

The effect of lexical frequency on vowel phonation as a correlate of /t/-glottaling

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Background

Background

- **/t/-glottaling**

- /t/ is substituted by [ʔ]: *cat* = [k^hæʔ]
- A complex phenomenon (Penney et al. 2018)

- **Manchester English** (Baranowski et al. 2016, Bermúdez-Otero et al. 2016)

- /ʔ/-substitution towards completion
- High-frequency words are ahead but change at the same rate as low-frequency words
- **Support** for abstract storage of lexical forms

Background

- **Exemplar Theory** (Pierrehumbert 2001, Bybee 2004)
 - Representations as clouds of exemplars with rich phonetic detail
 - Lexical frequency effects
- **Prediction**
 - High-frequency words are more exposed to phonetic bias and thus more affected

**Vowels of high-frequency words are more glottalised than
vowels of low-frequency words**

Methods

Methods: stimuli

- Subtlex-UK (Van Heuven et al. 2014)
- Monosyllabic minimal pairs ending in /t/ and /k/
 - Controlling for vowels: /æ/, /ɪ/, /ɔ:/ and /ʌ/
 - 32 words
 - log-frequency between 3.5–5.5
- *Say X again* (sentence medial), *The word is X* (sentence final)

Methods: participants

2 male participants from Manchester ...

... were asked to glottalise **throughout** the experiment

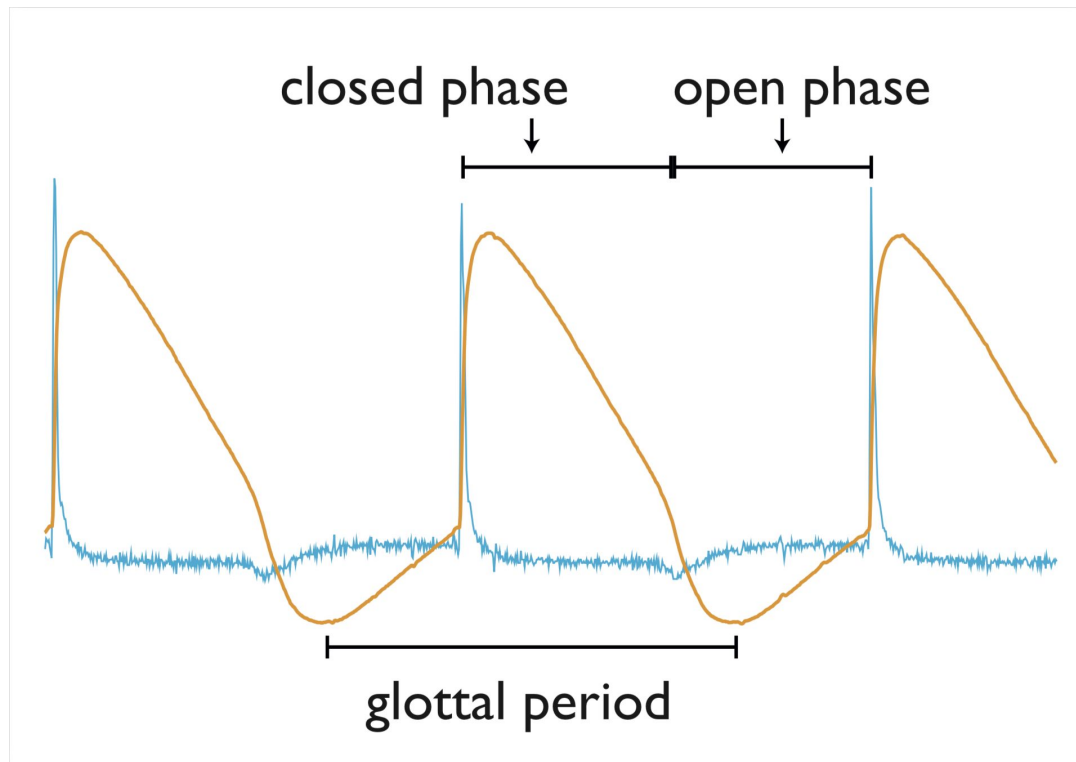
Not considered a bias

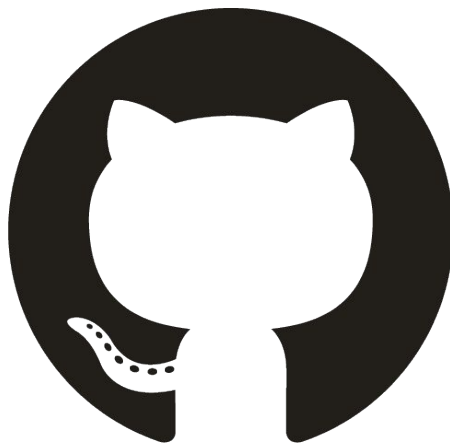
Methods: procedure

- Stimuli presented in **PsychoPy** (Peirce 2009)
- 32 words × 2 sentences × 3 repetitions – randomised order
- Simultaneous electroglottographic (**EGG**, Fabre 1957, Herbst 2014) and **acoustic** data collection
- Generalised Additive Mixed models (Wood 2006, Sóskuthy 2017)

Methods: procedure

Contact Quotient (CQ) = ratio of closed phase relative to glottal period.





The *research compendium* of this study (data + code)

is available on GitHub at

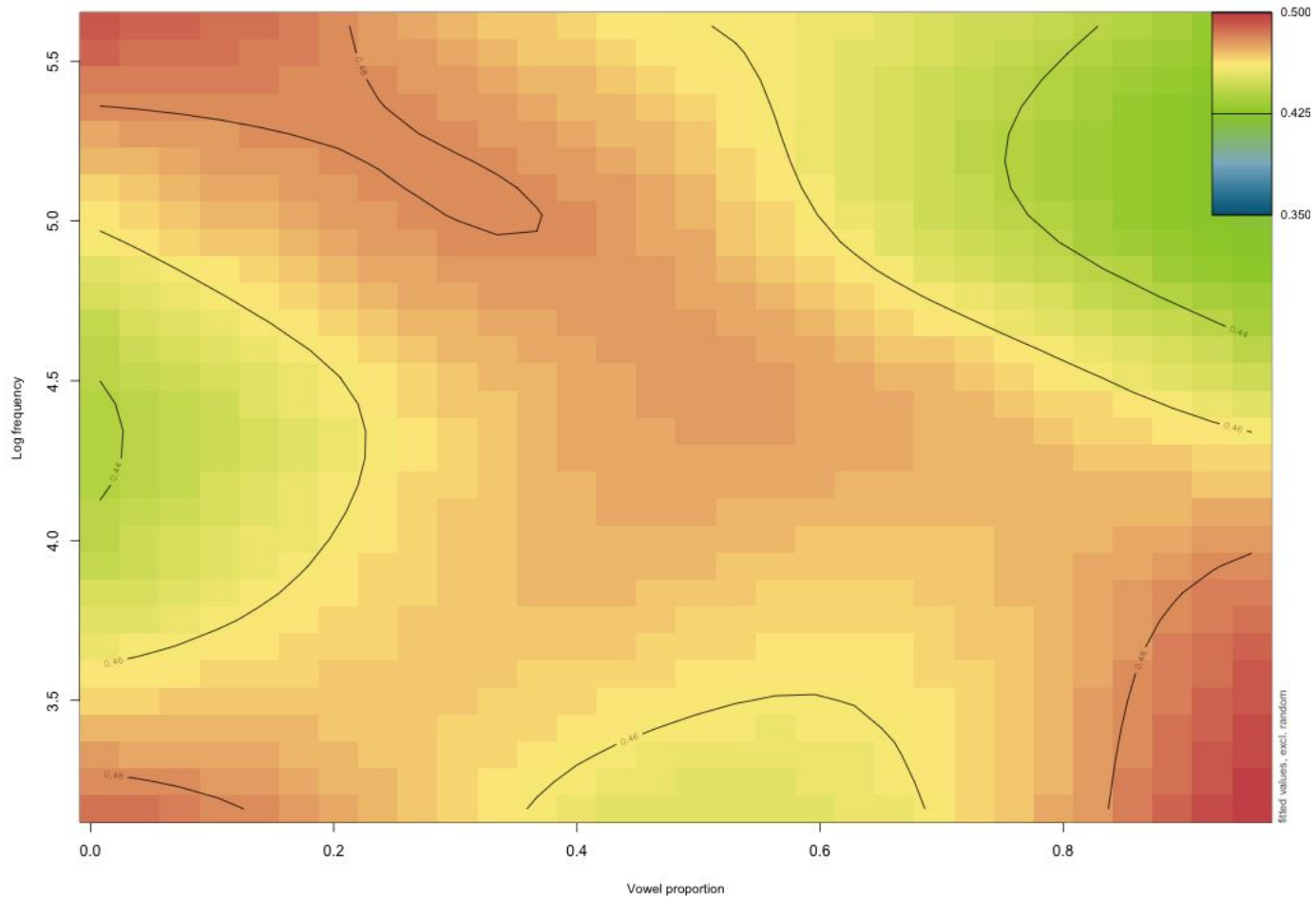
[stefanocoretta/2018-lagb](https://github.com/stefanocoretta/2018-lagb)

Results

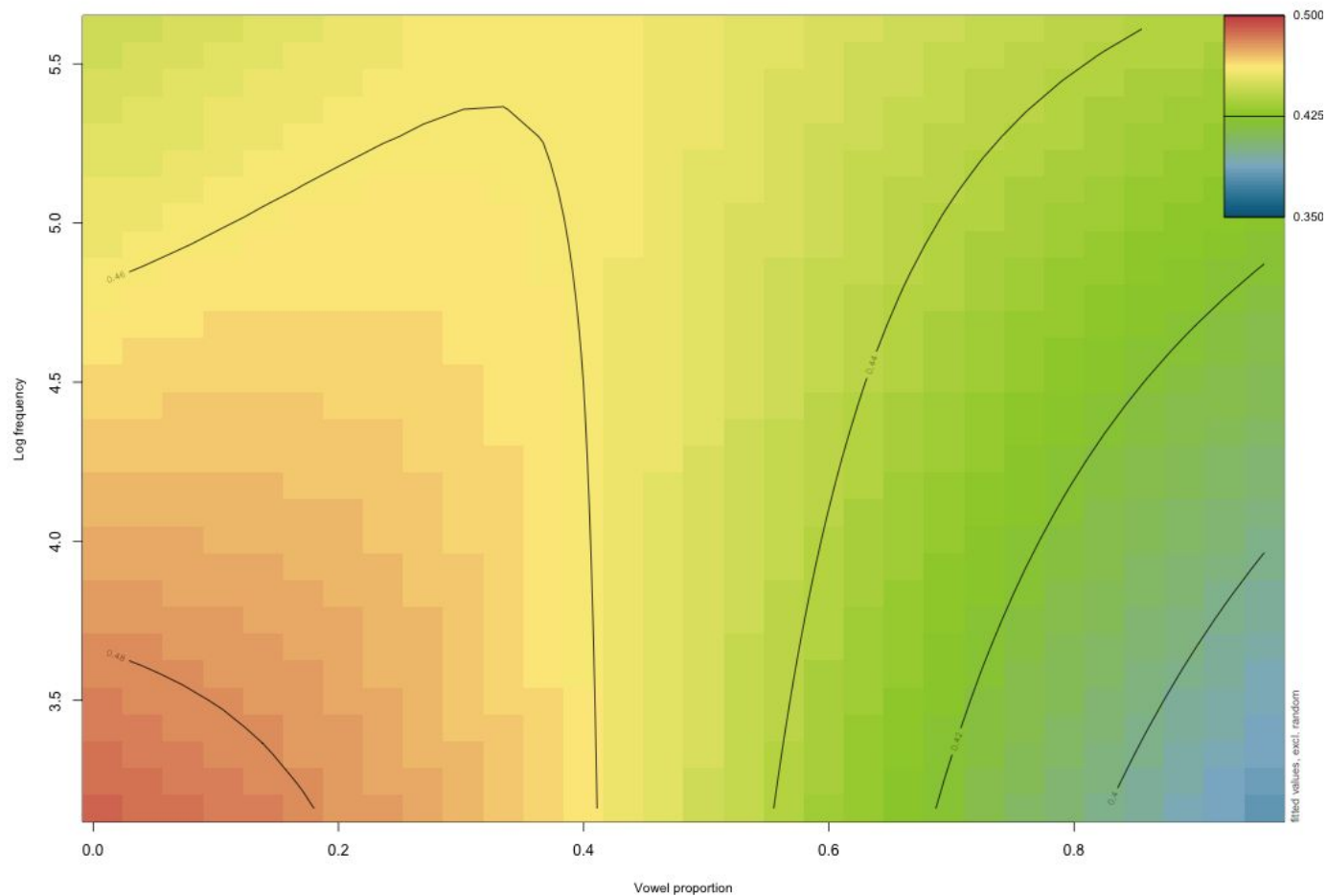
Our simple prediction is not born out.

Instead, there is a complex relationship between lexical frequency and context.

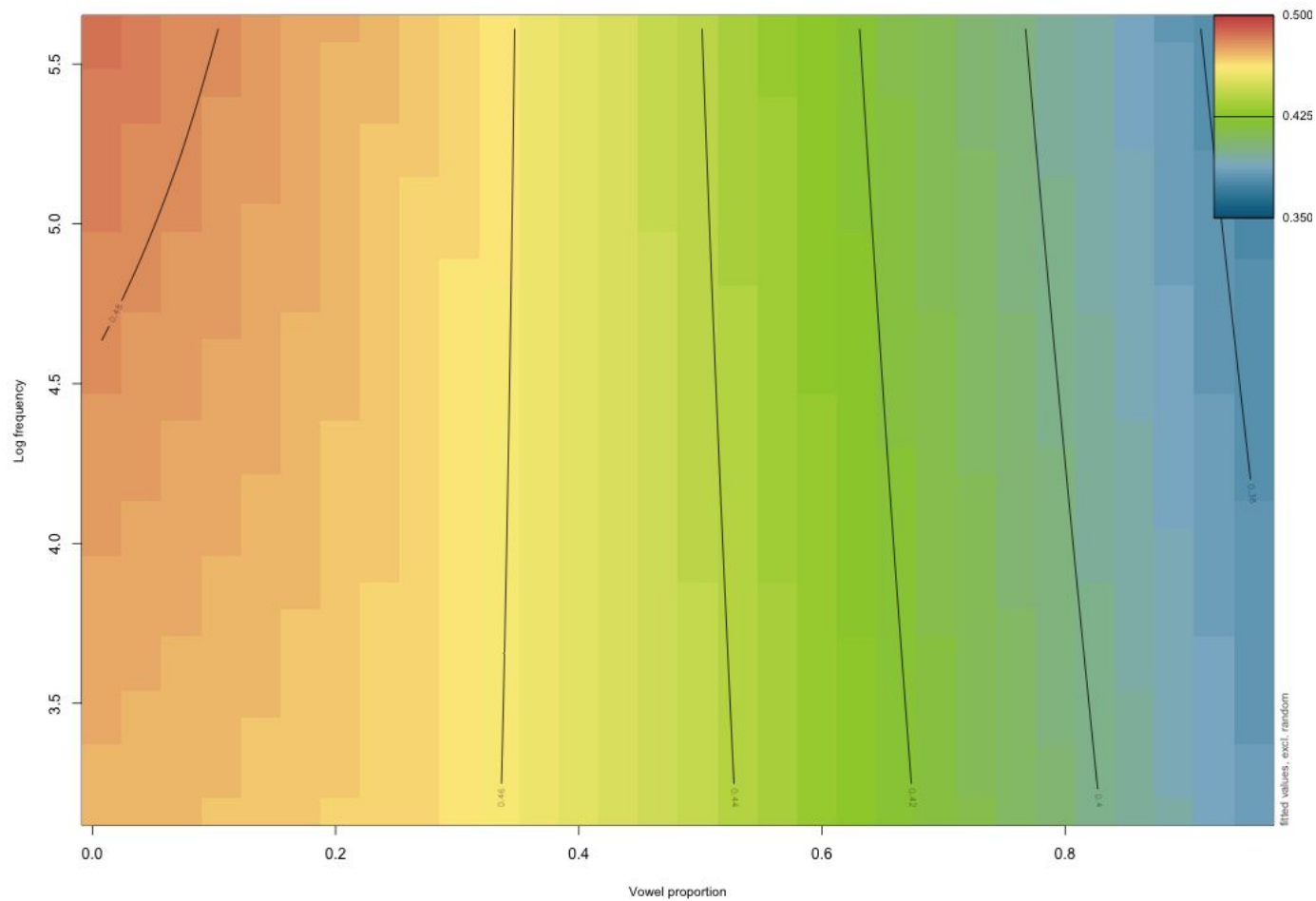
CQ in vowel tokens preceding sentence medial /t/



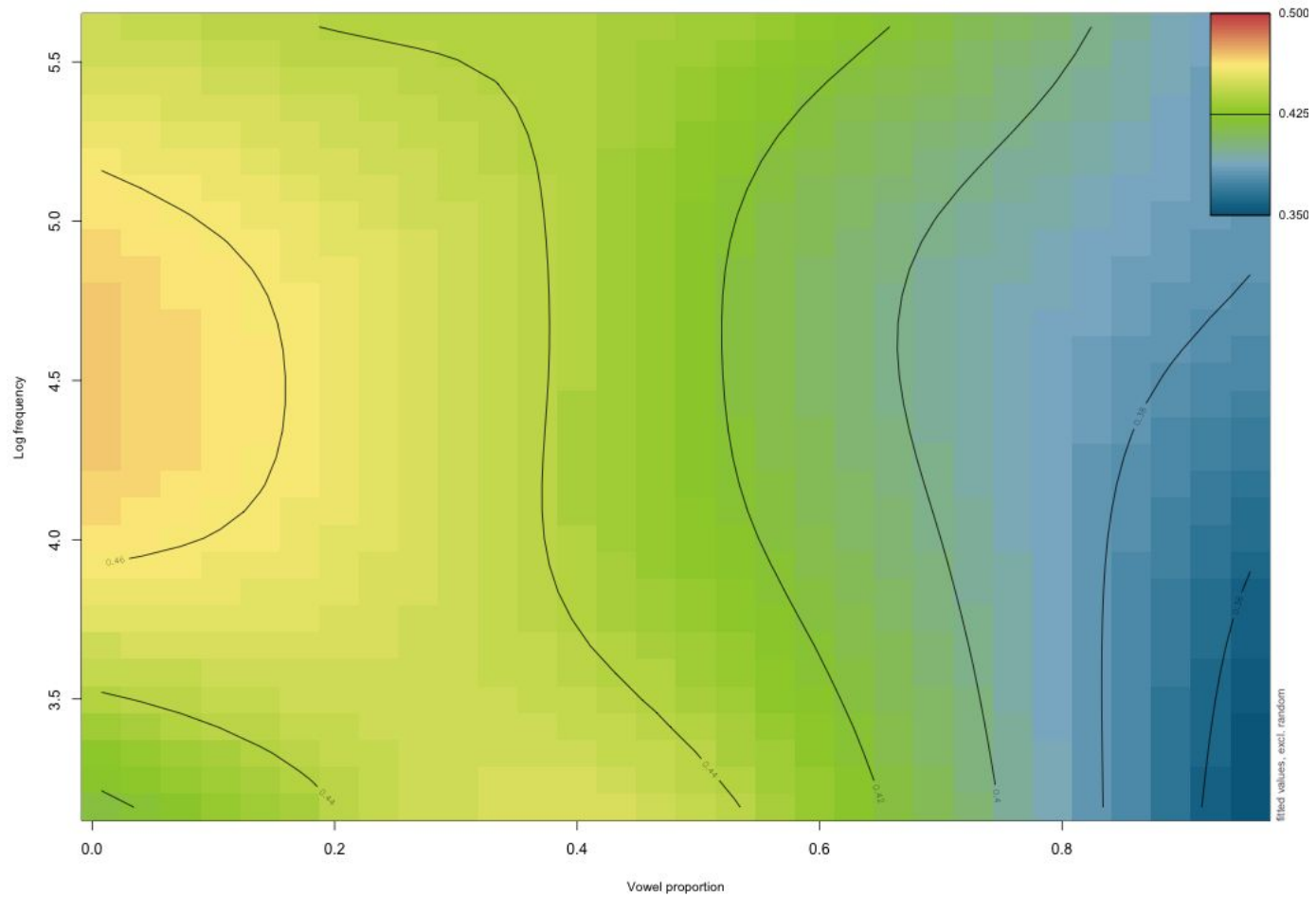
CQ in vowel tokens preceding sentence medial /k/



CQ in vowel tokens preceding sentence final /t/



CQ in vowel tokens preceding sentence final /k/



Discussion

Consequences for Manchester /t/-glottaling

- if change is at **completion**, sentence-final glottal spreading
 - sentence-final /t/-words have lower CQ than sentence-medial /t/-words (more spreading)
 - sentence-final high frequency /t/-words have lower CQ than low frequency /t/-words

Consequences for Manchester /t/-glottaling

- if change is **not completed**, maybe low frequency words lead (Hay et al. 2015)
 - sentence-medial low frequency /t/-words have a higher and increasing CQ (more glottalisation)
 - sentence-final low frequency /t/-words have later decrease of CQ (more glottalisation)
- glottalisation from voiceless codas in American English (Garellek 2011)
 - *more confusable words have more glottalisation*

Consequences for glottalisation

- creaky voice
 - +sg and +cg are compatible (non-constricted creaky voice, Keating et al. 2015)
 - creaky voice as tense vocal folds?
- gestural timing and competition
 - sentence-final spreading and low frequency
 - tense folds are compatible with spreading, but hinder it

Open issues

- Issues with CQ
 - imperfect approximation (Coretta 2018a, Coretta 2018b)
 - not a good measure of glottalisation
- Disentangle online processing from diachrony
- /k/-words, more speakers

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Questions
