

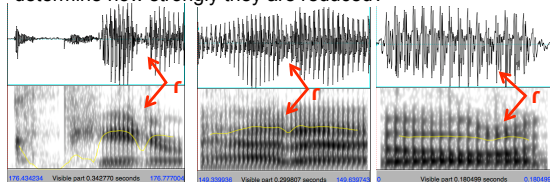
# "Probably, OK, whatever!": Variability in conversational speech stops and flaps

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## Introduction: Questions

- Speech sounds are often reduced, especially in spontaneous speech. Expected stops and flaps may be approximants.
- How often are they reduced, in what ways? What factors determine how strongly they are reduced?



- Spontaneous speech looks very different from careful speech, yet sounds fine. How often do listeners hear such reductions?

## Methods

- 13 young-adult native English speakers, recorded in sound booth.
- Phone conversation with friend/family, story-reading, isolated word-list reading; ~700 stop/flap tokens per speaker.
- Measured intervocalic /p, t, k, b, d, g/ before unstressed vowel (flapping environment).
- Word-list and story reading had the target consonants in six segmental/word-boundary environments (e.g.  $_{-}\text{ə}$  ('status'),  $_{-}\text{i}$  ('pretty'),  $_{-}\text{\#V}$  ('...write a...') and two stress environments (post-stress, 'status', inter-unstressed, 'limited').
- Measured consonant duration, intensity drop relative to V\_V maxima, absence of burst, continuation of voicing, presence of formants (strong or weak). 6 dependent variables.

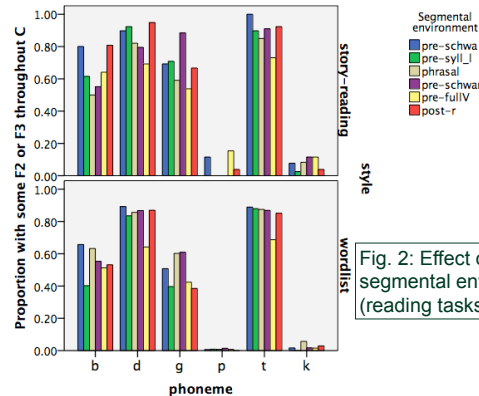


Fig. 2: Effect of segmental environ. (reading tasks only)

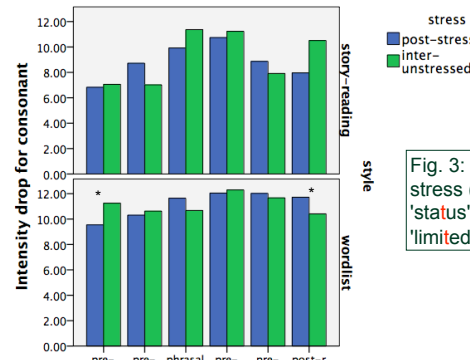


Fig. 3: Effect of stress (e.g. 'status' vs. 'limited'), /t/ only

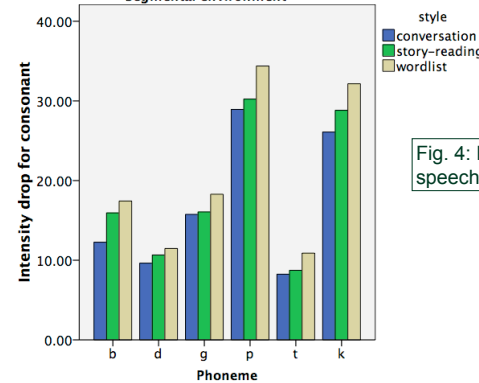


Fig. 4: Effect of speech style

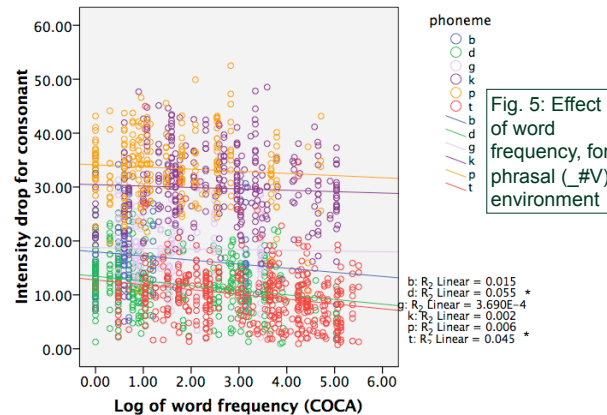


Fig. 5: Effect of word frequency, for phrasal ( $_{-}\text{\#V}$ ) environment

b: R<sub>2</sub> Linear = 0.015  
d: R<sub>2</sub> Linear = 0.055 \*  
g: R<sub>2</sub> Linear = 3.690E-4  
k: R<sub>2</sub> Linear = 0.002  
p: R<sub>2</sub> Linear = 0.006  
t: R<sub>2</sub> Linear = 0.045 \*

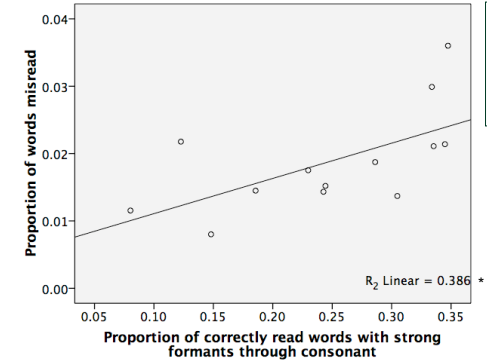


Fig. 6: Correlation between mis-reading and reduction

## Results

- Fig. 2: There are significant but inconsistent patterns of reduction depending on segmental/word-boundary environment: consonants may reduce less or differently before /i/, and /t, d/ only may reduce more before syllabic /l/.
- Fig. 2: There is a lot of reduction overall, even in careful speech. Even /p, k/ sometimes have formants, /b, g/ often do.
- Fig. 3: Post-stress vs. inter-unstressed has little or no effect.
- Fig. 4: Reduction is greater in casual speech. The two connected speech styles may group together.
- Fig. 5: Higher frequency words and phrases show slightly more reduction (significant in multiple regression).
- Fig. 6: Speakers who mispronounce more words during reading may reduce more (only on two measures). They might have weaker access to the orthographic representation.

## Discussion

- Phoneme identity, speech style, word frequency, and perhaps speaker characteristics determine how strongly consonants are reduced, but stress does not.
- Reduction of consonants, as in Fig. 1, is gradient, pervasive, and not limited to casual speech. Listeners encounter reduced forms extremely often, so parsing reduction is the norm.

## References

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