

Variation in Early Utah English's CORD-CARD merger

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New Ways of Analyzing Variation 53
November 7, 2025
Ann Arbor, Michigan

FORCE

Prerhotic (historic) /o/ (GOAT)

*more, store, four, story, course, door,
board, floor, chore, sport, court, fort,
shore, support, pork, sore, source,
score, glory, core, orient, roar, etc.*

NORTH

Words that are /ɔɪ/ in AmE varieties
that don't merge it with FORCE

*horse, war, morning, north, ward,
important, short, order, corner, warm,
quarter, forty, lord, organ, form, fork,
corn, horn, fortune, storm, etc.*

START

Prerhotic (historic) /ɑ/ (LOT)

*car, farm, hard, part, far, park, party,
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FORCE-NORTH merger.
(aka. the *hoarse-horse* merger)

Probably the most common
configuration in North America.

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NORTH-START merger.
(aka. the *cord-card* merger)



Less common, but attested in
some varieties.

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CLOTH

(Relevant for this talk) Basically, NORTH in
open syllables

*orange, forest, quarantine, tomorrow,
horror*

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A FORCE-NORTH merger probably
implies CLOTH merging as well.

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Most common in the Northeast,
but is scattered all over to some
extent.

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This is a logical possibility, but I don't know if it is attested.



Interviewer Alright, where were you born?

C. G. I was **born** in Heber City.

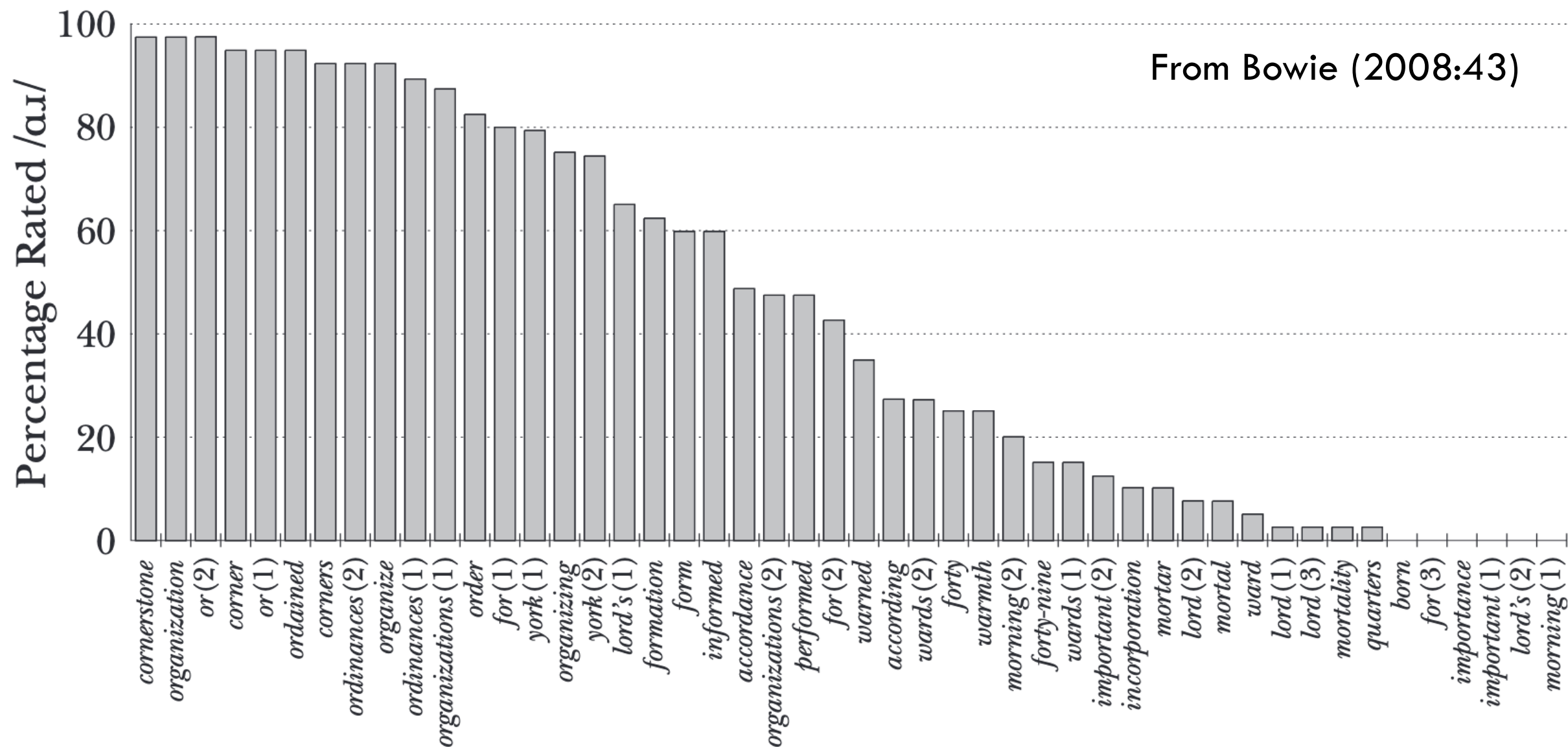
Interviewer Alright, um, where are your ancestors from? Your family heritage?

C. G. My ancestors come from Nottingham, England. They came through the church. The missionaries uh. They heard the gospel and they come on over and uh. My grandpa had to work a year in New **York** in **order** to get enough money to catch a covered wagon that was coming to uh, Nebraska.

The *cord-card* merger in Utah

- Was once highly socially salient and stigmatized (Cook 1969, Helquist 1970)
 - More common in rural, older, uneducated people.
 - Evidence for a collapsed distinction with a wide phonetic space.
- Bowie's (2003, 2008) reports, based on recorded religious sermons
 - CLOTH was more likely than NORTH to lower.
 - Preceding glide (chiefly /w/) encourages lowering.
 - It became increasingly common from 1850s to 1890s (birth years).
 - Most common among nouns.
 - A clear separation between the two classes when F1, F2, and F3 are considered.
- Common theme: NORTH is highly variable.

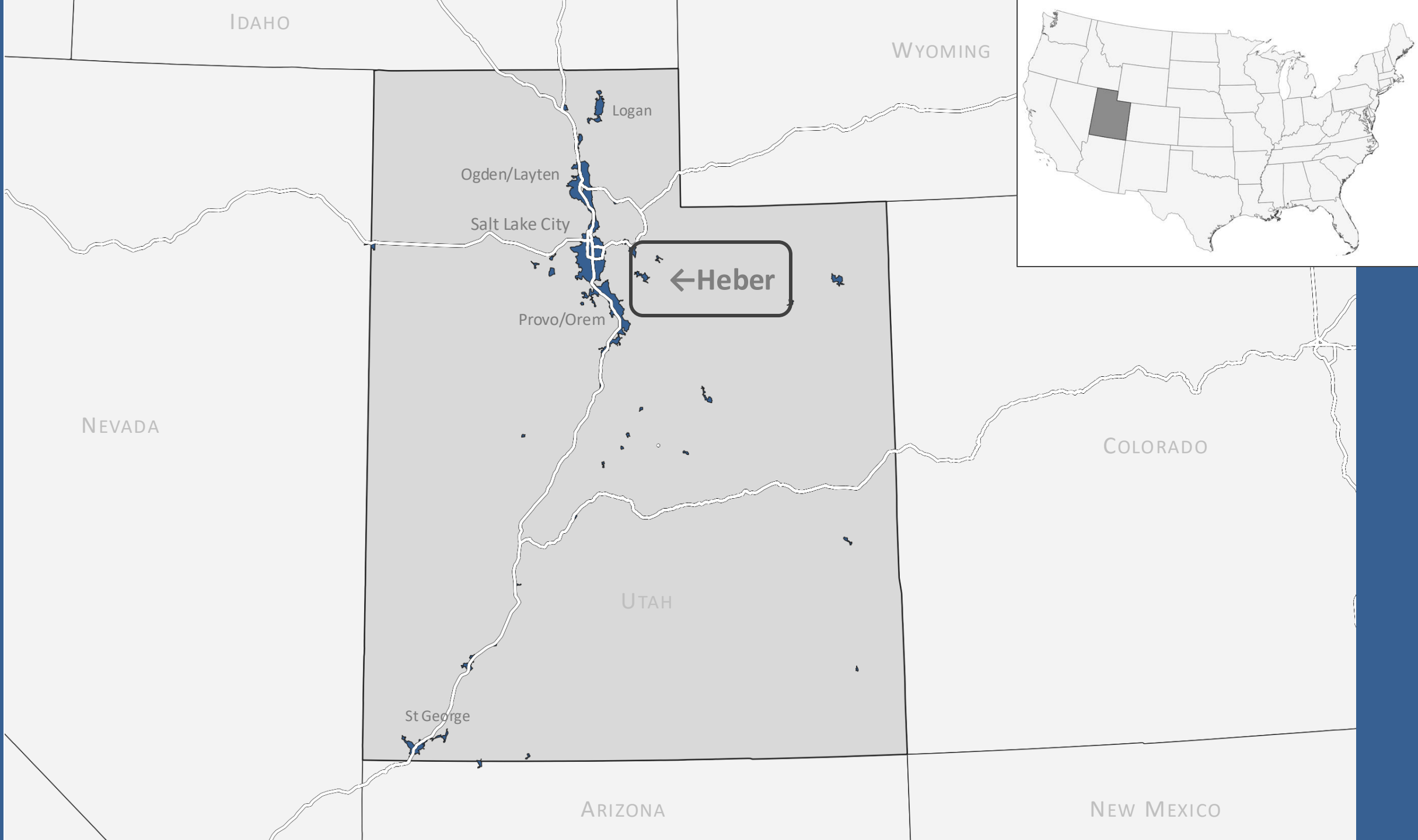
Ratings of (ɔɪ) Class Words as Containing [ɑɪ], by Word



This Study

- What this study contributes.
 - Much larger sample size.
 - Better representation of a typical Utahn in typical conversation.
 - Phonetic description of people born 1900–1940ish
- Today's goals
 - Variation within NORTH
 - potentially how it spread and reversed
 - Variation across speakers
 - potentially how it reversed

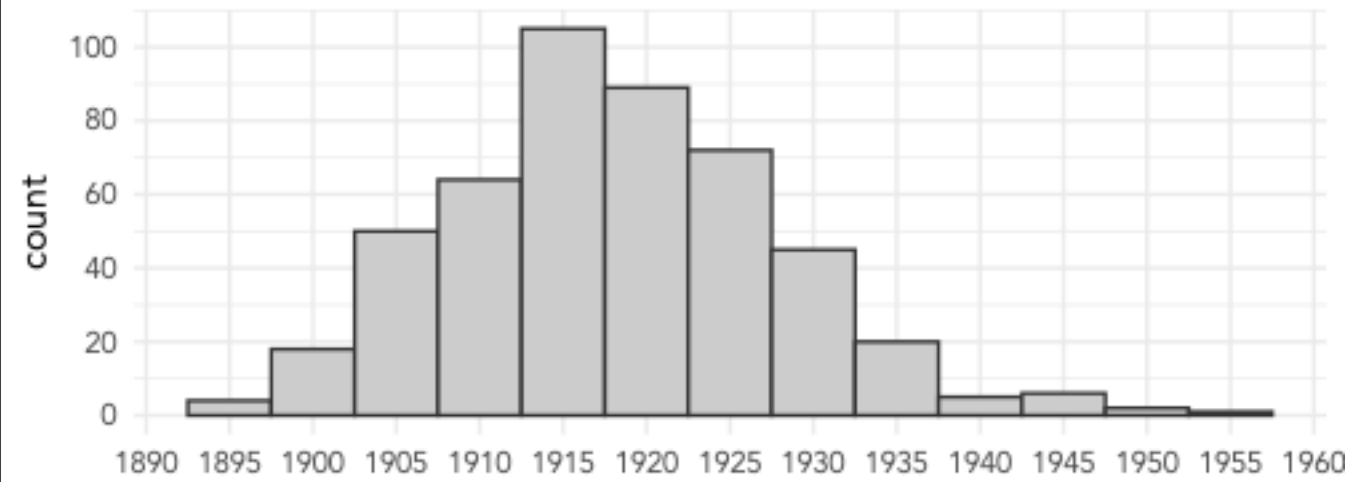
Methods



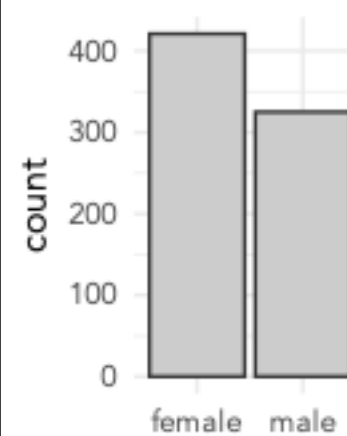
Data

Source	8th graders interviewing older community members
Speakers	≈725
Location	Heber, Utah
Interview years	1989–2000
Metadata	Extracted manually

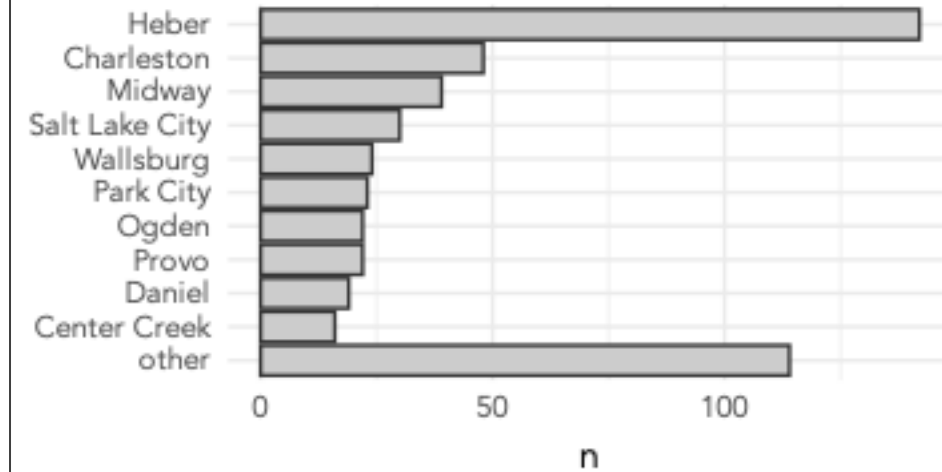
Birth year distribution



Gender distribution



Birth place distribution



Audio-to-formants pipeline

Transcription CrisperWhisper (Wagner et al 2024, Lyman & Stanley *in prep*)

Forced alignment MFA (McAuliffe et al. 2017)

Formant extraction new-fave (Fruehwald 2025a)

Formant-to-processed- data pipeline

(in this order, Stanley 2021b)

Vowel classification Based on Wells (1982)

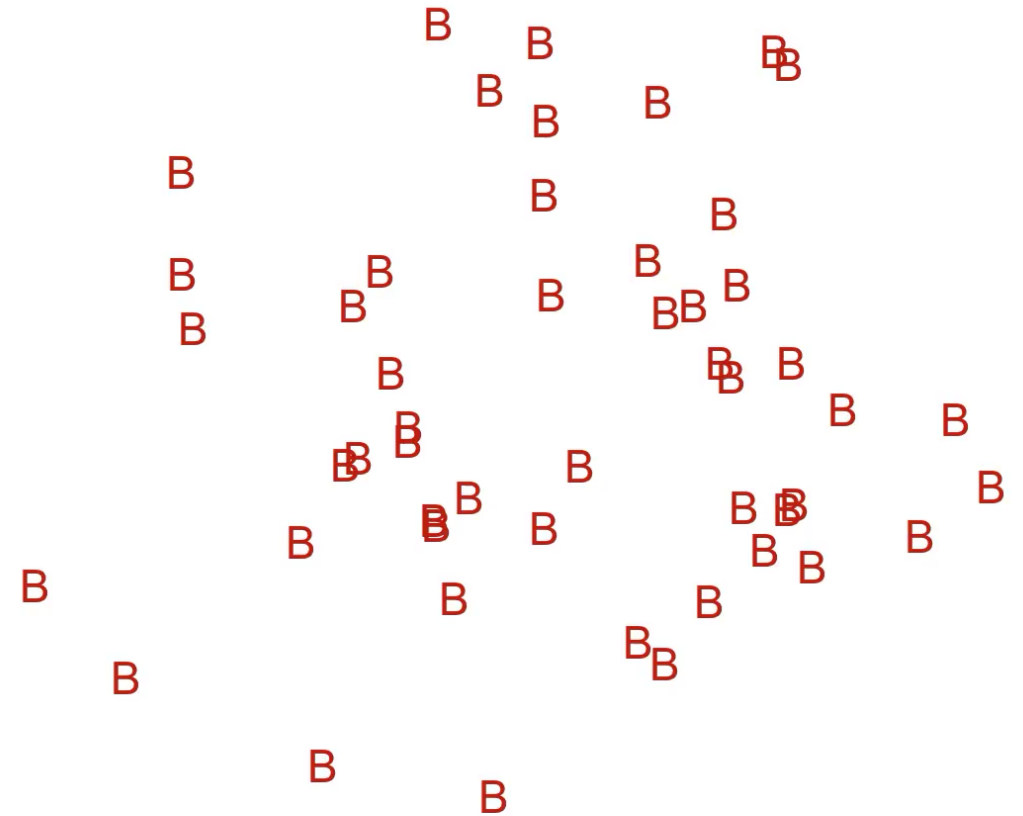
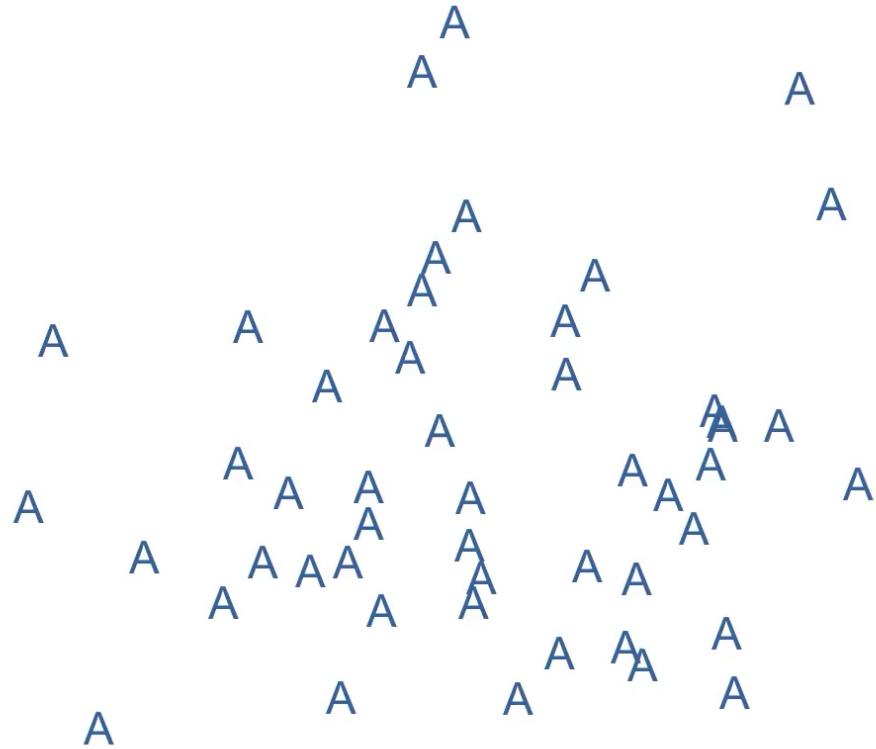
Remove stopwords stopwords::stopwords(source = “marimo”)
and *our(s), your(s), or, are, for*

Remove outliers Modified Mahalanobis Distance (Stanley 2020, Stanley 2021a)

Normalize tidynorm::norm_nearey() (Nearey 1978, Fruehwald 2025b)

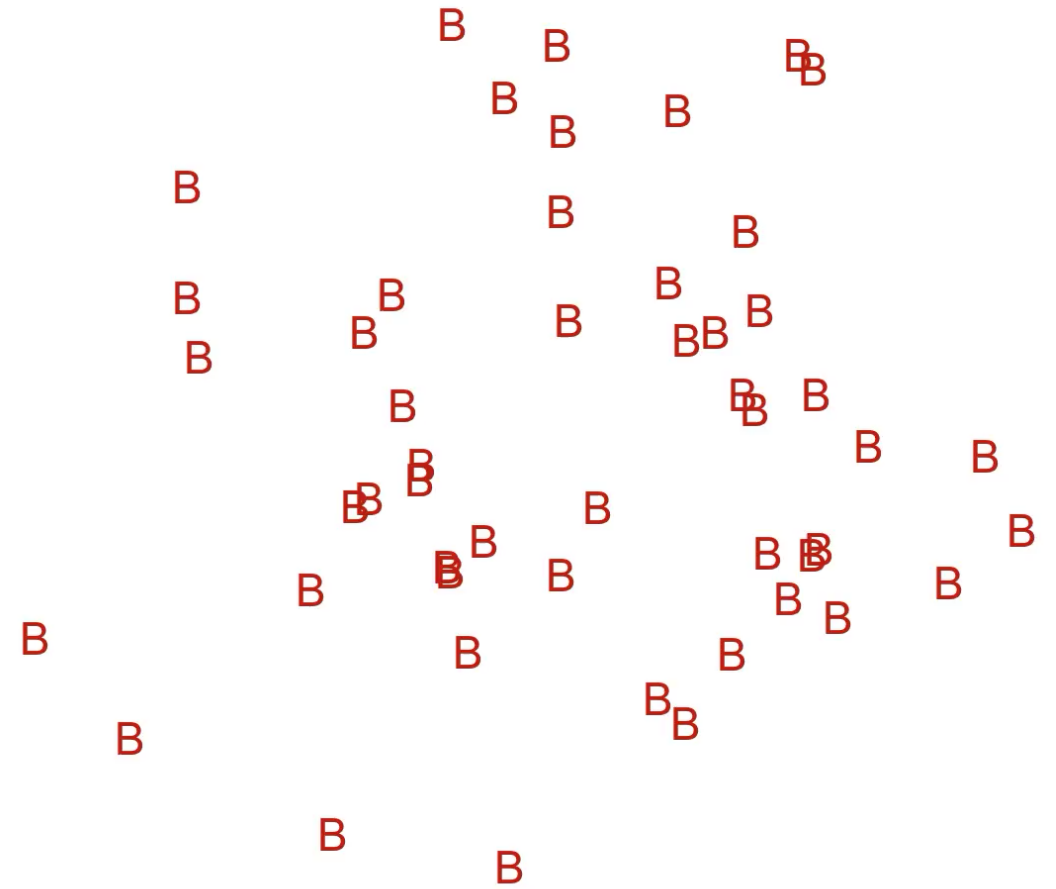
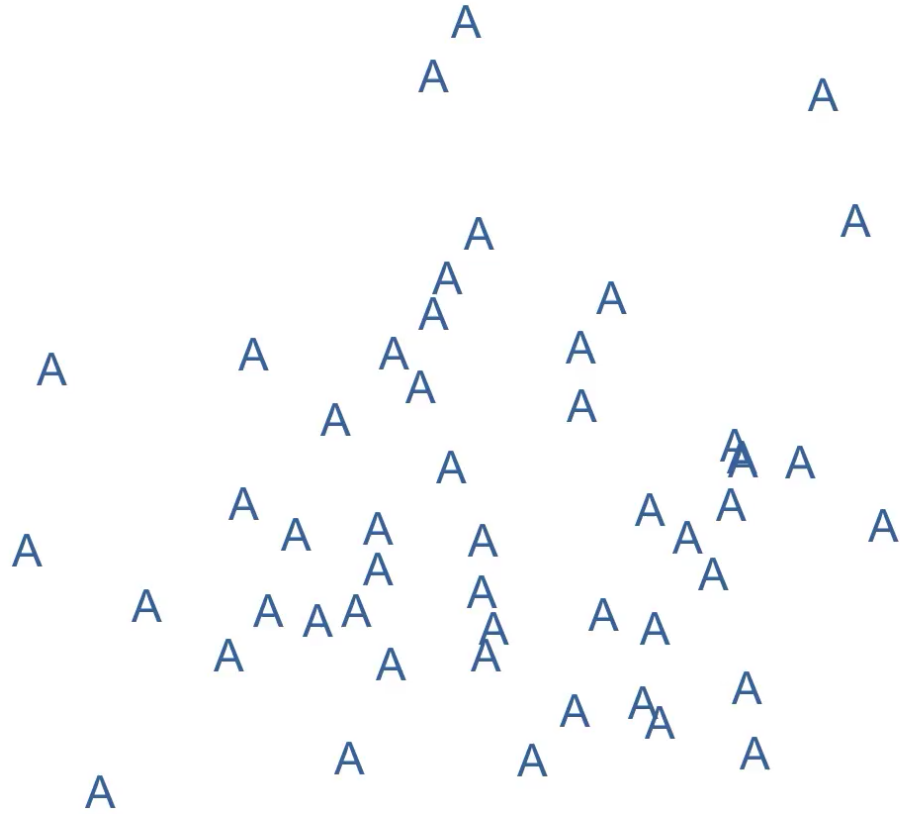
Merger by Approximation (Trudgill & Foxcroft 1978)

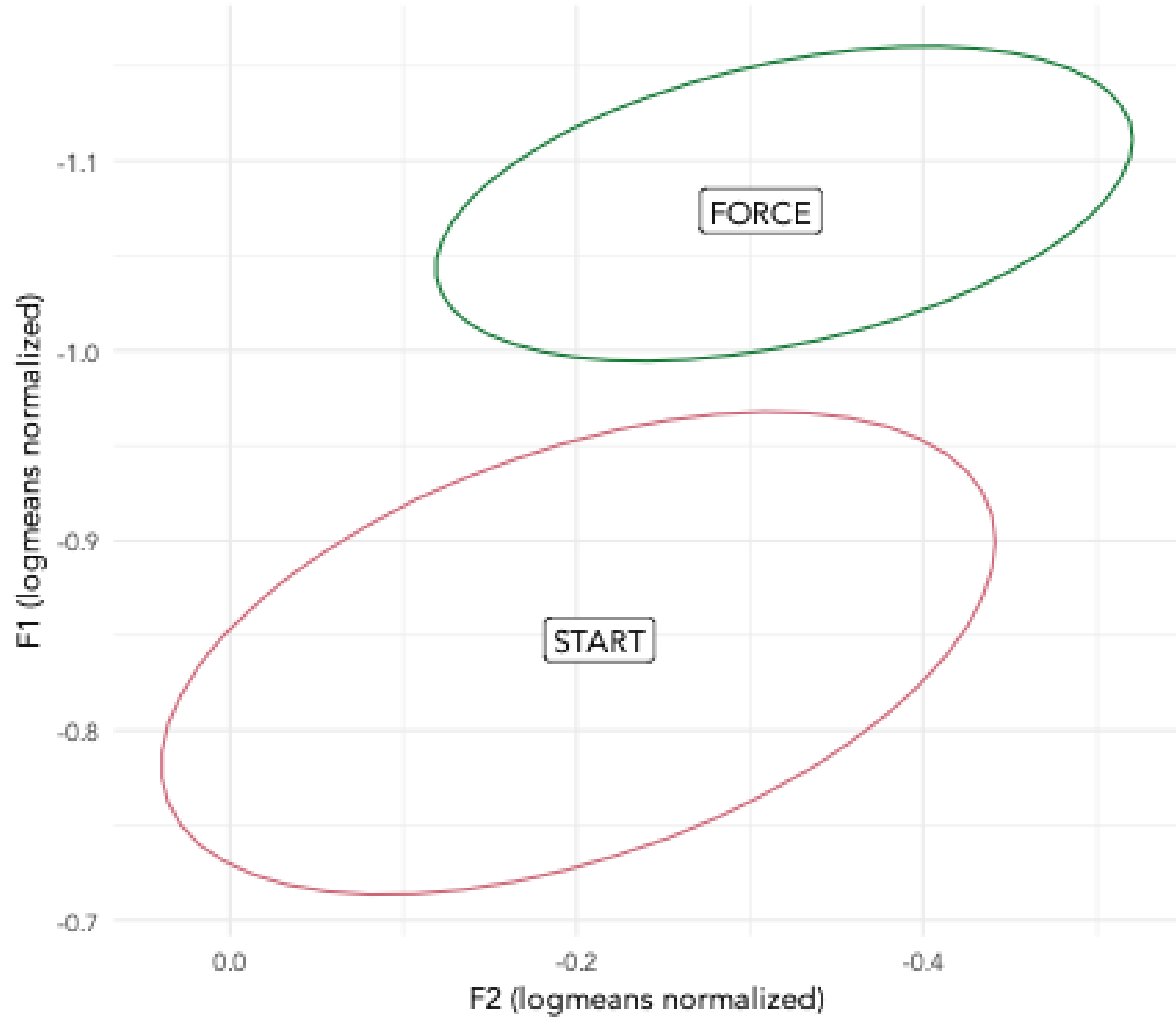
Based on 100 randomly generated data points

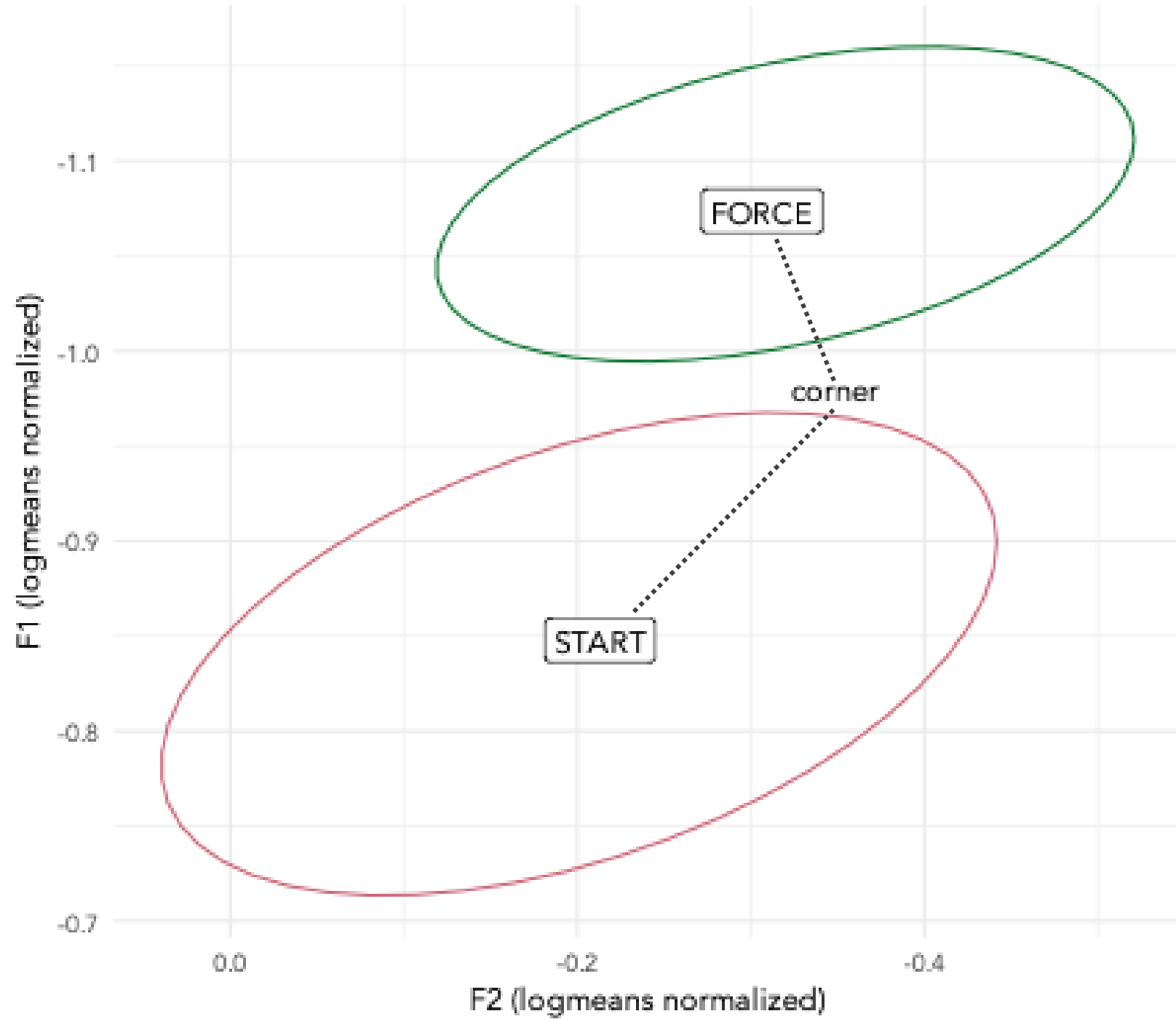


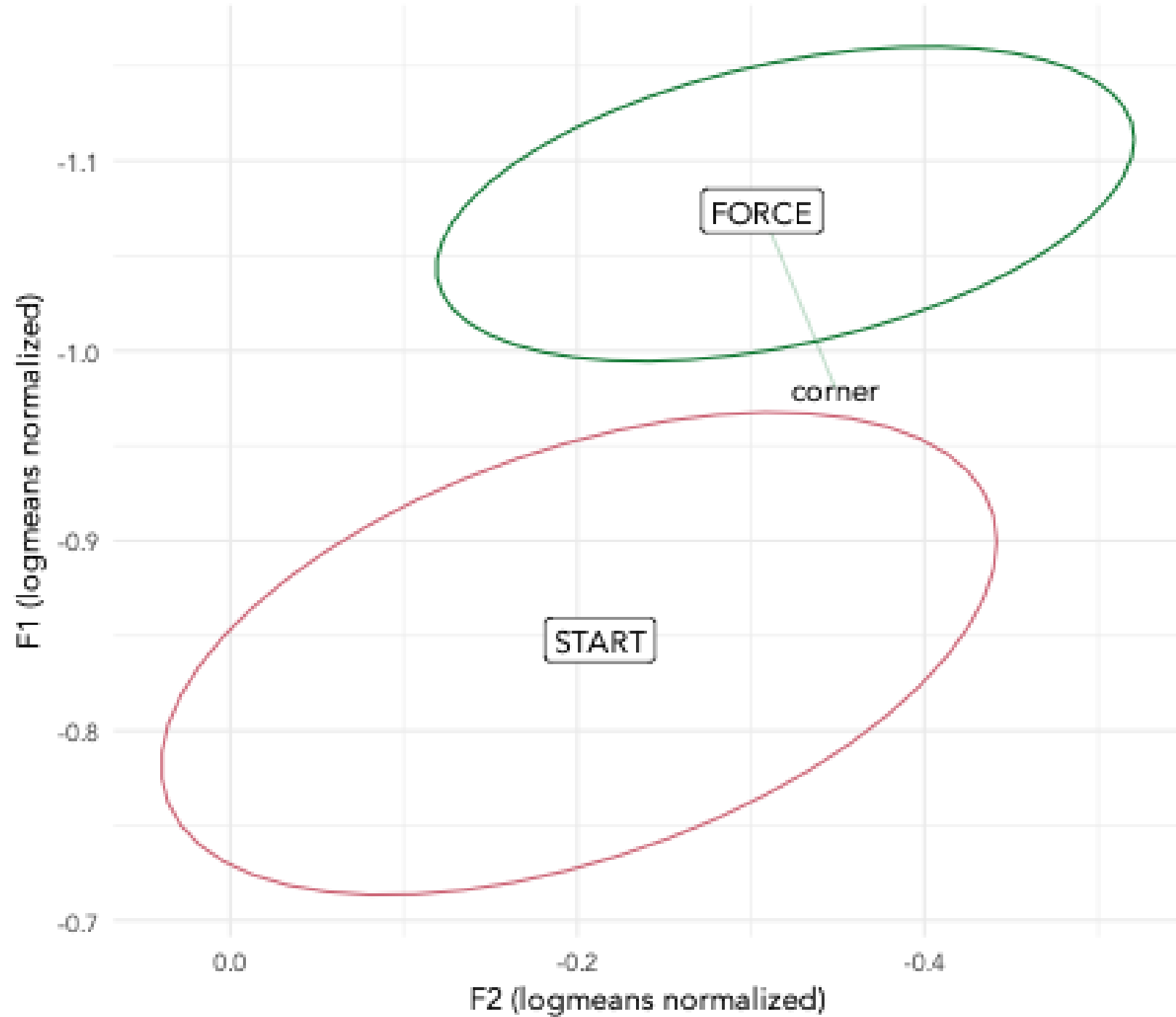
Merger by Transfer (Trudgill & Foxcroft 1978)

Based on 100 randomly generated data points



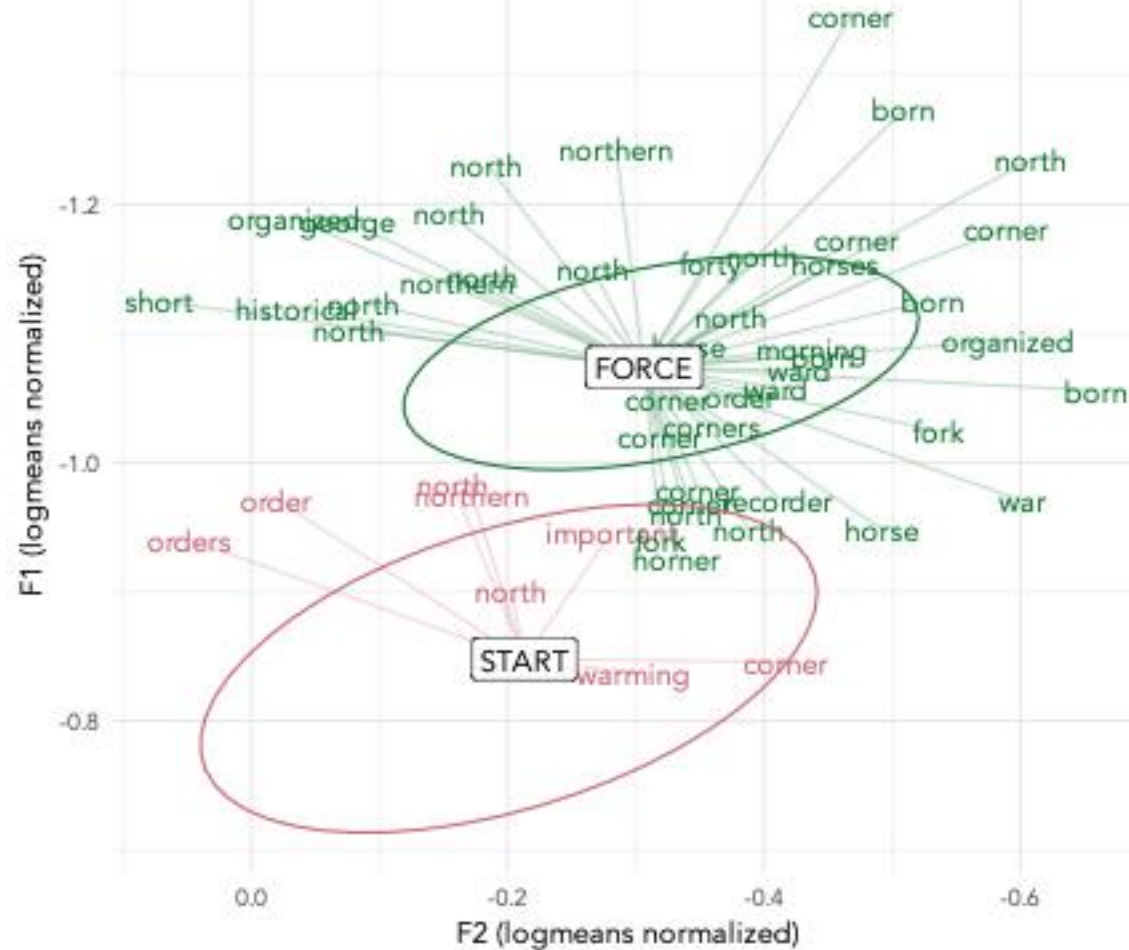




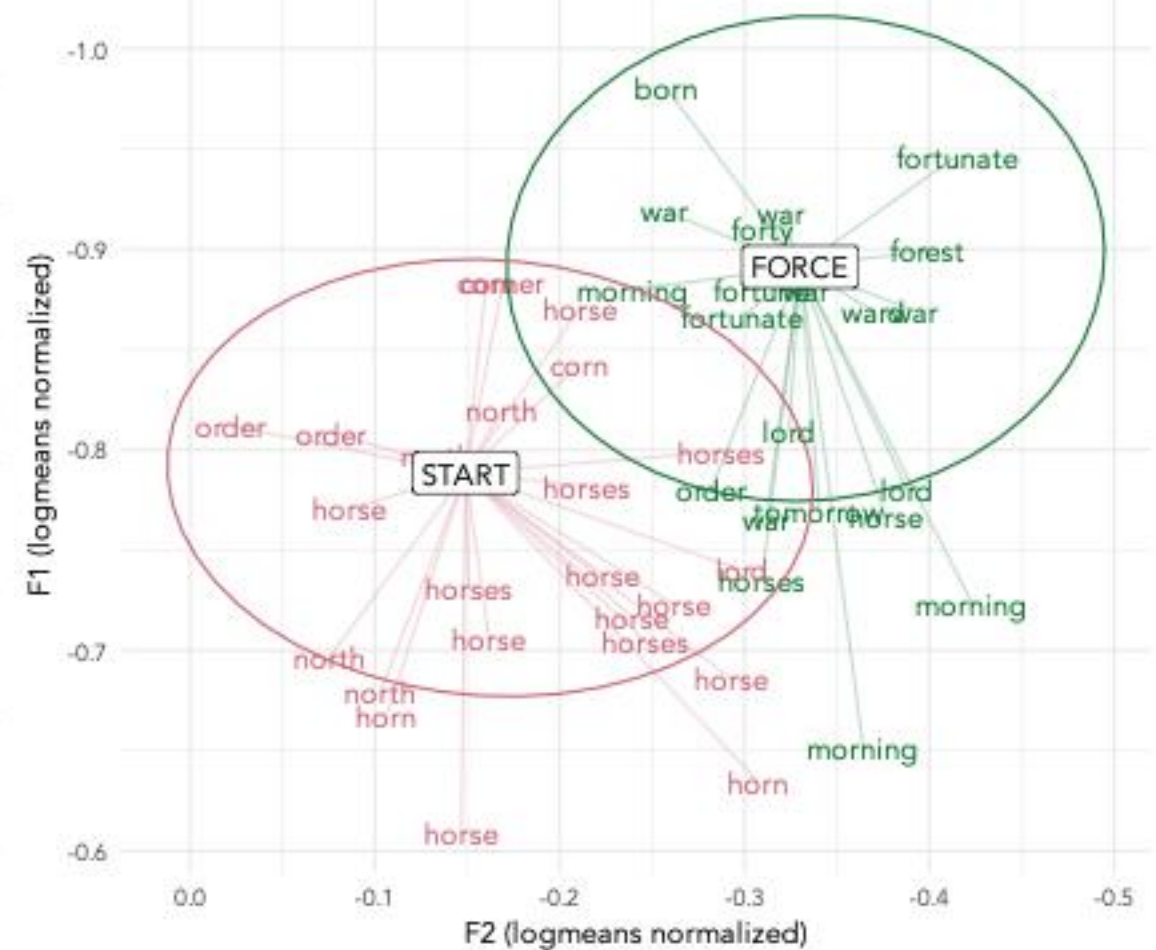


Measuring Merger

E.W., male, b. 1918, Midway: 15% NORTH as START



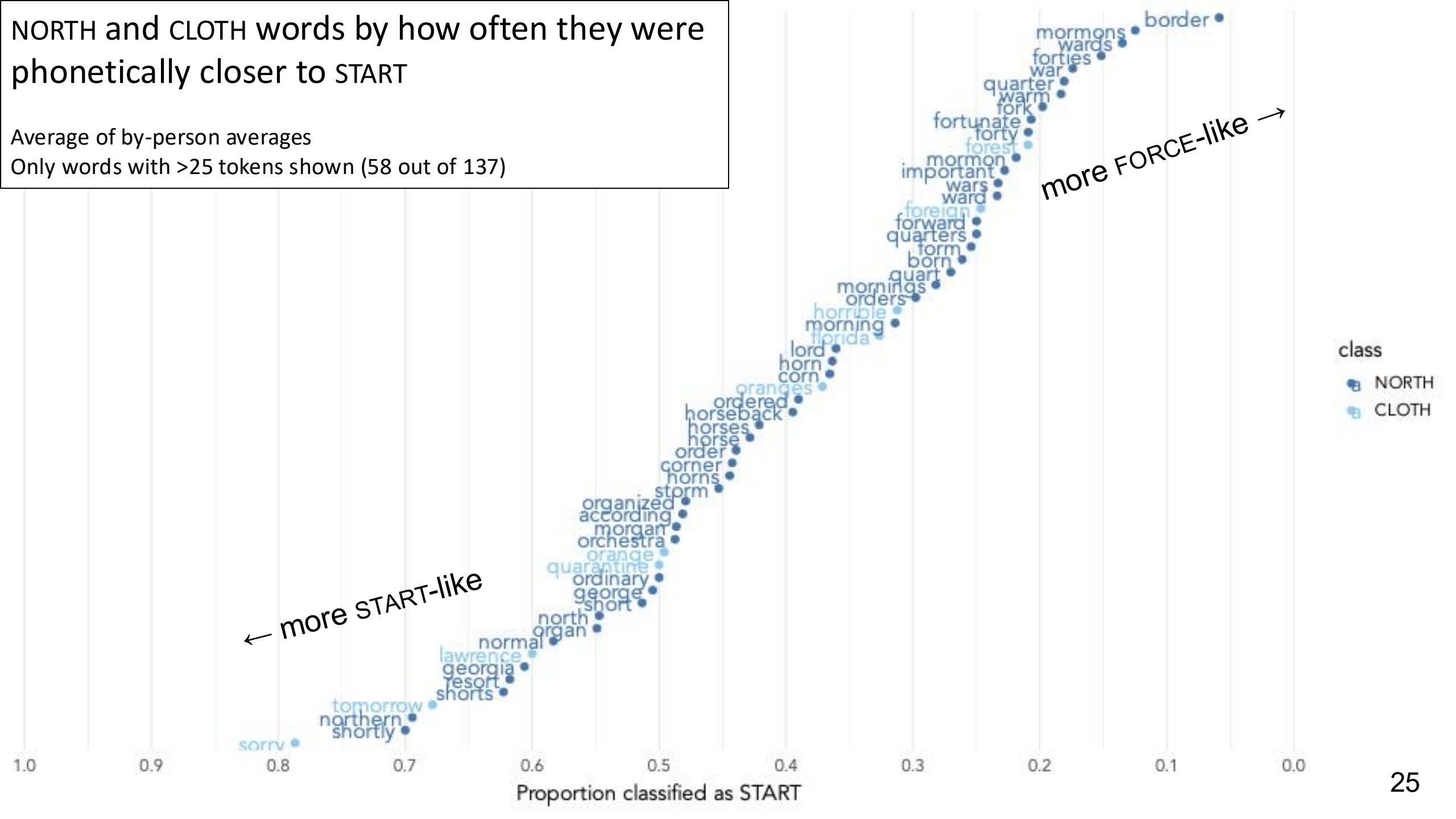
C.G., male, b. 1925, Heber: 53% NORTH as START



Results (word-level analysis)

NORTH and CLOTH words by how often they were phonetically closer to START

Average of by-person averages
Only words with >25 tokens shown (58 out of 137)

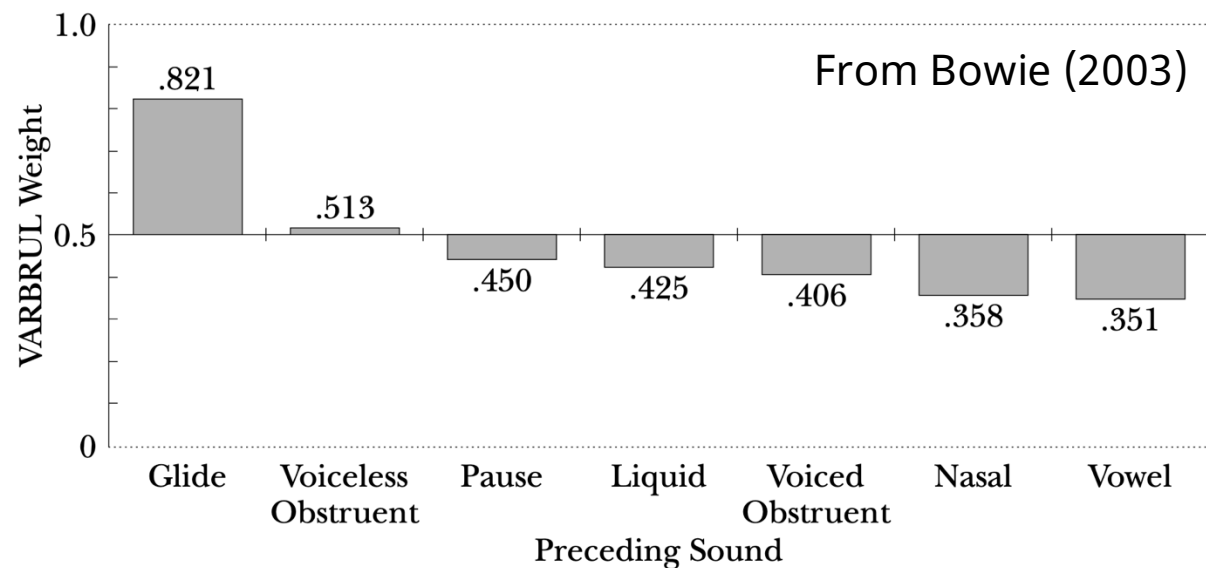


Correlation between Bowie (2008) and this dataset

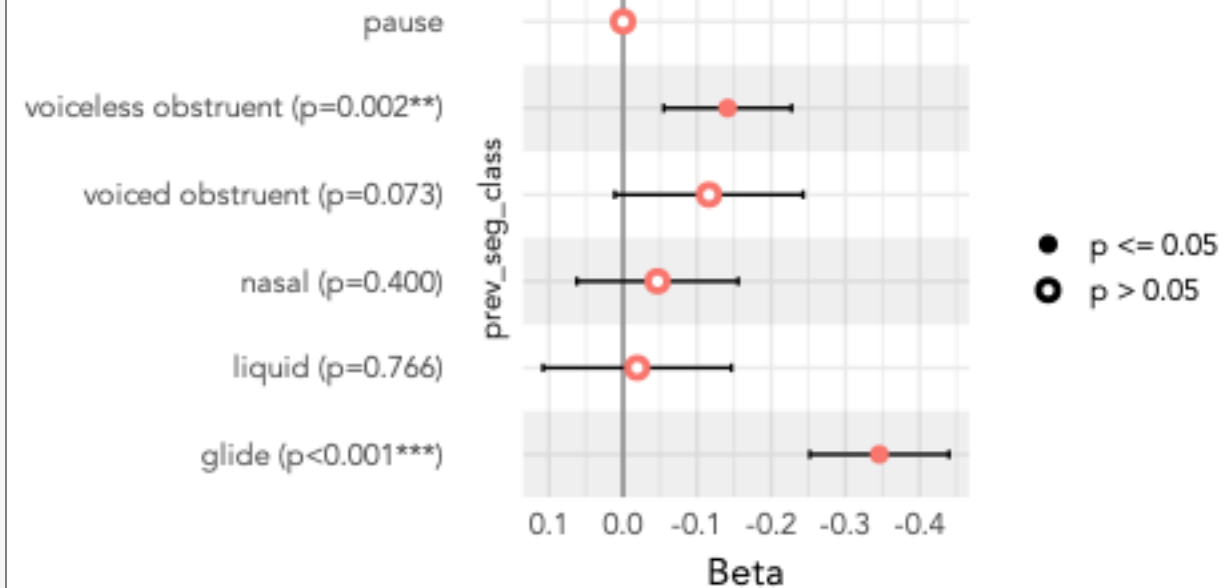


figure 4

VARBRUL Weights for Preceding Sound



Model coefficients



Correlation between Bowie (2003) and this model



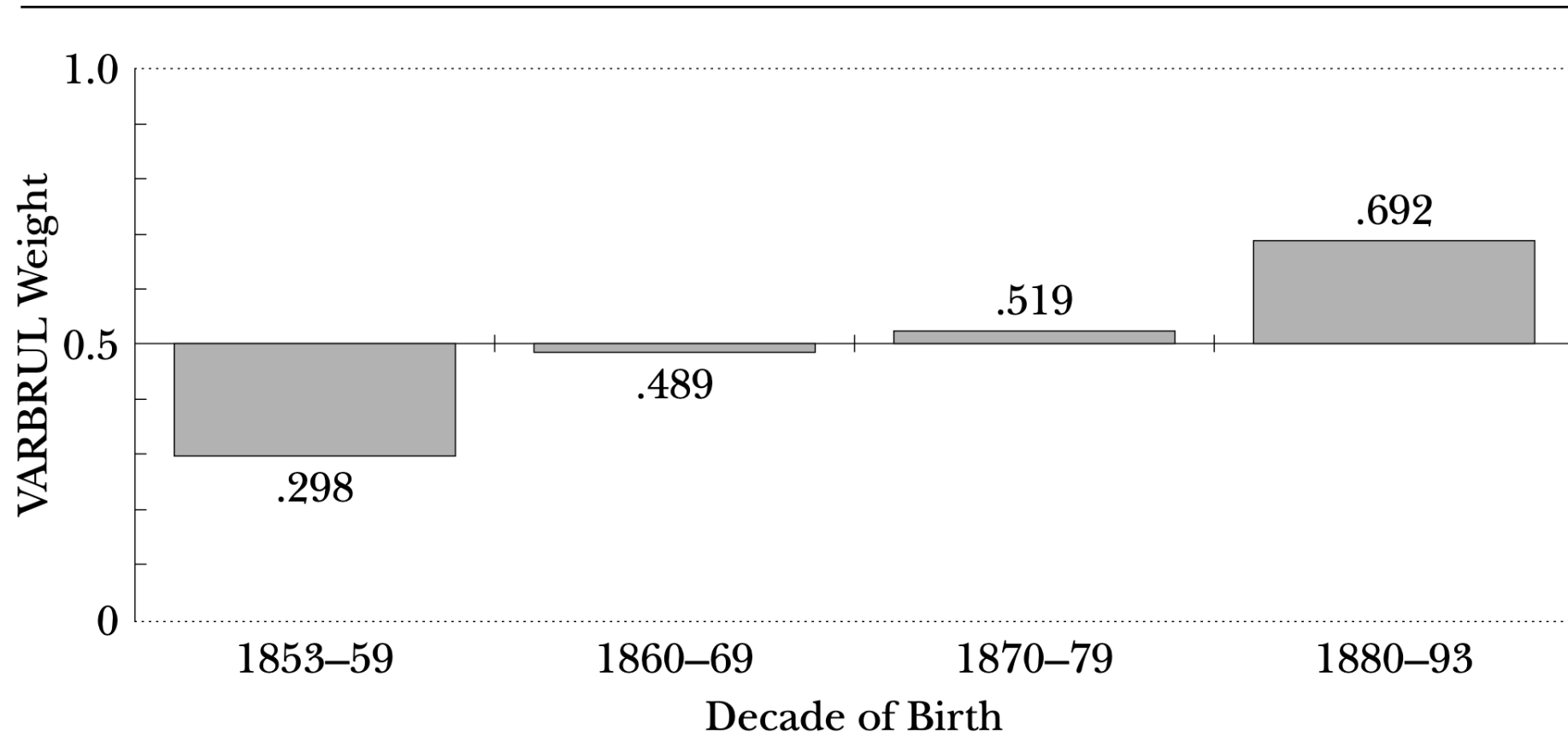
Interim Summary

- Massive variation in NORTH and CLOTH
 - No real difference between NORTH and CLOTH.
 - Previous /w/ and voiceless obstruents inhibit lowering.
- Some indication of consistency across speakers.
 - Some NORTH words are usually FORCE-like while others are usually START-like.
 - However, inconclusive similarity with Bowie's (2003) speaker from another region.

Results (speaker-level analysis)

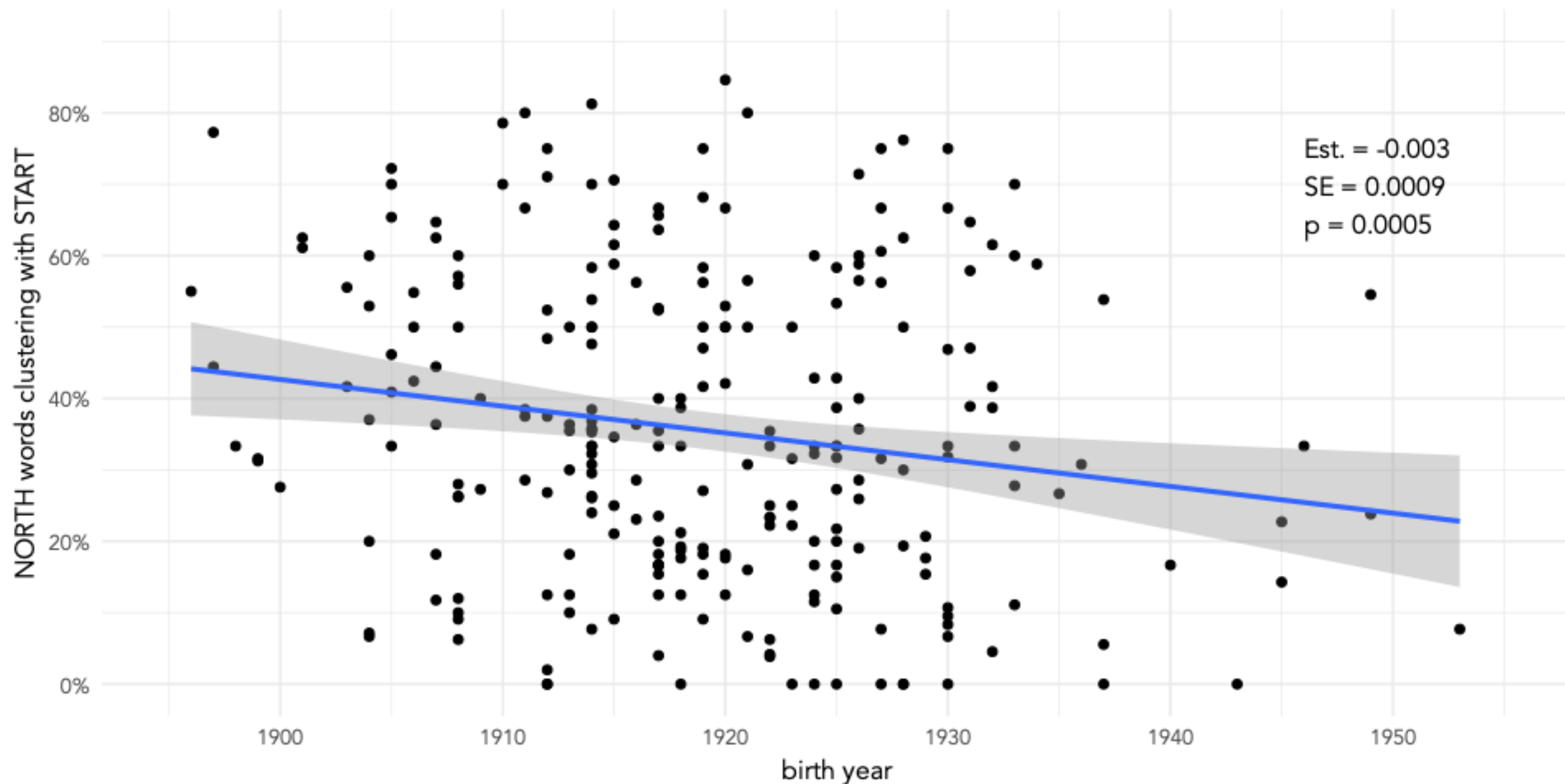
From Bowie (2003)

figure 5
VARBRUL Weights for Year of Birth of Speaker by Decade



Percent of NORTH words clustering with START, by birth year

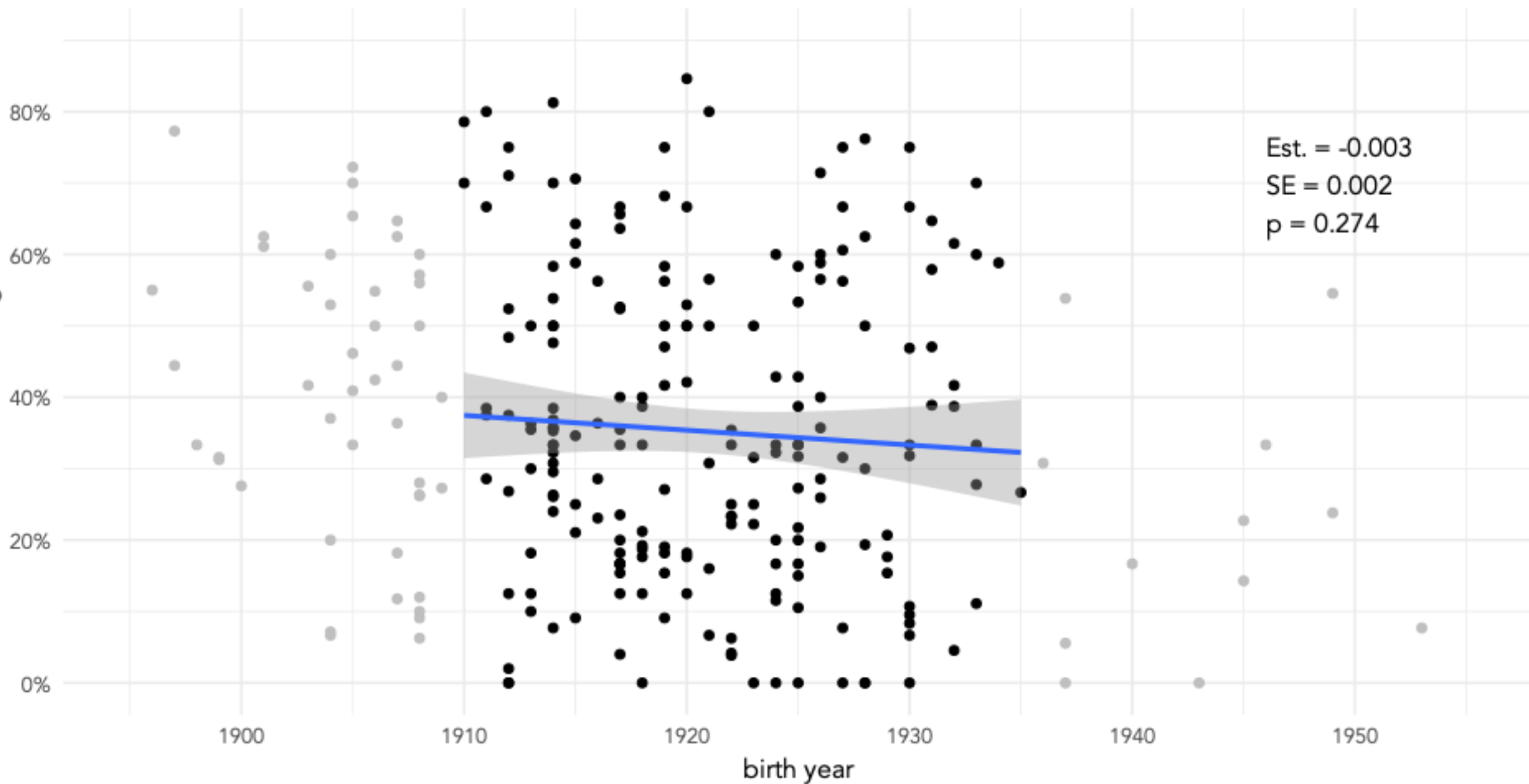
Higher values suggest more *cord-card* merger



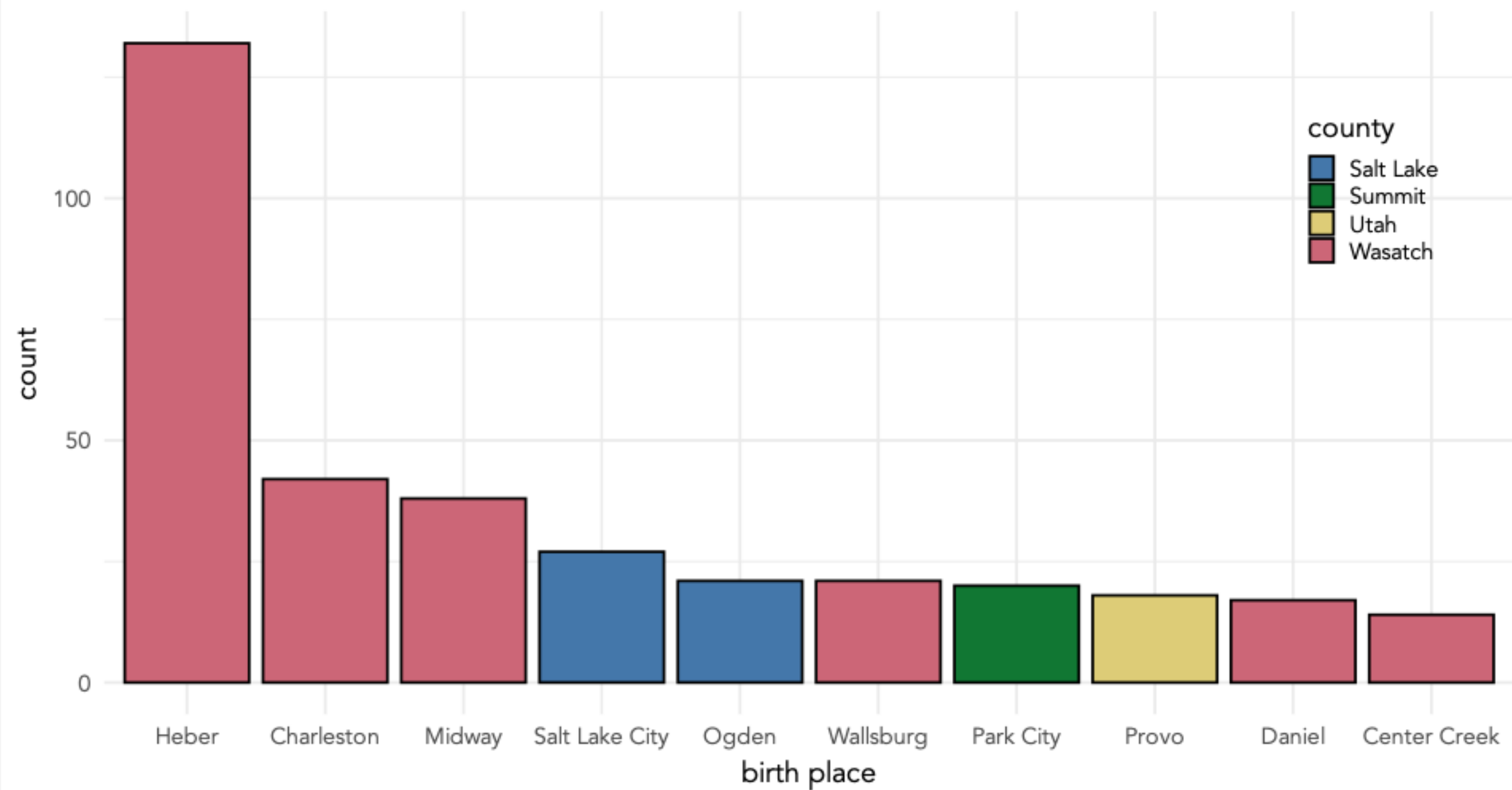
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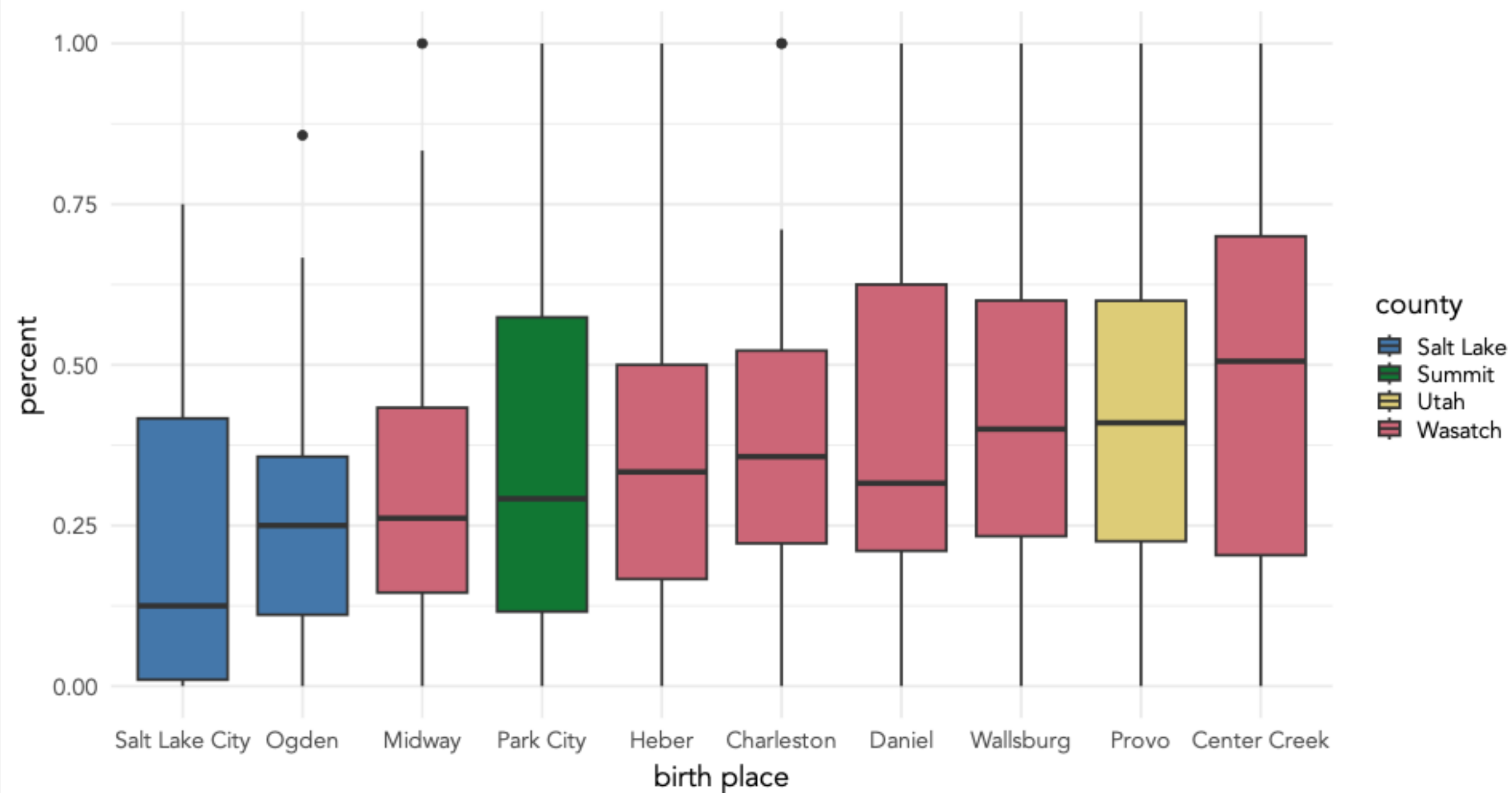
NORTH words clustering with START



Speaker birth places (only top 10 cities shown)

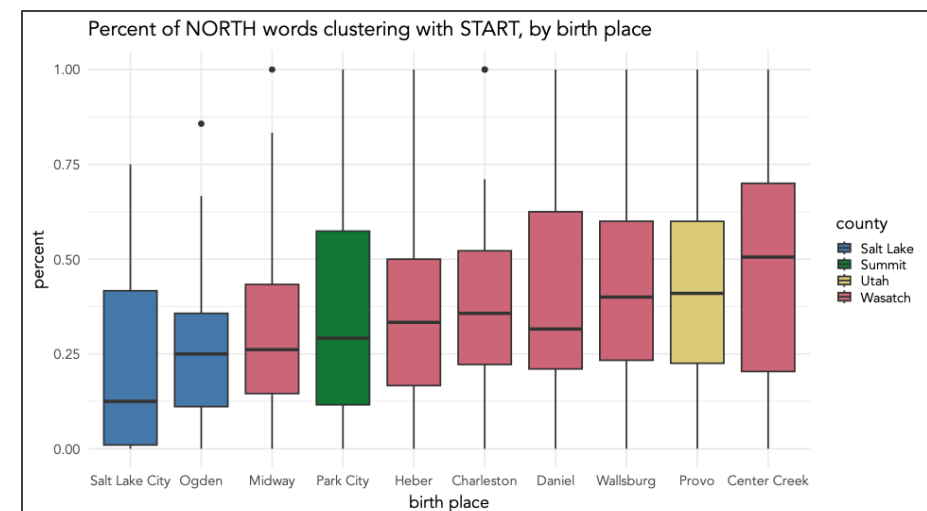
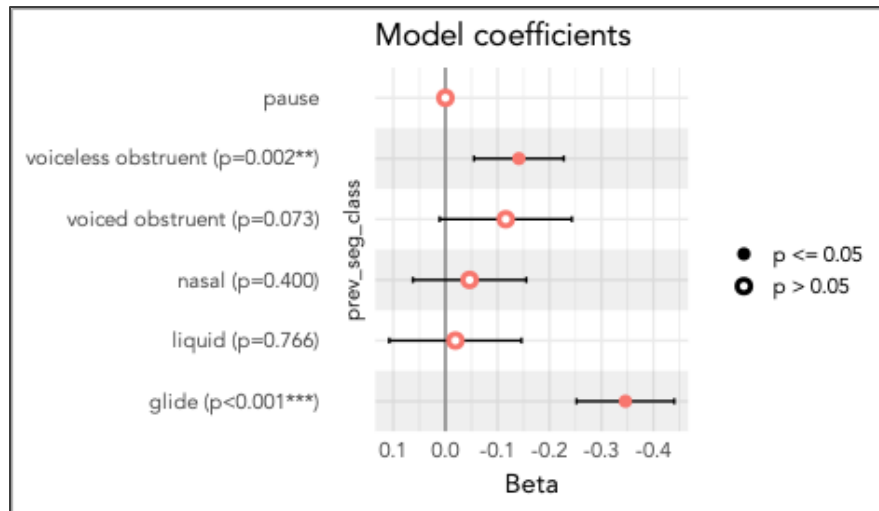
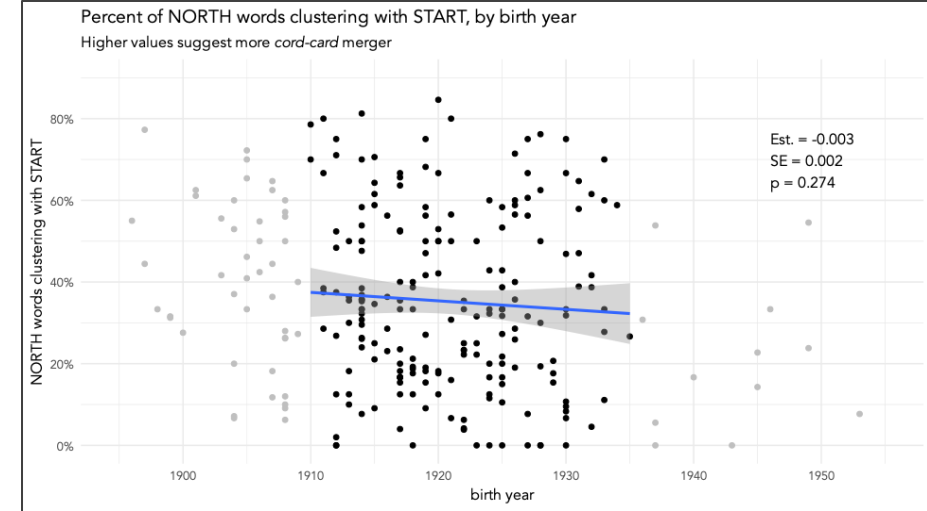
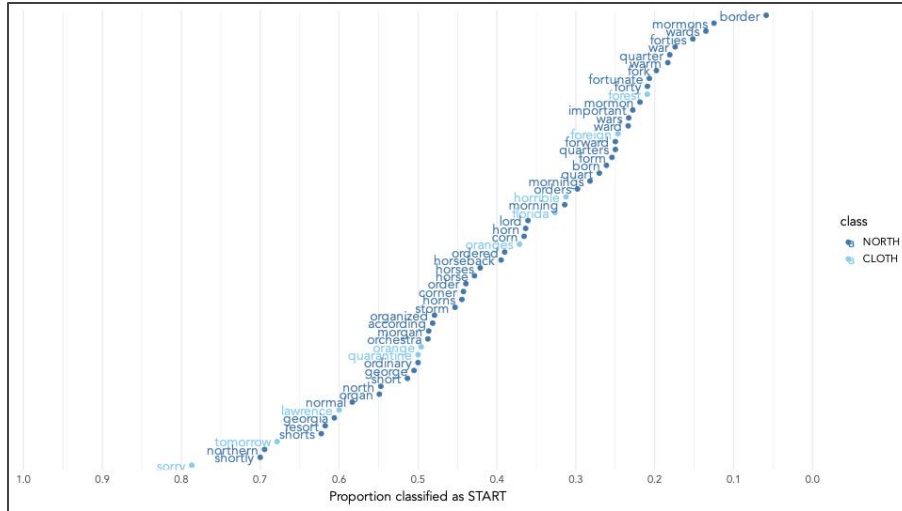


Percent of NORTH words clustering with START, by birth place



Discussion and Conclusions

Variation in NORTH



Utah's CORD-CARD merger(?)

- Was it really merged?
 - This might be a merger by transfer in progress.
 - Even the most “merged” people had $\approx 50\%$ of NORTH closer to FORCE.
 - It was able to reverse because it was incomplete.
- Salt Lake City leads the reversal.
 - More in-migration.
 - Ideology of non-accent and linguistic insecurity (Stanley under review)
 - Rural areas lag behind due to lack of contact.
 - Provo lags behind potentially due to religious identity.

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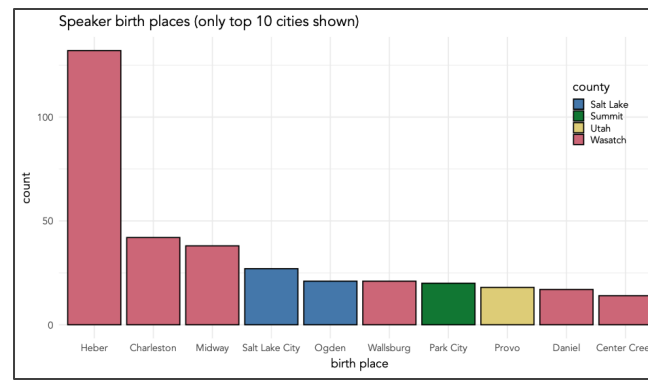
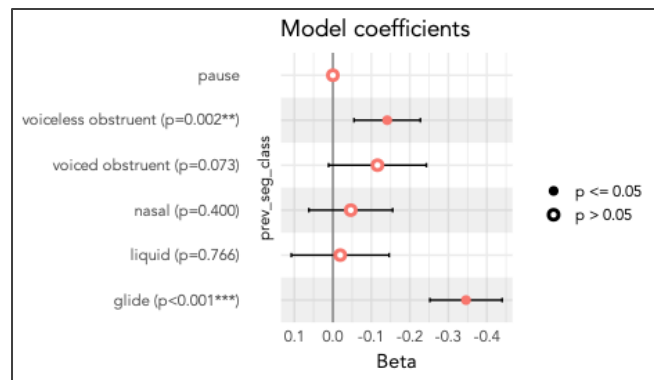
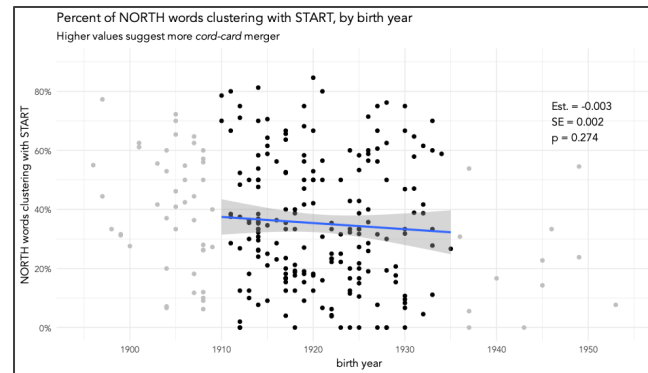
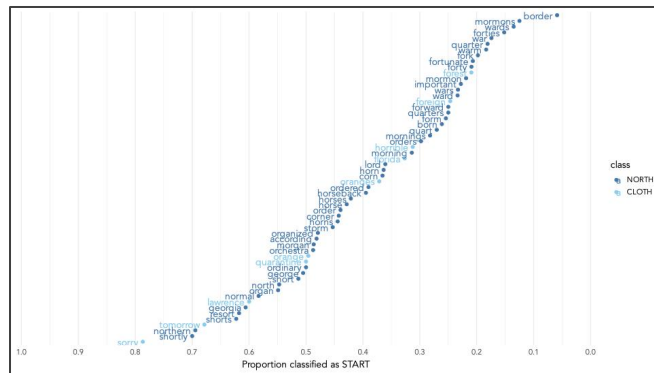
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Office of Digital Humanities

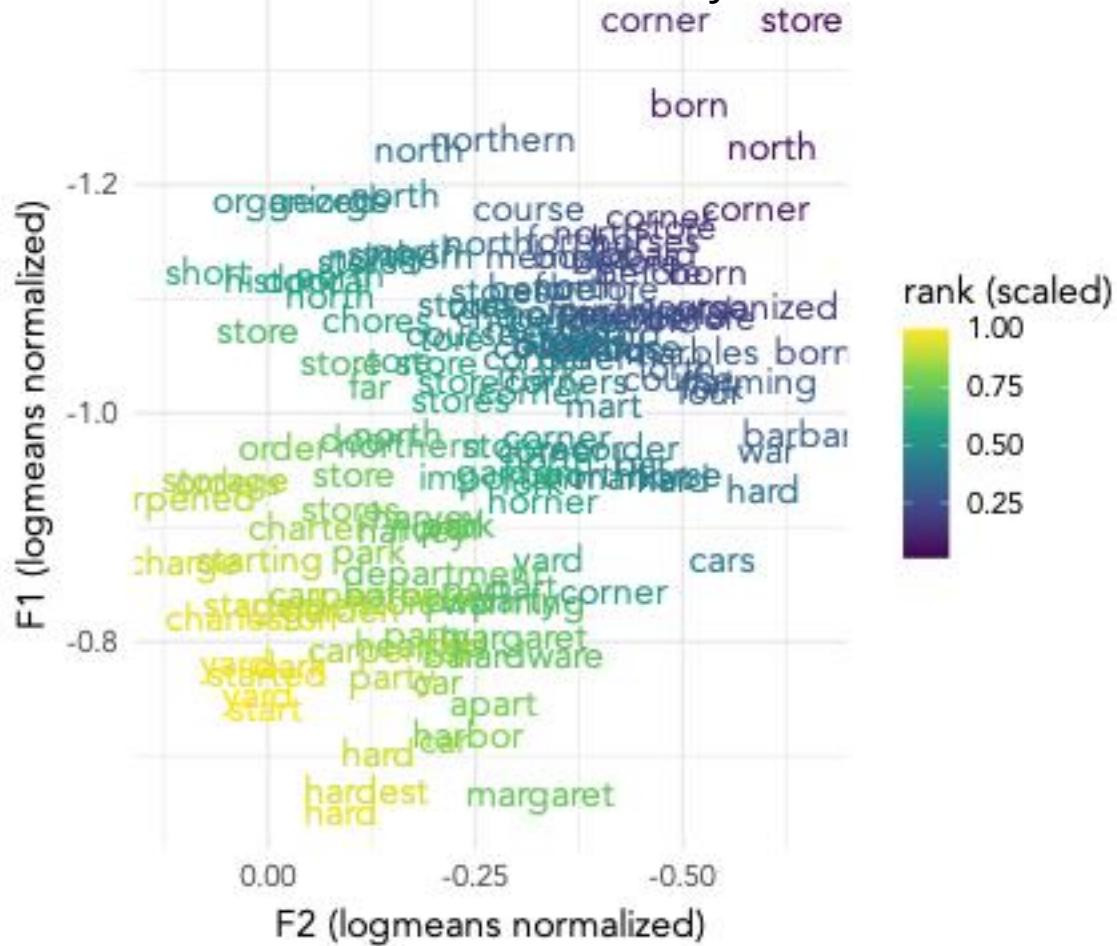
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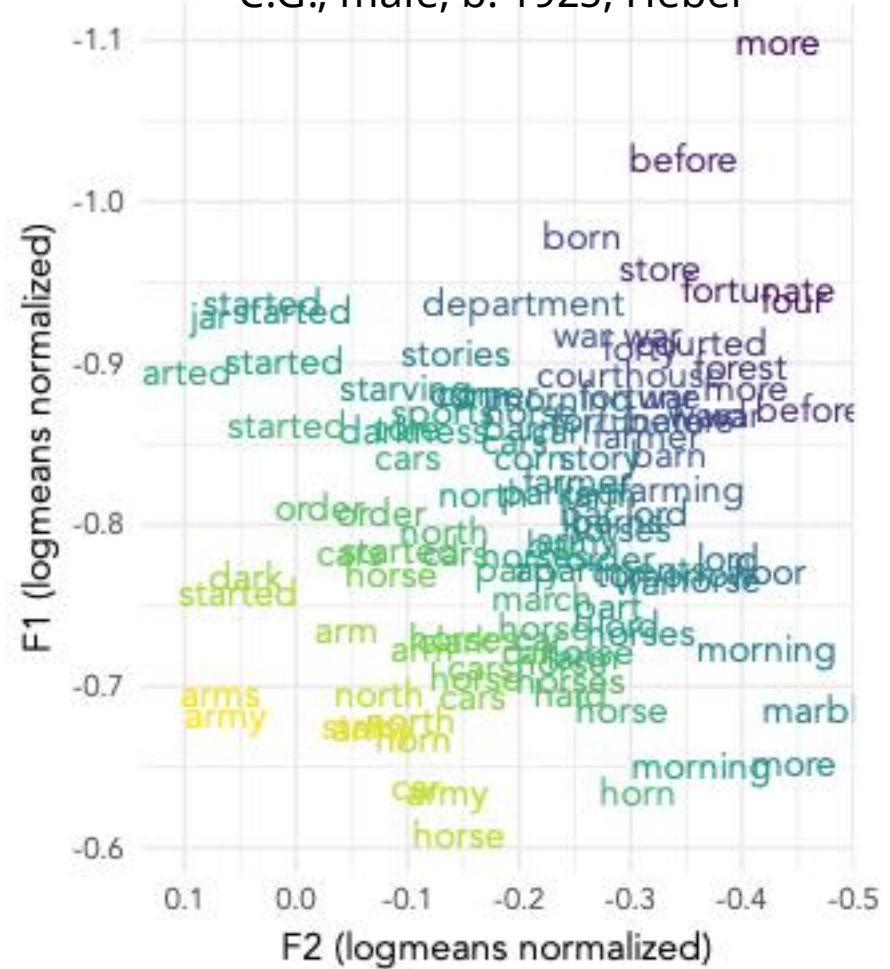
Bonus Slides!

Measuring Merger (method 2)

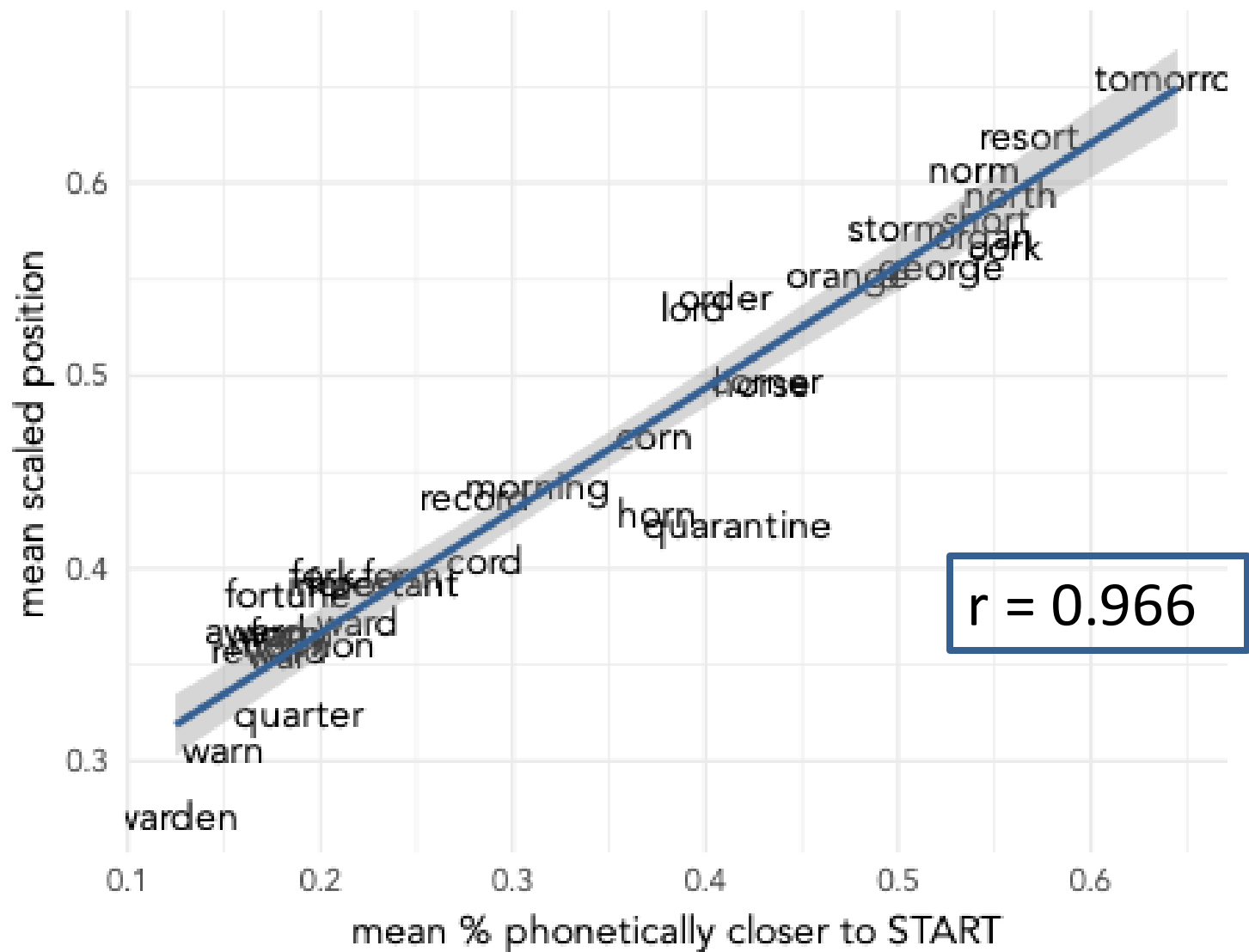
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C.G., male, b. 1925, Heber



Correlation between the two merger analysis methods



Percent of NORTH words clustering with START, by birth place and gender

