Prosodic constituency and boundary scope in Italian: An articulatory and acoustic study



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METHODS

Kinematic data: AG500 EMA, analysis UL (upper lip) and LL (lower lip) for calculating Lip Aperture (Euclidean Distance); visual inspection through *Mview*

· Acoustic analysis: preboundary consonant and vowel dur.; accented vowel dur.

• Statistics: Linear Mixed Models with additive factors (p< .05). Fixed: Prosodic

Internation.

Hierarchy (IP/ip/AP/syll), Sentence Type (Q/S), Stress (par/prop); Random: Words.

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INTRODUCTION

Prosodic phrasing & articulatory/acoustic variation:

 Gestures get larger, longer and further apart at phrase edges [1, 2, 3]

 The effect is incremental for larger/stronger boundaries.

 Much is known about phrase-initial gestural adjustments, less for phrase-final ones, especially for Romance languages.

 Temporal scope of acoustic right-boundary effect might go back to the rime of the stressed syllable [4]

 Articulatorily, [5] found longer preboundary C closing and opening movement and longer time-to-peak velocities even when C is not immediately adjacent to the boundary because of intervening final vowel ("dodo]_{IP}")

In Italian:

 Closing/opening movements are larger and less stiff for stressed/accented than unstressed syllables [6]. What about preboundary effects? Is there an effect of vicinity to preceding stressed syllable?

 Acoustic evidence on Neapolitan suggested the existence of three levels of phrasing, Intonation phrase (IP) > intermediate phrase (ip) > Accentual Phrase (AP) [7], in both questions and statements. Are these prosodic levels reflected in articulatory variation?

The π –gesture framework trosodic events (such as phrase boundaries) ave a temporal interval of activation, similar o constriction gestures [3]. This predicts that:

• Strength of activation of π -gesture will be correlated with slowing down of constriction movements

 Stronger prosodic boundaries are associated to stronger π-gesture activation
 Boundary effects should be local (tied at the boundary, [7]).

HYPOTHESES 1. Incremental effect of prosodic phrasing:

IP > ip > AP > syll

- Labial constriction movement for preboundary C will have longer duration, greater amplitudes, longer peak-to-peak intervals and slower velocity when preceding a stronger boundary
- Acoustic pre-boundary lengthening will cumulatively increases with prosodic boundary strength

2. Effects of prosodic phrasing on articulatory and acoustic variation are local and thus independent of pitch accent position

3. Similar prosodic phrasing effects in both question and statements





RESULTS

(M. Tiede)

• Subjects: 1 Neapolitan Italian speaker

CORPUS

Conson.	Word-final syllable		Stressed syllable		
	Penult stress	Antepenu lt stress	Penult stress	Antepenult stress	
/m/	A <u>bra</u> MA	<u>Pa</u> na MA	Ta <u>MA</u> ra	<u>MA</u> rica	
/g/	Gon <u>za</u> G A	<u>Ma</u> la GA	Pa <mark>GA</mark> ni	<u>GA</u> spare	
Boundary type	Sentences				
IP	Le lettere da Malaga e da <u>Pa</u> na M A, per quanto ne so, stanno nel cassetto "The letters from Malaga and from Panama, as far as I know, are in the drawer"				
ip	Le lettere da Malaga e da <u>Pa</u> na MA stanno nel cassetto				
AP	Le lettere da <u>Pa</u> na MA e da Malaga stanno nel cassetto				
word- internal	Le lettere da MA <u>rina</u> e da Marica stanno nel cassetto "The letters from X and from X are in the drawer"				
Bo	oundary T	ype (4 lev (par/prop)	els) * 2 co	onsonants * 2	2

DISCUSSION

 The acoustic results show a clear preboundary lengthening for the word final vowel from the lowest levels (AP/syll) to the highest prosodic levels (ip and IP), but no difference between smallest levels (AP and syll). Onset consonants, on the other hand, do not show a comparable lengthening effect.

 Lengthening is strongest in the final syllable, though an incremental effect is also found on the stressed syllable (as for English, cf. [4]), though this is true only when the stressed syllable is very close to the boundary, i.e. one syllable away (i.e. in penultimate but not in antepenultimate syllables).

 The kinematic temporal results show a lengthening pattern for the closing movement of the preboundary labial consonant, as well as for time-to-peak velocity and displacement of the same, independent of vicinity to the stressed syllable (i.e. equal effect for penult and antepenult items).

• On the other hand, the closing labial movement of stressed syllables (being further away from the boundary) does not vary according to boundary strength.

 \bullet Statistical analysis showed mixed evidence for 2 or 3 levels of phrasing, in both Q/S

CONCLUSION

• As predicted by the $\pi\text{-gesture hypothesis}$, closing labial movements of preboundary consonant show temporal prosodic effects despite not being immediately adjacent to the juncture (one segment away).

 The temporal effects are incremental, being stronger for boundaries higher in the prosodic hierarchy. Similar but weaker evidence for spatial data.

• The effect does not extend to the closing movements of stressed syllable, neither for peultimate nor for antepenultimate stress.

Need to extend data analysis to other speakers and segmental types.

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