Pre-Nasal Laxing in European Portuguese[1]

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1.0 The Phonological Pattern

Recent observations of native speakers of European Portuguese (EP) suggest that a major change in the phonological rule system governing pre-nasal vowels is underway. In order to analyze these phenomena, we must first examine the other phonological rules which have an impact on the pre-nasal sound pattern of EP.

Portuguese has a rich set of vowels including two tense/lax pairs: [e]-[ɛ] and [o]-[ɔ]. The surface distribution of these vowels is the result of a set of intricately interacting processes, including Verb Stem Laxing, Vowel Harmony, Unstressed Tensing, and Pre-Nasal Tensing.

1.1 Verb Stem Laxing

All four of the non-high, non-rtr vowels, tense and lax, i.e., [e] [ɛ] [o] [ɔ], occur underlyingly, as illustrated by the nouns:

s<u>e</u>lo	[e]	'seal'
regr<u>e</u>sso	[ɛ]	'return'
esc<u>o</u>va	[o]	'brush'
dem<u>o</u>ra	[ɔ]	'delay'

but in the cognate verb forms the stressed stem vowel is always lax:

s<u>e</u>lo	[e]	'seal'	s<u>e</u>lo	[ɛ]	'I seal'
regr<u>e</u>sso	[ɛ]	'return'	regr<u>e</u>sso	[ɛ]	'I return'
esc<u>o</u>va	[o]	'brush'	esc<u>o</u>va	[ɔ]	'I brush'
dem<u>o</u>ra	[ɔ]	'delay'	dem<u>o</u>ra	[ɔ]	'I delay'

1.2 Vowel Harmony

The [e]-[ɛ] [o]-[ɔ] distribution is also impacted by the Vowel Harmony process in which the last vowel preceding a V+V sequence copies the tense/lax features of the first V of a following V+V sequence, which then deletes. I.e., the last vowel in a stem takes on the features of the vowel immediately preceding the morpheme boundary, which then deletes:

$$V \times V + V \quad \rightarrow \quad V \times \cancel{V} + V \qquad \text{(v. Redenbarger 1982 for a full discussion.)}$$
$$\quad\ \ | \qquad\qquad\ \ \backslash$$
$$\quad\ \ \alpha \qquad\qquad\ \ \alpha$$

Below are two verbs with 'e' stems and two verbs with 'o' stems. They differ in that *levar* 'raise' and *morar* 'reside' are a-themes while *dever* 'owe' and *mover* 'move' are e-themes (i.e. first and second conjugation respectively). The forms illustrated are the first person singular present indicative.

	lɛva + o	dɛve + o
→	lɛva + o	deve + o
→	lɛv + o	dev + o
	mɔɾa + o	mɔve + o
→	mɔɾa + o	move + o
→	mɔɾ + o	mov + o

[1] This paper originated as a co-presentation at HLS VII between Amanda Reiter and myself. I would like to thank my collaborator for her contributions to the research presented in this published version, especially the computational elaboration of the data. Responsibility for the opinions expressed remains with the author.

 Selected Proceedings of the 7th Hispanic Linguistics Symposium, ed. David Eddington, 1-11. Somerville, MA: Cascadilla Proceedings Project.

1.3 Unstressed Tensing

Portuguese, like many of its sister Romance languages, needs to indicate the tense/lax distinction in its dictionaries only on stressed 'e' and 'o' vowels since its unstressed vowels are always tense and there are no high lax vowels. Many Portuguese dictionaries use a comma diacritic, to indicate the tense/lax quality, and only in stressed vowels spelled 'e' and 'o':

cf.	It.	pesca	[e]	'peach'	Ptg.	selo	[e]	'seal'
		pęsca	[ɛ]	'fishing'		regręsso	[ɛ]	'return

In modern Portuguese, this process creates phonological alternations: all unstressed vowels become tense when stress does not fall on them:

dɛ́ve	vs.	devémos
pɔ́de	vs.	podémos

As a result of the interaction of these three processes, Portuguese shows the following pattern in present tense verbs (Table 1):

* No matter whether the underlying root vowel was tense [e] or [o] or lax [ɛ] or [ɔ], the stem vowel is laxed to [ɛ] or [ɔ] by Stem Vowel Laxing. That lax vowel appears on the surface in all 3rd singular and 3rd plural indicative forms: *leva, levam; deve, devem; mora, moram; move, movem.*

* The last vowel before a V+V sequence harmonizes with the first vowel in the V+V sequence which then deletes. In the forms in Table 1, the V+V vowel harmony requirement is met whenever an affix is vowel initial. This occurs when the stem-final theme vowel (-a or -e) is followed by either the first person singular affix (+o) or when it is followed by the subjunctive marker (+e or +a).[2] Thus 1st sg's *levo, moro, devo, movo* harmonize as do all present subjunctives: *leve, leve, levemos, levem; deva, deva, devamos, devam; more, more, moremos, morem; mova, mova, movamos, movam.* Since stem vowel laxing had already laxed all stem vowels, the application of vowel harmony is vacuous in the a-themes; in e-themes it its tensing effect overwrites the effect of Stem Vowel Laxing with a tense vowel.

* The lax stem [ɛ] also tenses to [e] when unstressed, no matter what the theme vowel is. This occurs in all 1st plural forms where the presence of a vowel in the affix changes the stress placement: *levamos, levemos; devemos, devamos; moramos, moremos; movemos, movamos*. In the case of the first conjugation a-themes, it overwrites the effect of vowel harmony.

* The only paradigm with the same surface vowel throughout is the e-theme present subjunctive where the early process of verb stem laxing is overwritten with a tense vowel in every form and unstressed tensing operates vacuously in the first person plural.

[2] V. Redenbarger 2000 for an illustration of why this pattern demonstrates the importance of preserving strata during process derivations in order to codify this process in a maximally general way. In Portuguese, it is crucial that the composition of the stem from a root plus a theme vowel be accomplished in an earlier stratum so that the affixation stratum operations can not see the internal composition boundaries. Otherwise the process will make the mistake of thinking all composition is in the same layer, i.e. it is lev-a → leva in the stem stratum before leva+o in the affixation stratum.

Table 1 Present tense surface forms

				Processes
Present Indicatives				(All undergo VbStmLxg)
1sg.	(+o)	l[ɛ́]vo	d[é]vo	*VHarm*
3sg.	(+Ø)	l[ɛ́]va	d[ɛ́]ve	
1pl	(+mos)	l[e]vamos	d[e]vemos	*UnStrTnsg*
3pl	(+N)	l[ɛ́]vam	d[ɛ́]vem	
1sg.	(+o)	m[ɔ́]ro	m[ó]vo	*VHarm*
3sg.	(+Ø)	m[ɔ́]ra	m[ɔ́]ve	
1pl	(+mos)	m[o]ramos	m[o]vemos	*UnStrTnsg*
3pl	(+N)	m[ɔ́]ram	m[ɔ́]vem	
Present Subjunctives				
1sg.	(+V+Ø)	l[ɛ́]ve	d[é]va	*Vharm*
3sg.	(+V+Ø)	l[ɛ́]ve	d[é]va	*Vharm*
1pl	(+V+mos)	l[e]vemos	d[e]vamos	*Vharm, UnStrTnsg*
3pl	(+V+N)	l[ɛ́]vem	d[é]vam	*Vharm*
1sg.	(+V+Ø)	m[ɔ́]re	m[ó]va	*Vharm*
3sg.	(+V+Ø)	m[ɔ́]re	m[ó]va	*Vharm*
1pl	(+V+mos)	m[o]remos	m[o]vamos	*Vharm, UnStrTnsg*
3pl	(+V+N)	m[ɔ́]rem	m[ó]vam	*Vharm*

1.4 Pre-Nasal Tensing

A fourth process, Portuguese Pre-Nasal Tensing has the effect of overwriting the entire tense-lax alternation discussed above by tensing all vowels before a nasal consonant. Compare the present indicative forms of *tomar* 'take' and *comer* 'eat' with the corresponding *morar* and *mover* forms in Table 1:

t[ó]mo	c[ó]mo
t[ó]ma	c[ó]me
t[o]mamos	c[o]memos
t[ó]mam	c[ó]mem

This uniformity of stem vowel in pre-nasal position is why Portuguese 101 textbooks teach these verbs first, permitting students to learn the second conjugation endings before tackling the stem vowel alternations. Note the similarity of this uniformly tense stem vowel paradigm to the e-theme present subjunctives discussed above. In that sense, Pre-Nasal Tensing produces an effect similar to the effect of Vowel Harmony but via a different mechanism.

The set of Portuguese vowels appearing in Pre-nasal Position is: [i, u, e, o, ɐ] while the set of Portuguese nasal vowels is: [ĩ, ũ, ẽ, õ, ɐ̃]. The similarity of distribution is traditionally explained by ordering Pre-nasal Tensing which applies before all nasal consonants before Nasalization which applies to the proper subset, viz. before tautosyllabic nasal consonants. (Redenbarger 1982).

2.0 Innovation in European Portuguese

The above system is the one which was exported to Brazil post 1500 and is still operating there. It is reflected in the IPA transcriptions of Brazilian Portuguese in the Houaiss & Avery Dictionary of the 1960's, in the IPA transcriptions of Brazilian Portuguese in the Oxford Portuguese Dictionary of 1996,

as well as the stressed vowel indications ‘e’ vs ‘ê’, ‘o’ vs ‘ô’ in the Morais Silva dictionary of European Portuguese of 1950’s.

However, there is evidence of recent innovation in European Portuguese wherein lax vowels may occur in pre-nasal position in violation of the pre-nasal tensing rules above. One piece of evidence is anecdotal reactions by native Brazilian Portuguese speakers to Americans with high quality European Portuguese accents who hesitate to comment to a native speaker from Portugal but are willing to tell North Americans using EP pronunciations that they hear lax vowels before nasals as ‘wrong’. There have also appeared changes in the computer spellchecker for European Portuguese e.g. fêmea > fémea, fêmur > fémur in a subset of the cases where penultimate stress requires an explicit written accent mark and thus Portuguese orthography makes explicit the tense/lax nature of the vowel diacritic—a circumflex indicating a tense vowel and an acute accent a lax one. Also noted are changes in the IPA transcriptions in the recent Harper-Collins dictionary (2002) based on EP speech.

Based on such hints, inquiries to native EP speakers were made to native speaker students from the University of Lisbon and the University of Coimbra eliciting the clear feedback that given a choice between the traditional tense vowel or a lax vowel before a nasal, there was a strong feeling in several, but not all cases, that the correct choice was the lax vowel. A preliminary pilot study of the experiment described below using one of these two speakers gave strong reason to presume that a change in phonology was underway.

Therefore, a research study was constructed to answer the following questions:

* Do some speakers of EP have stressed lax vowels before nasals?
* If so, does laxing operate the same in verbs as in nouns?
* If so, does this laxing overwrite the effects of vowel harmony?
* If so, is the innovative laxing age or sex dependent?

2.1 Experimental Design and Implementation

A set of 33 test sentences was constructed plus an equal number of filler sentences. The focus words were selected so that the pre-nasal ‘e’ or ‘o’ would be the stressed vowel syllable of a two-syllable word, thereby ensuring a single following unstressed syllable to reduce end-of-sentence effects. The frame sentences were constructed so that the stressed ‘e’ or ‘o’ of these trochaic target words always appeared as the final stressed word in the sentence; this plus the use of only declarative sentences ensured that the intonation contour of the larger sentence would cause the vowels of interest to bear exactly the same pattern in each token sentence.

Within the words, words were selected so that the focus stressed ‘e’ or ‘o’ always appeared before a labial consonant: [f, v, p, b, m], thereby factoring out anticipatory assimilation effects such as one finds before following consonant [ɾ], [ɬ] etc. In this case the choice of a bilabial minimizes the place of articulation assimilatory effect; moreover, whatever such effect it might exert would be exactly the same for each target vowel token.

As a further control, each token was read twice in succession to identify any possible nonce errors and to enable the measurement of performance consistency.

Example sentences:

Toronto tem n̲e̲ve.	*‘Toronto has snow.’*
Come o cr̲e̲me.	*‘He eats the cream.’*

Recordings were made of 6 speakers from the University of Toronto of varying ages and sex. The recordings were made in the faculty office of Prof. Josiah Blackmore III of Victoria College using a Sony MZ-R50 optical disk digital recorder and a Sony ECM-MS907 Electret Condenser microphone. The data were presented on an IBM X31 computer screen one sentence at a time via a Power Point slide sequence. Informants pronounced each token twice at a very slow speech rate and then pushed the space bar to see the next screen when ready.

The recordings were edited using ‘Speech Analyzer’ from SIL with the 70Hz high pass filter engaged. The results were digitized and the formants measured using the current release of Praat

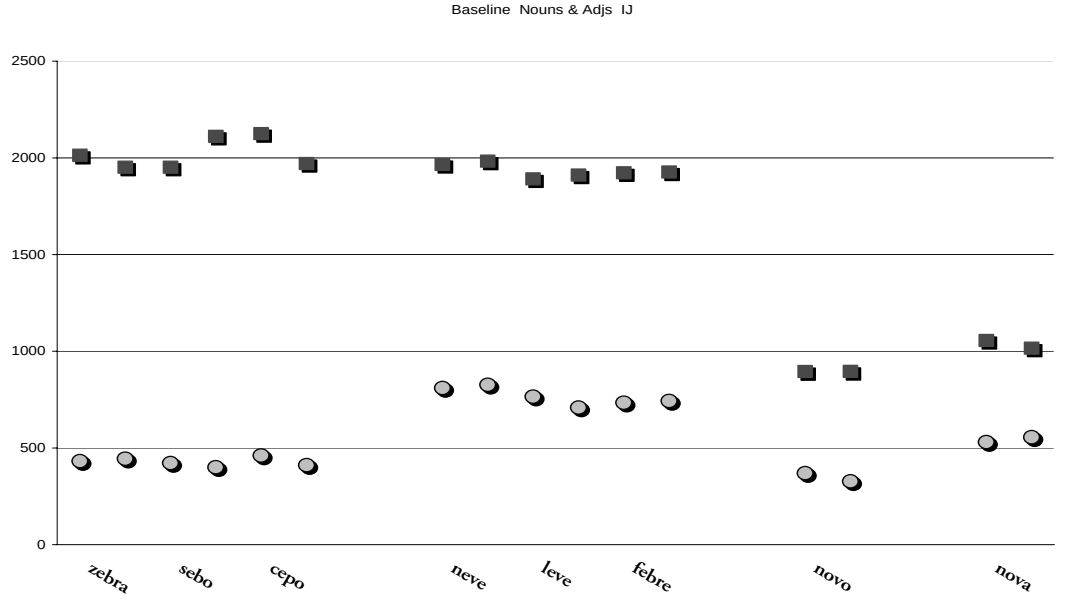
speech analysis software (4.1.11). Although F1, F2, and F3 were all measured, F1 and F2 alone were found to be sufficient for tense/lax measurement.

The F1/F2 values were normalized by each individual speaker rather than doing group statistics to avoid masking the differing characteristics of each individual speaker. As will be seen in the analysis of the results, this approach permitted the identification of critical phenomena which would have otherwise been lost in the statistical smoothing.

2.2 Baseline

A set of non-controversial performances of [e] [ɛ] [o] [ɔ] in non-prenasal position were measured first in order to establish a sure baseline for comparison. The test words were then compared to this baseline. For the baseline, words were selected in which the traditional lexicons agreed with the innovative transcriptions in the Harper-Collins. Hereafter we abbreviate the concurring Houaiss-Avery/Oxford/Morais Silva lexicons as H-A/Ox/MS. The more recent and innovative Harper-Collins lexicon is abbreviated H-C.

H-A/Ox/MS	[e]	H-C [e]	zebra, cepo, sebo	‘zebra, stump, grease’
H-A/Ox/MS	[ɛ]	H-C [ɛ]	neve, leve, febre	‘snow, light, fever’
H-A/Ox/MS	[o]	H-C [o]	novo	‘new’ (m.)
H-A/Ox/MS	[ɔ]	H-C [ɔ]	nova	‘new’ (f.)



In this chart and in each of the following charts the first formant (F1) is the oval at the bottom and the second formant (F2) is the square above it. The two plots for each word represent the two performances of each word, in the order spoken. These data are for a linguistically conservative mature female speaker.

Notice that the distinction in F1 values for [e] vs [ɛ] are extremely consistent within each group and these clearly differentiate tense vowels having the lower F1 from lax vowels with the higher F1. Interestingly, the F2 values for this speaker do not show substantial differentiation and would not serve to distinguish a tense vowel from a lax one.

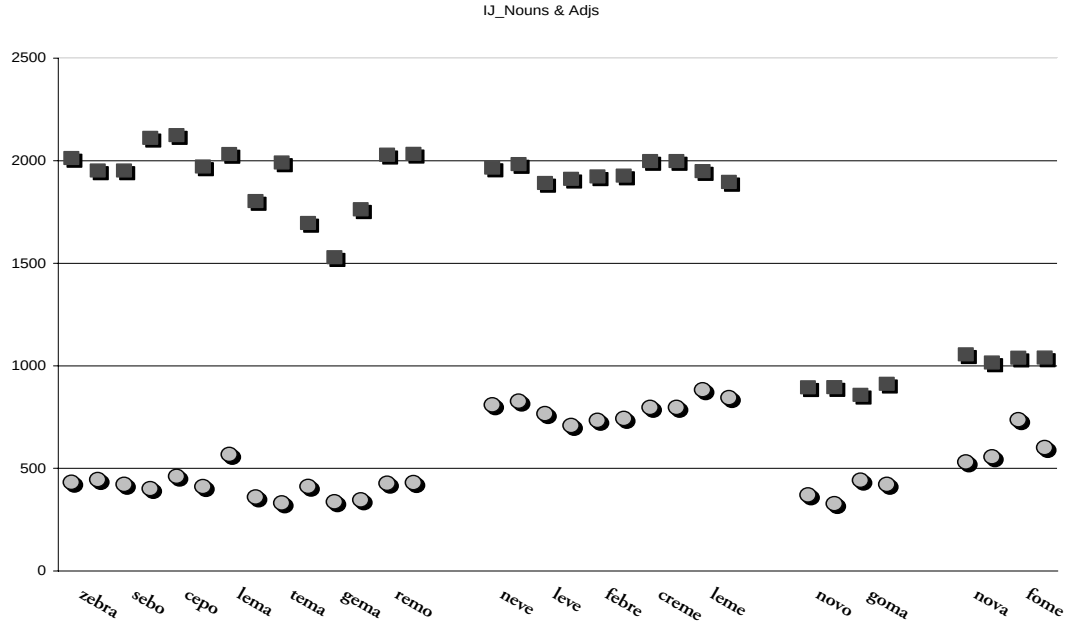
The [o]-[ɔ] data are few in number and are intended primarily as a check on the primary [e]-[ɛ] data, i.e. to ensure that the phenomena measured work the same in back vowels as they do in front

vowels. Note that the [o]-[ɔ] F1 values are also quite clear, though the variability between F1 performances is greater.

2.3 Test set 1 compared to baseline

To the previously measured baseline forms were added two sets of forms in which the stressed vowel was in pre-nasal position and for which the traditional lexicons and the innovative Harper-Collins forms do not agree:

H-A/Ox/MS	[e]	H-C [ɛ]	lema, tema, gema, remo	'motto, theme, yolk, oar'
			creme, leme	'cream, rudder'
H-A/Ox/MS	[o]	H-C [ɔ]	fome	'hunger'



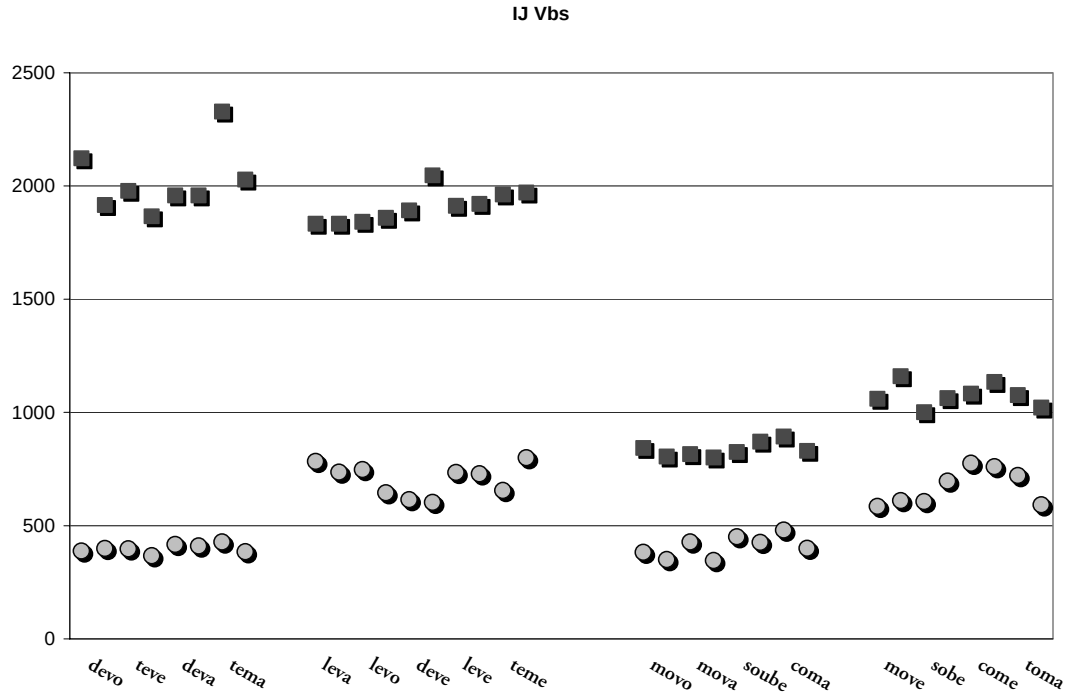
These plots clearly demonstrate that for this speaker several of the added forms are tense—*lema, tema, gema, remo*. However, others are just as clearly lax—*creme, leme*. If all of these added forms had exhibited F1/F2 values like the *lema, tema, gema* forms, there would be nothing novel to comment. However, the lax pronunciation of the stressed vowel in *creme* and *leme* is exactly the data the experiment was designed to detect—stressed lax vowels in pre-nasal condition. With this we observe that contrary to all published studies to date, the pre-nasal tensing phenomenon characteristic of contemporary Brazil and earlier European Portuguese no longer holds for all pre-nasal forms. We shall see that this pattern of permitting lax vowels in prenasal position holds across every European Portuguese speaker tested.

We also observe the exactly parallel phenomenon in the back vowels. While *goma* 'gum' is tense as predicted, *fome* is just as clearly lax, and is lax in pre-nasal position. The principal goal of the study is accomplished—even in a very conservative speaker there are clearly lax vowels in pre-nasal position.

Notice also that for this speaker the F2 for lax [ɛ] is very stable while the F2 for tense [e] is much more variable. This is consistent with genioglossus constriction as the effecting gesture for tense (i.e. [+atr]) vowels versus the lax vowel as remaining in 'neutral' position. (Halle 2002). There is a specific articulatory gesture required to perform the tense vowel, and that performance is subject to performance variability while the neutral, lax vowel does not. This is revealed especially in the greater

degree of achievement in the first performance when effort and focus is greatest versus the second token which is characteristically underperformed.

2.4 Verb data for Mature EP speaker:



Having established a tense/lax baseline and certified the appearance of lax vowels in pre-nasal position in a subset of the innovative forms, a test set of verb forms was analyzed. The goal is to determine whether the permission of lax forms in pre-nasal position is restricted to noun and adjective forms .

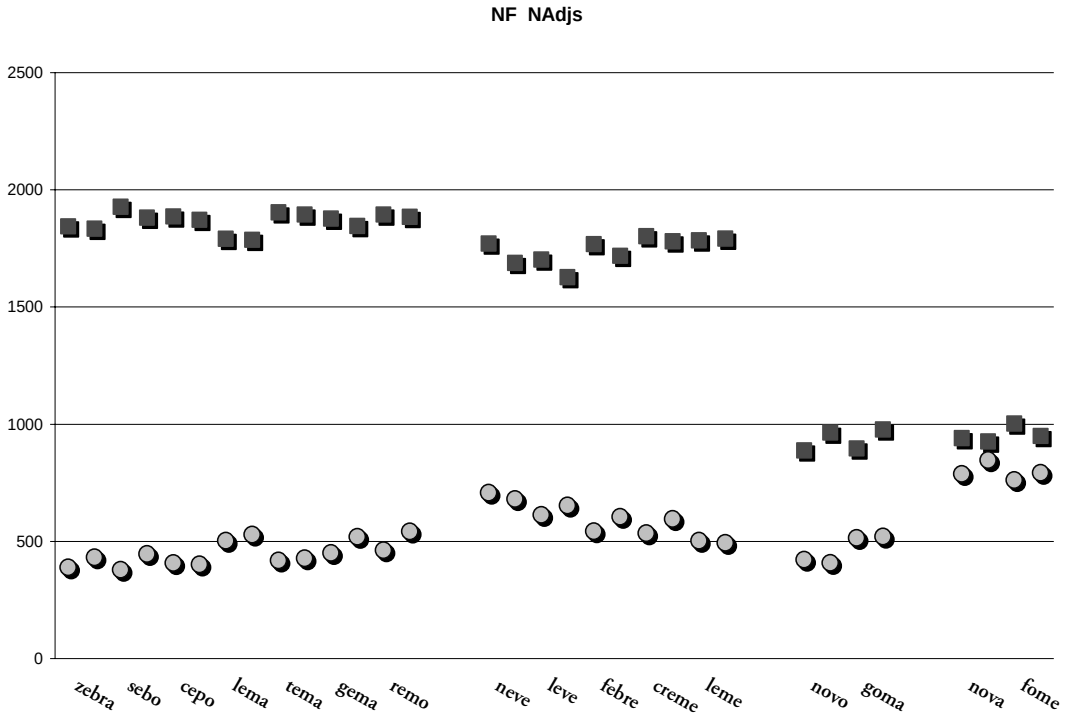
The chart above has a set of forms selected from Table 1 above as well as supplemental like verb forms to provide a statistically valid sample. A number of harmonizing forms were included: *devo, deva; levo, leve; movo, mova* as well as some irregular forms having underlying tense vowels, e.g. *teve* 'he had', *soube* 'he found out'.

The chart is organized with non-pre-nasal forms appearing first in each group and with pre-nasal forms appearing at the end of each group.

It can clearly be seen that we have in the verbs exactly the same pattern we had in the Nouns and Adjectives: some pre-nasal vowels are tense—*tema, coma* while other pre-nasal vowels are lax: *teme, come, toma.* Interestingly, none of the pre-nasal vowel harmonizing forms are lax; the only forms 'violating' the old pre-nasal tensing rule are forms which did not undergo vowel harmony. We note, therefore, that this informant's data can be explained phonologically by saying that she has innovated by simply losing the pre-nasal tensing rule. Where it used to overwrite the effects of all other phonological processes, in her phonology the simple cessation of that one process will explain why some forms are tense and others are lax in pre-nasal position: if it was tensed by vowel harmony, it is no longer overwritten; if it was not tensed by vowel harmony then it appears of the surface as lax.

In short, for a conservative EP speaker, rule loss of the pre-nasal tensing rule will explain the data.

2.5 N/Adj data for young male EP speaker:

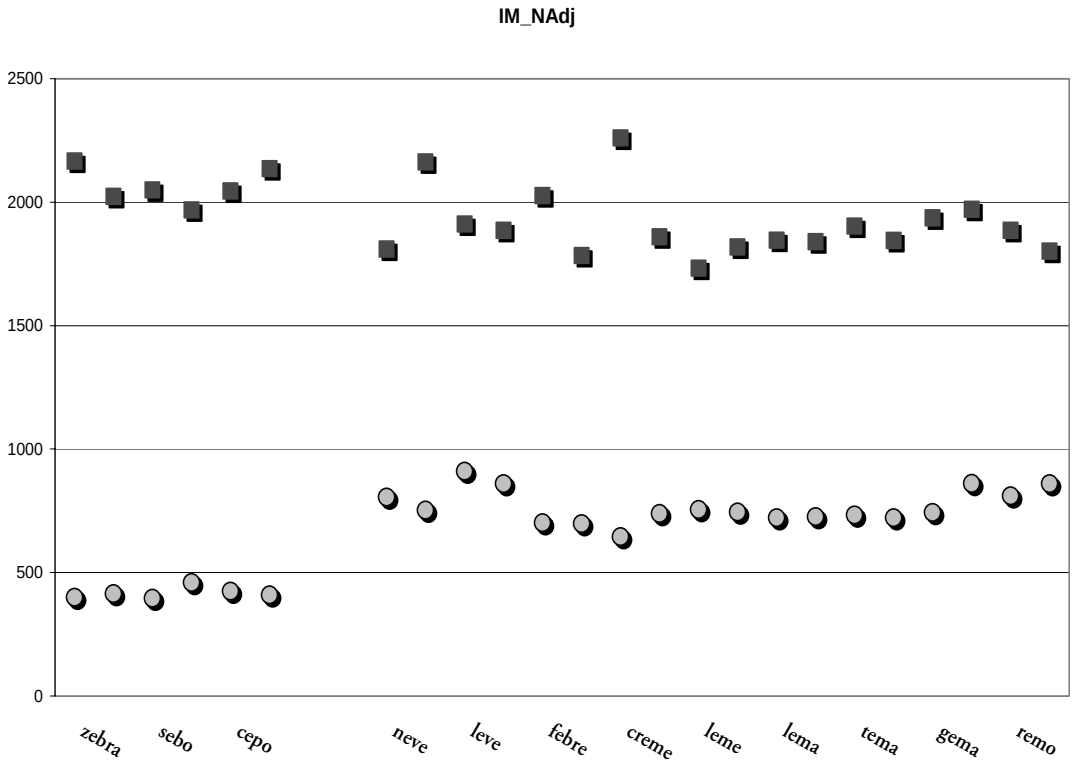


The same set of Noun & Adjective data above from a young male EP speaker were analyzed. Note that the F2 performances are much more stable than in subject IJ but the F1 distinction is much narrower. In short, for this speaker one must consider both the placement of F1 and F2 jointly to be able to distinguish a tense vowel from a lax vowel. This is one of several factors emphasizing the importance of analyzing patterns speaker by speaker rather than aggregating the population.

In addition, the two forms 'lema' and 'leme' are pronounced identically, with a tense [e] vowel. This appears to be a case where the form might not have been well known to the speaker and no distinction was made in performance.

Having noted those individual characteristics, note that the pattern is again the same as the pattern we find for the mature female speaker. We have both tense and lax 'e' and 'o' in both pre-nasal and non-pre-nasal position. This younger speaker shares the pre-nasal tensing rule loss innovation of the mature speaker. The phenomenon is not limited by age.

2.6.1 Results fm innovative young speaker

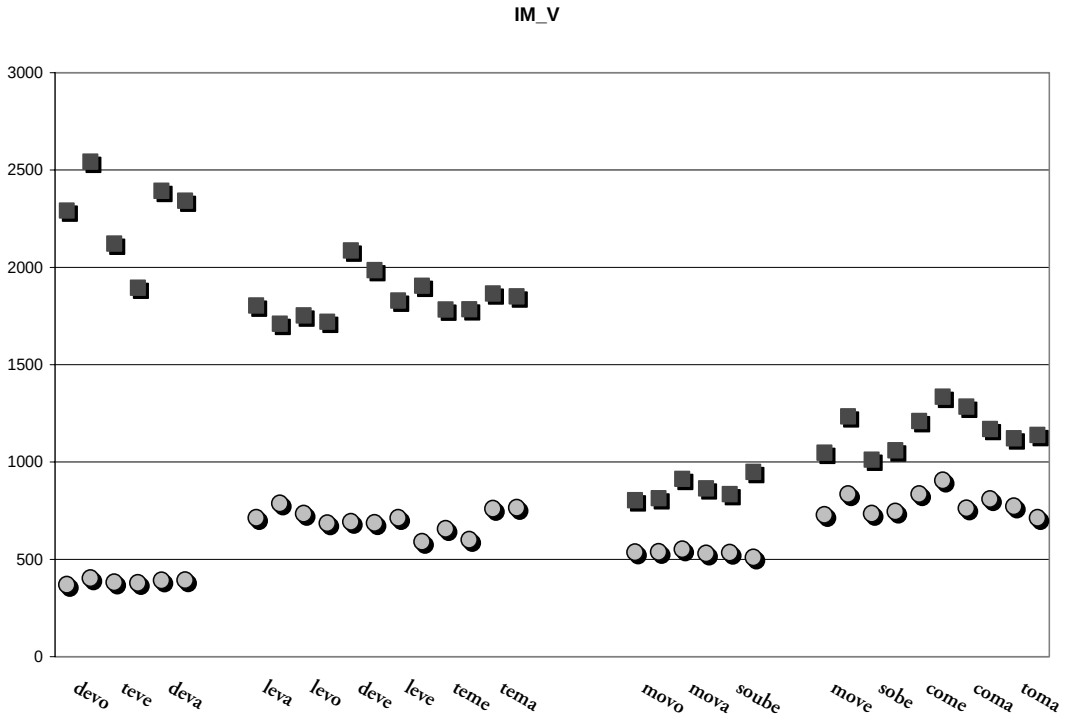


Having demonstrated that the pre-nasal tensing rule loss pattern occurs in both mature and younger informants, both male and female, we observe with this speaker the presence of an additional pattern which was also seen in both younger and mature speakers, both males and females.

Note that in this pattern *zebra, sebo, cepo* are the only tense [e] vowels, i.e. none of the pre-nasal forms are tense. All pre-nasal forms are lax. In the traditional system, it is Nouns and Adjectives which reveal underlying differences, e.g. *zebra* vs. *neve.* Only in these forms can we tell the difference since Verbs Stem Laxing laxes all stem vowels (v. supra). That underlying distinction emerges in non-pre-nasal forms, but it appears that this innovative speaker has not only discarded the pre-nasal tensing rule, but has also decided that all of the vowels in pre-nasal position are lax.

The only way to reveal whether the difference is due to massive restructuring of the underlying lexicon or to late rule addition is to examine the verb forms and see if the vowel harmony forms (which are derived by process) will show the same laxing as was observed in the subjects examined above.

2.6.2 Verbs from innovative young speaker



Unlike the previous speakers, in the verb forms too IM continues to lax every Pre-nasal stem vowel. Indeed, IM also laxes the Vowel Harmonizing forms. v. 'tema' and 'coma'. Clearly this innovative speaker, and the other subjects like him, represent a different approach to generating the lax prenasal stem vowels. Rather than simply ceasing to perform pre-nasal tensing, there has evidently been added a new, late rule of pre-nasal laxing which has the effect of overwriting all previous processes.

As a new rule it is expected to be late and surface transparent, which it is. But the effect is to make hundreds of words different from their Brazilian counterparts, making an already innovative phonology even more different the one from the other, and not because Brazil has innovated but because Portugal has again done so.

3.0 Conclusions and Theoretical Implications

We find that the ability to produce lax vowels in pre-nasal position is evidenced by every speaker. This is an innovation in comparison to both the previous rule system of Portugal and in comparison to Brazil where this innovation has not taken place. This pattern appears in all groups: older, younger, male, female. It is apparent in N's, Adj's and Vb's. It is not morphologically conditioned.

We find that there are two approaches to this innovation: the least change is occasioned by those speakers who merely cease to perform pre-nasal tensing; the change effecting more novel forms is one in which a new rule has been added which laxes all vowels in pre-nasal position. This approach wipes out the effects of vowel harmony while the simple rule loss innovation does not.

Pre-Nasal Tensing is a rule which, in the traditional system, was ordered early in the rule order. It was earlier than the nasalization rule which it fed, and the nasalization rule is very old and early in the system. Such rules tend to be either morphologized or lost. In modern European Portuguese this one has evidently been lost.

With its loss, the subsequent nasalization rule which it used to feed will now have some lax inputs allowing it to potentially output lax nasal vowels e.g. [ɛ̃] and [ɔ̃]. Preliminary indications indicate that

this is the case for those with generalized loss of Pre Nas Tensing. This is an area requiring further instrumental study.

As far as those speakers who exhibit the addition of a new laxing rule, these speakers lax more forms which speakers losing PreNasTensing do not. Such a rule being a new rule it would be expected to be added at the end of the rule system (King 1969). The data analyzed here support that longstanding hypothesis.

Note also that the differences between innovative approaches evidenced by our informants in this study could only have been captured by individualized deterministic generation systems, with differing rules set for different speakers. Had we been using a model with constraints which are variably violable the variation would have fallen within the normal variability of violable constraints and the explanation of the individual differences, consistent within themselves, would not have been found.

It should also be noted that in pre-innovation Portuguese phonology the stem vowels in pre-nasal position exhibited a consistent, uniform stem vowel, just as they still do in the present subjunctives of the e-themes. However this 'paradigmatic uniformity' is forgone when the new pre-nasal laxing is adopted. This present case of Portuguese phonological innovation represents another clear instance where diachronic models asserting paradigms and paradigm effects do not make the correct prediction (Kiparsky 1968) while rule addition models do (cf. Halle & Vaux 1998).

Finally, it should be noted that the two models of innovation discussed above—deletion of the pre-nasal tensing rule vs. the addition of a late pre-nasal laxing rule—both operate on a variety of lexemes whose frequency of occurrence ranges from very rare {fêmur} to very common {deve, toma}. While some recent theories suggest that frequency is the driving force behind such changes (Bybee 2001), the Portuguese data cited above are clear examples of innovations best explained by rule loss or rule addition and can not be explained by the lexical frequency of the items.

References

Bybee, Joan and Paul Hopper, eds. 2001. *Frequency and the Emergence of Linguistic Structure*. Amsterdam: Benjamins.

Halle, Morris and Kenneth. N. Stevens. 1969. On the Feature 'Advanced Tongue Root'. In Halle, Morris. 2002. *From Memory to Speech and Back.* Berlin: Mouton de Gruyter.

Halle, Morris & Bert Vaux. 1998. 'Theoretical Aspects of Indo-European Nominal Morphology: The Nominal Declensions of Latin and Armenian.' In Mi'r Curad: Studies in Honor of Calvert Watkins, ed. Jay Jasanoff, H. Craig Melchert and Lisi Olivier. Innsbruck: Innsbrucker Beitraege zur Sprachwissenschaft, 223-240.

HarperCollins Portuguese Dictionary. 2002 (2nd ed.) New York: Harper Collins.

Houaiss, Antônio & Catherine Avery. 1964. *Novo Dicionário Appleton das Línguas Inglesa e Portuguesa.* New York: Appleton Century Crofts.

King, Robert D. 1969. *Historical Linguistics and Generative Grammar.* Englewood Cliff, NJ: Prentice Hall.

Kiparsky, Paul. 1968. Linguistic universals and linguistic change. In *Universals in Linguistic Theory.* Ed. Bach, Emmon and Robert Harms. 171-204. New York: Holt Rinehart & Winston

Morais Silva, Antônio. 1959. *Grande dicionário da língua portuguesa.* Lisbon: Editorial Confluência.

The Oxford Portuguese Minidictionary. Whitlam, John (ed.) Oxford: Oxford.

Redenbarger, Wayne. 1997. Apocopy and Lenition in Portuguese, in. *Studies in Romance Linguistics,* ed. F. Martinez-Gil and A. Morales-Front. 439-467. Georgetown: Washington, D.C.

Redenbarger, Wayne. 1982. *Articulator Features and Portuguese Vowel Height.* Cambridge, Massachusetts: Harvard.

Selected Proceedings of the 7th Hispanic Linguistics Symposium

edited by David Eddington

Cascadilla Proceedings Project Somerville, MA 2005

ISBN 1-57473-403-2 library binding

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