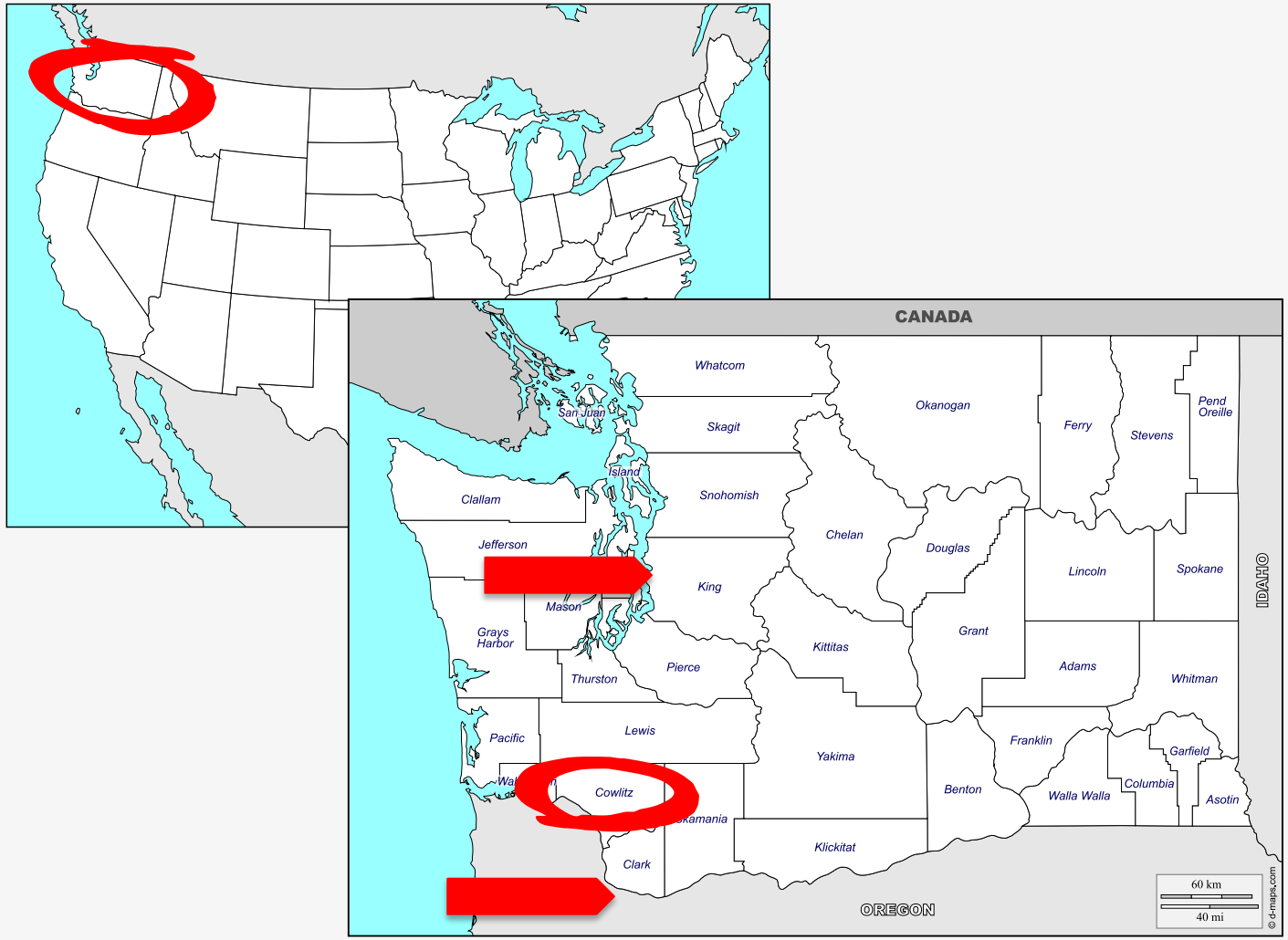
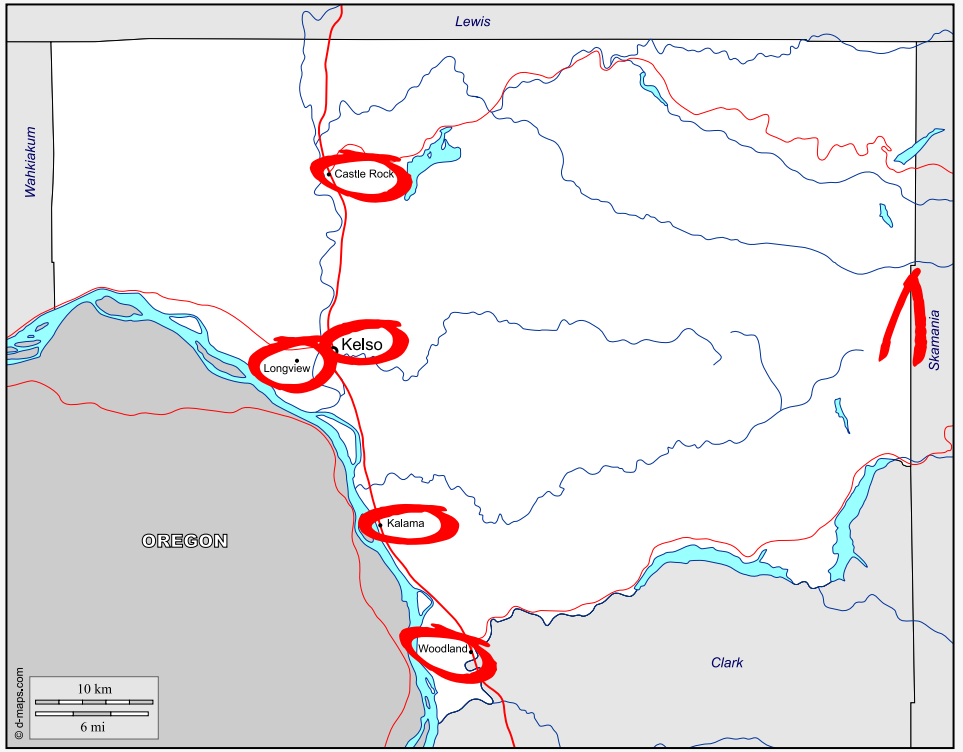
Volcanic Vocalic Changes

Joey Stanley

UGA Linguistics Colloquium
April 7, 2017

Cowlitz County, Washington





The West

"low homogeneity" and "low consistency"

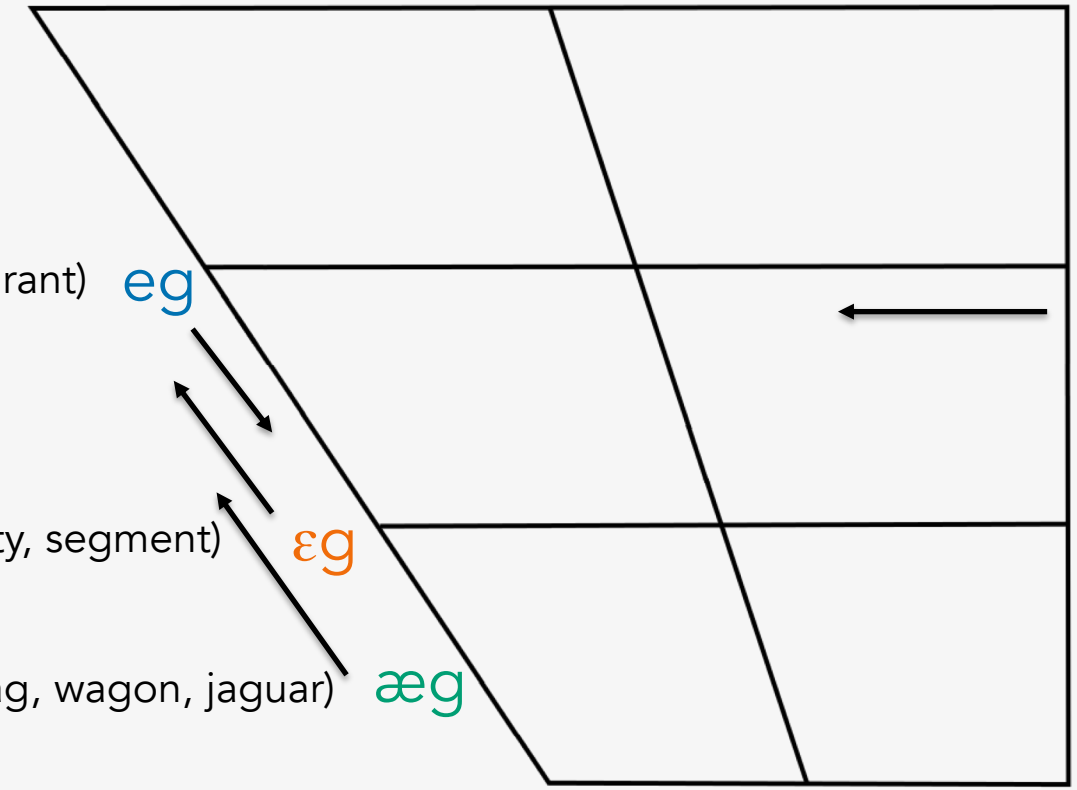
(Labov, Ash, Boberg 2006:277)

cot-caught merger

fronting of /u/

lack of Southern, Midland, and Canadian features

Pacific Northwest English



(Wassink *et al.* 2009, Freeman 2014, Riebold 2015, Wassink 2015, Wassink 2016, etc.)

(Ward 2003, Becker *et al.* 2013, McLarty & Kendall 2014, Becker *et al.* 2016, etc.)

HYPOTHESES

pre-velars

Hypothesis 1: Longview is like the rest of Washington

back vowels

Hypothesis 2: /o/ is fronted

Hypothesis 3: /o/ is monophthongized

Volcano

Hypothesis 4: These three changes have to do with a volcano

METHODOLOGY

Data Collection

41 natives of Cowlitz County, ages 18–70s

29-item word list (see appendix slides)

Number of tokens	
pre-velars	549
/o/	348
total	897

forced aligned with DARLA (Reddy & Stanford 2015), which uses ProsodyLab (Gorman *et al.* 2011) and FAVE (Rosenfelder *et al.* 2014)

used a Praat script to extract vowel formants at the midpoint

Bark normalized measurements (Traunmüller 1997)

Lobanov transformation not used because I'm not working with the full vowel space (Thomas & Kendall 2015)

Analysis

Mixed-effects models (Baayen 2008)

- `lmer()` in the R package `lme4` (Bates *et al.* 2015)

Effects are reported significant if $p < 0.01$.

Appendix slides:

- more detailed explanation of statistical methods
- all model outputs
- interpretation of each model

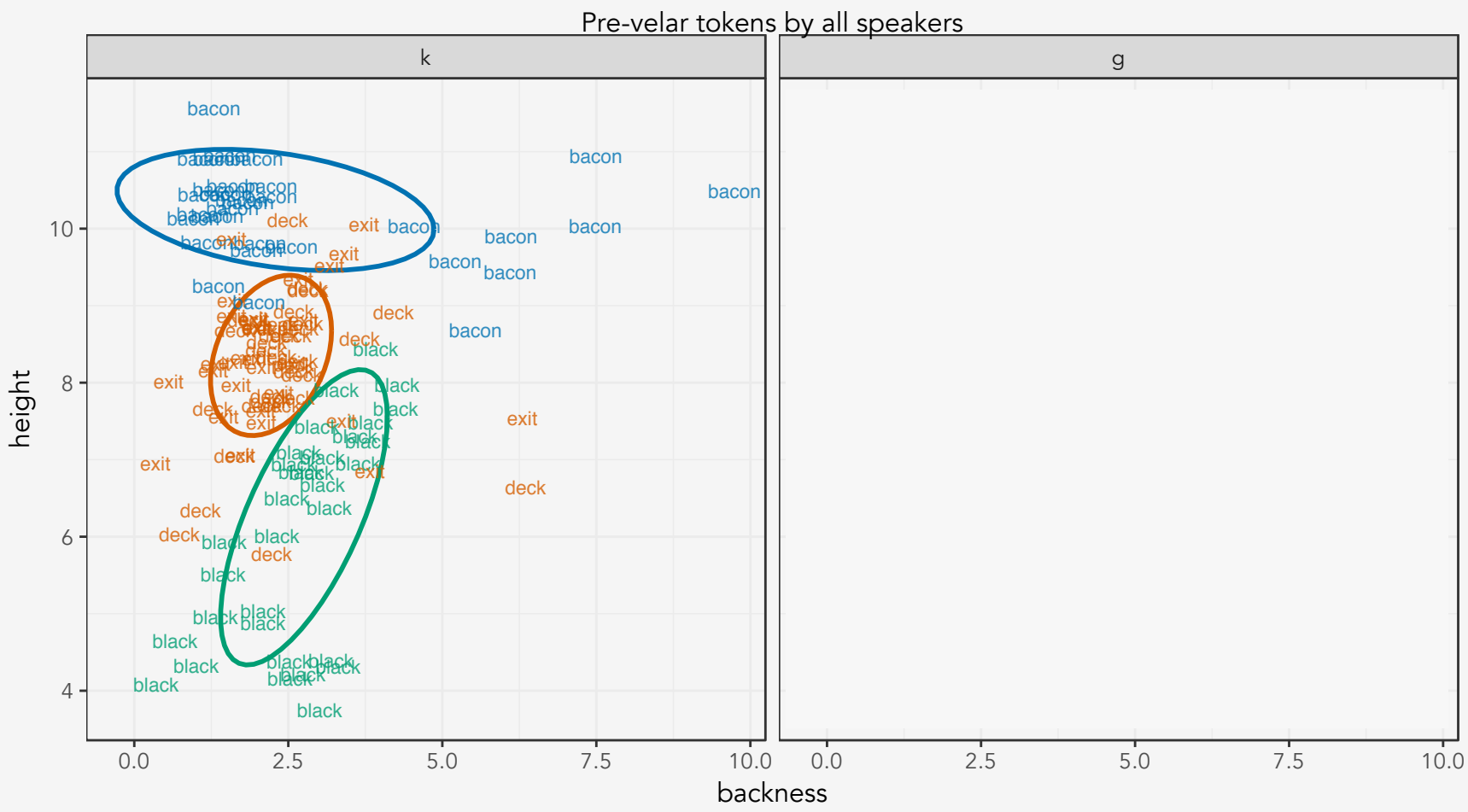
Results 1: Pre-Velars

PRE-VELARS: DISTRIBUTION

VAGUE and BEG merged somewhere in the middle of /ek/ and /ɛk/.

merger by approxi-mation (Labov 1994)

BAG is raised to the /ɛk/ space

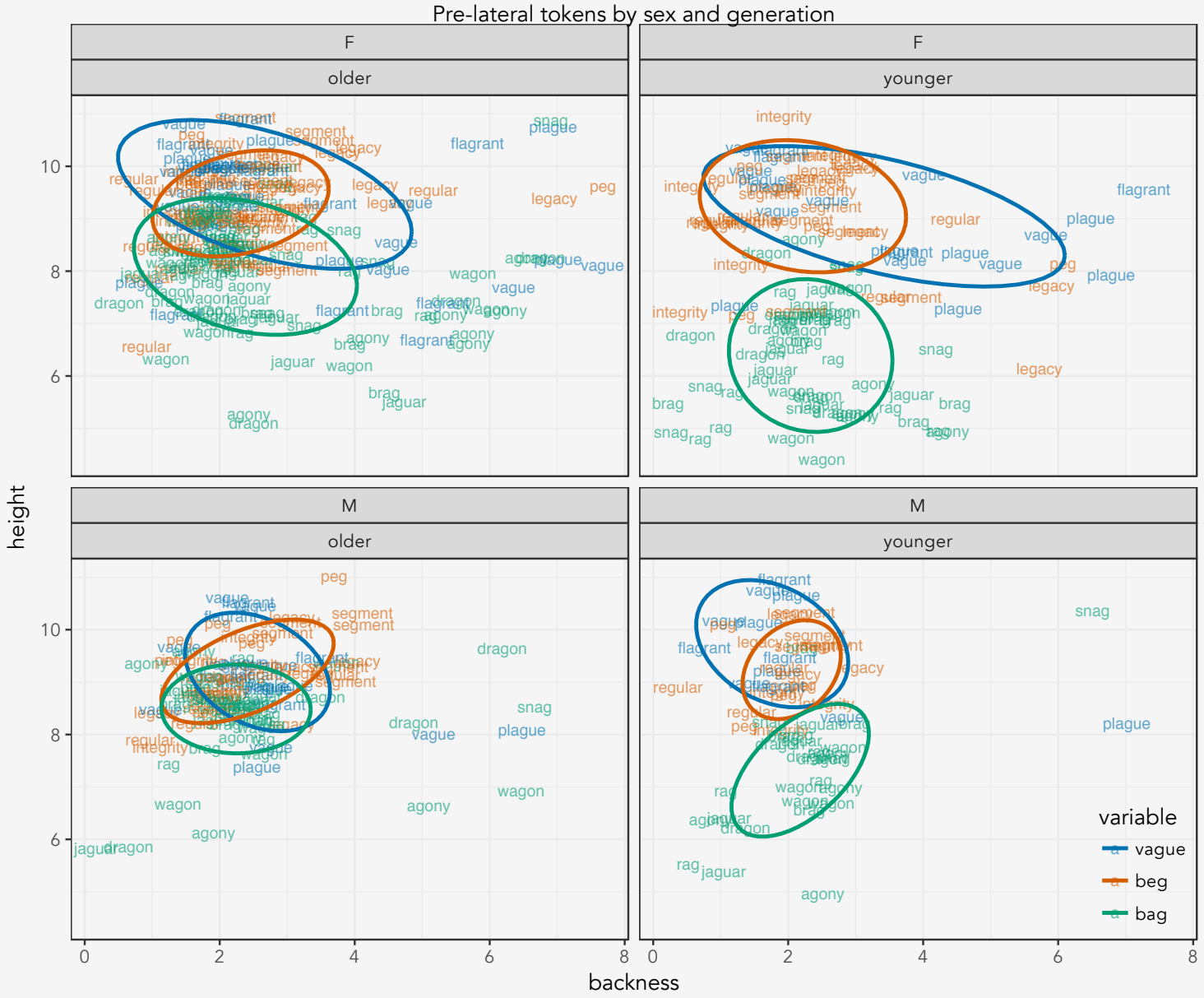


Age + Generation

high overlap between VAGUE and BEG for all groups

older men raise BAG almost to merge with VAGUE/BEG

younger group (in this sample) does not raise BAG



Pre-Velars in other Regions

Pre-Velars in other Regions

British Columbia (Cardoso 2016)
BEG and BAG raising

Seattle, Spokane, Yakima (Wassink 2016)
BEG and BAG raised by all speakers (male/female, young/old)

Me
BEG raising, except *exit*, *exile*, *segregate*, and *integrity*

Cowlitz County, WA
BEG raising in everyone
BAG raising in older speakers

Montana (anecdotally)
BAG raising

Wisconsin
(Bauer and Parker 2008)
BAG raising

Michigan (Roeder 2009)
BAG raising

Portland and E. Oregon
(McLarty *et al.* 2016; Becker *et al.* 2016)
BEG and BAG raising mostly in older speakers

San Francisco (Cardoso *et al.* 2016)
Some BEG and BAG raising

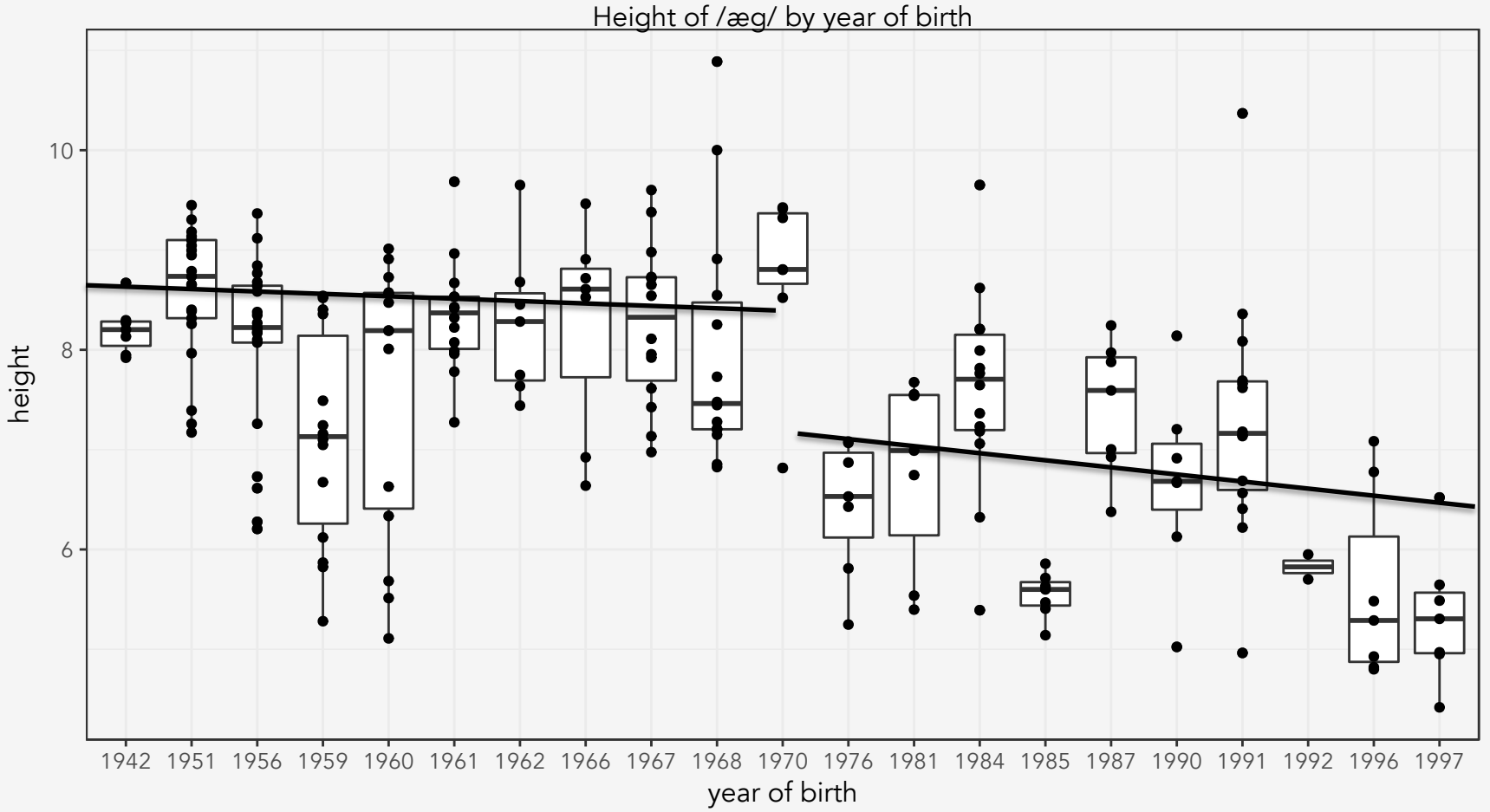
Nevada (Fridland *et al.* 2015)
BEG raising

Regression Model

(see model 1 in the appendix)

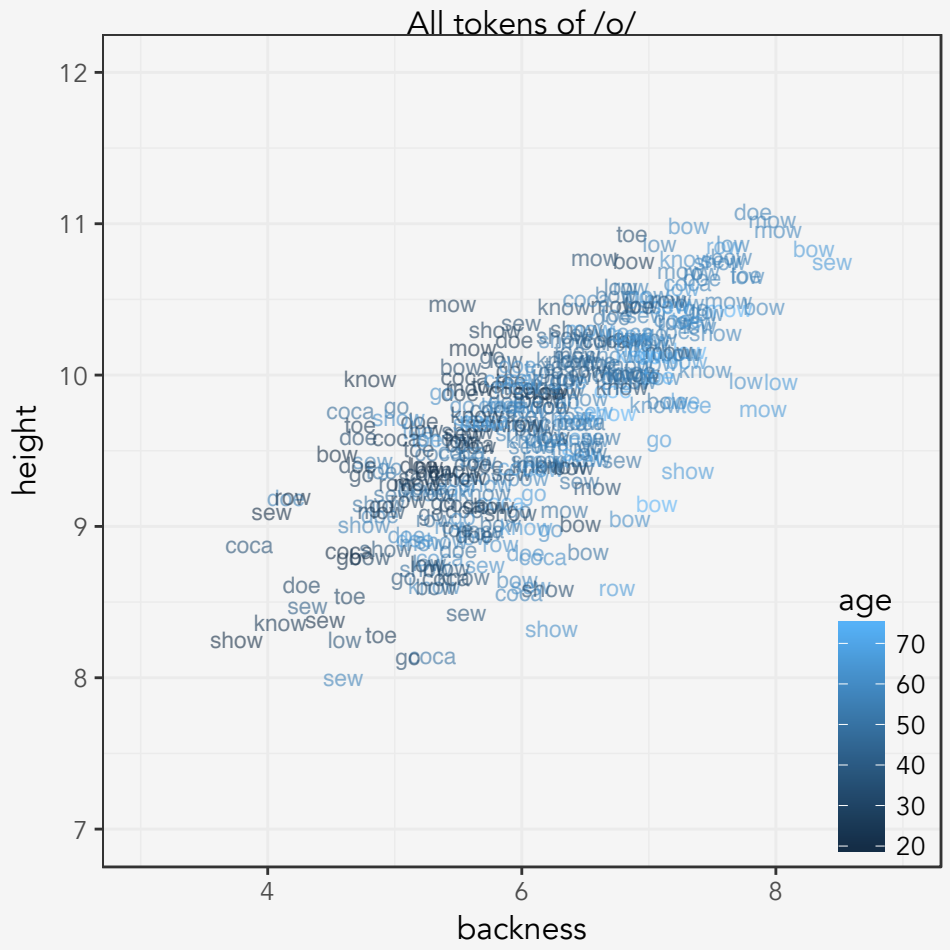
Best generation split was around 1970 (46 years old)

why this is important, later…



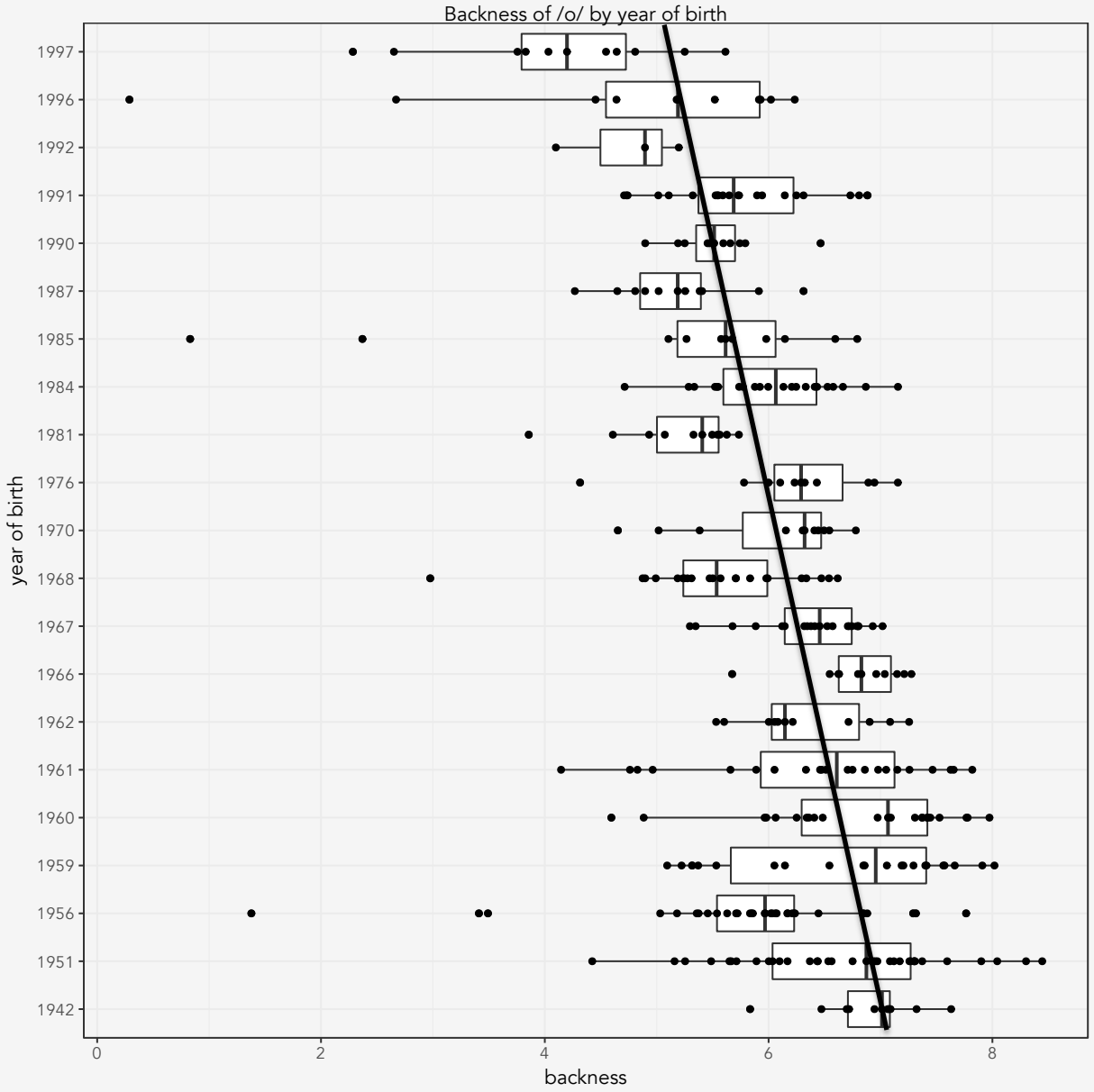
RESULTS 2: /O/ FRONTING

All Back Vowels



/o/ Fronting

/o/ is *gradually* fronting over time (see model 2 in the appendix)

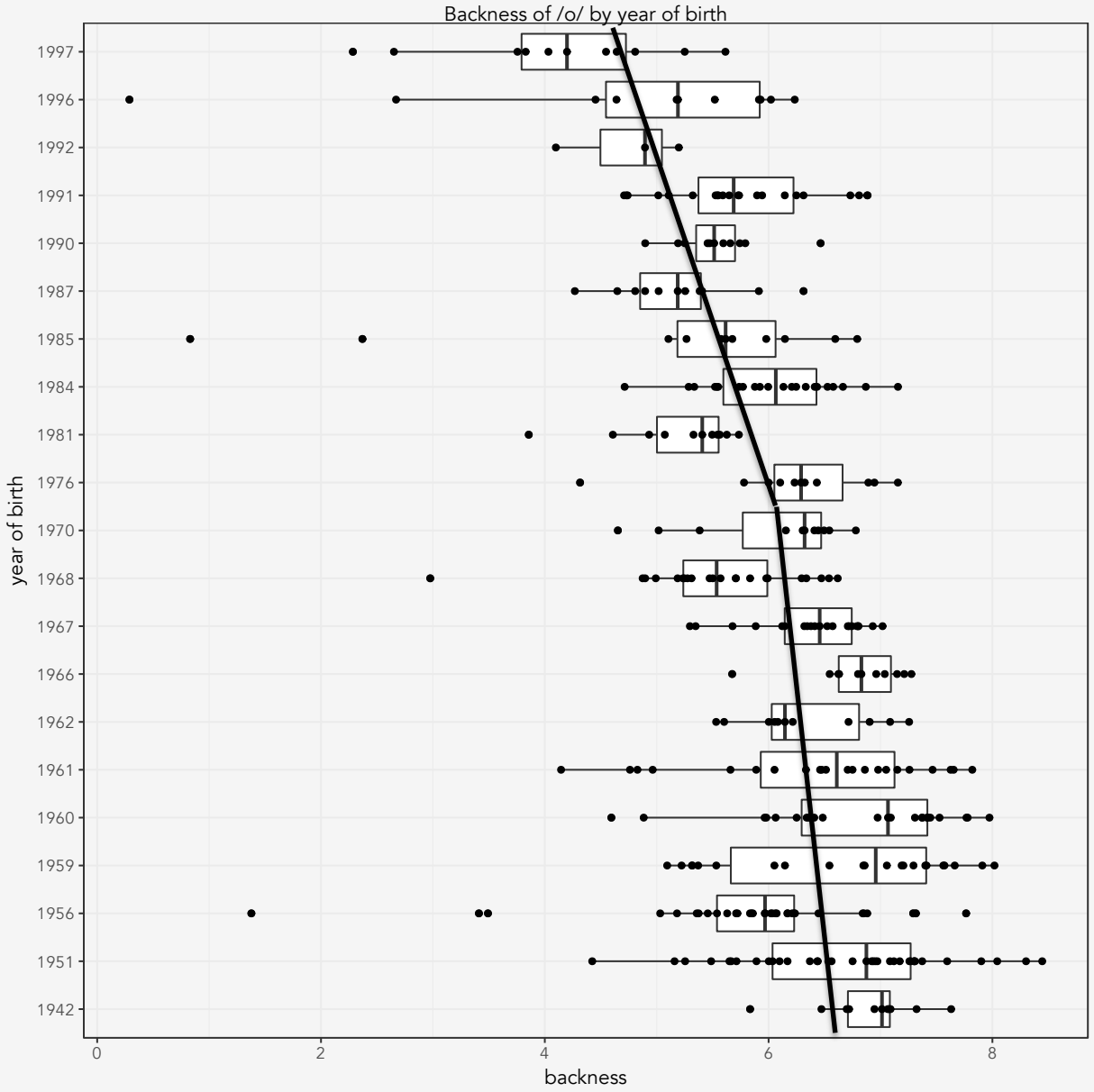


/o/ Fronting

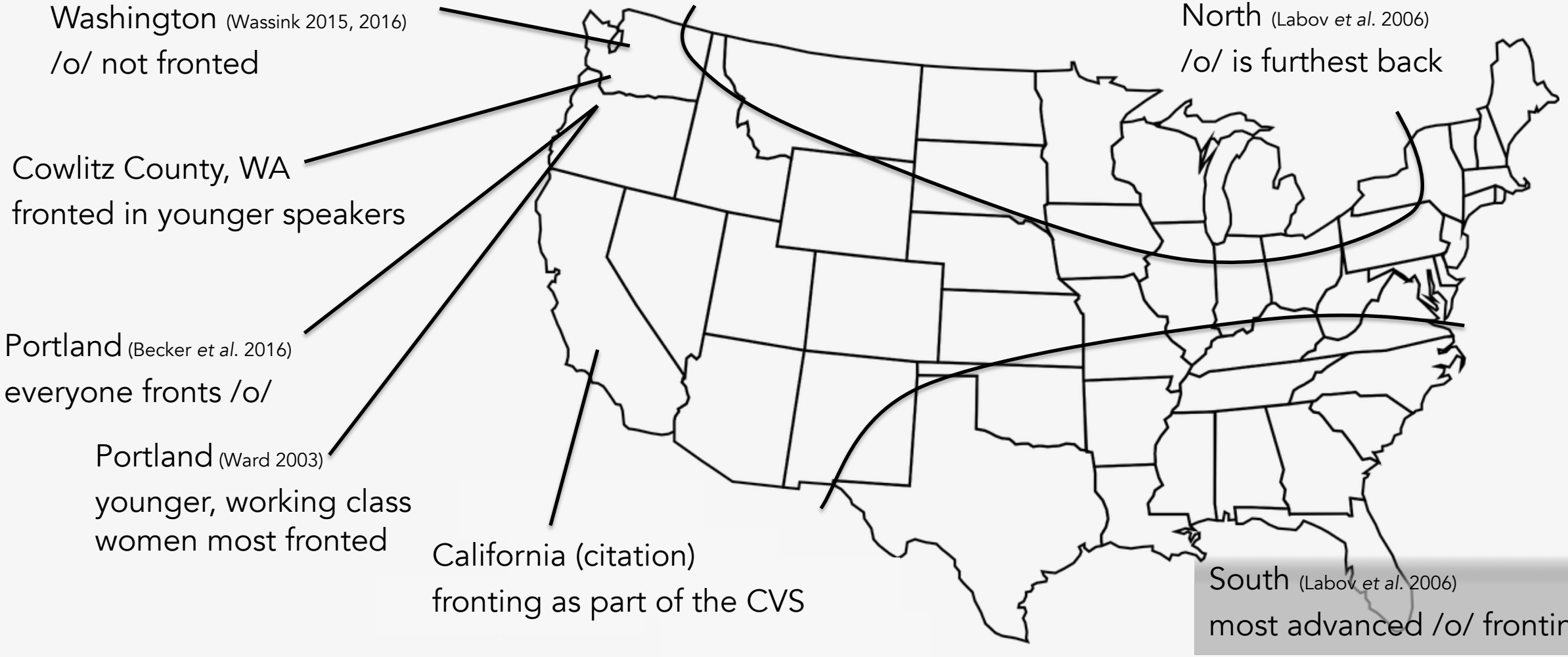
/o/ is *gradually* fronting over time (see model 2 in the appendix)

marginally significant *break-point* at 1970 (Baayan 2008 §6.4)

/u/ and /ʊ/ are also fronting too at slightly different rates
(output omitted)



/o/ Fronting in other Regions

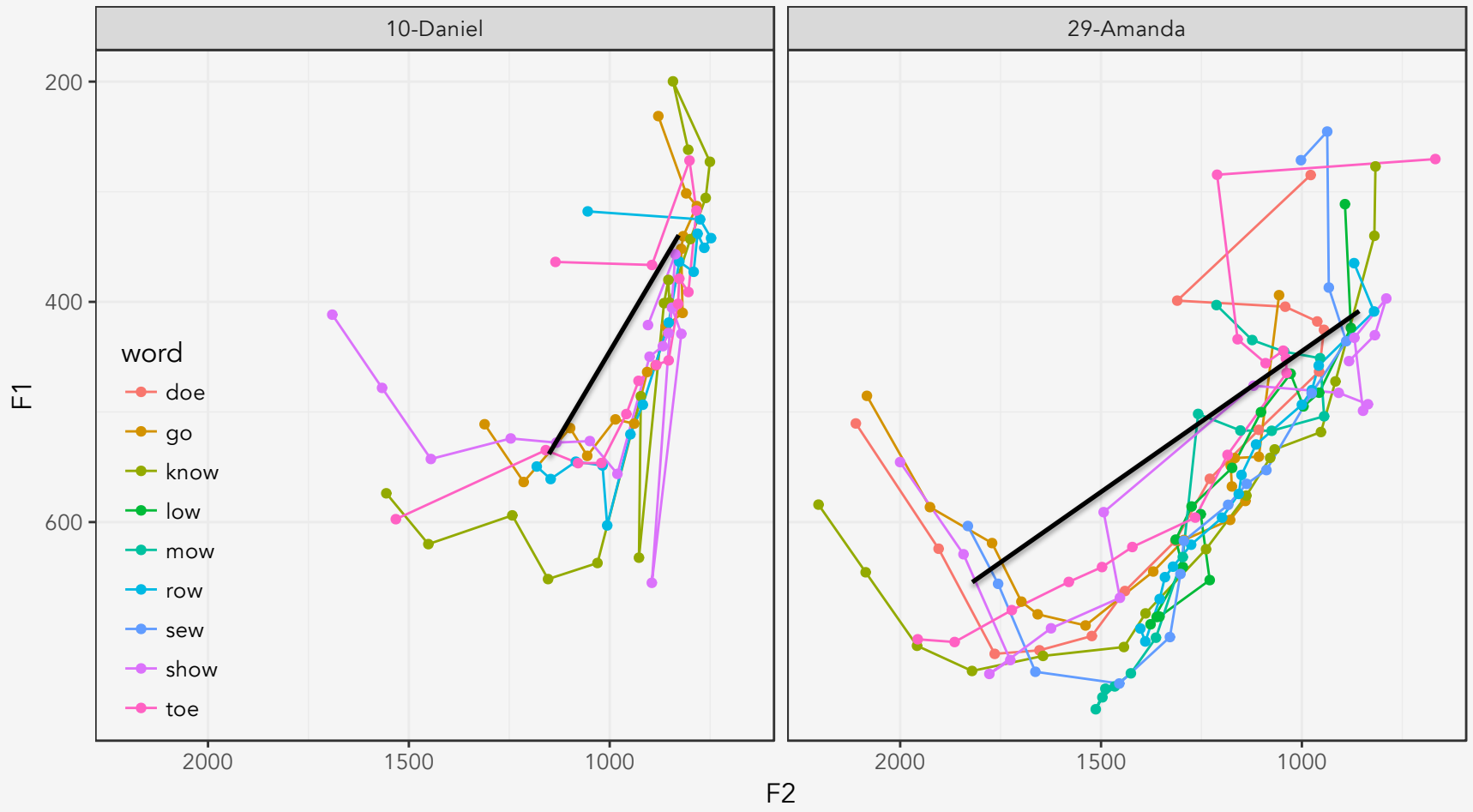


RESULTS 3: /O/ MONOPHTHONGIZATION

TRAJECTORIES

distance from 20% to 80%

messy data still, but the numbers match my intuition

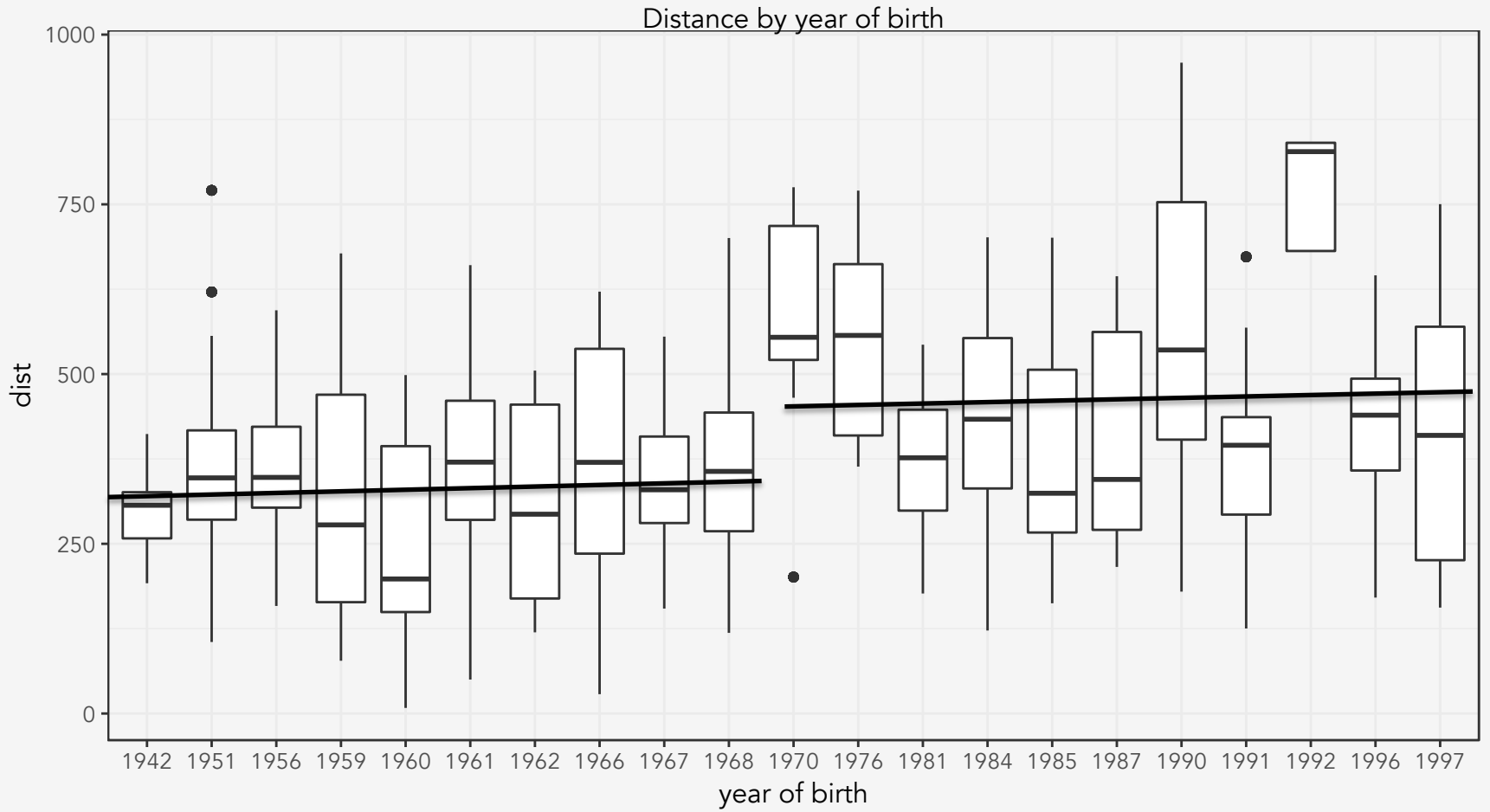


Monophthongization of /o/ over time

older generation = more monophthongal (see model 3 in the appendix)

jump at 1970

men generally more monophthongized



Discussion

Generational Divide

	Older (born before 1970)	Younger (born after 1970)
BAG	raised	lowered
back vowels	back	fronted
/o/	monophthongized	diphthongized

So what happened in 1970?

Carol

Ed

1923 — 1970 — 1980 — 1985 — 2016

nothing

Conclusion

Conclusion

✓ Hypothesis 1: Longview is like the rest of Washington

Mostly true, except BAG raising only for older people

✓ Hypothesis 2: back vowels are being fronted

Yes, but only by the younger speakers

✓ Hypothesis 3: some /o/ monophthongization

Yes, mostly by older speakers

? Hypothesis 4: Mount St. Helens might be an influencing factor.

REFERENCES

Baayen, R. H. 2008. *Analyzing Linguistic Data: A Practical Introduction to Statistics using R*. Cambridge: Cambridge University Press.

Bates, Douglas, Martin Maechler, Ben Bolker & Steve Walker. 2015. Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software* 67(1). 1–48. doi:doi:10.18637/jss.v067.i01.

Bauer, Matt & Frank Parker. 2008. /æ/-raising in Wisconsin English. *American Speech* 83(4). 403–431.

Becker, Kara, Anna Aden, Katelyn Best, Rena Dimes, Juan Flores & Haley Jacobson. 2013. Keep Portland weird: Vowels in Oregon English. Paper presented at the New Ways of Analyzing Variation (NWAV) 42, Pittsburgh.

Becker, Kara, Anna Aden, Katelyn Best & Haley Jacobson. 2016. Variation in West Coast English: The case of Oregon. In Valerie Fridland, Betsy E. Evans, Tyler Kendall & Alicia Beckford Wassink (eds.), *Speech in the Western States, Vol. 1: The Pacific Coast*, 107–134. (Publication of the American Dialect Society 101). Durham, NC: Duke University Press. doi: 10.1215/00031283-3772923.

Cardoso, Amanda. Pre-velar Raising in Western Canadian Dialects. Unpublished manuscript. Cited in Cardoso *et al.* (2016).

Cardoso, Amanda, Lauren Hall-Lew, Yova Kementchedjhieva & Ruaridh Purse. 2016. Between California and the Pacific Northwest: The front lax vowels in San Francisco English. In Betsy Evans, Valerie Fridland, Tyler Kendall & Alicia Wassink (eds.), *Speech in the Western States: Volume 1: The Coastal States*, 33–54. (Publication of the American Dialect Society 101). Durham, NC: Duke University Press. doi: 10.1215/00031283-3772890.

Freeman, Valerie. 2014. Bag, beg, bagel: Prevelar raising and merger in Pacific Northwest English. *University of Washington Working Papers in Linguistics* 32.

Fridland, Valerie, Tyler Kendall & Craig Fickle. 2015. It's Neva-ae-da, not nev-ah-da. Paper. Paper presented at the Annual Meeting of the American Dialect Society, Portland, Oregon.

Labov, William. 1994. *Principles of linguistic change. Vol. 1: Internal features*. Oxford: Blackwell.

Labov, William, Sharon Ash & Charles Boberg. 2006. *The Atlas of North American English: Phonetics, Phonology and Sound Change*. Walter de Gruyter.

McLarty, Jason & Tyler Kendall. 2014. The relationship between the high and mid back vowels in Oregonian English. Paper presented at the New Ways of Analyzing Variation (NWAV) 43, Chicago.

Gorman, Kyle, Jonathan Howell & Michael Wagner. 2011. Prosodylab-Aligner: A Tool for Forced Alignment of Laboratory Speech. *Canadian Acoustics* 39(3). 192–193.

Levshina, Natalia. 2015. *How to do Linguistics with R: Data exploration and statistical analysis*. Amsterdam: John Benjamins Publishing Company.

McLarty, Jason, Tyler Kendall & Charlie Farrington. 2016. Investigating the development of the contemporary Oregonian English vowel system. In Valerie Fridland, Betsy E. Evans, Tyler Kendall & Alicia Beckford Wassink (eds.), *Speech in the Western States, Vol. 1: The Pacific Coast*, 135–157. (Publication of the American Dialect Society 101). Durham, NC: The American Dialect Society. doi: 10.1215/00031283-3772934.

Reddy, Sravana & James N. Stanford. 2015. Toward completely automated vowel extraction: Introducing DARLA. *Linguistics Vanguard*. doi:10.1515/lingvan-2015-0002 (26 October, 2015).

Riebold, John Matthew. 2015. The Social distribution of a regional change: /æg, ɛg, eg/ in Washington State. Seattle: University of Washington PhD dissertation.

Roeder, Rebecca. 2009. The effects of phonetic environment on English /ae/among speakers of Mexican heritage in Michigan. *Toronto Working Papers in Linguistics* 31. http://twpl.library.utoronto.ca/index.php/twpl/article/view/6090 (6 April, 2017).

Rosenfelder, Ingrid, Josef Fruehwald, Keelan Evanini, Scott Seyfarth, Kyle Gorman, Hilary Prichard & Jiahong Yuan. 2014. *FAVE (Forced Alignment and Vowel Extraction) Program Suite v1.2.2*.

Thomas, Erik, and Tyler Kendall. "NORM: Vowel Normalization Suite 1.1 | Methods." N.p., 18 Nov. 2015. Web. Accessed 12 January, 2017.

Traunmüller, Hartmut. 1997. Auditory scales of frequency representation. *Stockholms universitet: Institutionen för lingvistik*. http://www2.ling.su.se/staff/hartmut/bark.htm (17 November, 2016).

Ward, Michael. 2003. Portland dialect study: The fronting of/ ow, u, uw/ in Portland, Oregon. Portland State University Master's Thesis. http://www.pds.pdx.edu/Publications/Ward.pdf (15 February, 2016).

Wassink, Alicia Beckford. 2015. Sociolinguistic Patterns in Seattle English. *Language Variation and Change* 27(1). 31–58. doi:10.1017/S0954394514000234.

Wassink, Alicia Beckford. 2016. The Vowels of Washington State. In Betsy Evans, Valerie Fridland, Tyler Kendall & Alicia Wassink (eds.), *Speech in the Western States: Volume 1: The Coastal States*, 77–105. (Publication of the American Dialect Society 101). Durham, NC: Duke University Press. 10.1215/00031283-3772912.

Wassink, Alicia Beckford, Robert Squizzero, Mike Scanlon, Rachel Schirra & Jeff Conn. 2009. Effects of Style and Gender on Fronting and Raising of /æ/, /e:/ and /**ɛ**/ before /g/ in Seattle English. Paper presented at the New Ways of Analyzing Variation (NWAV) 38, Ottawa.

Joey Stanley

University of Georgia
joeystan@uga.edu @joey_stan

joeystanley.com

Special thanks to Cathy Jones for invaluable help in finding research participants,
to the University of Georgia Graduate School Dean's Award for funding the fieldwork.

These slides available at
joeystanley.com/colloquium

Appendix A: Word List and Minimal Pairs

Word List Items

These were embedded psuedorandomly in a 160-item word list, with words targeting other research questions acting as fillers.

Participants often commented on how random the words seemed, so they likely did not catch on to the research questions these words targeted.

Words in parintheses were used as pre-voiceless reference points.

/eg/	flagrant, plague, vague (bacon)
/ɛg/	exit, integrity, legacy, peg, regular, segment (deck)
/æg/	agony, brag, dragon, jaguar, rag, snag, wagon (black)
/o/	bow, doe, go, know, low, mow, row, sew, show, toe

Appendix B: Statistical Tests

ANALYSIS

I use generalized linear mixed-effects models (Baayen 2008) using the function `glmer()` in the R package `lme4` (Bates *et al.* 2015), with speaker and word as random effects and sex and some form of age/generation as a fixed effect.

The older generation was defined as those born on or before 1970.

Effects are reported significant if $p<0.01$.

For each hypothesis, three models were tested to see how age should be coded that included either 1) age as a continuous factor, 2) generation as a binary variable, or 3) only the interaction of age and generation to test the breakpoint.

All three models fit using maximum liklihood (ML) and were compared to a model without age at all (a null model) using the `anova()` function. The model with the lowest BIC was chosen and refit using restricted maximum liklihood (REML). The output of these final models is given in the following slides.

See Baayan (2008) for regression with breakpoints, and Levshina (2015) for model comparison.

(1) Linear mixed-effects model fit by REML of bark-normalized height (bark(F3)–bark(F1)) of pre-velar vowels with sex (F*, M) and generation (older, younger) as fixed effects and speaker and word as random effects.

Random effects

	Variance	Std. Dev.
word	0.484	0.696
speaker	0.048	0.219
residual	0.598	0.773

Fixed effects

	Value	Std.Error	*t*-value
(Intercept)	7.886	0.212	37.16
sex: M	0.599	0.281	2.13
generation: younger	–1.455	0.278	–5.24

Interpretation: The younger generation produced a lower BAG vowel than the older generation. The effect of sex was only marginally significant based on the small *t*-value (<3).

(2) Linear mixed-effects model fit by REML of bark-normalized backness (bark(F3)–bark(F2)) of /o/ with sex (F*, M) and age (as a continuous variable) as fixed effects and speaker and word as random effects.

Random effects

	Variance	Std. Dev.
word	0.274	0.523
speaker	0.038	0.195
residual	0.662	0.813

Fixed effects

	Value	Std.Error	*t*-value
(Intercept)	4.312	0.337	12.78
sex: M	0.326	0.215	1.52
generation: younger	–0.034	0.007	–5.11

Interpretation: The model technically shows that the older someone was the backer their /o/ vowel would be. To put it another way, /o/ is fronting in apparent time. The effect of sex was not significant based on the small *t*-value (<2).

* Underlined values are the reference levels

(3) Linear mixed-effects model fit by REML of trajectories of /o/ with sex (F*, M) and generation (older, younger) as fixed effects and speaker and word as random effects.

Random effects

	Variance	Std. Dev.
word	4767	69.04
speaker	9274	96.30
residual	10082	100.41

Fixed effects

	Value	Std.Error	*t*-value
(Intercept)	387.92	34.72	11.17
sex: M	–110.88	27.95	–3.967
generation: younger	96.59	27.56	3.504

Interpretation: The younger generation had longer trajectories than the older generation. Men had shorter trajectories than women.

* Underlined values are the reference levels