

Accents on the face? Visual prosody in varieties of Portuguese

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Visual prosody: general background

Facial gestures as a complement of spoken language are organized into a linguistic system that shares several features with the prosody of spoken language (Krahmer & Swerts 2009; Mol et al. 2011, 2012; Loehr 2012).

A detailed analysis of visual prosody has shown that alongside pitch accents in the auditory component, eyebrow movements play a strong role on the perception/distinction of specific sentence types and pragmatic meanings:

- in several languages (Purson et al. 1999, for French; Krahmer et al. 2002, for Dutch; Borràs-Comes & Prieto 2011, for Catalan, inter alia);
- across languages (Crespo-Sendra et al. 2013, Borràs-Comes et al. 2014).

Does visual prosody vary across varieties of a given language?

Languages are known to differ in several aspects of their intonational systems (Gussenhoven 2004; Ladd 2008; Jun 2005, 2014), and language varieties have been shown to exhibit similar variation in intonation (Bruce 2005; Prieto & Roseano 2011; Frota & Prieto in press).

To our knowledge, the role of visual prosody in the distinction between varieties of a given language has not been investigated, and little is known about the relation between pitch accent/boundary tone types and gesture types.

Visual prosody in Portuguese

Visual prosody in European Portuguese (EP) is still unstudied.

The present work provides a first contribution to this research field.

Main goals

Three main questions are addressed in this research:

- whether facial gestures correlate with pragmatic meaning across varieties, irrespective of tonal pattern;
- if there is a correlation between tonal pattern and facial gestures, in form and type, independently of pragmatic meaning;
- whether different varieties use different facial gestures to convey the same sentence type/pragmatic meaning, independently of the tonal patterns observed.

Methodology

Materials:

- The audiovisual database of prosodic variation in Portuguese from the *Interactive Atlas of the Prosody of Portuguese* (Frota, coord., 2012-2014) was used (<http://www.fl.ul.pt/laboratorionfonetica/InAPoP/>).
- Semi-spontaneous data obtained by means of a Discourse Completion Task (DCT - Kasper & Dahl 1991): 3 neutral statements, 2 focused statements, 3 neutral yes-no questions, 2 focused yes-no questions, all produced twice.

Varieties: 3 EP varieties already described for intonation (Frota 2000, 2014; Cruz 2013; Frota et al. in press): the Standard variety (SEP) and two central-southern varieties (Ale and Alg).

Speakers: 2 female speakers per variety, aged between 20-45 years-old, all recorded *in loco*.

Analysis:

A total of 120 sentences were analyzed (10 sentences x 2 renditions x 2 speakers x 3 varieties).

The nuclear contours of both sentence types and pragmatic meanings were considered for the inspection of potential visual parallels for the following intonational features:

- pitch accent (type);
- boundary tone (type);
- configuration of the nuclear contour.

Annotation of facial gestures followed the Facial Action Coding System (Ekman et al. 2002).

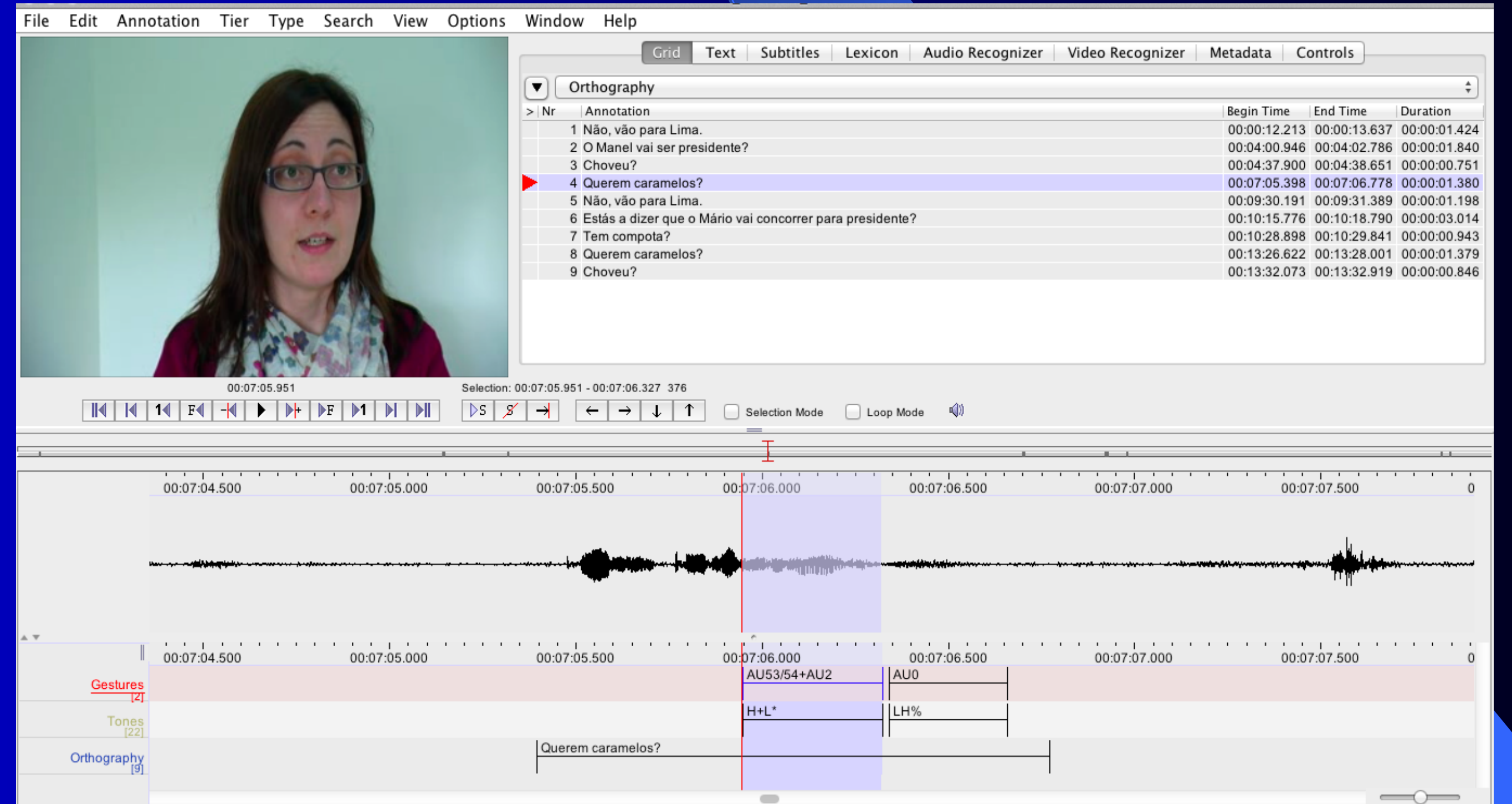


Figure 1 – Annotation of visual cues aligned with the waveform in ELAN 4.6.2. Example of a neutral yes-no question produced in SEP – *Querem caramelos?* 'Do you want candies?'

Preliminary Results

EP	Statements			
	Tonal	Visual	Tonal	Visual
SEP	H+L*	Head up-down	H*+L	Head up-down +eyebrow raising
	L%	Neutral position	L%	Neutral position
Ale	(H+)L*	Head up-down	H*+L	Head up-down +eyebrow lowering
	L%	Neutral position	L%	Neutral position
Alg	H+L*	Head up-down	H*+L	Head up-down +eyes closed
	L%	Neutral position	L%	Neutral position

Same basic facial gesture across varieties
↓
Same contour type
↓
Additional visual cues were observed across varieties, mainly in focused statements.

Table 1 – Visual cues aligned with pitch accent/boundary tone types in neutral and focused statements produced across EP varieties (SEP, Ale, and Alg).

More variation than in statements, both in intonational and visual cues.
↓
L*+H

- ≈ facial gestures in Alg, irrespective of ≠ pragmatic meanings;
- ≠ facial gestures across varieties to convey the same pragmatic meaning.

EP	Yes-No questions			
	Tonal	Visual	Tonal	Visual
SEP	H+L*	Head up-down +eyebrow raising	L*+H	Head down-up +eyebrow lowering
	LH%	Neutral position	HL%	Head back +eyebrow lowering
Ale	(H+)L*	Head up-down +eyebrow raising	H+L*	Head up-down +eyebrow lowering
	H%	Head forward +eyebrow raising	HL%	(Head back) +eyebrow lowering
Alg	L*+H	Eyebrow raising	L*+H	Eyebrow raising or lowering
	H%	Head forward (+eyebrow raising)	H%	Head forward (+eyebrow raising or lowering)

Table 2 – Visual cues aligned with pitch accent/boundary tone types in neutral and focused yes-no questions produced across EP varieties (SEP, Ale, and Alg).

Ale = intonational cues ≠ visual cues

SEP ≠ intonational cues = visual cues

Sentence type and pragmatic meaning constrain the correlation between pitch accent type and gesture type within the same variety.

For discussion (sum up)

- Our findings show that facial gestures do not correlate with sentence type or pragmatic meaning, irrespective of tonal pattern.
- The absence of correlation between intonational and visual cues was observed either across varieties or within the same variety.
- A complex picture was found where language variety, sentence type/pragmatic meaning and tonal patterns are all relevant factors.
- This suggests that, like intonational cues, facial gestures may display some degree of grammaticalization (i.e. variety specific gestures).
- In future work, facial gestures recorded in different tasks (interview and reading task) will be analyzed, and audiovisual perception experiments will be run to further examine the role of facial gestures in intonational variation in European Portuguese.

Selected references

Borràs-Comes, J. & P. Prieto. 2011. 'Seeing tunes'. The role of visual gestures in tune interpretation. *Laboratory Phonology* 2(2), 335-380.

Crespo-Sendra, V., C. Kaland, M. Swerts & P. Prieto. 2013. Perceiving incredulity: the role of intonation and facial gestures. *Journal of Pragmatics* 47, 1-13.

Cruz, M. 2013. *Prosodic variation in European Portuguese: phrasing, intonation and rhythm in Southern varieties*. Unpublished PhD Dissertation. University of Lisbon.

Ekman, P., W. V. Friesen & J. C. Hager. 2002. *Facial Action Coding System*. Salt Lake City, UT: A Human Face.

Frota, S. (Coord.). 2012-2014. *InAPoP – Interactive Atlas of the Prosody of Portuguese Project*. [Webplatform available at <http://www.fl.ul.pt/LaboratorioFonetica/InAPoP/>].

Frota, S., M. Cruz, F. Fernandes-Svarzman, G. Collischonn, A. Fonseca, C. Serra, P. Oliveira & M. Vigário. In press. Intonational variation in Portuguese: European and Brazilian Varieties. In S. Frota & P. Prieto (orgs.) *Intonation in Romance*. Oxford: Oxford University Press.

Jun, S.-A. (ed.). 2014. *Prosodic Typology II: The Phonology of Intonation and Phrasing*. Oxford: Oxford University Press.

Krahmer, E., & M. Swerts (Eds.). 2009. *Audiovisual prosody (special issue)*. *Language and Speech*, 52(2-3), 129-386.

Mol, L., E. Krahmer, A. Maes & M. Swerts. 2011. Seeing and Being Seen: The effects on gesture production. *Journal of Computer-Mediated Communication*, 17(1), 77-100.