Initiation, progression and conditioning:
Short front vowels in Australian English

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- Lowering and retracting short front vowels KIT, DRESS and TRAP
  - Reversal of short front vowel raising, with all vowels lowering, and TRAP retracting[3]
  - Recent phenomenon in Australian English[3]
  - Parallel shifts in other English speaking parts of the world, esp. North America[7,11]

Change overtime

- When and in what order did the changes occur?
- What was the structural catalyst for this change?

Role of conditioning factors

- What is the role of phonological and lexical factors conditioning the progression of the change?
  - TRAP: Variable split-nasal system[4]
  - BATH: lexical effects (for example)

Speech Corpora

| 1920 | 1930 | 1940 | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2010 | 2020 |

1970s Adults   1970s Teens   2010s Older Adults   2010s Younger Adults

Sydney Social Dialect Survey (Horvath 1985)   Sydney Speaks 2010s

Speaker sample (N=48)
Sydneysiders
Anglo Australians
Upper working / Middle class

	1970s		2010s	
	Adults (31-64 yrs)	Teens (15-18 yrs)	Older adults (45-57 yrs)	Younger adults (18-31 yrs)
Male	6	8	5	6
Female	5	7	5	6

Data

- Spontaneous speech
  - "the most systematic data for linguistic analysis"[12]
  - illuminating for the study of change; the prestige of the standard variety operative in more controlled settings[16]
- Sociolinguistic interviews
  - 27 hours
  - Approx. 200,000 words

Jamie: *I was driving along the road --*
.. leaving,
and it was like a --
... you have to really pull over to let each other pass,
.. and they would drive straight at me.
Alice: *@[@]*
Jamie: *[there] was no sort of --*
oh,
you know,
we'll shift around each other,
Alice: *.. hm.*
Jamie: *.. I had to drive off the road,*
and off the gutter,
...(1.0) to avoid being .. run down,

[SydS_AOFU_005]

Data preparation, extraction and analysis

- Speech transcribed orthographically in ELAN[14]
- Force-aligned at segment level in LaBB-CAT[9]
- Tokens for analysis:
  - No grammatical or unstressed words
  - No more than 5 instances of any one word per speaker
  - Alignment of all tokens manually checked for accuracy
- F1/F2 measurements taken at vowel midpoint
- Normalized on the basis of the entire vowel space[15]

Vowel	N	Most frequent instances
KIT	3,840	*thing, think, big, bit, kid*
DRESS	3,263	*get, remember, never, better, went*
TRAP	2,653	*back, family, hand, dad, bad*
BATH	715	*class, last, half, ask*
Total	**10,471**	

- Linear mixed-effects models fit to front diagonal (F2-2*F1)[8,13]
- Independent variables
  - Age, Gender
  - Following nasal consonant (within word), Vowel duration/Speech rate
- Logical two- and three-way interactions
- Random intercepts: Speaker, Word/Lemma

- Significance assessed using Kenward-Roger approximation from pbkrtest[10] and lme4[1] in R
- Complex models compared step-wise with less complex models by ANOVA; pruned predictors which did not improve model fit

Change over time

Figure 1: KIT, DRESS, TRAP, BAN, & BATH across age group

- **TRAP**
  - Significant lowering/retraction ($p<0.0001$)
  - Pre-nasal TRAP (BAN) (already relatively raised), raises further ($p<0.001$)
- **BATH**
  - Significant retraction evident in 2010s adults ($p<0.001$), before that of TRAP
  - Suggests structural connection with TRAP retraction – retraction of BATH provided space for TRAP to retract
- **DRESS**
  - Significant lowering/retraction ($p<0.001$)
- **KIT**
  - Significant raising/fronting ($p<0.05$) up to 2010s older adults
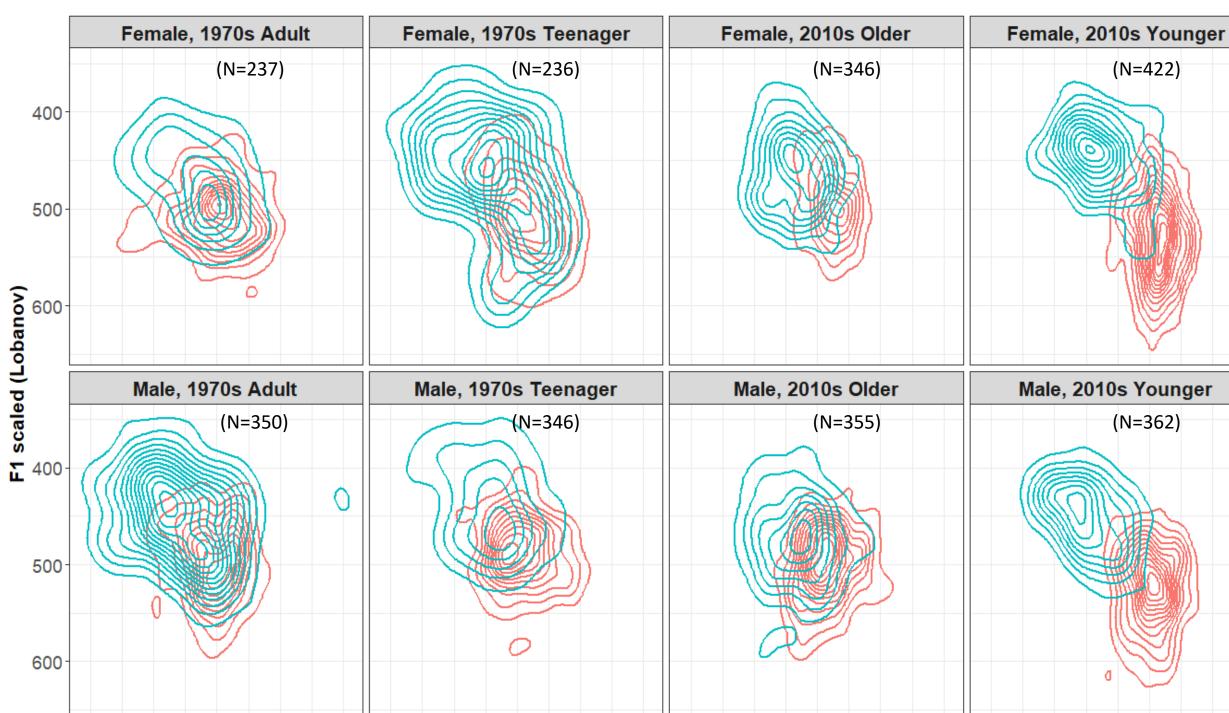
Role of conditioning factors

Development of an allophonic split in TRAP

- Pre-nasal TRAP always on aggregate higher than pre-obstruent TRAP
- Gradually enhanced differentiation between the two phonological contexts
- Distribution decreases in variance/scatter over time
- Progression of change:
  - 1970s
    - Large degree of overlap between pre-nasal and pre-obstruent TRAP, with complete overlap for some speakers
  - 2010s
    - younger adults show allophonic split, yielding two categories: TRAP and BAN

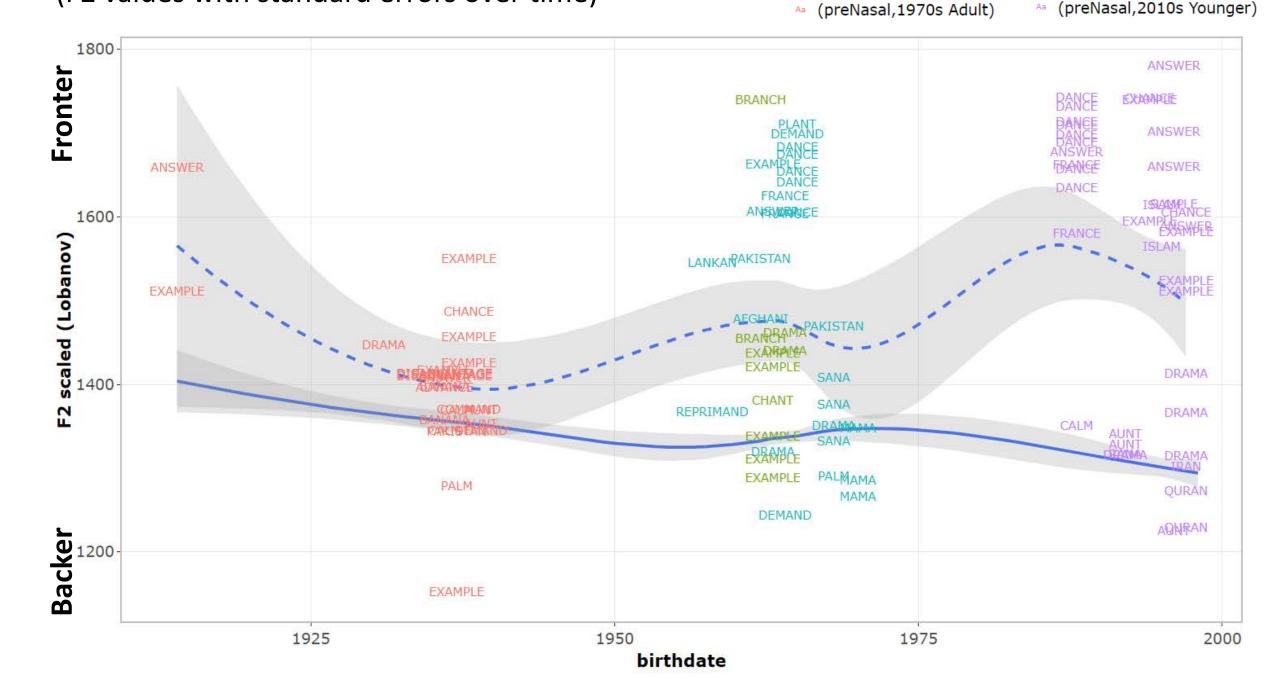**Figure 2:** TRAP across age, gender & phonological context

Phonological Context
preObstruent
preNasal

Figure 3: Pre-obstruent and pre-nasal TRAP across age & gender by speaker

Lexical effects

Lexical reassignment in certain words from BATH to TRAP over time

- Pre-obstruent BATH gradually retracts
- Pre-nasal BATH advances; artefact of lexical reassignment
  - *example, chance, answer*
    - track with BATH in the 1970s; re-assigned to TRAP in the 2010s
  - *aunt, drama, calm, palm*
    - track with BATH
- NB: *sample, France, dance:* track with TRAP in 2010s (no data for 1970s)

Figure 4: BATH over time & lexical/phonological context (F2 values with standard errors over time)

Age by phonological context
(preObstruent,1)   (preNasal,1970s Teenager)
(preNasal,1)   (preNasal,2010s Older)
(preNasal,1970s Adult)   (preNasal,2010s Younger)

Conclusions

- **Lowering and retracting of short front vowels in Sydney English**
  - Retraction in BATH predates motion in TRAP
    - BATH retraction may have been catalyst for short front vowel lowering/retraction
    - Parallels conditions observed in other dialects (e.g., merging of LOT and THOUGHT in North American varieties)
  - Reduced variance across categories suggests crystalizing of changes at the leading edge of the shift

- **Phonological and lexical conditioning**
  - Gradual move towards a split nasal system for TRAP
    - Incremental change evident from 1970s to today, resulting in a distinct TRAP-BAN system in 2010s younger adults
  - Rapid lexical reassignment
    - Some pre-nasal BATH tokens reassigned to TRAP within one generation, over 20 years in real time

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