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SPeECH ACross DIALECTS of ENGLISH

The fate of the Scottish Vowel Length Rule in contemporary Scottish English

**Jane Stuart-Smith*, Rachel Macdonald*,
& the SPADE Consortium~**

**Glasgow University Laboratory of Phonetics (GULP)*
<https://spade.glasgow.ac.uk/the-spade-consortium/>

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Vowel duration patterning in English

- most varieties of English show **Voicing Effect**
- vowels are short before voiceless obstruents, and long before voiced obstruents, also nasals, liquids

	SHORT	LONG	LONG
English English	<i>beat</i>	<i>bead</i>	<i>bees</i>

The Scottish Vowel Length Rule (SVLR)

- vowels are short except
 - before /r/, e.g. *beer*
 - before voiced fricatives, e.g. *please, breathe*
 - before morpheme boundary, e.g. *bees*

	SHORT	SHORT	LONG
Scottish English:	<i>beat</i>	<i>bead</i>	<i>bees</i>
	SHORT	LONG	LONG
English English	<i>beat</i>	<i>bead</i>	<i>bees</i>

(e.g. Aitken, 1981/2015; Scobbie et al 1999)

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English English	<i>beat</i>	<i>bead</i>	<i>bees</i>

(e.g. Aitken, 1981/2015; Scobbie et al 1999)

The Scottish Vowel Length Rule (SVLR)

- continues earlier historical process in Scots, which appears to be receding
- contact with Anglo-English linked with SVLR weakening towards Voicing Effect in Edinburgh (Hewlett, Matthews & Scobbie, 1999)
- real-time SVLR weakening in Glasgow, especially in strong prosodic position (e.g. Rathcke & Stuart-Smith, 2016)

SVLR: which vowels in which dialects?

- no alternation for KIT and STRUT for all dialects (Aitken, 1981, 2015; Scobbie et al 1999)
- differences in SVLR in North East (Warren, 2018; Watt and Yurkova 2007)
- SVLR now only in FLEECE, BOOT and PRICE/PRIZE for Standard Scottish English and Scottish Central Belt (Scobbie et al, 1999)
- possible SVLR in Glasgow for FACE and GOAT in early 20th Century (Stuart-Smith et al 2017)

Research questions

- Which vowels show SVLR in Scottish English?
- How is the SVLR influenced by social factors such as gender and social class?
- How has the use of the SVLR changed over time in Scottish English?

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Speech Across Dialects of English

August 2017 – July 2020

<http://spade.glasgow.ac.uk/>



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SPADE

Highlands, Islands and Insular

SCOTS 15 (10F)
5,843 tokens

Northern

1 Speaker 2 Dialects, SCOTS
49 (26F) 105,692 tokens

Glasgow

Sounds of the City,
Brains in Dialogue
SCOTS

177 (88F) 152,364 tokens

South

SCOTS

17 (6F)

13,860 tokens

Edinburgh/Standard Scottish English

SCOTS, Edinburgh,
Doubletalk

85 (41F) 41,418 tokens

Scottish English with
no diversity yet by
ethnicity

343 speakers

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Edinburgh/Standard Scottish English

SCOTS, Edinburgh,
Doubletalk

85 (41F) 41,418 tokens

timespan: decade of Birth
from 1890 to 1990

343 speakers

Vowels analysed

- FLEECE KIT FACE DRESS CAT COT STRUT
GOAT BOOT /i ɪ e ε a ɔ ʌ o ʊ/
- all monosyllables

Data analysis using Integrated Speech Corpus Analysis (ISCAN)

- each audio corpus (soundfiles + time-aligned transcripts) imported into ISCAN (McAuliffe et al 2019)
<https://spade.glasgow.ac.uk/software/>
 - vowel durations automatically extracted
 - removed vowels with durations
 - < 49ms (likely to be reduced, e,g, Dodsworth, 2013)
 - > 2000ms (likely erroneous) durations
- => 319,177 tokens

Predictions for SVLR by vowel

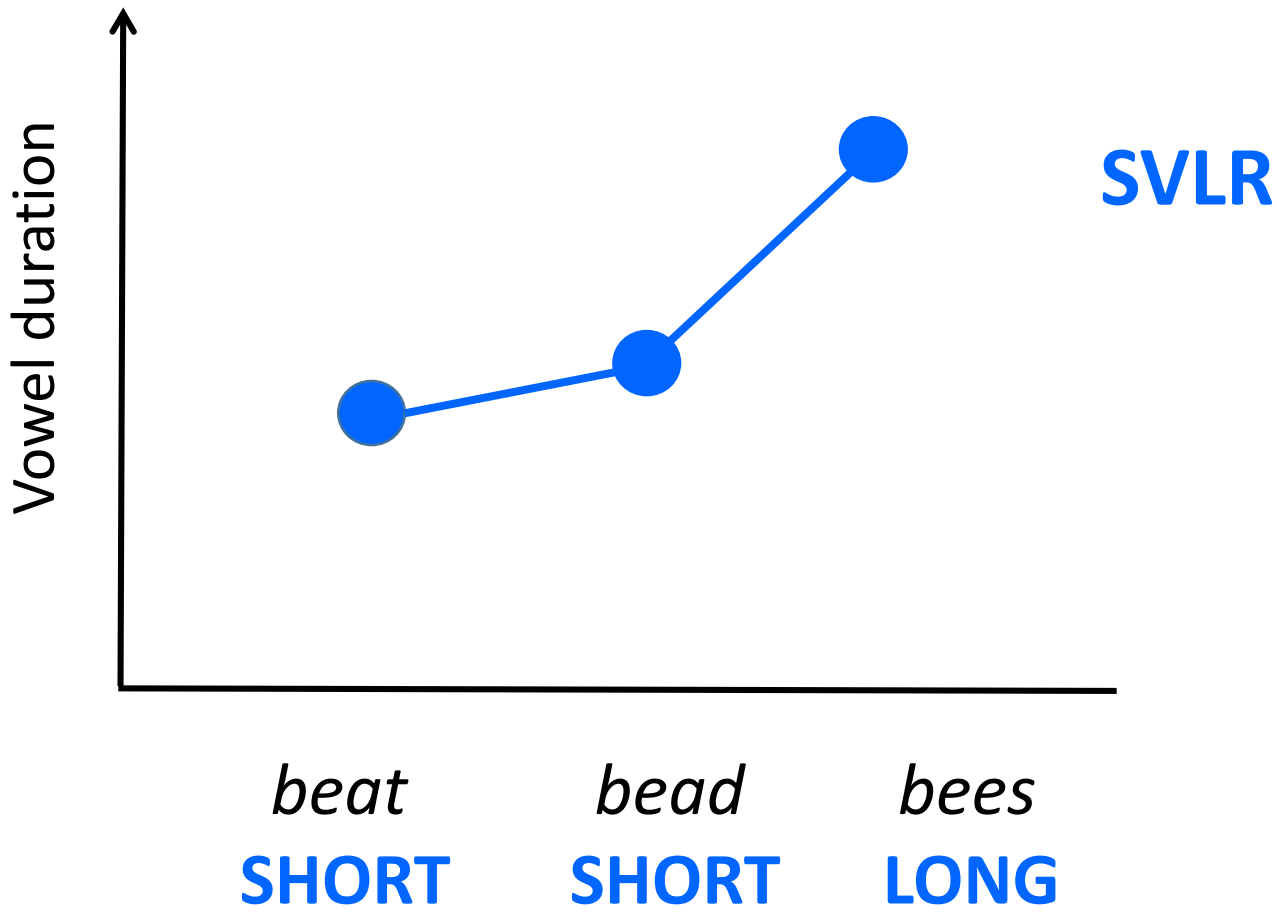
- **KIT, DRESS, STRUT:** unlikely to show SVLR
- **CAT, COT:** unlikely to show SVLR in most dialects
- **FACE, GOAT:** might show SVLR in some dialects
- **FLEECE, BOOT:** likely to show SVLR in Central Belt, perhaps all dialects

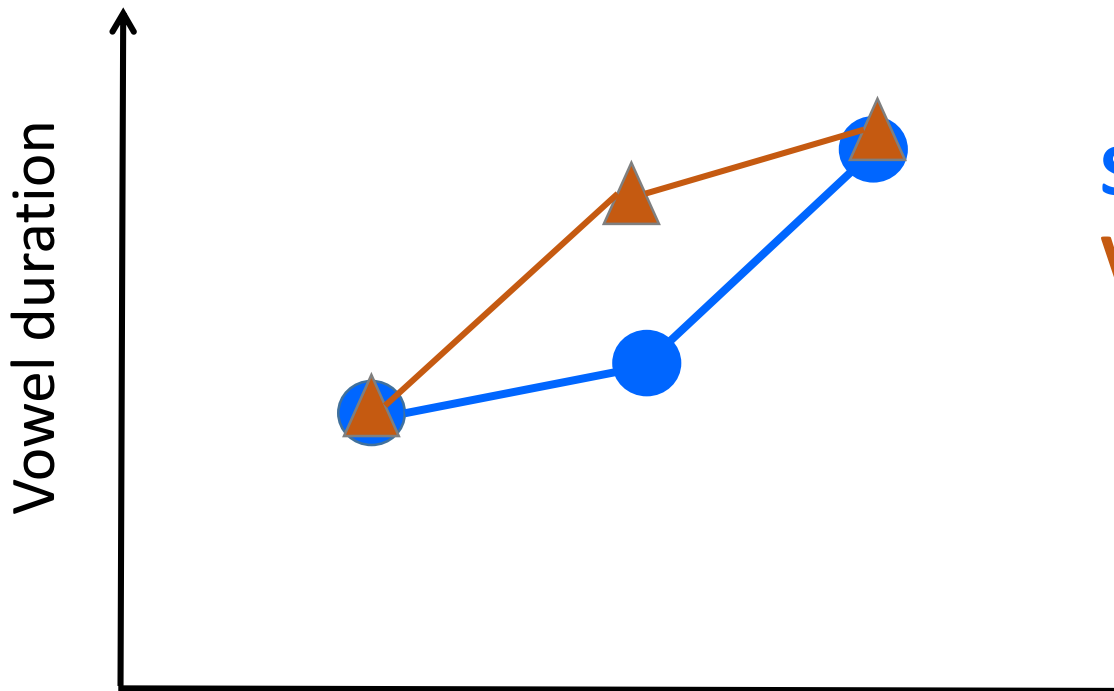
Linear mixed effects modelling of **log vowel duration** in R

Fixed factors

- Vowel, following Context
- (log) speech Rate deviation, phrase position, (log) word frequency (Subtlex-UK)
- Gender, Time (birth Decade)
- all possible interactions

Random intercepts: Word, Speaker
(slopes did not converge)





SVLR
Voicing Effect

beat *bead* *bees*
SHORT **SHORT** **LONG**
SHORT **LONG** **LONG**

Results



Results – sanity check!

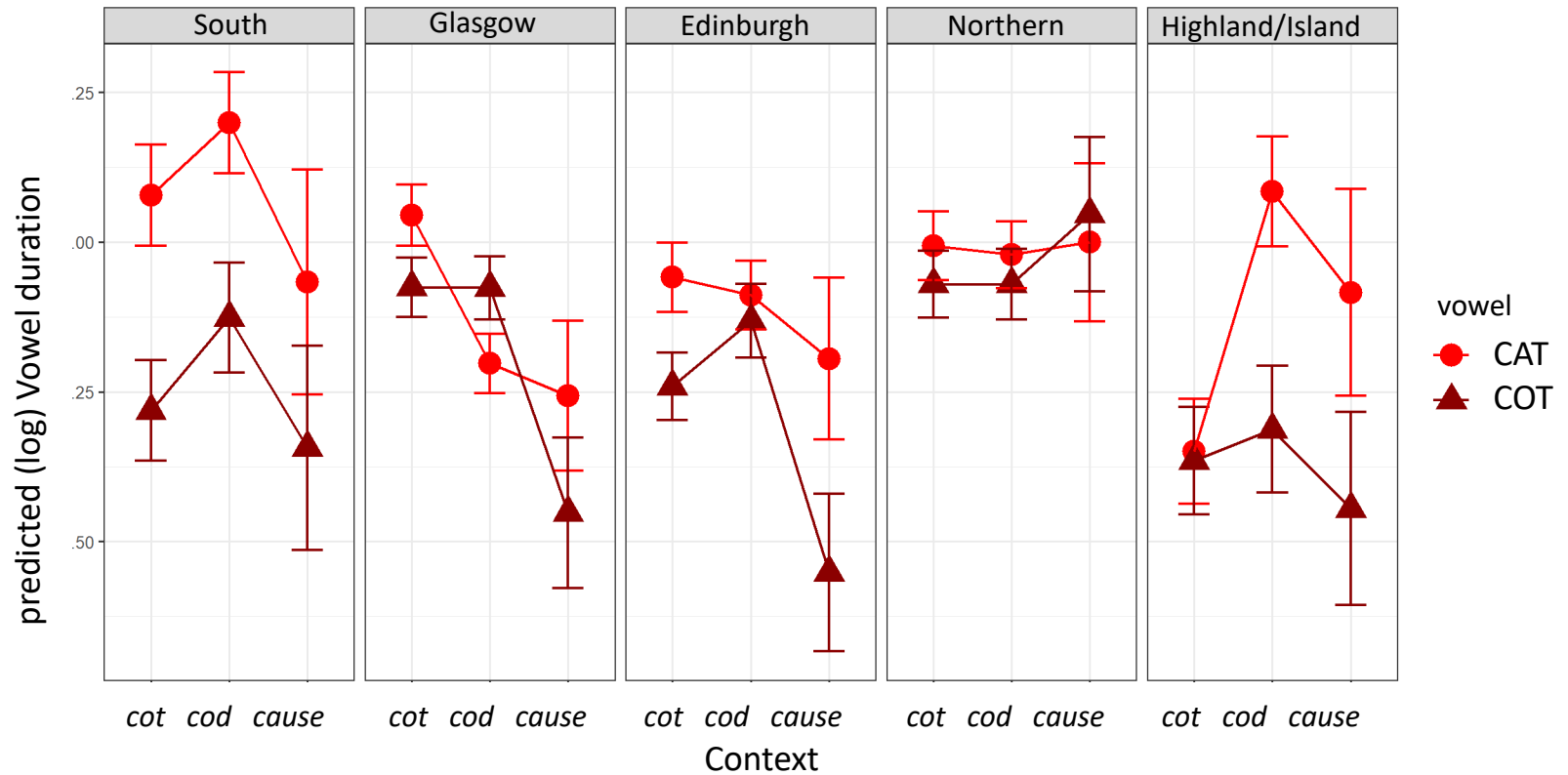
Vowels are:

- shorter at faster speech rates
- shorter in more frequent words
- longer in utterance-final position

No SVLR or Voicing Effect for **KIT DRESS STRUT**

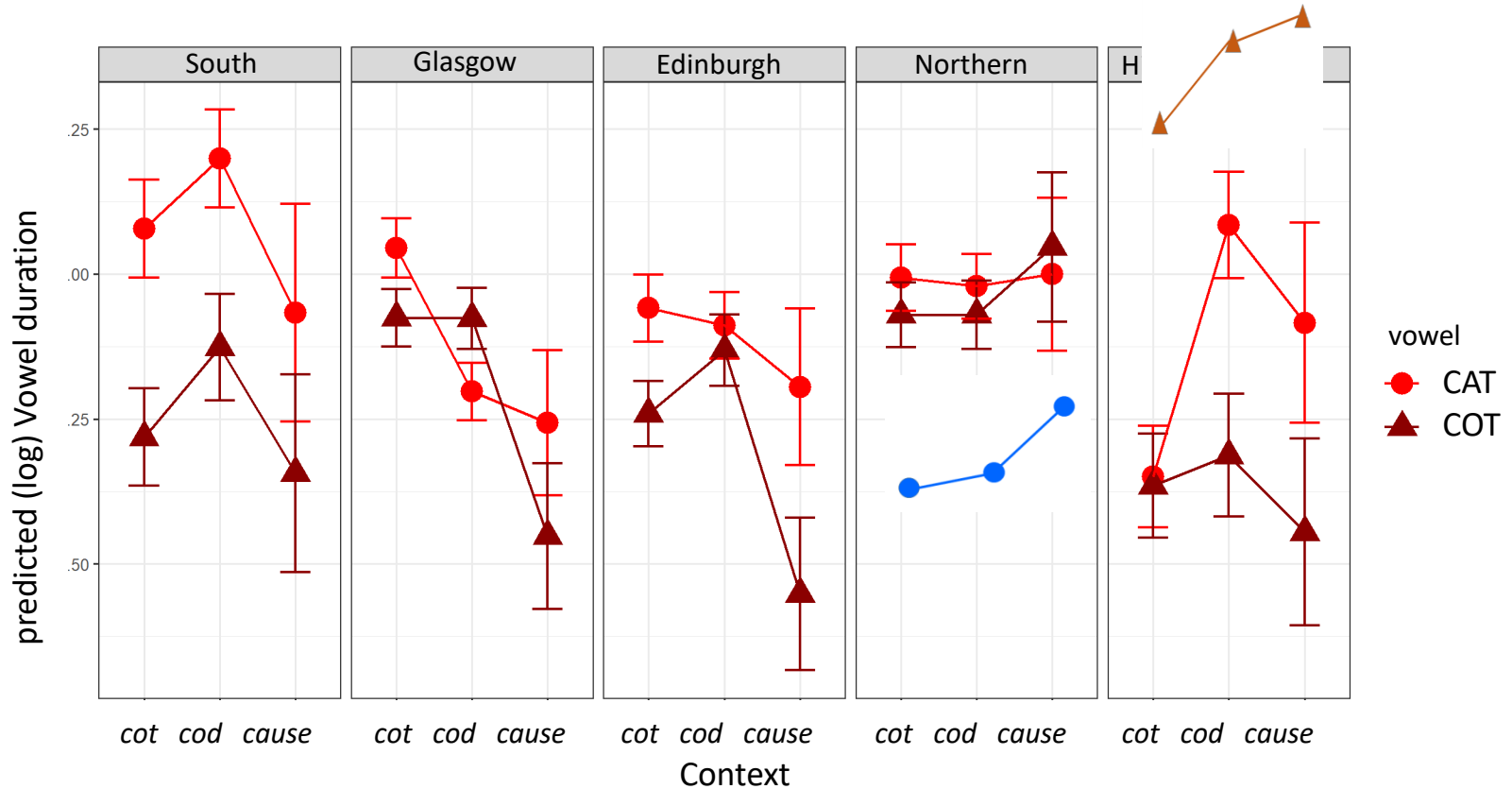
CAT, COT

N = 116,776



CAT, COT

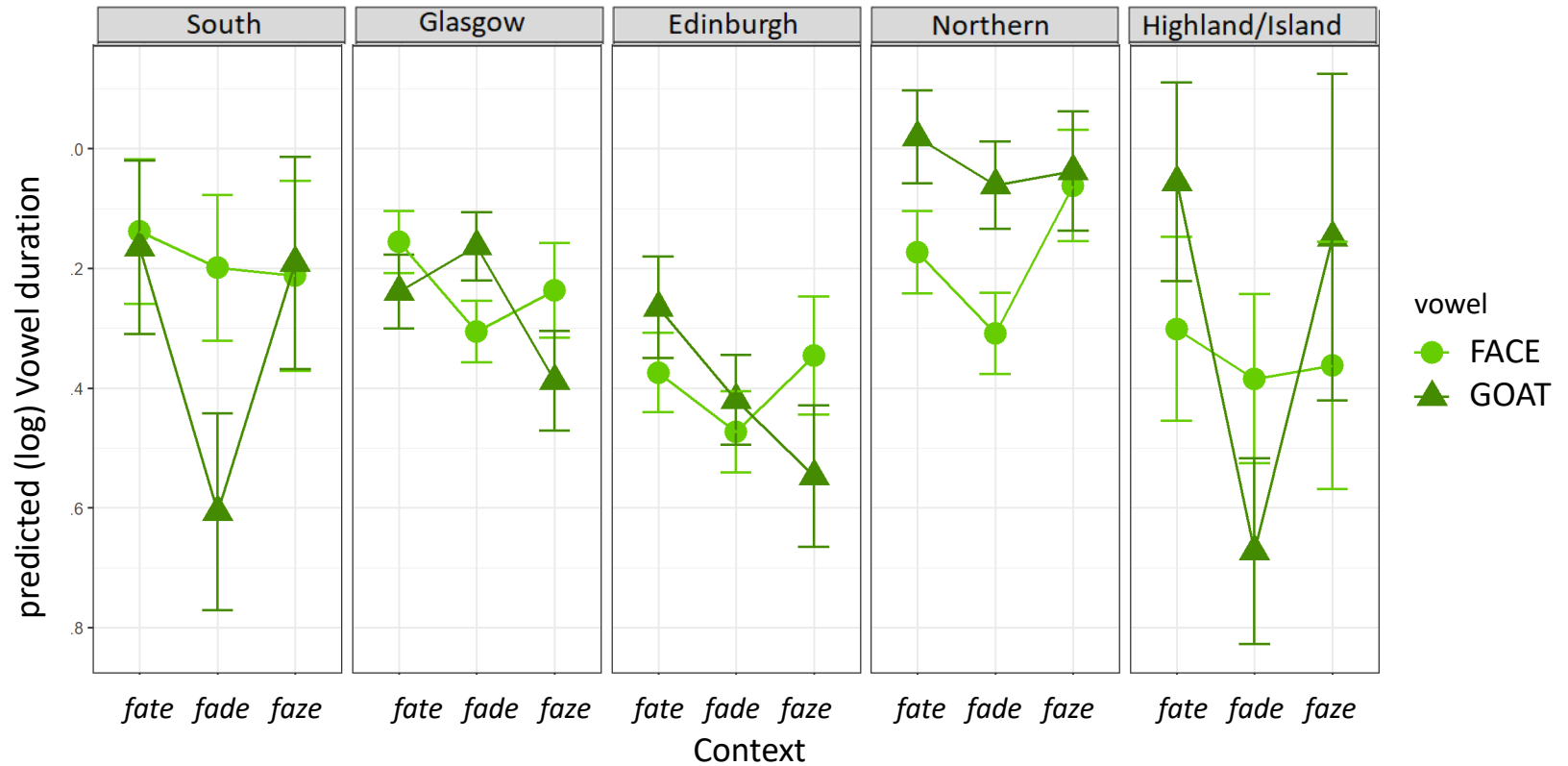
N = 116,776



- SVLR only for COT for Northern
- Voicing Effect only for CAT for Highland-Island-Insular

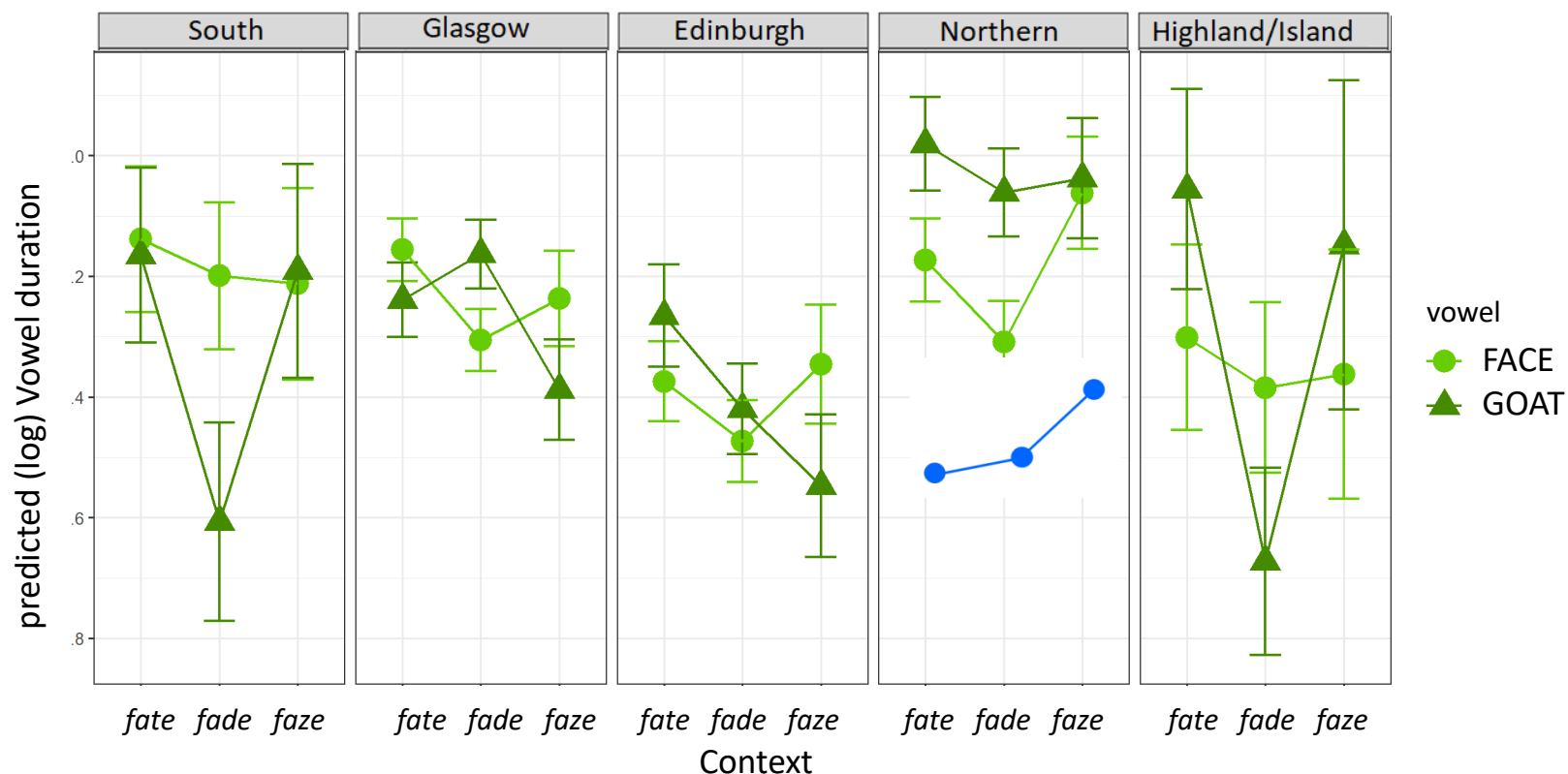
FACE GOAT

N = 30,968



FACE GOAT

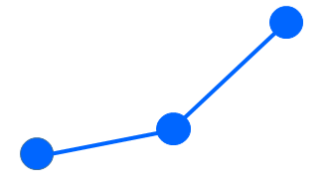
N = 30,968



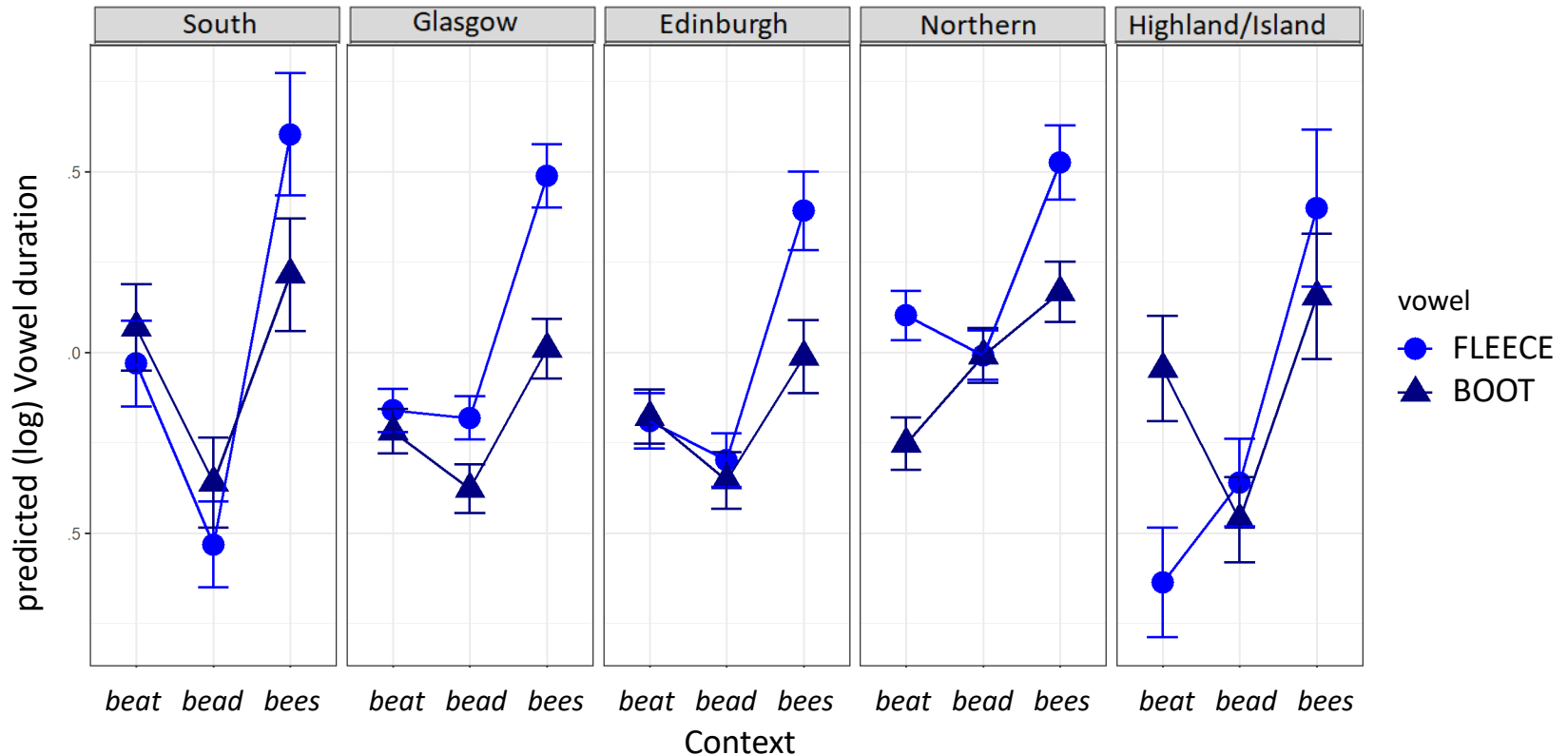
- SVLR only for FACE for Northern dialects
- 'anti-Voicing Effect' visible in both vowels



FLEECE BOOT



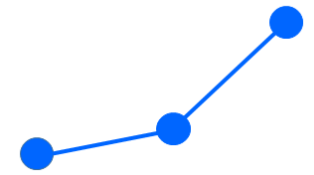
N = 33,679



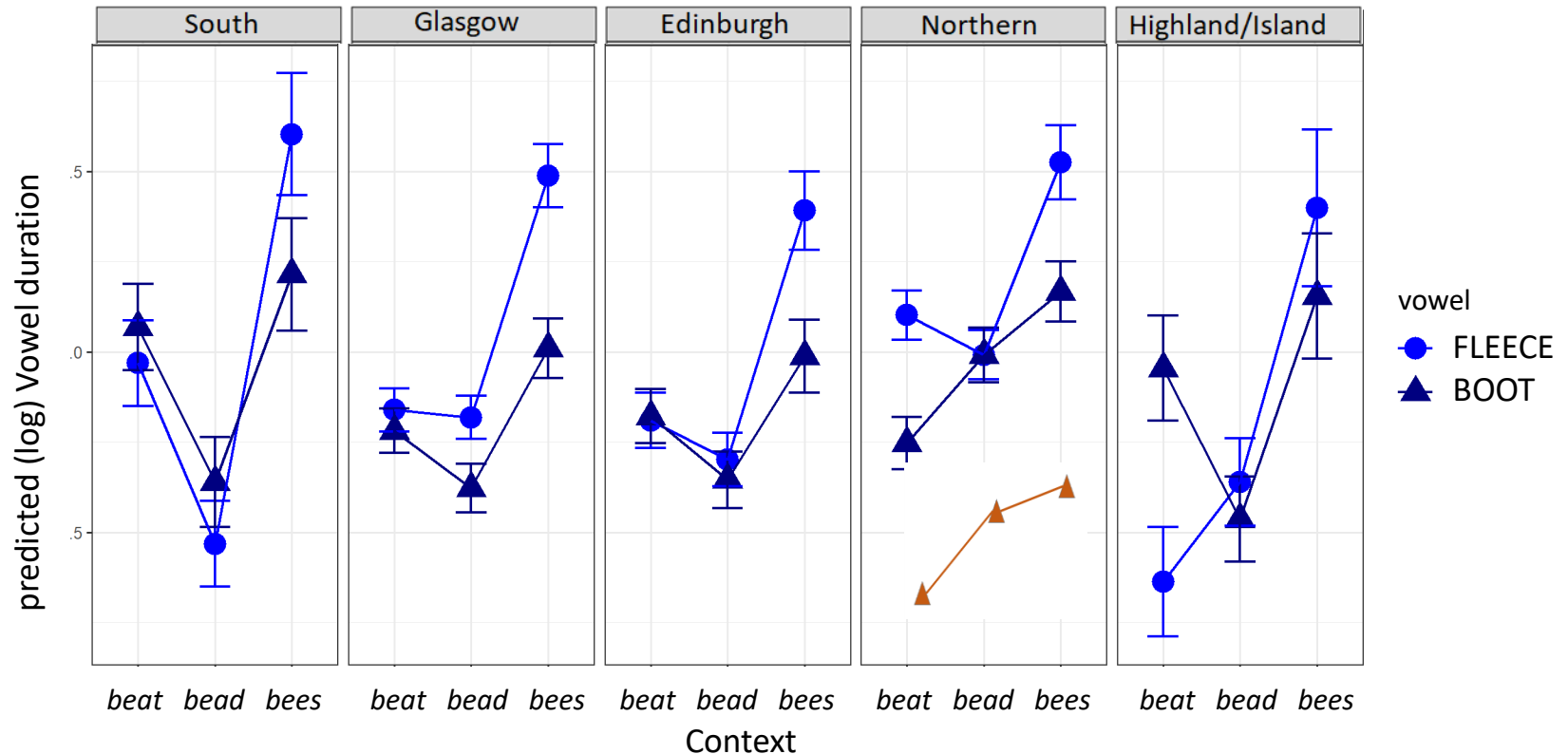
- SVLR – *bees* always longer than *beat/bead*
- ‘anti-Voicing Effect’ – *bead* shorter than *beat*



FLEECE BOOT



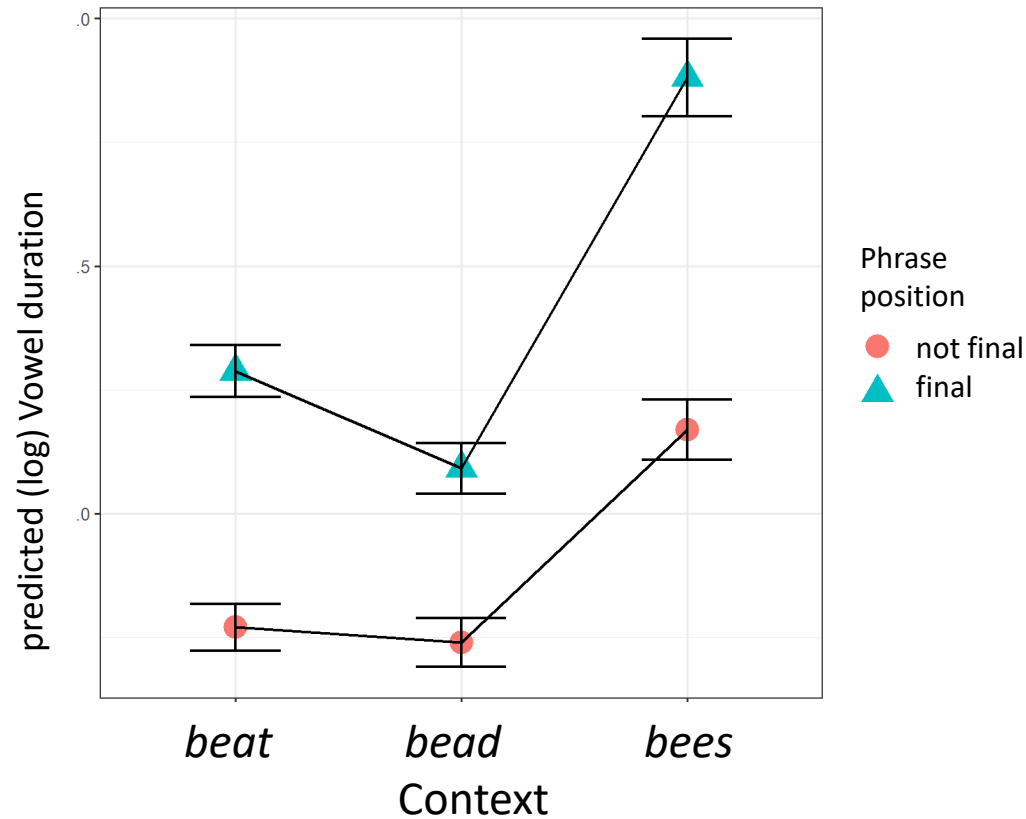
N = 33,679



- SVLR – *bees* always longer than *beat/bead*
- ‘anti-Voicing Effect’ – *bead* shorter than *beat*
- Voicing Effect only in BOOT (Northern)



SVLR and prosodic factors (**FLEECE**, **BOOT**)

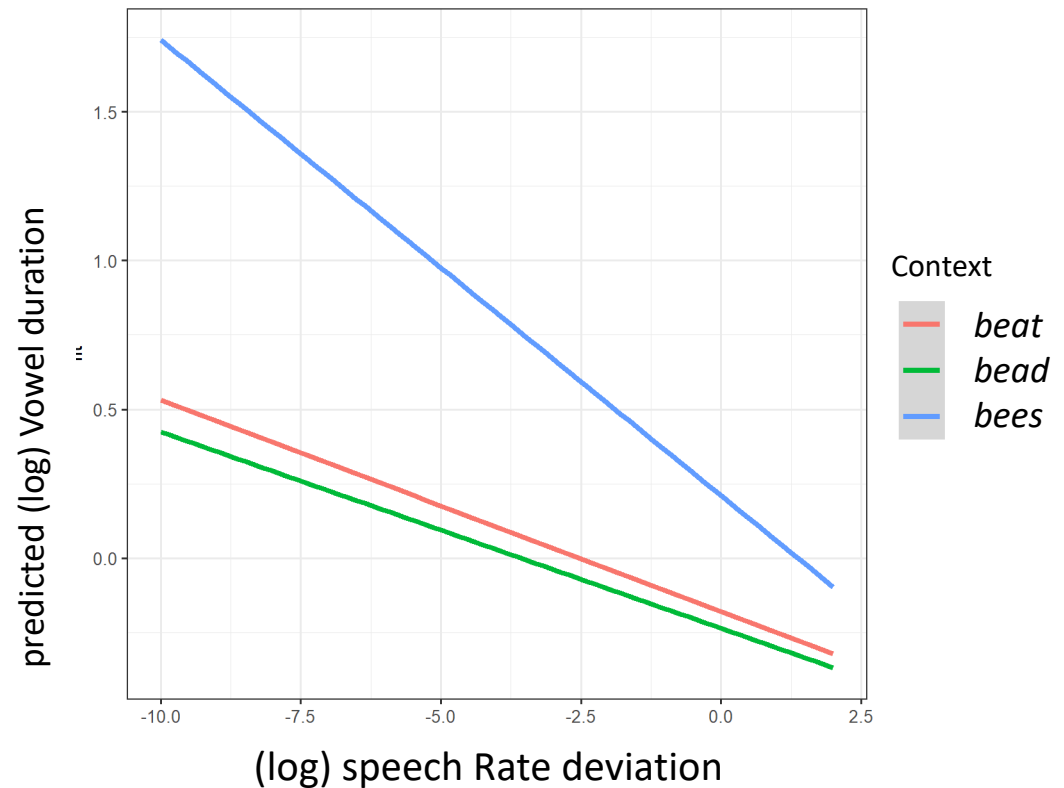


SVLR lengthening
more extreme in
phrase-final position

N = 33,679

SVLR and prosodic factors (**FLEECE, BOOT**)

SVLR patterning retained despite increased speech rate



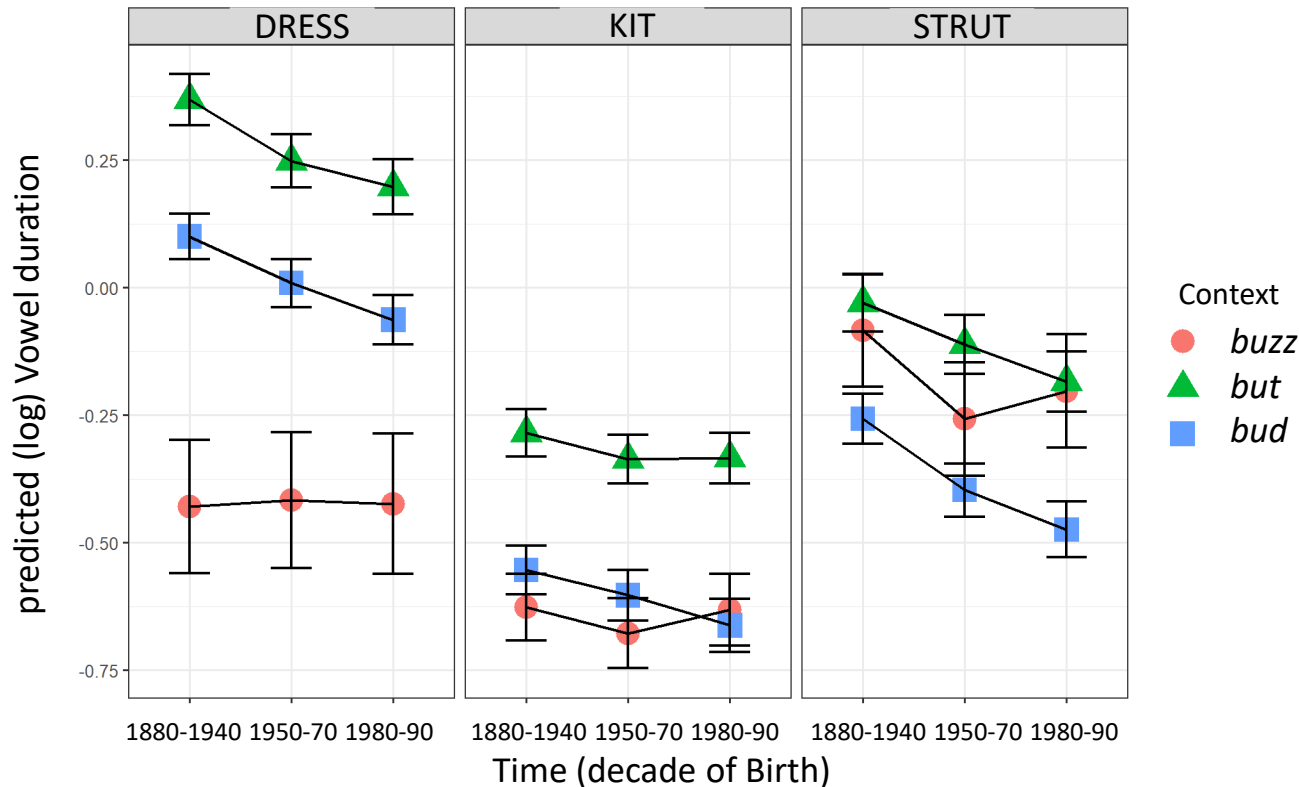
N = 33,679

Social factors

- no clear effect of **gender** on patterning of vowel duration for any vowel
- **social class** captured in **Edinburgh** dialect, who are mostly Standard Scottish English speakers
- no evidence of difference in SVLR in these speakers

SVLR and time e.g. KIT, STRUT, DRESS

N = 137,754

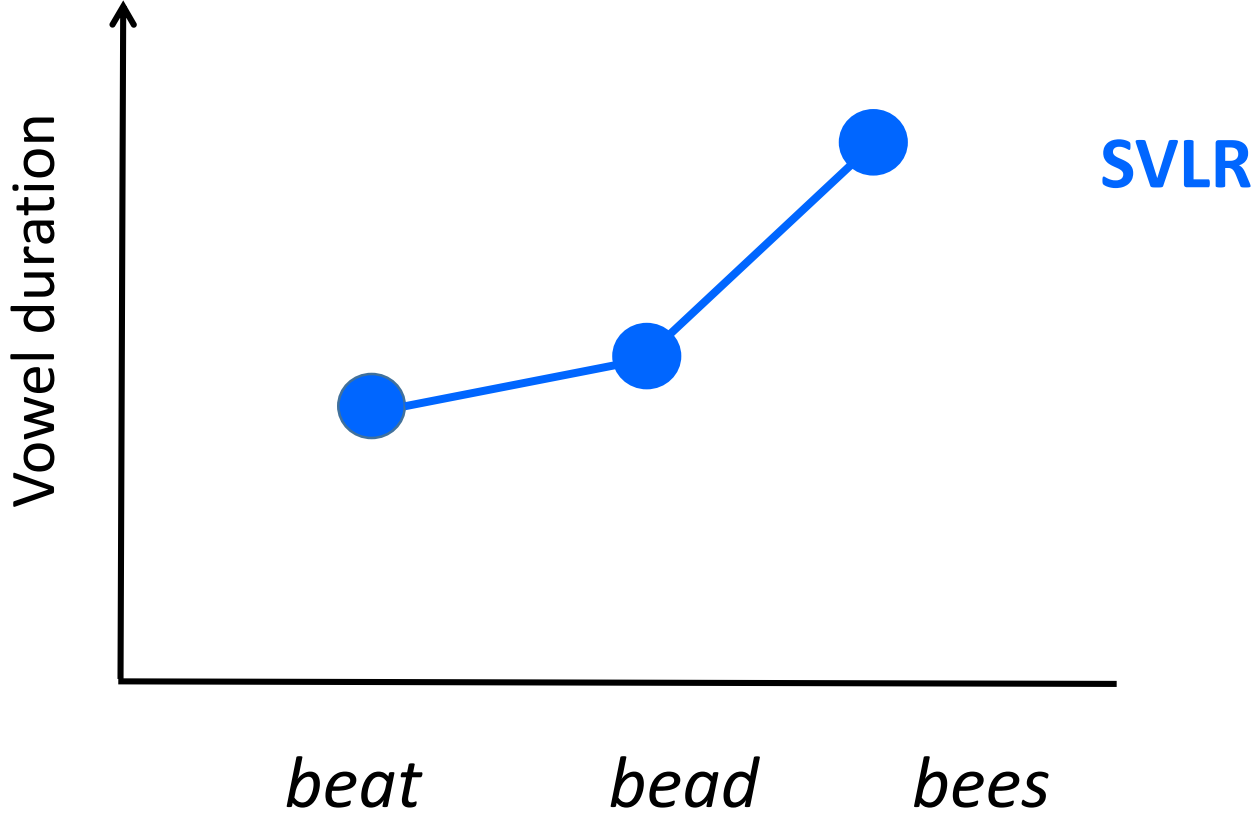


- no evidence for weakening of SVLR over time
- real-time shortening, moderated by vowel and dialect

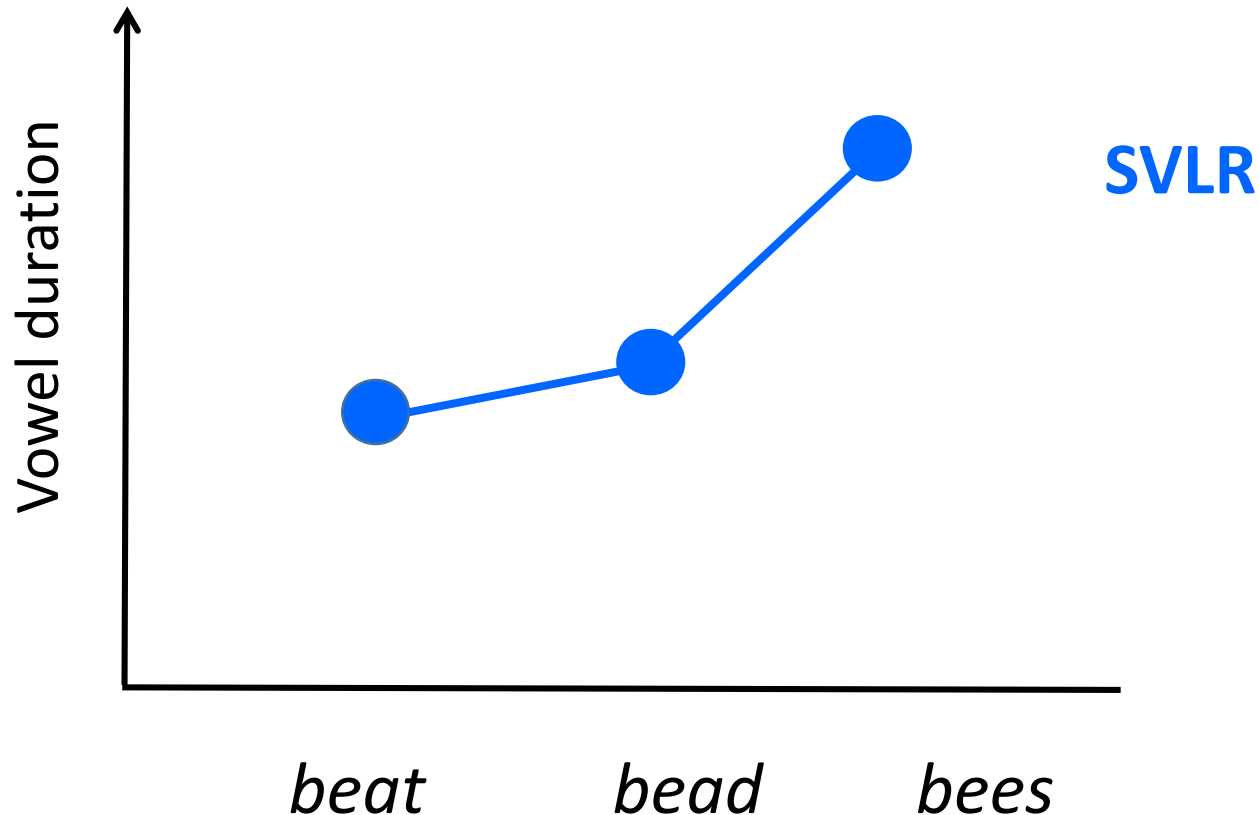
Discussion



- SVLR in FLEECE, BOOT confirming Scobbie et al 1999 (and in FACE and COT in North East; cf Warren 2018)

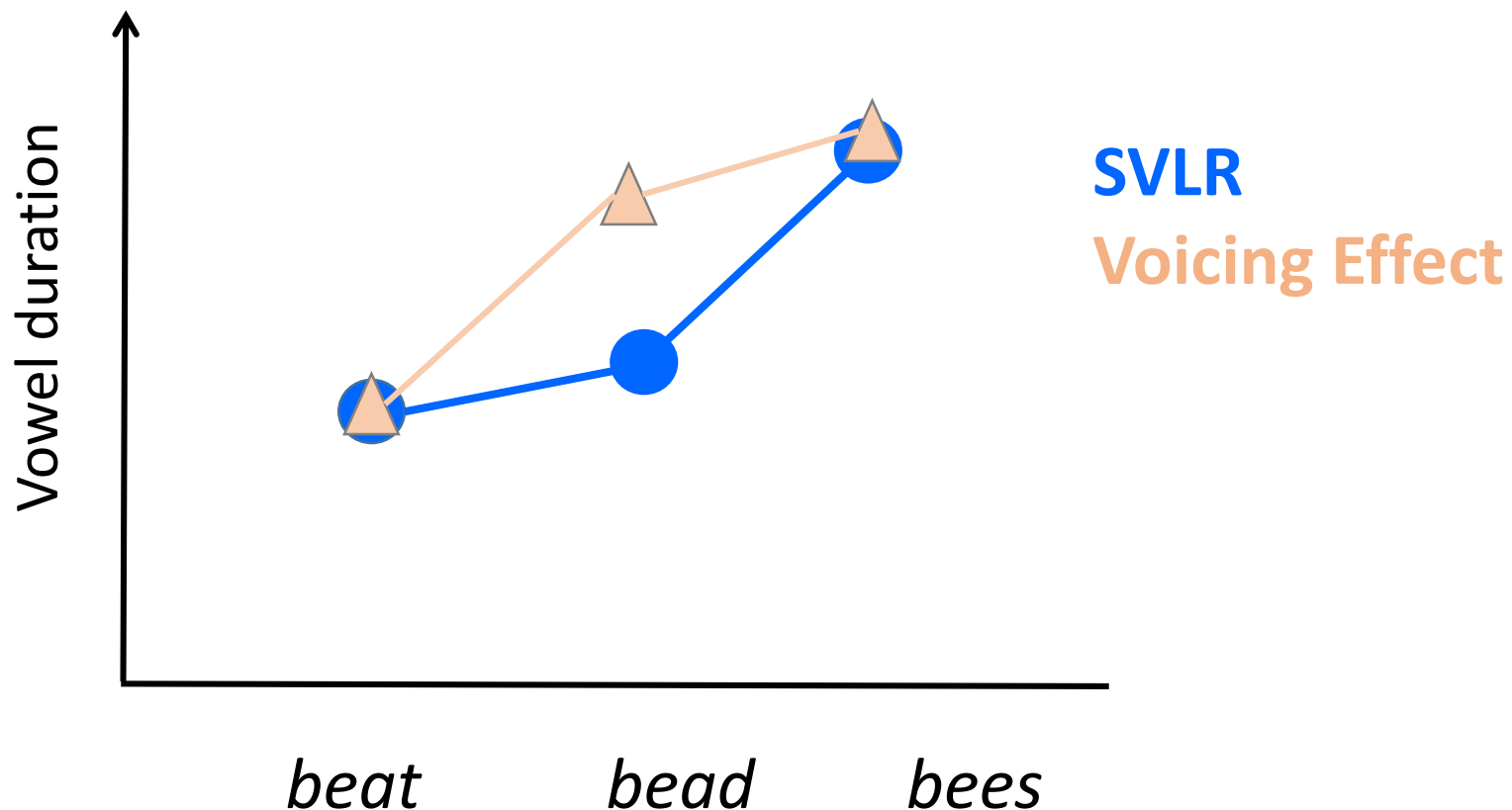


- SVLR in FLEECE, BOOT confirming Scobbie et al 1999 (and in FACE and COT in North East; cf Warren 2018)

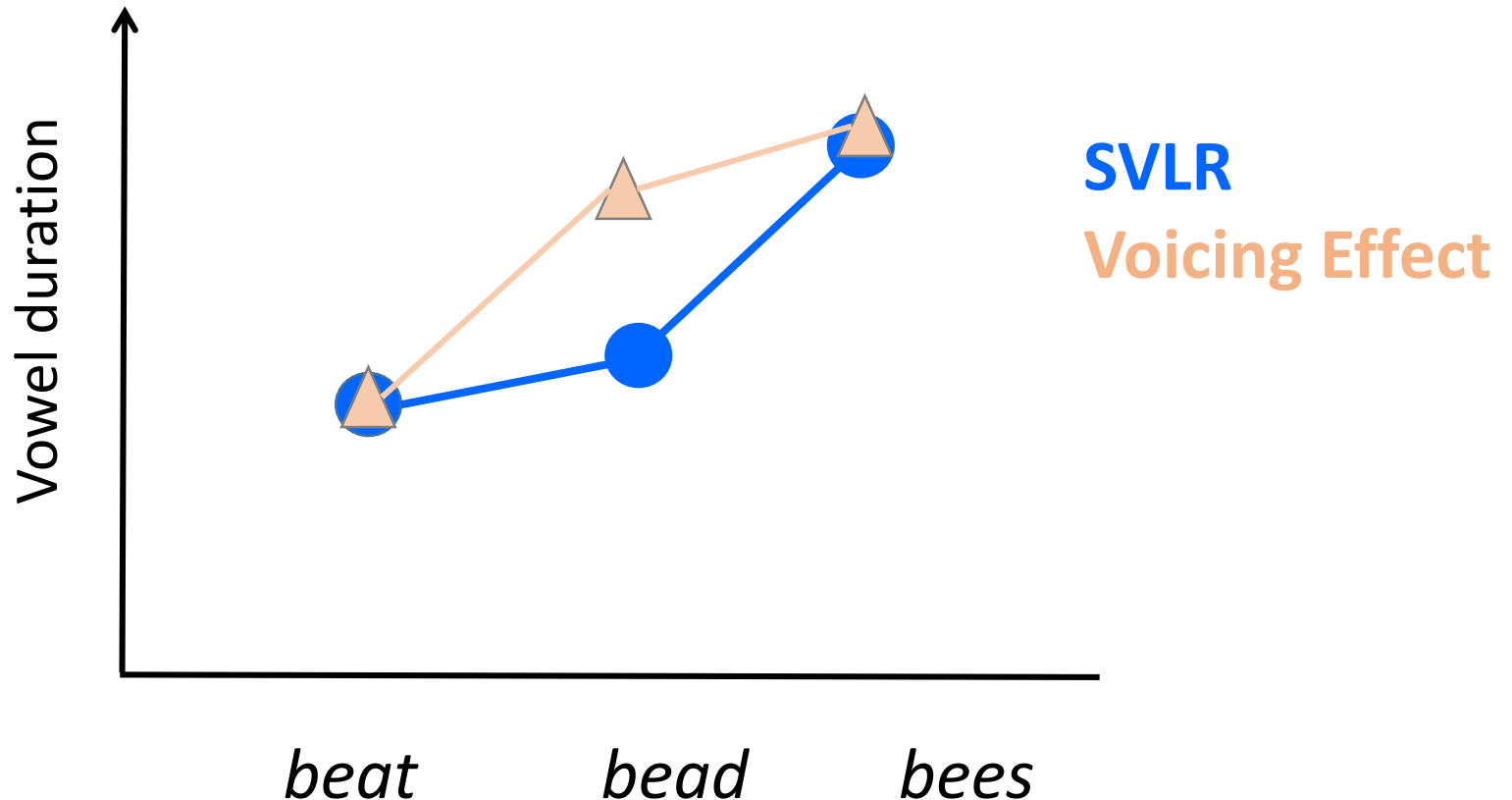


- Interactions with prosody show that SVLR in FLEECE and BOOT is well embedded structurally

- only weak evidence for Voicing Effect

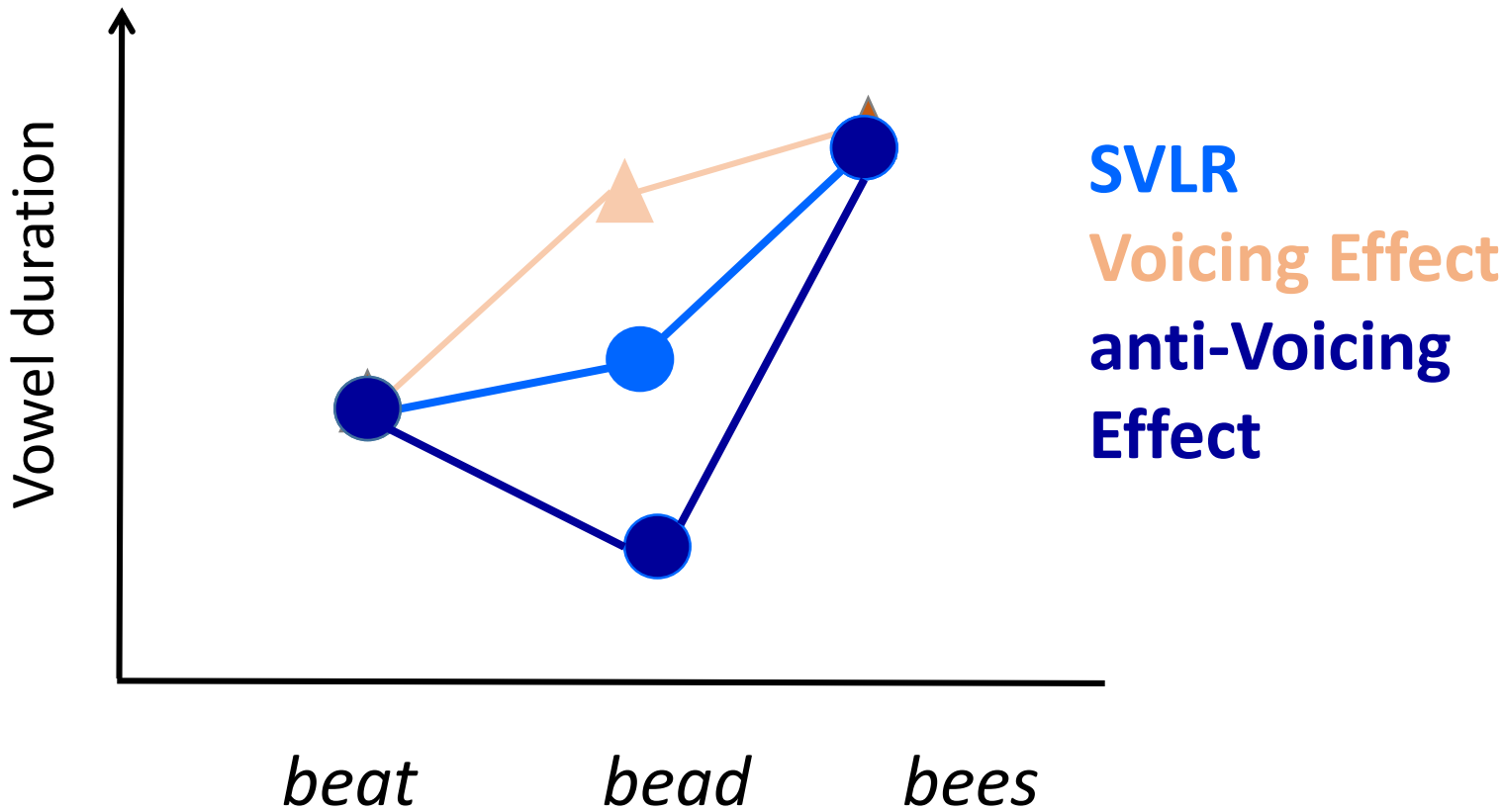


- only weak evidence for Voicing Effect



- vowel duration patterns seem to be rather different in spontaneous speech (cf VOT, voicing)

- unexpected 'anti-Voicing Effect': extreme shortening in SVLR short (VE long) *bead* context



- increased difference between Anglo-English and Scottish English irrespective of social variety
- no interaction with time

Social factors, time and SVLR

- SVLR is consistent across gender and social variety of Scottish English – as for e.g. Glasgow in 1990s for wordlist speech (Scobbie et al 1999)
- no evidence of weakening of SVLR over time from this, large-scale, perspective (cf Rathcke and Stuart-Smith 2016)

Next steps for SVLR

- add ethnicity with the Glaswegian corpus, and other ethnicities if possible
- Import more Scottish datasets
- consider 'time' in terms of birth and recording decade
- adapt modelling strategies to Bayesian modelling see James Tanner's poster today on large-scale analysis of SPADE data for Voicing Effect in English!

Thank you!

...and to James Tanner, Morgan Sonderegger, Vanna Wilerton, and our Data Guardians for sharing their data with us!

<http://spade.glasgow.ac.uk/>



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