

Aspiration and the gradient structure of English prefixed words

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English voiceless stops

Aspirated

- beginning of stressed syll.: *po.[tʰ]á.to*
- beginning of word: *[pʰ]otáto*

Otherwise unaspirated

Previous research on prefixed words

- [2, 5]: 8 prefixed words (*mistimes*, *distrusts*) vs. 8 pseudoprefixed (*mistakes*, *displayed*)
 - Phonetic differences suggest morpheme boundary forces syllable boundary
 - mis.[tʰ]imes* vs. *mi.s[t]akes*

Our goal: use larger set of words, so that we can...

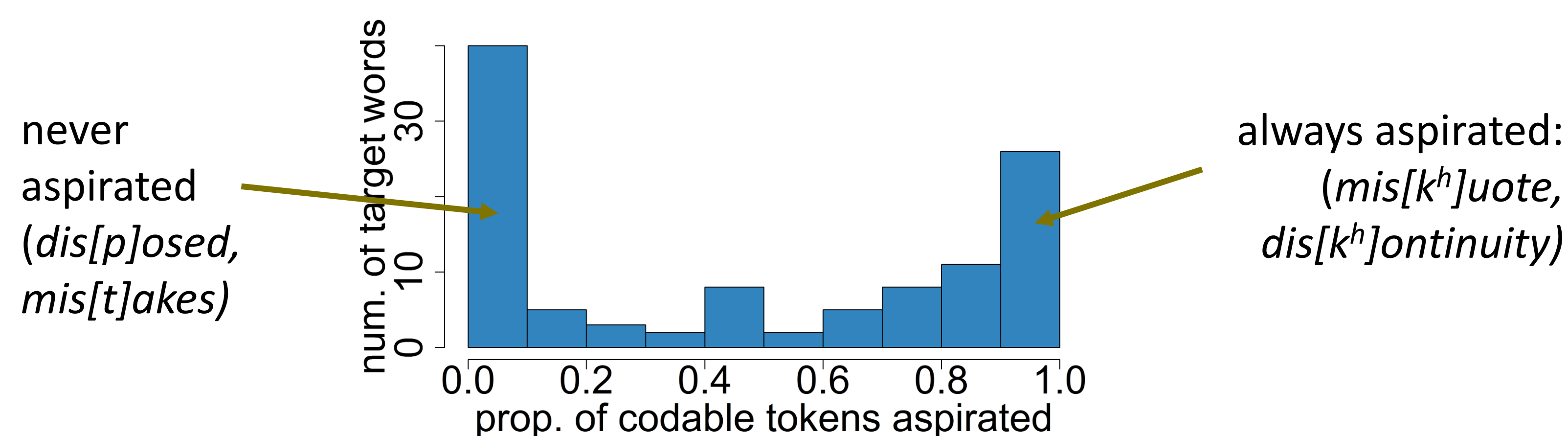
- include words with intermediate morphological status
- test for frequency effects

Methods

- 16 native speakers of English
- 110 targets beginning with *mis-* or *dis-*
- 330 fillers beginning with *pre-*, *re-*, *i{n,m,l,r}-*, or *co{n,m,l,r}-*
- Target and filler words range from prefixed to pseudoprefixed
- Participant reads aloud a two-word phrase shown on computer screen
 - target trial: *she disperses*
 - filler trial: *a commandment*
- 440 trials per participant
- Two dependent variables, two regression models
 - continuous: Voice Onset Time (VOT) measured from waveform
 - binary: English-speaking author judged aspiration (yes/no)

Results

- Binary model: Most words were **consistent** across participants

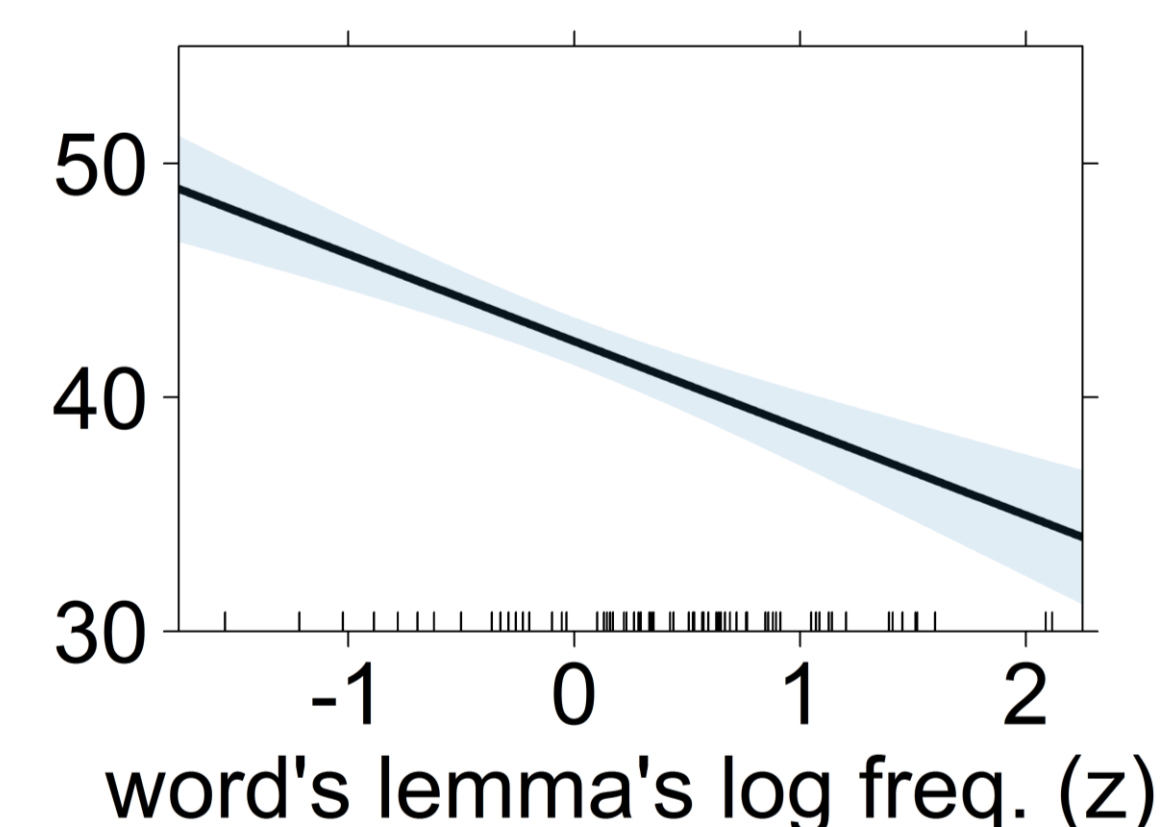
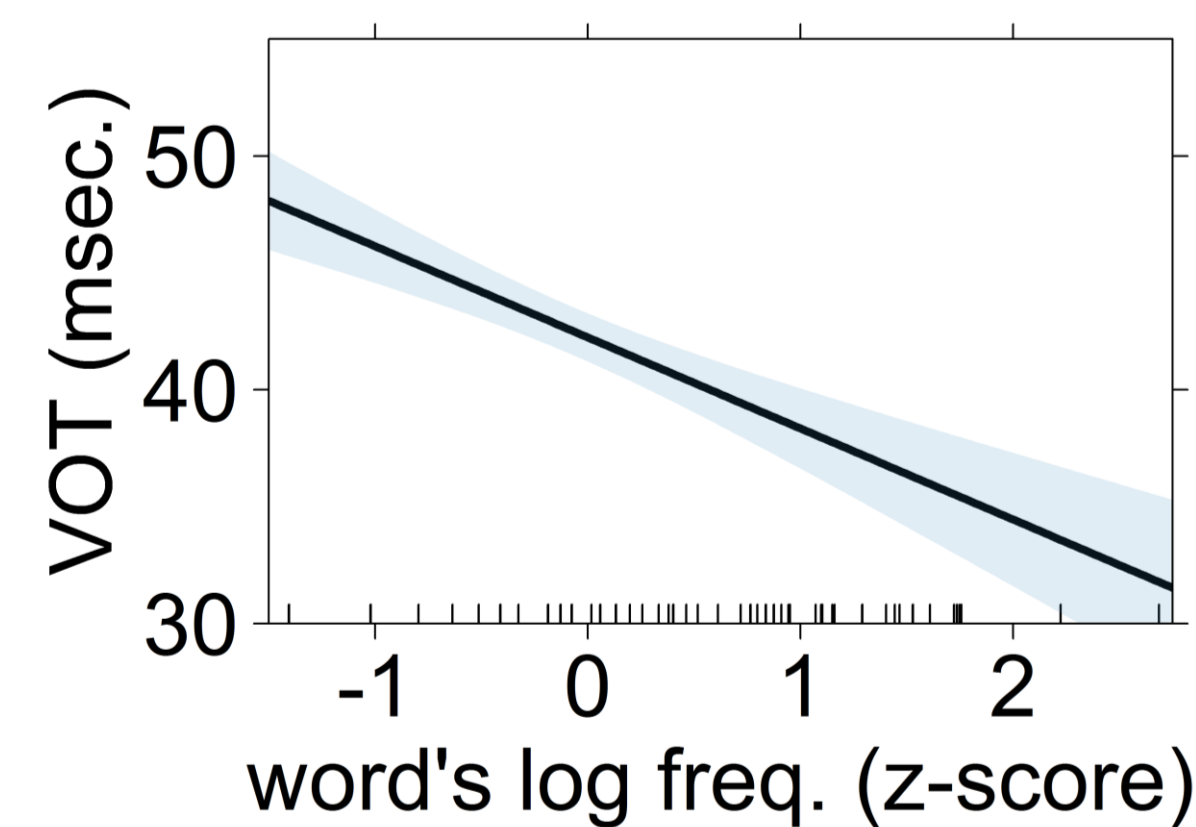


but many words **varied** (*dis[pʰ]leased*, *dis[kʰ]laimers*, *dis[pʰ]osition*)

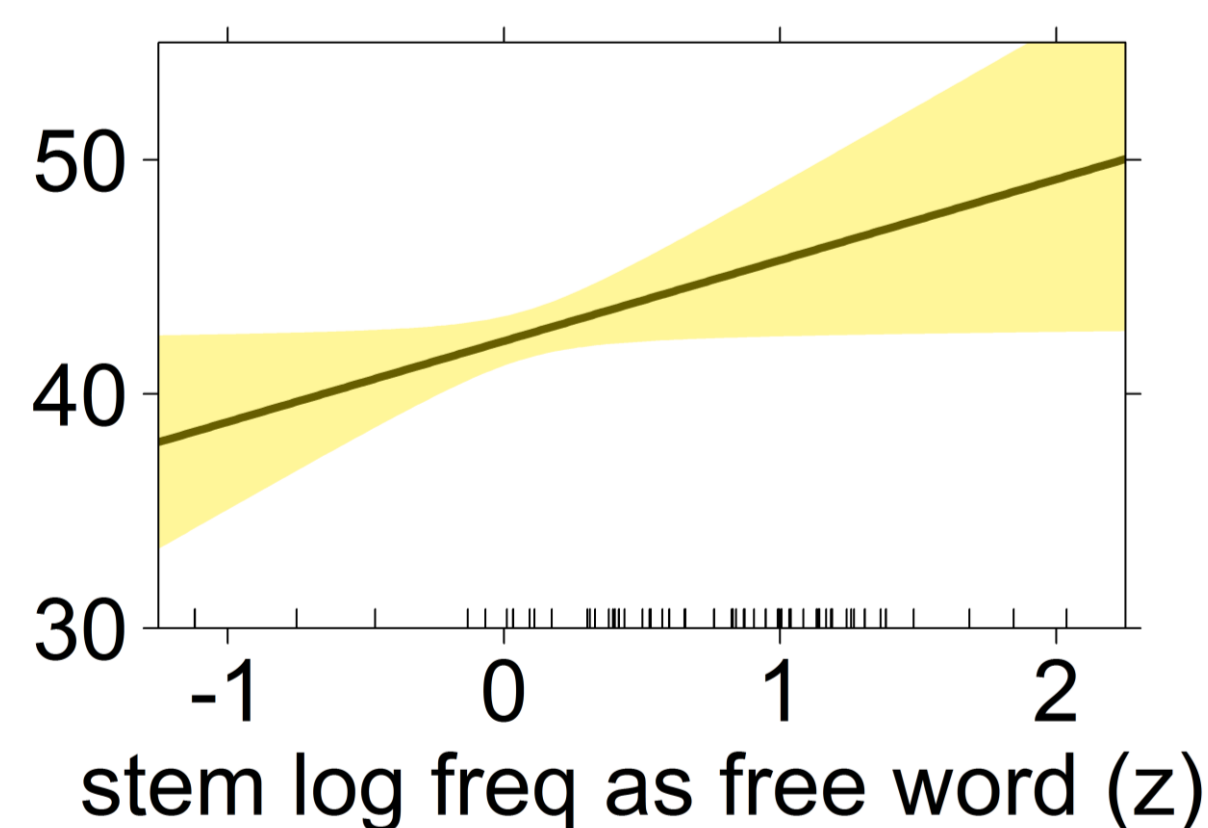
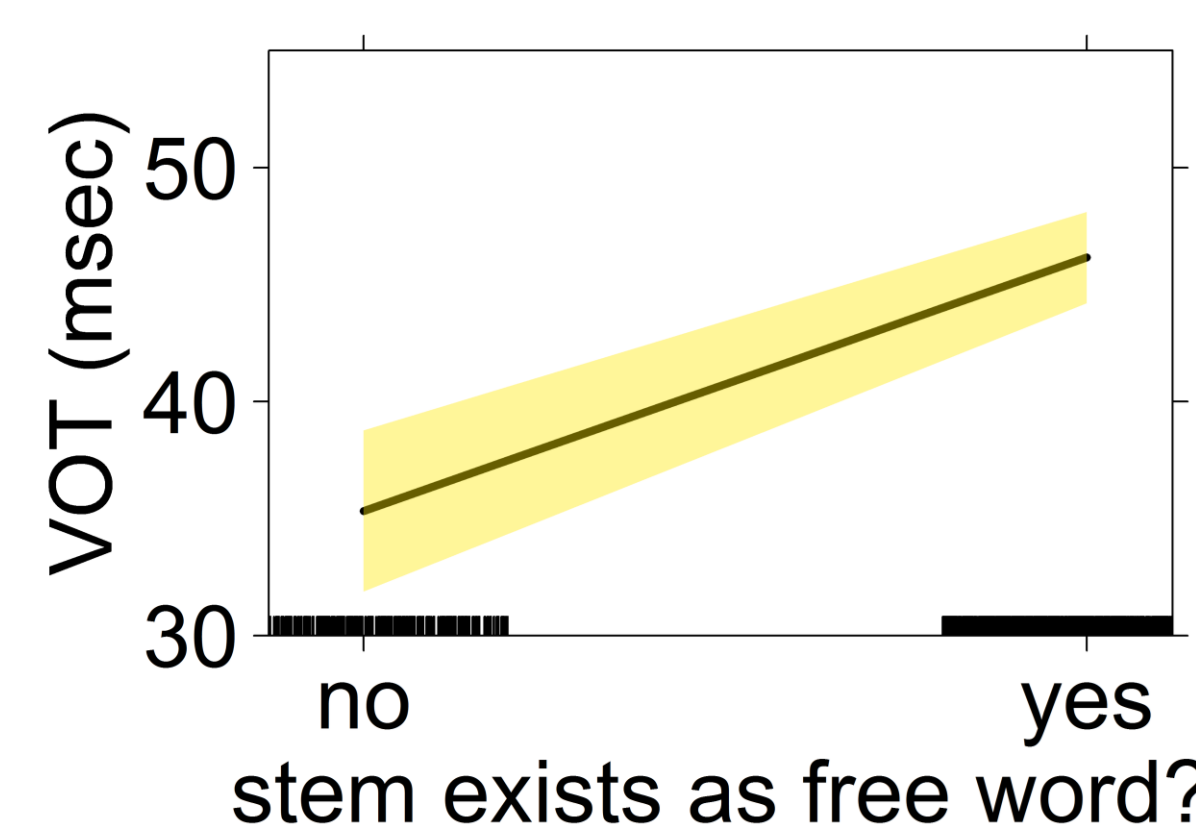
- Aspiration was common even when first syllable of stem unstressed: *mis[kʰ]ondúcted*, *mis[pʰ]ronóunce*, *dis[kʰ]ontínued*, *dis[pʰ]oséssed* → suggests stem-initial consonant is treated as **prosodic-word-initial**

- Both models: **Frequency** conjecture of [5] upheld

Frequent **word** → less aspiration



Frequent, freestanding **stem** → more aspiration



- Consistent with [4, 3]: whole-word representation and prefix+stem representation compete
 - whole word accessed first → syllabified like monomorpheme → /s/ in onset → no aspiration
 - prefix+stem accessed first → stem treated as separate prosodic word [6] → stem-initial aspiration

Details of plots above

- COBUILD frequencies from [1]
- plots show frequency factors that were significant in generalized linear mixed-effects models of both binary judgements and continuous VOT (stem's lemma freq. had smaller, negative effect, in VOT model only)
- partial-effects plots from a VOT model with fixed effects only

Conclusions and further directions

- Many items varied across participants, suggesting intermediate degrees of prefixed-hood → Is there also variation within speakers?
- More prefixed behavior (aspirated) if stem is more frequent, and more whole-word behavior (unaspirated) if whole word is more frequent, supporting [5]'s conjecture: competition between whole-word treatment and prefixed treatment → Is this competition a real-time race in production?
- Priming study underway to address both questions

References

- [1] Baayen, R. H., Piepenbrock, R., van Rijn, H. 1993. The CELEX lexical data base on CD-ROM, Linguistic Data Consortium.
- [2] Baker, R., Smith, R., Hawkins, S. 2007. Phonetic differences between mis- and dis- in English prefixed and pseudo-prefixed words. *Proc. 16th ICPHS Saarbruecken*, 553-556.
- [3] Baroni, M. 2001. The representation of prefixed forms in the Italian lexicon: evidence from the

distribution of intervocalic [s] and [z] in Northern Italian. *Yearbook of Morphology 1999*. Dordrecht: Springer, 121-152.

[4] Hay, J. 2003. *Causes and consequences of word structure*. New York: Routledge.

[5] Smith, R., Baker, R., Hawkins, S. 2012. Phonetic detail that distinguishes prefixed from pseudo-prefixed words. *Journal of Phonetics*, 40, 689-705.

[6] Zuraw, K. 2009. Frequency influences on rule application within and across words. *Proc. Chicago Linguistic Society* 43, 283-309.