	(roof)

What we see now is that the stressed vowel [e] can surface phonetically as [ɐ], the same vowel of the examples of (14.a). However, the removal of the stress in (18.b) and (19.b) leaves behind an empty nucleus, which cannot be a branching nucleus in any circumstances. The syllabic representation of the word *cereja* is illustrated in (20).

(20)

O	N	O	N	O	N
x	x	x	x	x	x
s	v <sup>o</sup>	r	v <sup>o</sup>	ʒ	ɐ
	[ø]		I+		
			A+		
			I <sup>o</sup>		
			[e]		

This word has two empty nuclei where the stressed one is interpreted with the vowel [e]. But, because of the presence of the palatal containing the element I<sup>o</sup>, two elements I<sup>o</sup> are next to each other; therefore, OCP applies, erasing the element I<sup>o</sup> of the vowel [e]. As a result, the internal structure of the vowel is smoothed, and the phonetic outcome is the sound [ɐ] instead of the initial [e]<sup>2</sup>.

<sup>2</sup> Notice that in words like *tapete* [təpéti] (carpet) and *parede* [pərédi] (wall), the stressed vowel is always pronounced [e] what provides further support to our interpretation of the facts .

This seems to be a reasonable phonological explanation for this phonetic outcome, where no diphthong is identified.

### 3. Conclusion

From these observations, the problem of defining a diphthong acquires a new dimension. The fact that a vowel and a semivowel are phonetically juxtaposed does not necessarily mean they constitute a diphthong. If we want to give the problem a phonological interpretation, then we shall have to demonstrate for every vowel and semivowel pair, whether they have the capacity to form a syllabic constituent. Once this work is done, we establish with certainty the exact number and form of the Portuguese diphthongs.

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