

# Longer vowel duration correlates with tongue root advancement in Italian and Polish: An ultrasound study

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LabPhon

## The voicing effect

- shorter vowels before voiceless stops, longer vowels before voiced stops

Heffner (1937); House & Fairbanks (1953); Belasco (1953); Peterson & Lehiste (1960); Halle & Stevens (1967); Chen (1970); Klatt (1973); Lisker (1974); Raphael (1975); Javkin (1976); Maddieson & Gandour (1976); Farnetani & Kori (1986); Kluender et al. (1988); ?, Fowler (1992); Hussein (1994); Esposito (2002); Lampp & Reklis (2004); Warren & Jacks (2005); Durvasula & Luo (2012)

Still no consensus on source!

Proposed accounts:

- **production**
  - constant articulatory force (Belasco, 1953; Delattre, 1962)
  - durational trade-off (Slis & Cohen, 1969; Lehiste, 1970)
  - laryngeal adjustment (Halle & Stevens, 1967)
  - closing gesture duration (Chen, 1970)
- **perception**
  - misperception (Javkin, 1976)
  - enhancement (Kluender et al., 1988)
- but problems (Maddieson & Gandour, 1976; Fowler, 1992)

## This talk:

- support for *durational trade-off hypothesis*
- positive correlation between *vowel duration and tongue root position*

# Methods

- **Participants:** 11 Italians (5 F, 6 M), 6 Polish (3 F, 3 M)
- **Targets**
  - $C_1V_1C_2V_1$
  - $C_1 = /p/, V_1 = /a, o, u/, C_2 = /t, d, k, g/$
  - *pata, pada, paka, ..., poto, podo, ...*
- **Frame sentence**
  - *Dico X lentamente*, 'I say X slowly'
  - *Mówię X teraz*, 'I say X now'
- **Data**
  - Durational data from acoustics
  - Tongue root from ultrasound tongue imaging
- **Reproducibility**
  - <https://github.com/stefanocoretta/2018-labphon>

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