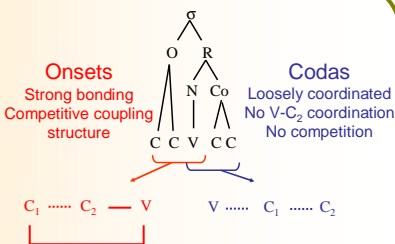


# Articulatory evidence for syllable onsets

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## Background

- Syllable structure is reflected by coordination between Cs and Vs [2, 3, 6] (different timing)
  - Competitive coupling structure in complex onsets → C-center
- C-center as diagnostic: Clusters form complex onsets in English [3, 7] and Georgian [6], but not in Tashlhiyt Berber [6] and Moroccan Arabic [9]



## 'Impure-s' in Italian

- Word initial sibilant followed by a consonant [1]
  - Treated differently in morphology:
    - e.g. definite article alternation: il sale, il premio but lo studente; [3]
- Syllabification of /s/+C clusters is unclear

## Questions

- Does Italian have a C-center effect in word initial CC and CCC clusters?
- Morphological evidence suggests /s/+C clusters could be syllabified differently from CC. Is this reflected in articulatory coordination?
- Is /s/ part of a complex onset?

## Recordings

- Kinematic (EMMA) and acoustic data
- Sensors placed on upper and lower lip, tongue tip, tongue blade and tongue body
- 3 native speakers (2 female: Apulia, 1 male: Trentino)
- 510 tokens
  - 17 target words x 10 repetitions x 3 speakers

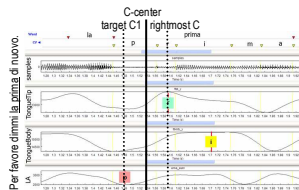


## Speech material

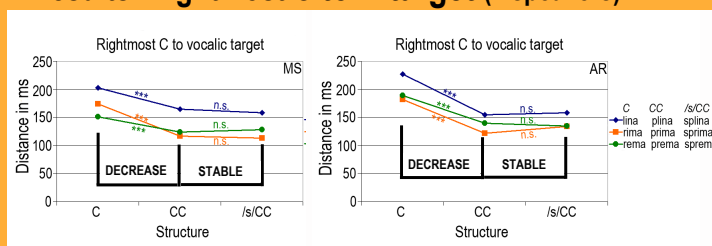
- Target words containing simple onsets and clusters: C - CC - /s/+C - /s/+CC
  - e.g. /rima/-/prima/-/sprima/
- Carrier sentence: *Per favore dimmi la \_\_\_ di nuovo* ('Please say \_\_\_ again')
- Vocalic gestures /i-a-i-a-i/

## Rightmost C measure

- (i) In complex onsets, distance between *rightmost C* target and V target decreases as consonants are added to the onset



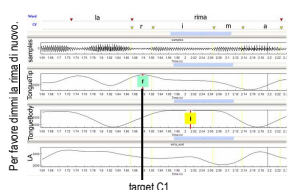
## Results: Rightmost C to V target (2 speakers)



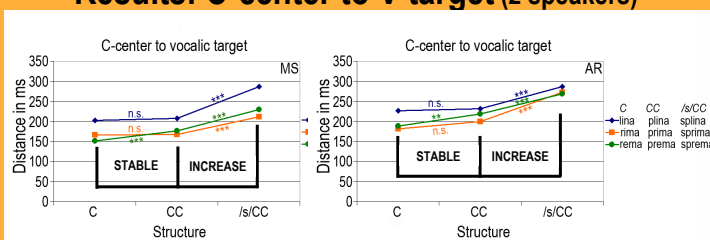
- C vs CC: Decrease of rightmost C to V (make room for Cs added to left)
- CC vs. /s/+CC: Distance remains stable

## C-center measure

- (ii) In complex onsets, distance between C-center ('temporal center of gravity'-Saltzman et al. 2006) and V target is stable

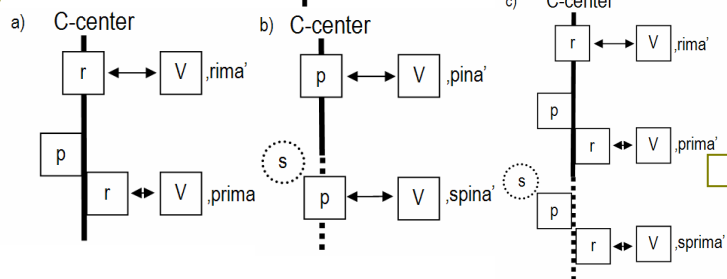


## Results: C-center to V target (2 speakers)



- C vs CC: C-center effect in 2 out of 3 cases
- CC vs. /s/+CC: No C-center effect

## Interpretation



- Italian word initial C clusters generally form complex onsets
- But clusters with /s/ exceptions (S)

## Summary

- ★ Articulatory timing provides evidence for syllable constituency
- ★ Italian allows complex onsets
- ★ 'impure-s' is *not* part of onset in Italian
- ★ No universal syllabification of /s/-clusters