

Broad focus and narrow-contrastive focus: Articulatory data on tonal alignment in Italian and Catalan

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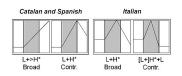


Introduction

Recent investigations [1], [2], [3], [4], [5] showed that tonal targets tend to be more closely aligned with articulatory landmarks than acoustic ones.

This work is part of a wider project aiming at exploring the tonal alignment features for different tonal categories of Catalan (Majorcan variety), Spanish (Madrid variety) and Italian (Lecce variety) in broad and narrow-contrastive focus conditions. In the present study only Catalan and Italian data are investigated.

For Catalan (Central variety), [5] found that H peak coincides with the peak velocity of the closing gesture of lower lip in broad focus accent.



An investigation concerning articulatory aspects of alignment may possibly offer more precise anchors to refer to in the AM

Corpora

Target words

Open and closed syllables with various segmental composition in paroxitons and proparoxitons: [mi.'ma.mi] [mi.'mam.li] [la.'la.la] [la.'lal.ma] [na.'na.na] [na.'nan.ma]

[mi.'ma.mi.ma][mi.'mam.la.ma] [la.'la.la.la][la.'lal.ma.la] [na.'na.na.na][na.'nan.ma.na]

Question-answer pairs with either a broad or a narrow-contrastive focus accent. Same number of syllables and stress pattern

Articulatory data (AG500)

6 speakers (3 for Majorcan Catalan and 3 for Lecce Italian)

240 items per speaker (12 target words x 2 focus conditions x 10 repetition) = 1440 tokens

Working hypotheses

- Articulatory anchors of rising (L1-H) tonal gestures are different in the production of broad and contrastive focus conditions.
- Articulatory anchors are different between Majorcan Catalan and Lecce Italian

A previous investigation [6] was conducted on open syllables for H targets using statistical analisys. In this study closed syllables, L1 tonal target (start of the H tone gesture) and lag measures of tone-consonantal/ vocalic gestures are added in order to determine the articulatory anchors of tonal targets.

Methods

Acquisition

Synchronized EMA and acoustic data. A mini-dialogue was presented on a monitor; the speaker heared the questions and answered using the sentence displayed.

Tonal and segmental levels were labeled using PRAAT.

Articulatory level was semi-automatically labeled through MASSA software (developed at CRIL). Measures

Latencies of tonal targets are measured from:

- onsets/offsets of consonant and vocalic gestures
- peak velocity of gestures
- consonantal/vocalic attainment phases
- ipc = 10% of the peak velocity BEFORE the zero velocity point
- fpc = 10% of the peak velocity AFTER the zero velocity point

Articulators considered

CONSONANTS - LL (lower lip) for MA(M), TT (tongue tip) for LA(L) and NA(N)

VOWELS - TD (tongue dorsum) for MA(M), LA(L) and NA(N)

Measure of the lag between tonal targets and:

- Consonantal gestures
- A-A vocalic gestures

Y axis: tone-art.landmark lag in ms

peak velocity of the opening gesture

- I-A vocalic gestures

X axis: speakers

closed syllable Italian broad focus

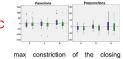
Legenda: open syllable

L1 target synchronization H target synchronization

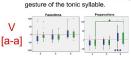
max constriction of the closing gesture of the tonic syllable.

max constriction of the closing gesture of

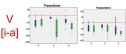
Statistical significativity:



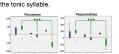
max constriction of the closing gesture of the post-tonic syllable



peak velocity of the opening gesture peak velocity of the closing gesture of the tonic syllable







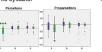
Italian contrastive focus

L1 target synchronization H target synchronization

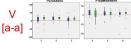
peak velocity of the closing gesture of the tonic syllable.

*** = p < 0,001

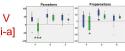
* = p < 0.05



velocity of the closing gesture of the tonic syllable



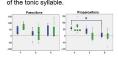
beginning of the opening gesture of



peak velocity of the opening gesture

peak velocity of the opening gesture

of the tonic syllable.

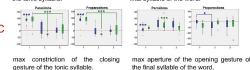


max constriction of closing gesture of

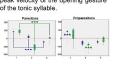
Catalan broad focus

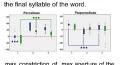
L1 target synchronization H target synchronization

max constriction of closing gesture of max aperture of opening gesture of the

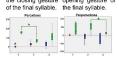


velocity of the opening gesture of the tonic syllable.





the closing gesture of the final syllable.



Catalan contrastive focus

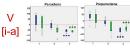
L1 target synchronization H target synchronization

max constriction of closing gesture



max constriction of closing gesture of the tonic syllable

peak velocity of closing gesture of the post-tonic syllable



peak velocity of the closing gesture of the post-tonic syllable.

Conclusions

- In both languages, there seems to be more stability in low targets than in high targets.
- Lecce Italian data show a better coordination with positional landmarks (consonantal and vocalic closing gestures) in broad focus condition and peak velocity
- (closing gestures for low targets and opening gestures for high targets) in contrastive focus condition.

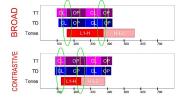
 Majorcan Catalan data show a strong interspeaker variability; there seems to be a better coordination with positional landmarks (closing gestures for low

Gestural scores (based on the actual means of the landmarks)

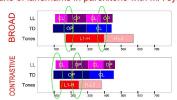
Italian

- No differences between open and closed syllables
- No differences between paroxitons and proparoxitons

Means of landmarks in paroxitons with LA syllable



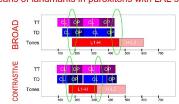
Means of landmarks in paroxitons with MA syllable



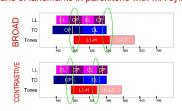
Catalan

- Many interspeaker differences.
- Because of too advanced landmarks in productions, speaker 1 was excluded in broad focus and speaker 2 was excluded in contrastive focus.

Means of landmarks in paroxitons with LAL syllable



Means of landmarks in paroxitons with MA syllable



References: [1] D'Imperio, M., Nguyen, N. and K. G. Munhall (2003), An articulatory hypothesis for the alignment of tonal targets in Italian, in Proceedings of 15th ICPhS, Barcelona, 255-256. [2] D'Imperio, M., Espesser, R., Lœvenbruck, H., Menezes, C., Nguyen, N. and P. Welby (2007), Are tones aligned with articulatory events? Evidence from Italian and French, in J. Cole and J. I. Hualde (eds.) Papers in Laboratory Phonology IX, Mouton de Gruyter, 577-698. [3] Mücke, D., Grice, M., Becker, J. and A. Hermes (2009), Sources of variation in tonal alignment: evidence from acoustic and kinematic data, in Journal of Phonetics, 37 (3): 321–338. [4] Mücke, D., Nam, H., Prieto, P., and L. Goldstein (2009), Coupling of Tone and Constriction Gestures in Catalan and German. Poster presented at PaPl 2009, 17-16 June 2009, Las Palmas de Gran Canaria. [5] Prieto, P., Mücke, D., Becker, J. and M. Grice (2007), Coordination patterns between pitch movements and oral gestures in Catalan, in J. Tourvain and W. J. Barry (eds.) Proceedings of the XVIth ICPhS, Pirot GmbH, Dudweiler: 989-992. [6] Stella, A., Vanrell, M., Prieto, P., Gili Fivela, B. (2010), Articulatory comparison of tonal alignment in Italian and Catalan: Preliminary data on broad focus and narrow-contrastive focus, Poster presented at LabPhon 12, 8-10 July, Albuquerque (NM, USA).