Structured Variation across Sound Contrasts, Talkers, and Speech Styles

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BACKGROUND

- Speech is variable due to **talkers**, **contexts**, **speaking styles, etc.**
- Individual **talker** variability observed for;
  - · Vowels (e.g. Peterson & Barney 1952, Johnson et al. 1993)
  - · VOT (e.g. Allen et al., 2003; Scobbie, 2006, Chodoroff et al. 2015)
  - · CoG (e.g. Newman et al. 2001)

QUESTIONS

- How systematic are talker differences?
  - · Are they stable **across consonants**?
- How does this relate to speech style?
  - · Do talkers differ in **how clear** they are?

METHODS

- Confederate-led scripted dialogues
- 32 participants (80 dialogues per participant)
  (Ohala, 1994; Lindbolm et al. 2007; Maniwa, Jongman & Wade, 2009)
- Measurements (n=2514)

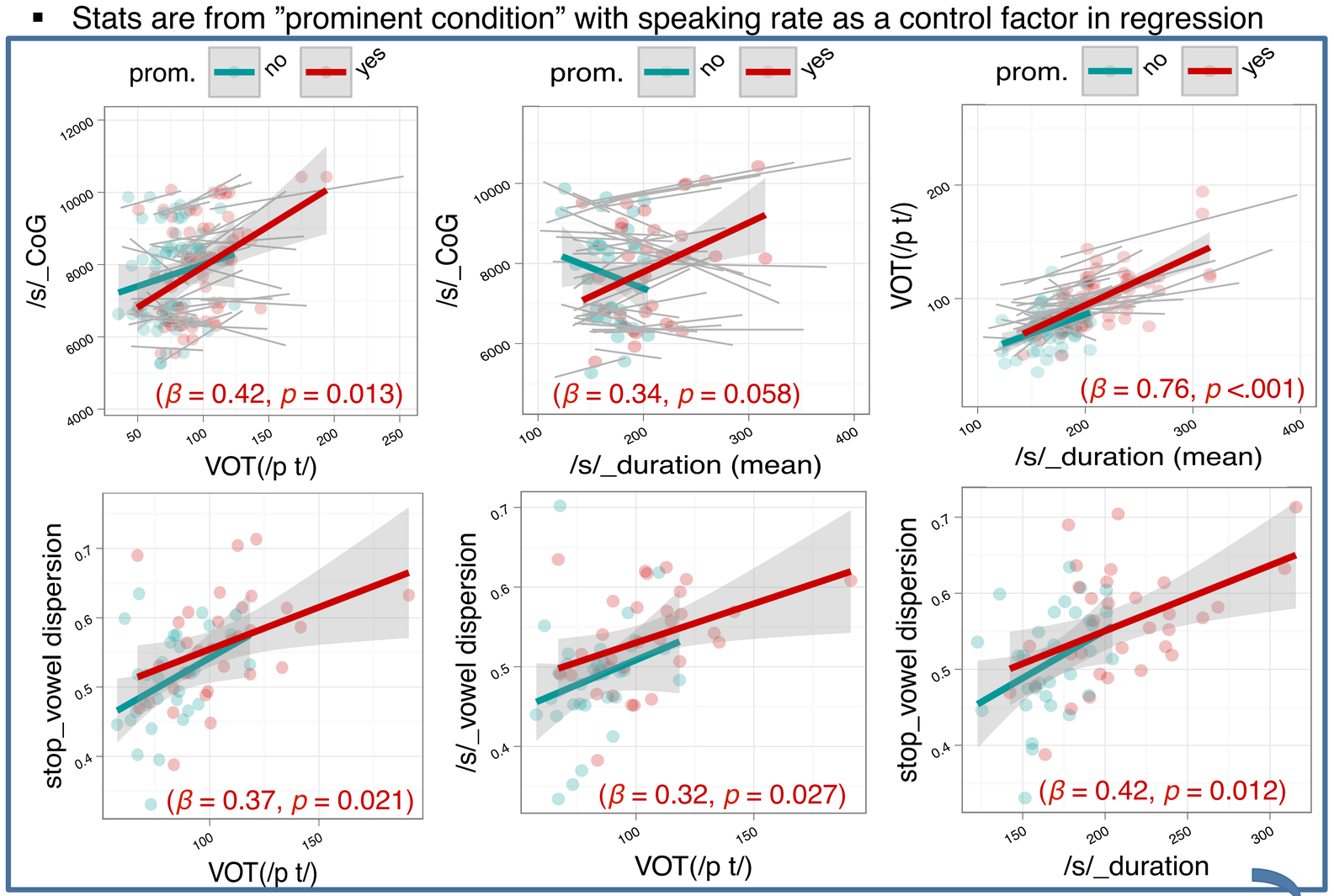
/ p, t /	/ s, ʃ /
VOT	CoG duration
Locus equation (LE) slope (co-articulation) Vowel dispersion V = /i/, /æ/, /ɑ/, /oʊ/, or /u/ (Euclidean distance Neary normlalized)	
Speaking rate (num. of syllables per sec.)	

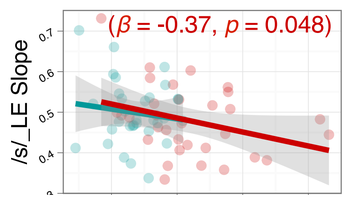
- Prominence-induced **"Clear speech"** by confederate "mishearing" portion of dialogue
  - · **Control condition**: TARGET heard correctly
  - · **Prominent condition**: TARGE misheard for another C (p,t,s or ʃ)

SAMPLE DIALOGUES

RESULTS

- Stats are from "prominent condition" with speaking rate as a control factor in regression

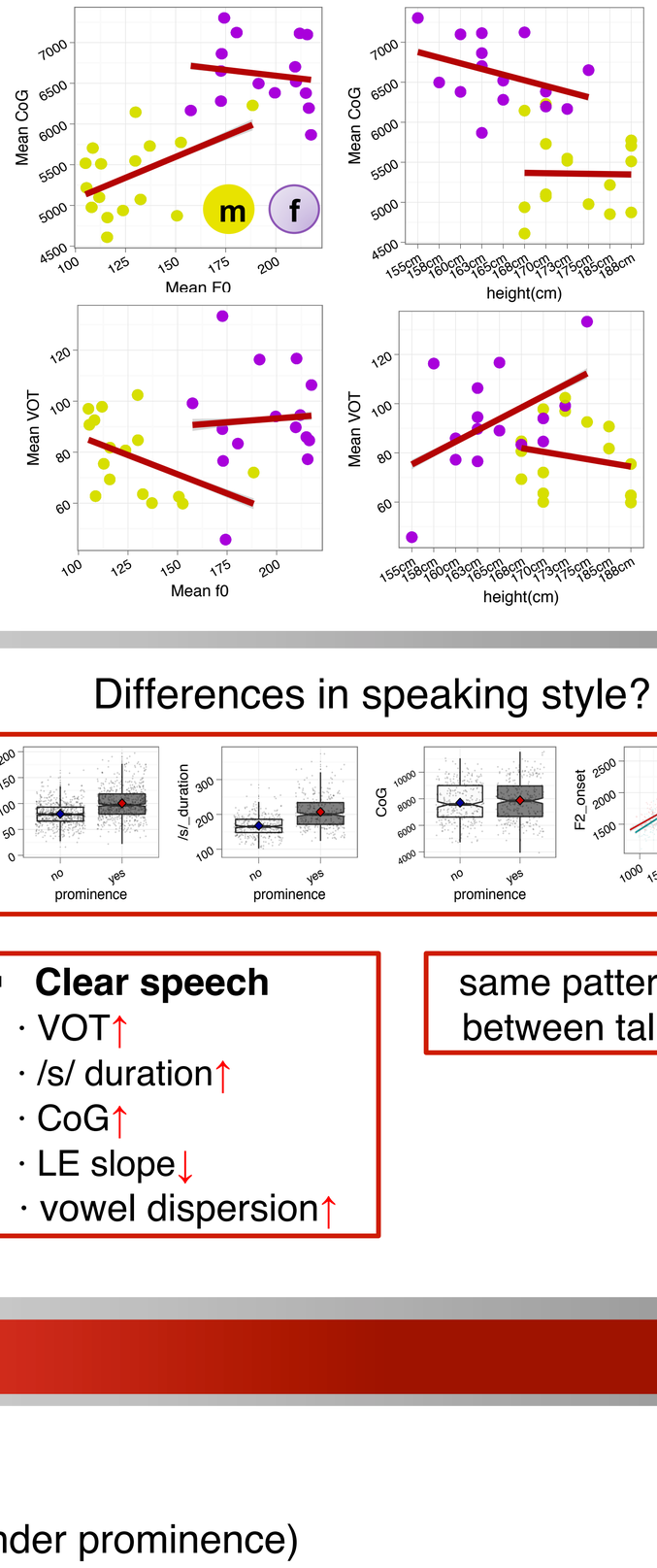




longer /s/ = smaller slope = less co-articulation

- **VOT** correlated with /s/ **CoG**
- **/s/ duration** correlated with /s/ **CoG**
- **VOT** correlated with /s/ **duration**
- **VOT** and /s/ **duration** correlated with **vowel dispersion** across consonants

Differences in body size or gender?



Differences in speaking style?

- **Clear speech**
  - · VOT↑
  - · /s/ duration↑
  - · CoG↑
  - · LE slope↓
  - · vowel dispersion↑

same pattern as between talkers

CONCLUSION

- Talkers differ systematically across sound contrasts within a speaking style
- Talkers differ **in degree of hyper-articulation**
- Correlations between cues across speakers tend to be strengthened in clear speech (under prominence)
- Differences between talkers (at least partly) reflect global properties of talkers
- The systematic differences in talkers may help listeners quickly adapt to talker variability in speech perception

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