Te Kāhui Roro Reo • New Zealand Institute of Language Brain & Behaviour

Systematic co-variation of monophthongs across speakers of New Zealand English

James Brand, Jen Hay, Lynn Clark, Kevin Watson, Márton Sóskuthy

james.brand@canterbury.ac.nz

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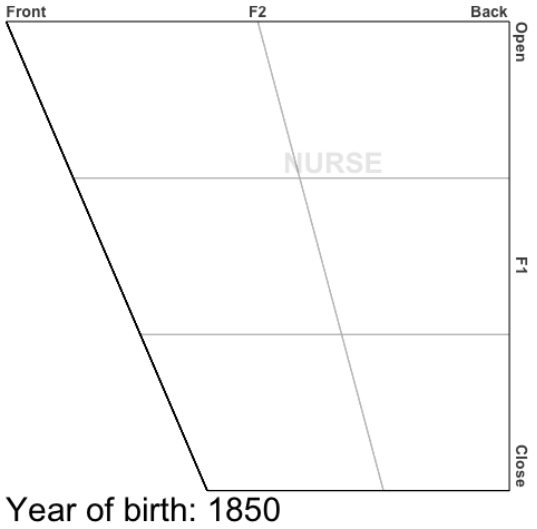
Slides: https://tinyurl.com/icphs-covar

Background

Traditional approaches to studying language variation and change

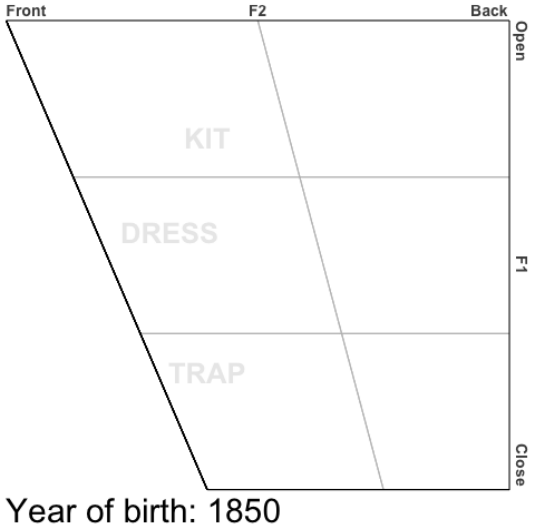
- Tended to focus on a single linguistic variable
- e.g. NURSE raising and fronting in NZE (Maclagan et al, 2017)
- But... unclear whether an individual variable also co-varies with others



Background

Evidence of variation and change across multiple variables

- Evidence for change where variables are not independent from one another
- e.g. Short front vowel shift in NZE (Maclagan & Hay, 2007)
- But... still not clear whether these changes exist simply at a community level or if it also exists within individuals
- But… still not clear whether other sounds changes are also co-varying together



Background

Existing approaches to understanding co-variation

- Recent empirical work has been limited by small speaker sizes or number of variables investigated
- Suitability of the statistical approaches to gain a 'full picture' of how co-variation is operating
- When investigating data with known sound changes, how do we explore co-variation whilst keeping the known predictors of change constant
- On-going theoretical debate about how sets of variables might work together to create speaker styles – is a linguistic variable really an independent entity? (see Guy & Hinskens, 2016)

Research question 1

Are there systematic patterns across speaker's realisations of combinations of vowels?

Prediction...

Yes... systematic variation is known to exist when we look at variables in isolation, but these variables rarely operate in isolation

Research question 2

Are there identifiable *leaders* of change who use combinations of innovative variants together?

Prediction…

Yes… it is plausible that a constellation of innovative variants are used by some speakers, whilst not at all by others

Method

Vowel	Freq
KIT	259,788
SCHWA	162,566
DRESS	116,993
FLEECE	73,806
STRUT	70,721
THOUGHT	58,676
LOT	52,481
TRAP	48,769
START	44,842
GOOSE	42,915
NURSE	25,804
FOOT	21,249
Total	978,610

Analysis

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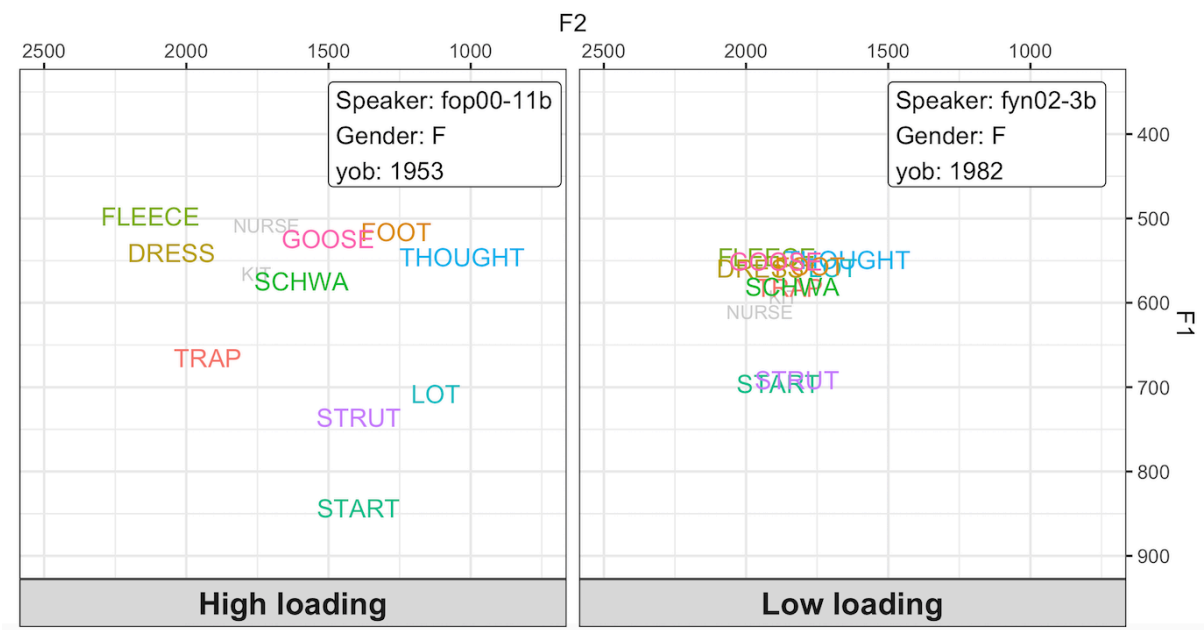
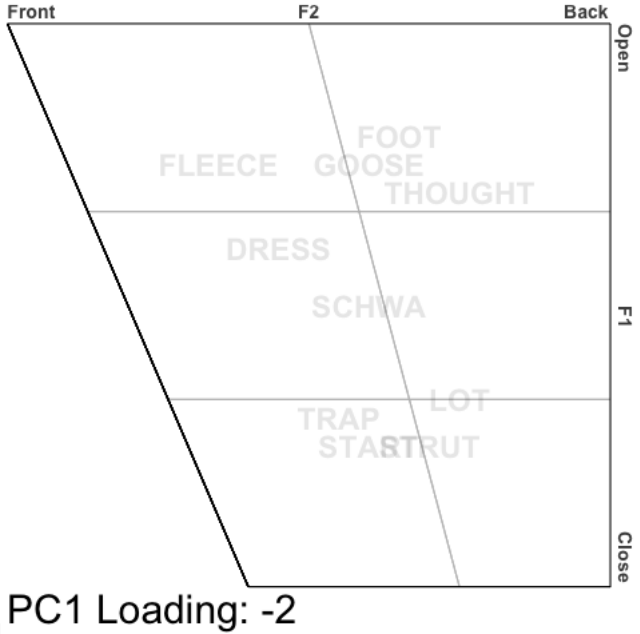
Speaker	F1_TRAP	F2_TRAP	F1_DRESS	F2_DRESS	F1_KIT	F2_KIT
fop00-8b	0.184	0.061	-0.053	0.016	0.139	0.152
fop01-12b	0.162	-0.207	0.180	-0.109	0.136	0.055
fop94-13a	0.167	-0.132	0.102	-0.219	0.136	0.393
fop98-4a	0.054	0.126	0.066	0.082	0.136	-0.081
myp99-16b	-0.543	0.033	-0.097	0.194	0.133	-0.195
fyn98-10b	0.164	-0.090	0.073	0.045	0.132	-0.043
fyp99-24a	-0.211	0.167	-0.046	0.288	0.131	-0.150
fop01-1a	-0.218	0.087	-0.208	0.112	0.129	-0.026
fyn94-9b	-0.177	-0.556	-0.271	-0.916	0.127	0.325
fyn02-1a	-0.129	0.068	0.117	-0.069	0.125	-0.073
fop96-20b	-0.094	0.092	-0.014	-0.050	0.124	0.091
fon00-12b	0.100	0.170	-0.004	0.074	0.118	-0.246
fon02-12b	-0.045	-0.155	-0.057	-0.001	0.115	0.037
fop02-2b	-0.247	0.086	-0.050	-0.010	0.115	-0.059
fyn96-11b	-0.005	0.083	0.056	-0.229	0.115	-0.134
myp01-7b	0.035	-0.058	-0.111	0.062	0.115	-0.023
fyp95-6a	0.044	-0.112	0.148	0.228	0.114	-0.105

Analysis

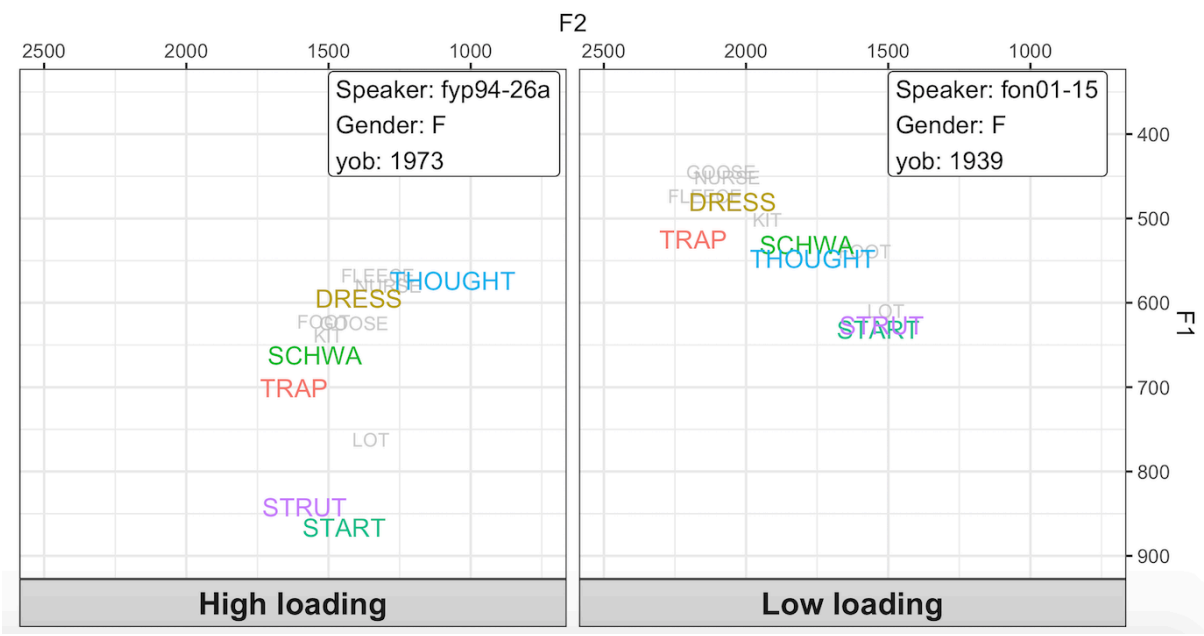
PC1 (21.0%) – Vowel space

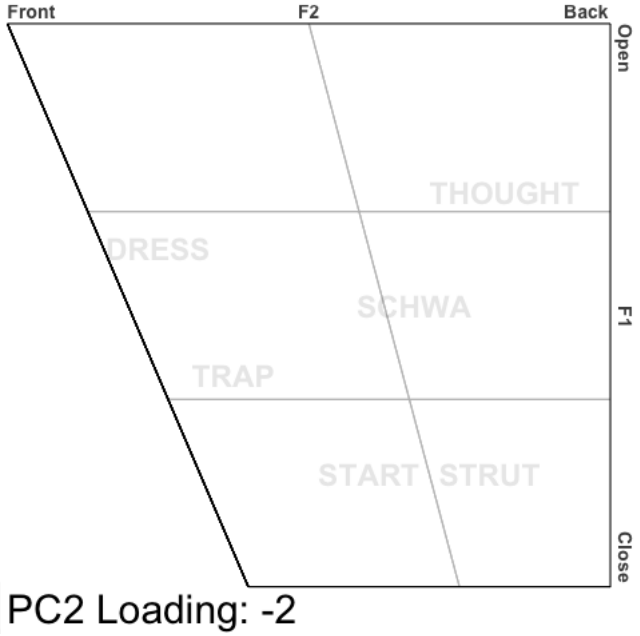




Analysis

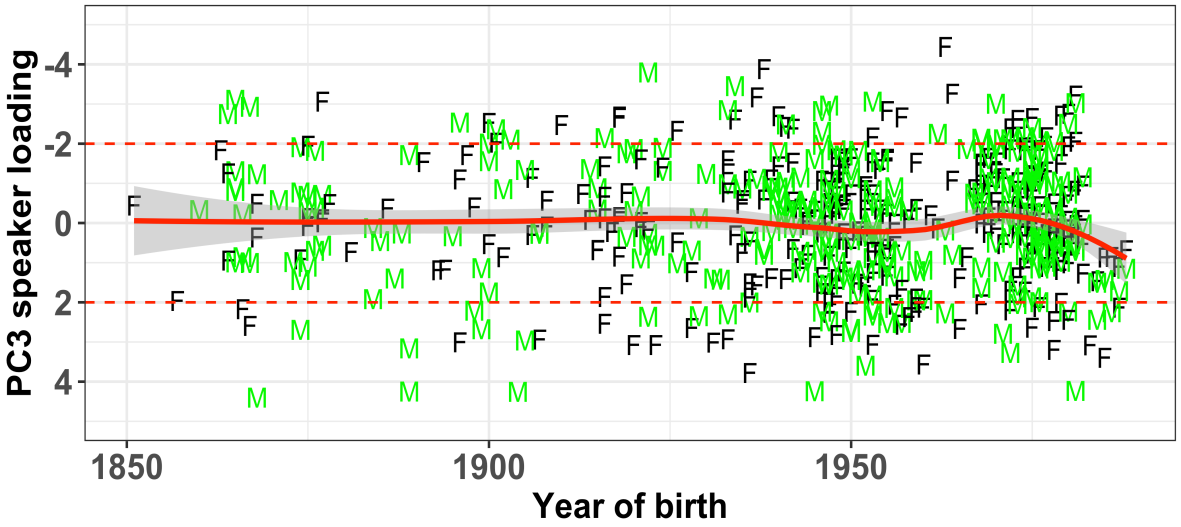
PC2 (13.7%) – Further normalisation

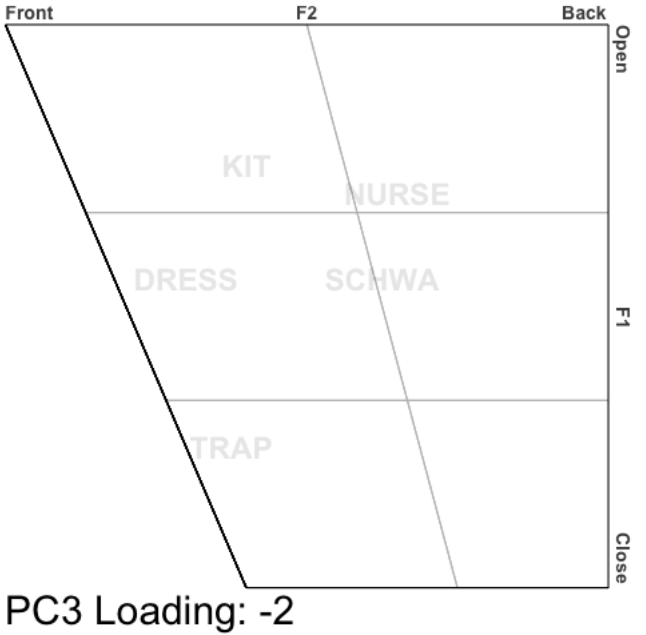




Analysis

PC3 (10.3%) — Leaders and laggers





PC3 Loading: -2

Discussion

- Looking at large scale co-variation across periods of sound change is possible... and interesting
- We have a workflow for assessing co-variation across time
- This can be applied to other questions/datasets to further explore co-variation and better understand what the linguistic variable is

Thanks

Slides: https://tinyurl.com/icphs-covar

Proceedings paper: https://tinyurl.com/icphs-covar-paper