Nasal coda and vowel nasality in BP

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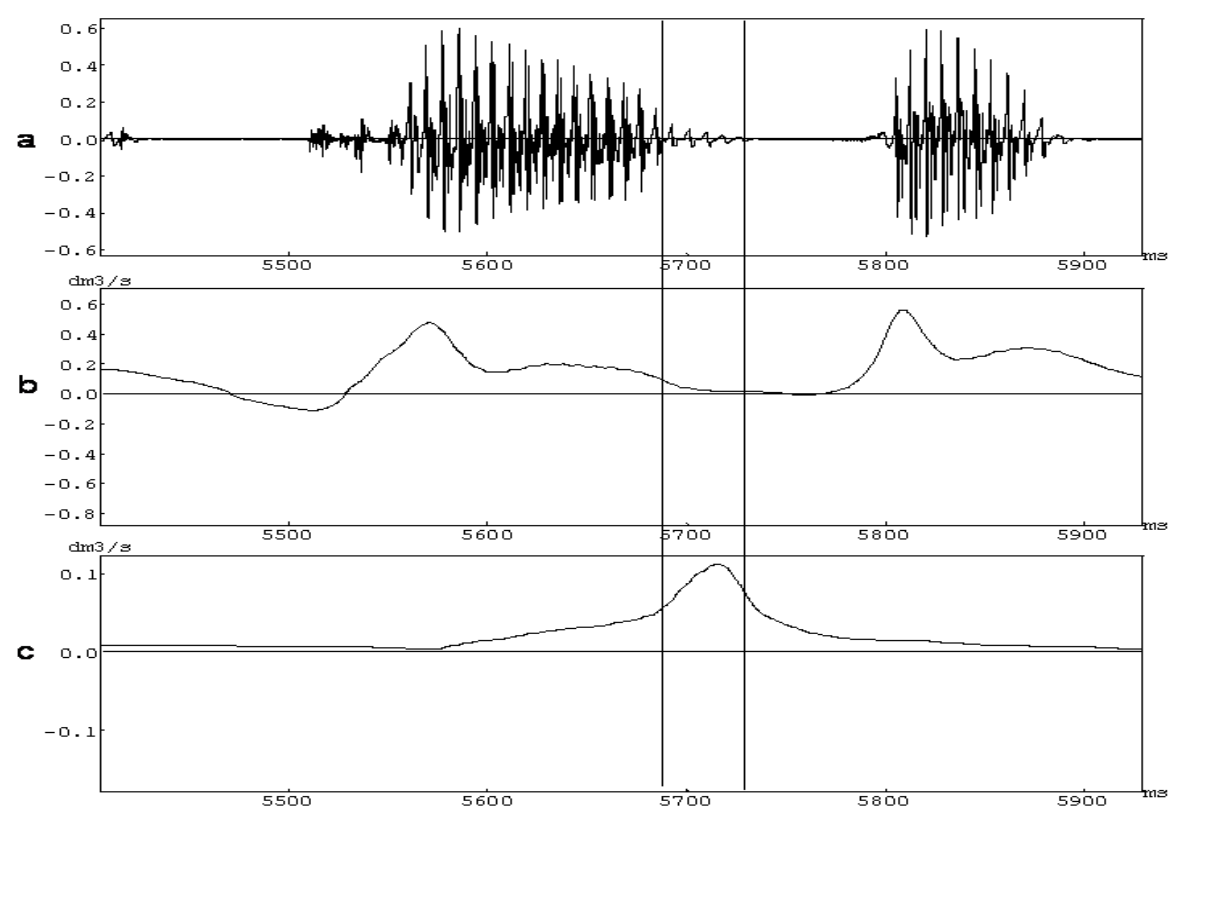
Some views about nasal vowel in BP

- Only nasalized vowels = V + NC (Biphonemical approach)
- Full nasalization in romance languages (Kawasaki, 1986)
- Emergence of a nasal coda (Shosted, 2006)

A nasal vowel gesture in BP

- Two gestures not aligned in time
  - The vocalic gesture and the nasal gesture
- How is that so?
- Let's hear the sound and see the figure, first.

Figure 1: The word *campa* spoken by VP subject. Nasal appendix between lines, following the low nasal vowel. (a) waveform; (b) oral airflow; (c) nasal airflow. (Medeiros et al. 2008)



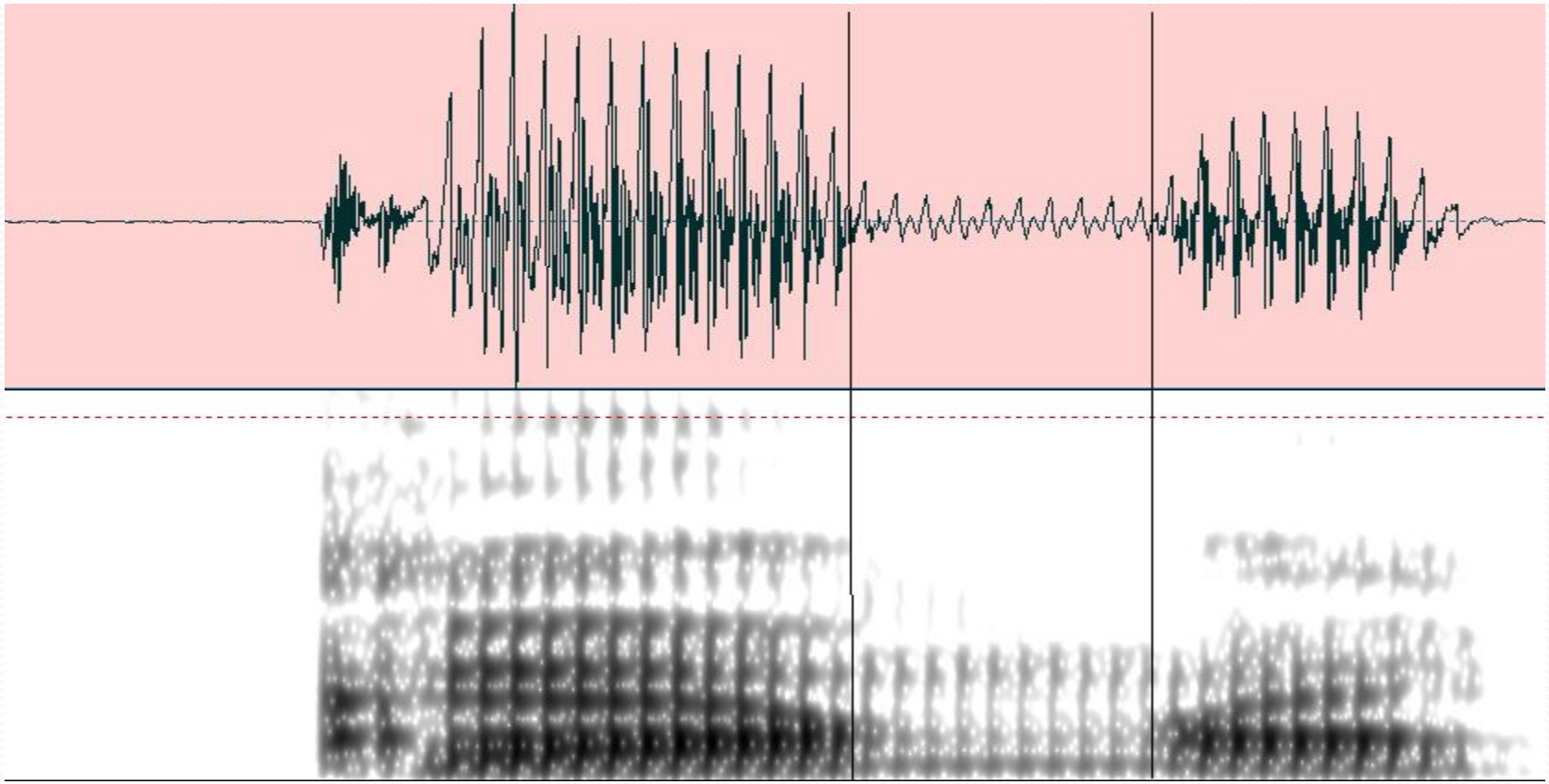
Coda: the aerodynamical evidence

- The word *campa* showed a nasal airflow peak after the vowel.
- In Medeiros et al. (2008) results were:
  - Lip closure just after the nasal vowel determined through aerodynamical curves.
  - Onset defintion for a nasal appendix (NAP)
  - NAP characterization:
- Average NAF: 0.090 dm3/s
- Average duration: 44 ms

The present study: a comparison between Nasal (N) and Nasalized (n) vowels

pampa	pimpa
campa	quimpa
ampa	impa

pama	pima
cama	quima
ama	ima



cama

before going ahead: a nasalized vowel

Method and Measures

- EVA 2, Evaluation Vocale Assistée (à l'aide de B. Teston)
- 5 Brazilian subjects(PBSE)
- 12 target words and non-words
- 4 repetitions
- Randon presentation of carrier phrase
  - *Eu digo* _____ *claramente*
- Software Phonedit (A. Ghio, LPL, Aix, France)
- Target vowels low and high **N** & **n** vowels

1. Aerodynamical measures

- Onset of NV to Onset of NAP
- A MAX NAF at 50 ms windows was obtained

2. Durational measures

- Praat: Onset of NV to Offset NAP and Onset to Offset of nV

Results: Reasoning on …

the MAX NAF

	Max NAF		
	NV	nV	S*
Low	0.031 dm3/s	0.018dm3/s	.001
High	0.063 dm3/s	0.035 dm3/s	0

NV plus NAP duration

	In ms		
	NV	nV	S*
Low	188	147	0
High	164	121	0

*Mann-Whitney u-test

Whithout a 44 ms NAP

	In ms		
	NV	nV	S
Low	188	147	0
High	164	121	0

	In ms	
	NV	nV
Low	**144 ~**	147
High	**120~**	121

Discussion

- Our reasoning is that there is an overlapping between NAP (44 ms) and the initial portion of /p/, a subtraction of NAP length approximates NV and vN durations
- Aerodynamical results showed that NV & NAP interplay is different from the nV nasalization
- … but how could the coda (or NAP) be a better explanation of vowel nasality in BP?

Auxiliary Study: duration measures of sequences formed by NV +/p/; OV+/p/; OV+OCd+/p/

Group 1		**Group 2**		**Group 3**	
pampa	pimpa	papa	pipa	paspa	pispa
campa	quimpa	capa	quipa	caspa	quispa
ampa	impa	apa	ipa	aspa	ispa

Method and Measures

- Recording with Soundforge and a Shure PG27LC
- 4 Brazilian subjects(PBSE)
- 18 target words and non-words
- 4 repetitions
- Randon presentation of carrier phrase
  - *Digo_____todo dia*
- Praat
- Target durations:

NV +/p/

OV+/p/

OV+OCd+/p/

Results

Sequences duration in ms

GLLM alfa at 0.010

	Low vowel	
NV+/p/	OV+/p/	OV+Ocd+/p/
265 =	249 <	348

	High vowel	
NV+/p/	OV+/p/	OV+Ocd+/p/
226 =	254 <	312

i.e., campa = capa, but caspa > campa

Results are in line with…

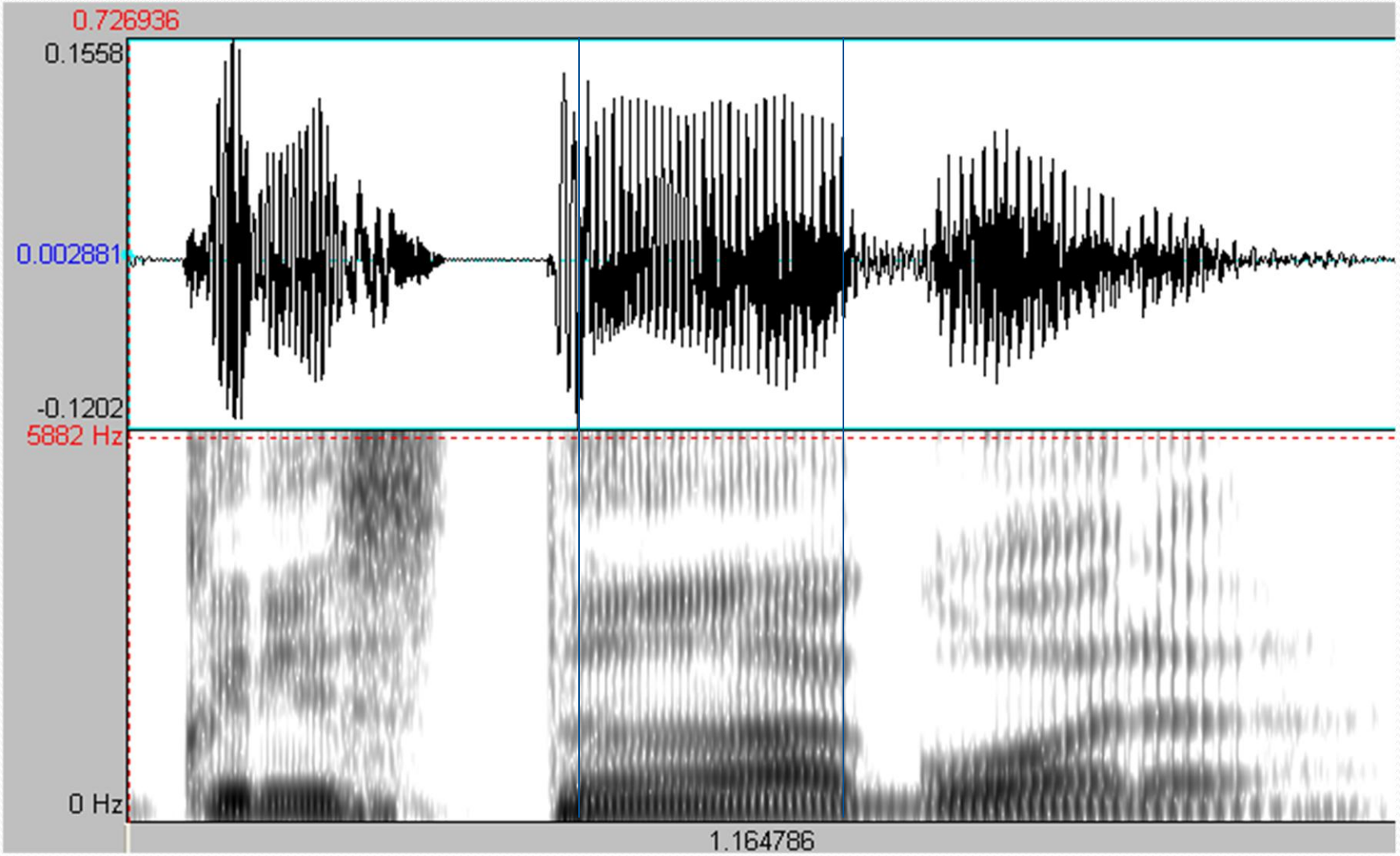
- …the idea that the nasal coda lies in the temporal domain of /p/
- and point out to an interplay between the nasal gesture and the oral gesture that follows.
- Such interplay is due to a fine gestural orchestration that preserves vowel quality so that nasalization is installed and gradually attains a NAF peak
- Our claim: in terms of gesture coordenation, nasal coda is different from oral coda, and can be understood as having an important role on vocalic nasal quality

...for future studies

- However, BP offers more challenges in the field of nasal vowels
- The word “cristã”, for instances, does not have a obstruent following the NV
- So be it a nasal coda, or a NAP (as claimed in Medeiros e al. 2008) it is not the only gesture responsible for nasality.

I thank your attention!

Eu digo cristã agora (Medeiros, 2008)



/p/ durations

Low vowel

- OV - 117 ms
- NV - 87 ms
- Ocd -95 ms

High vowel

- OV 1 31 ms
- NV 92
- Ocd 96

- /p/ in *capa* > /p/ in *caspa* (< 0.010)
- /p/ de *capa* > /p/ de *campa* (< 0.010)
- p/ de *caspa* = /p/ de *campa* (>0.010)

/s/duration in onset position

- Control Group 4

passa/ piça

caça/quiça

assa/iça

- /s/ in onset (152 ms) > /s/ in coda (103 ms), high and low vowels confounded