

# Variation in Early Utah English's CORD-CARD merger

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Joseph A. Stanley

*Brigham Young University*

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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 /ɔ:/ 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.*

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

*orange, forest, quarantine, tomorrow, horror*

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*car, farm, hard, part, far, park, party, barn, garden, army, yard, large, arm, dark, march, heart, card, charge, marble, star, guard, harbor, etc.*

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?

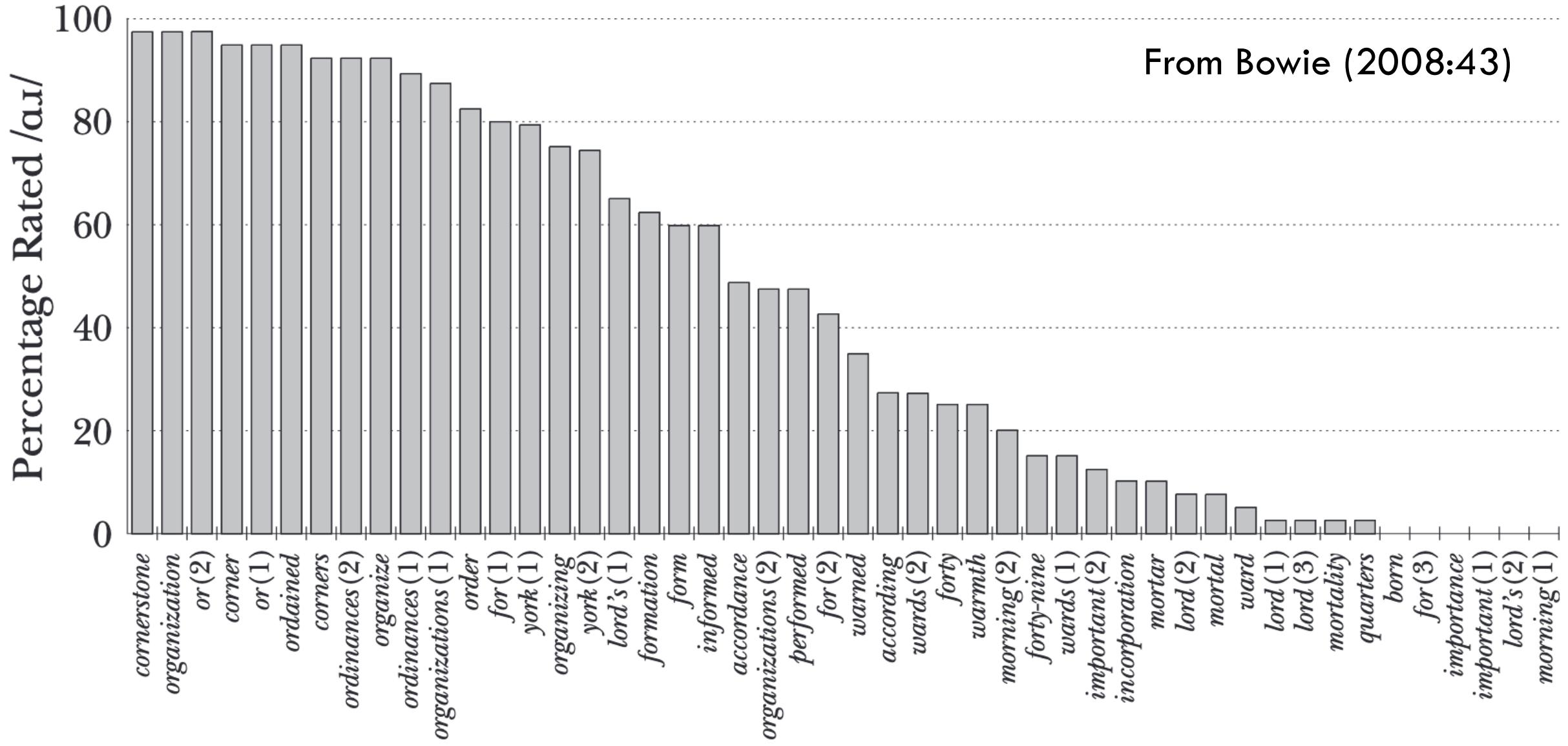
C. G. My ancestors come from Nottingham, England. They came through the church. The missionaries uh. They heard the gospel and they come on over and uh. My grandpa had to work a year in New **York** in **order** to get enough money to catch a covered wagon that was coming to uh, Nebraska.

# The *cord-card* merger in Utah

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- 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 (rc) Class Words as Containing [ər], by Word



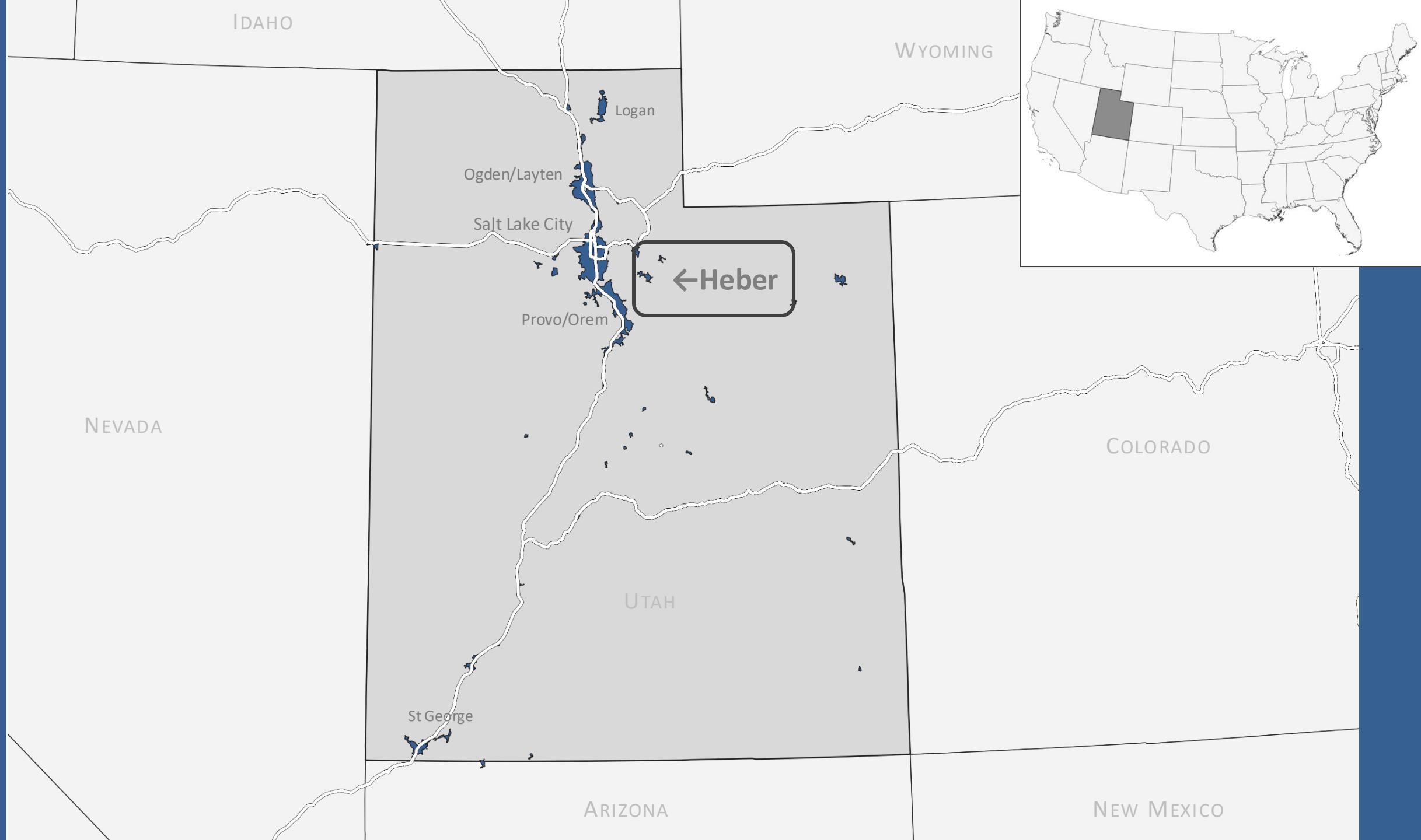
# This Study

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- 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

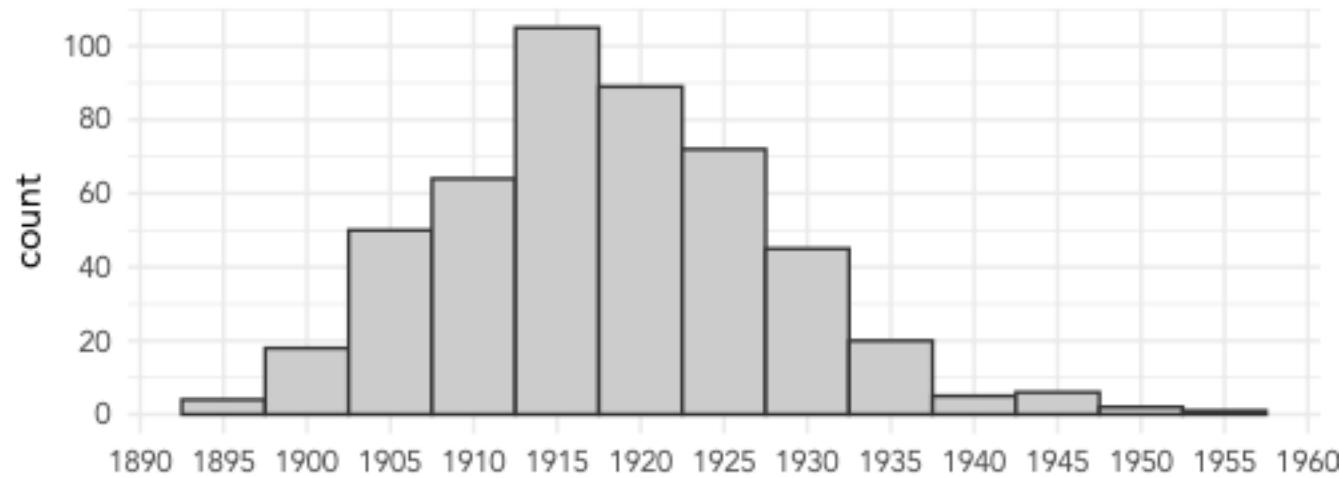
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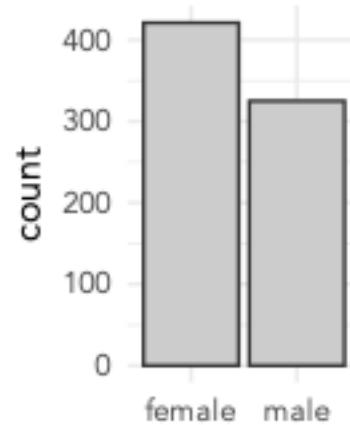
# Data

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

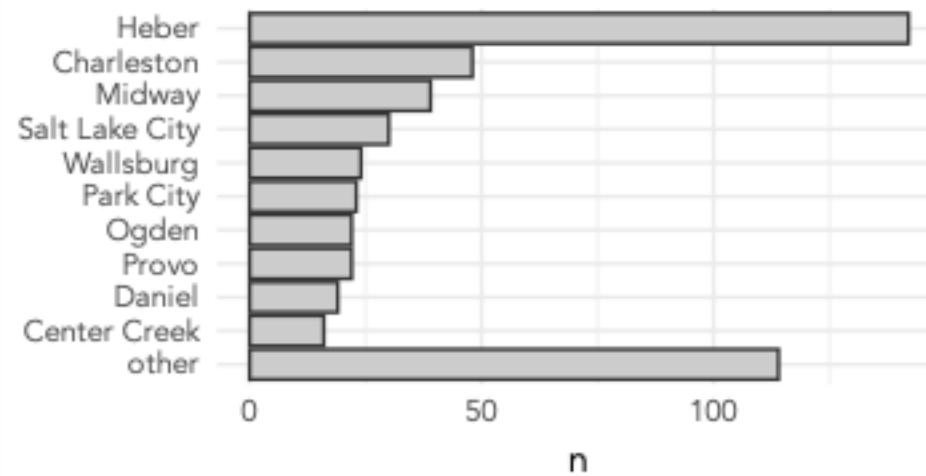
Birth year distribution



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)

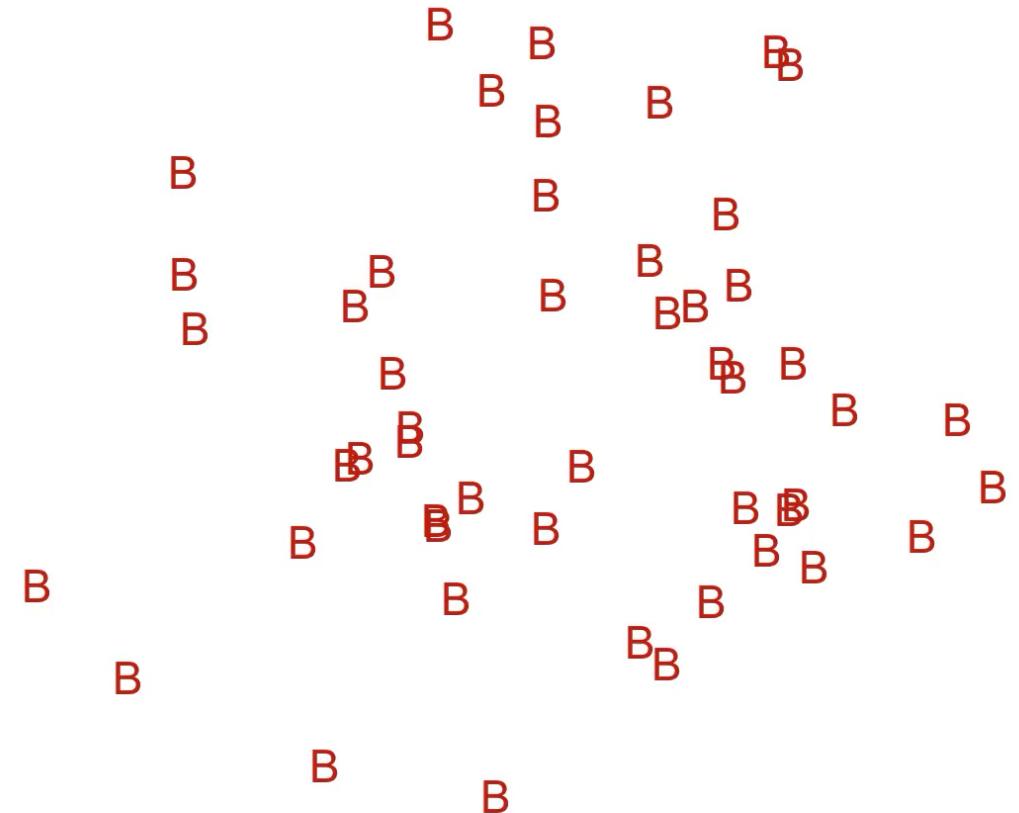
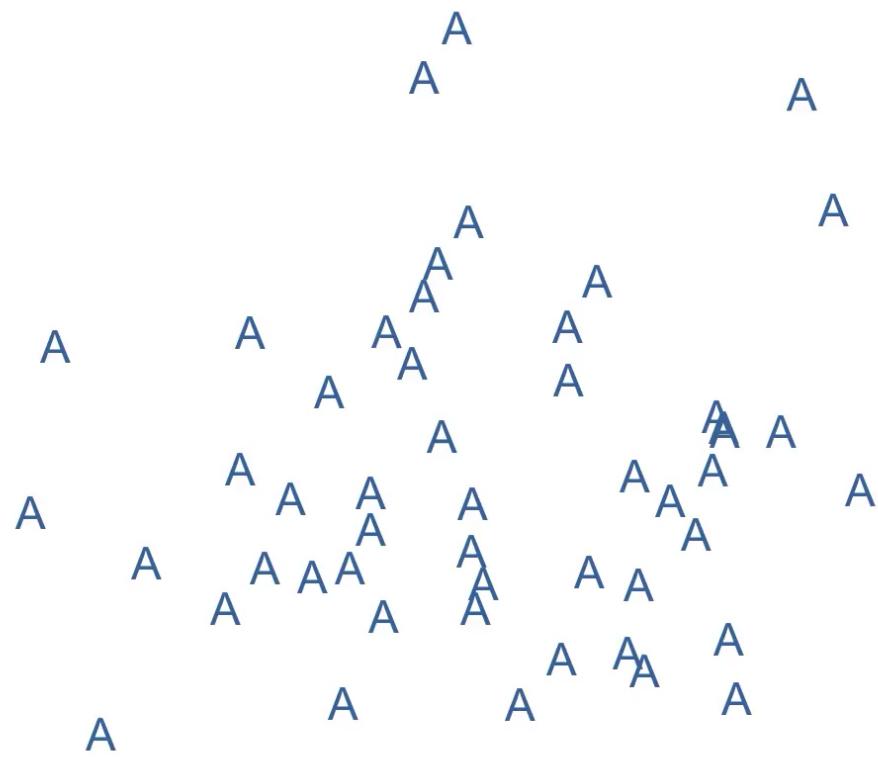
**Remove stopwords** stopwords::stopwords(source = "marimo")  
and *our(s)*, *your(s)*, *or*, *are*, *for*

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

**Normalize** tidynorm::norm\_nearey() (Nearey 1978, Fruehwald 2025b)

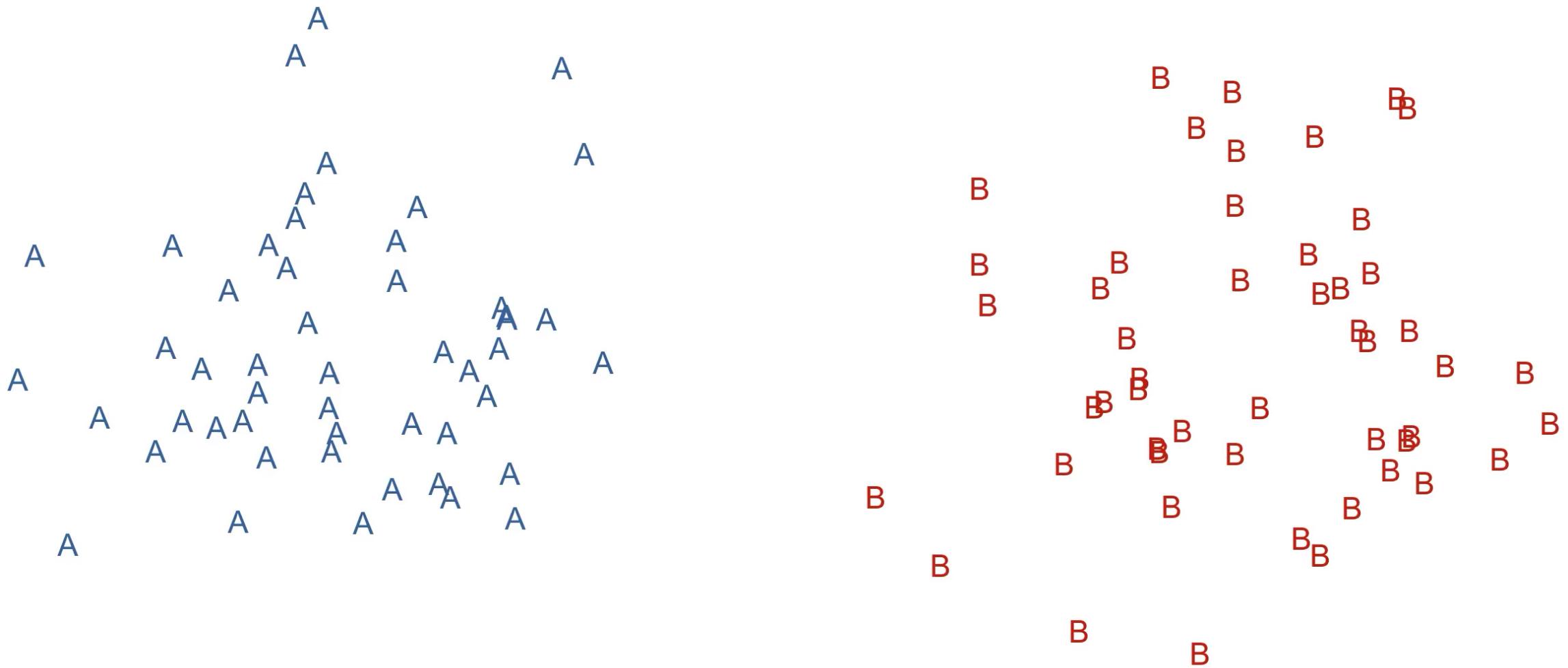
# Merger by Approximation (Trudgill & Foxcroft 1978)

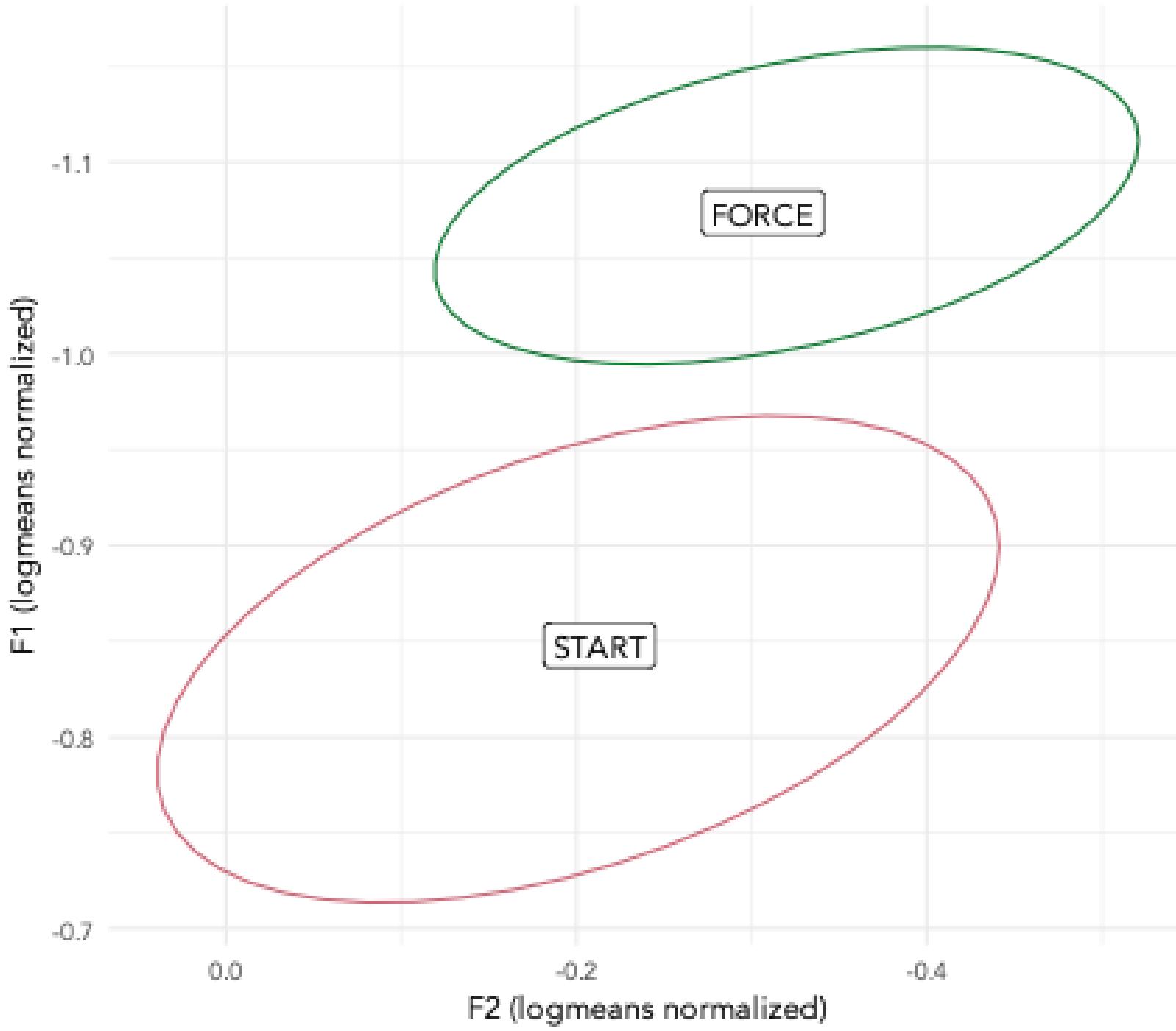
Based on 100 randomly generated data points

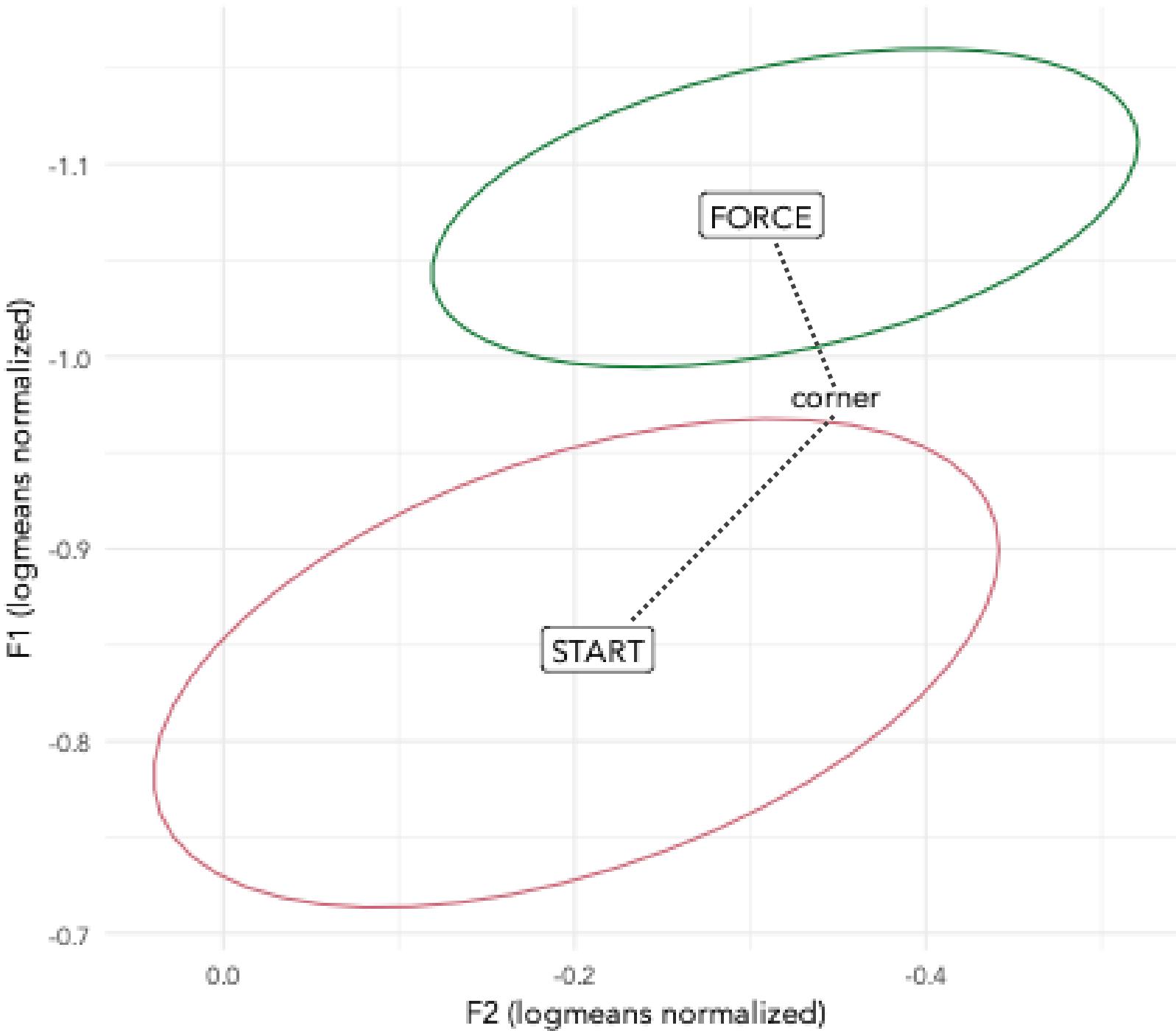


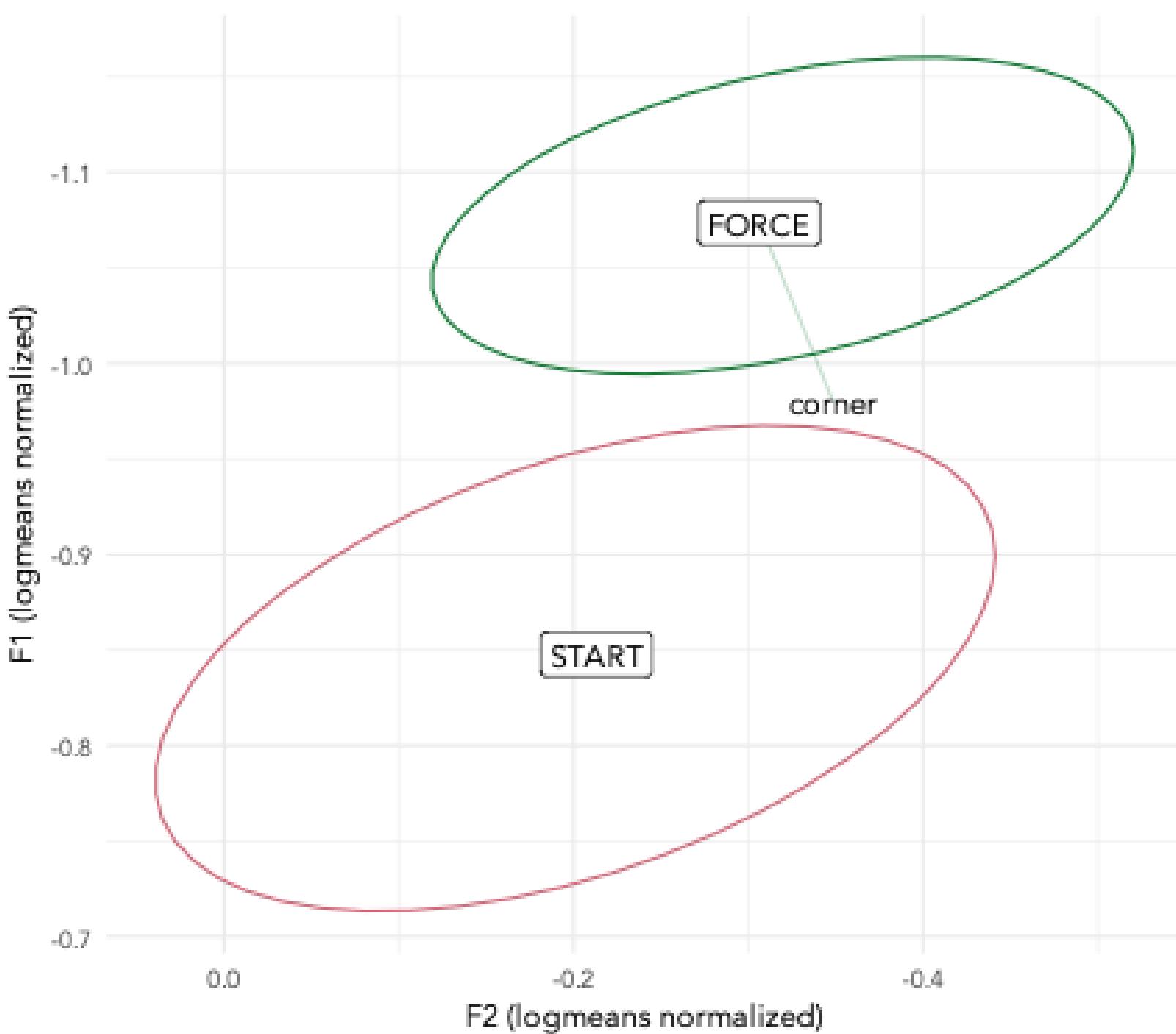
# Merger by Transfer (Trudgill & Foxcroft 1978)

Based on 100 randomly generated data points



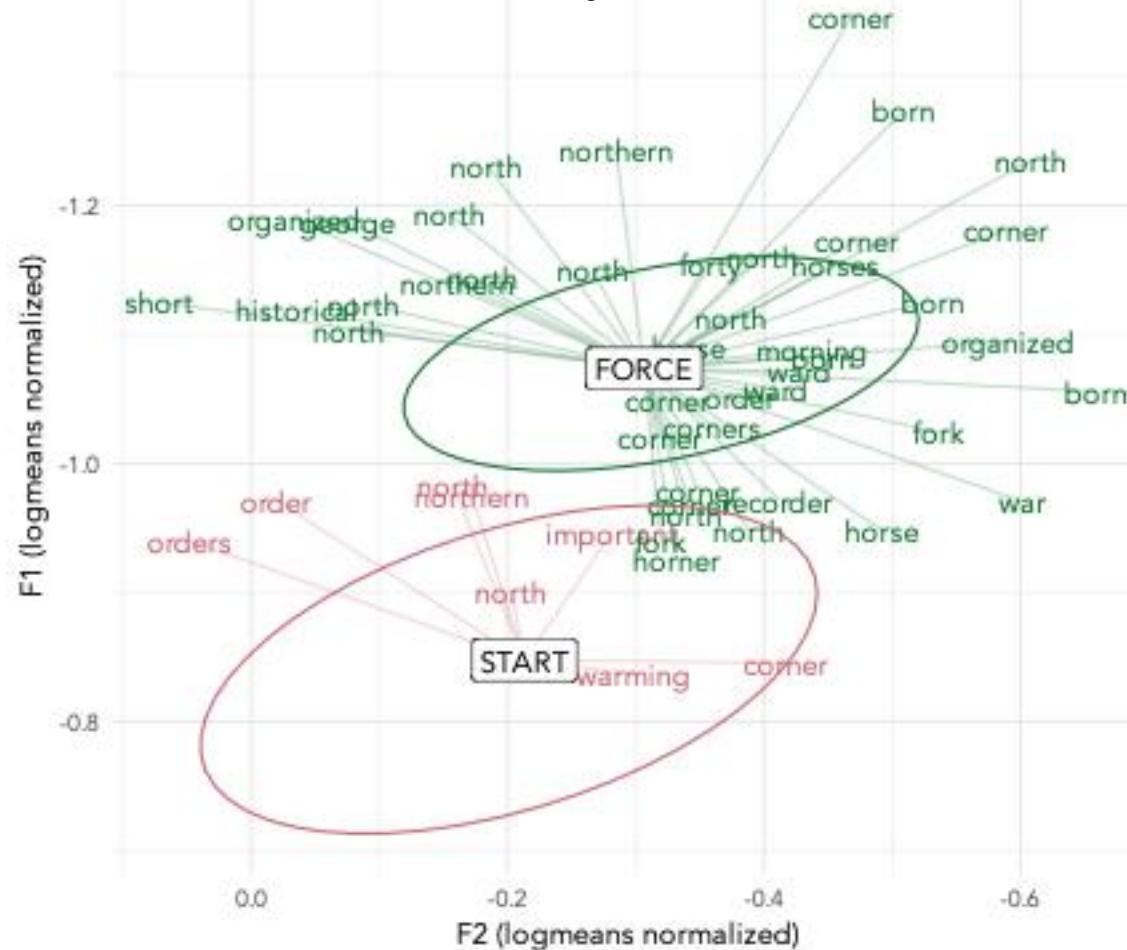




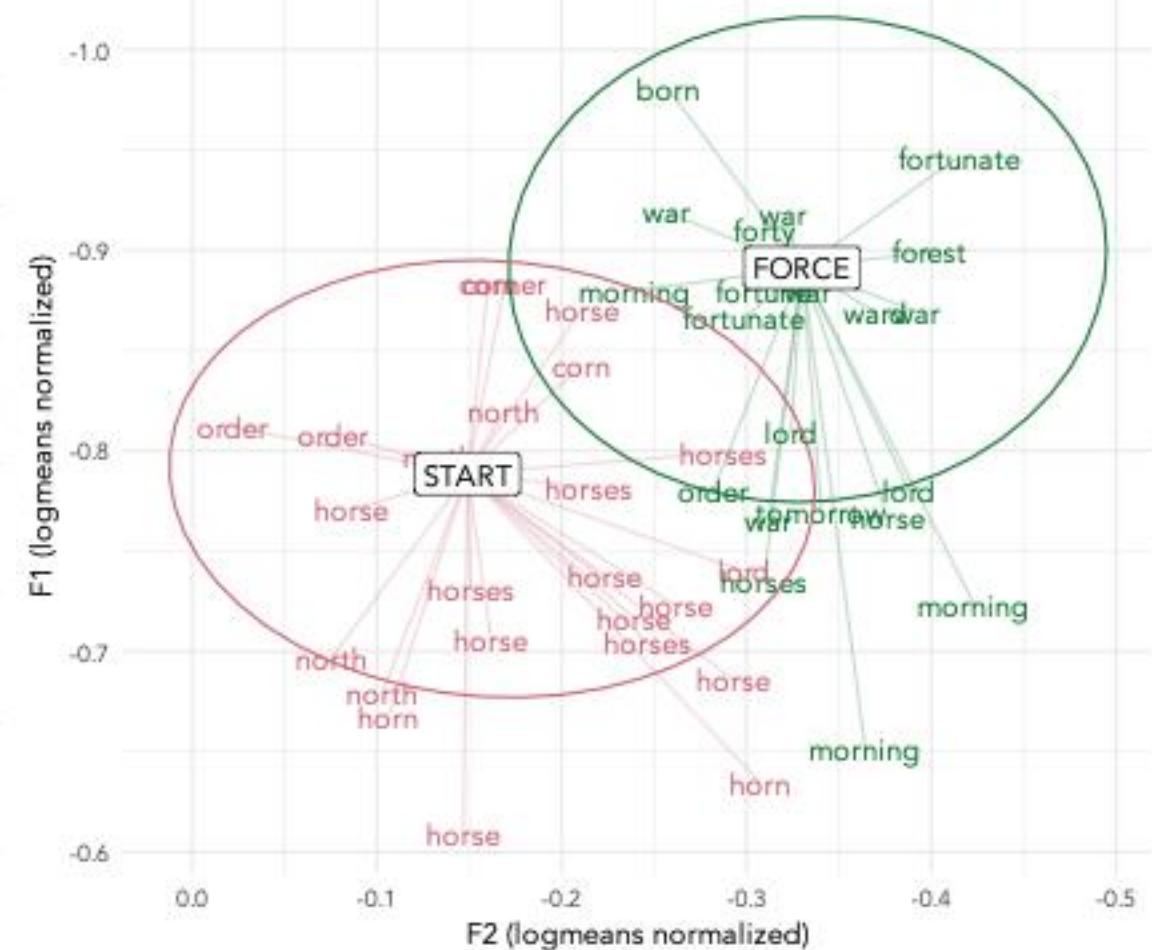


# Measuring Merger

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



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



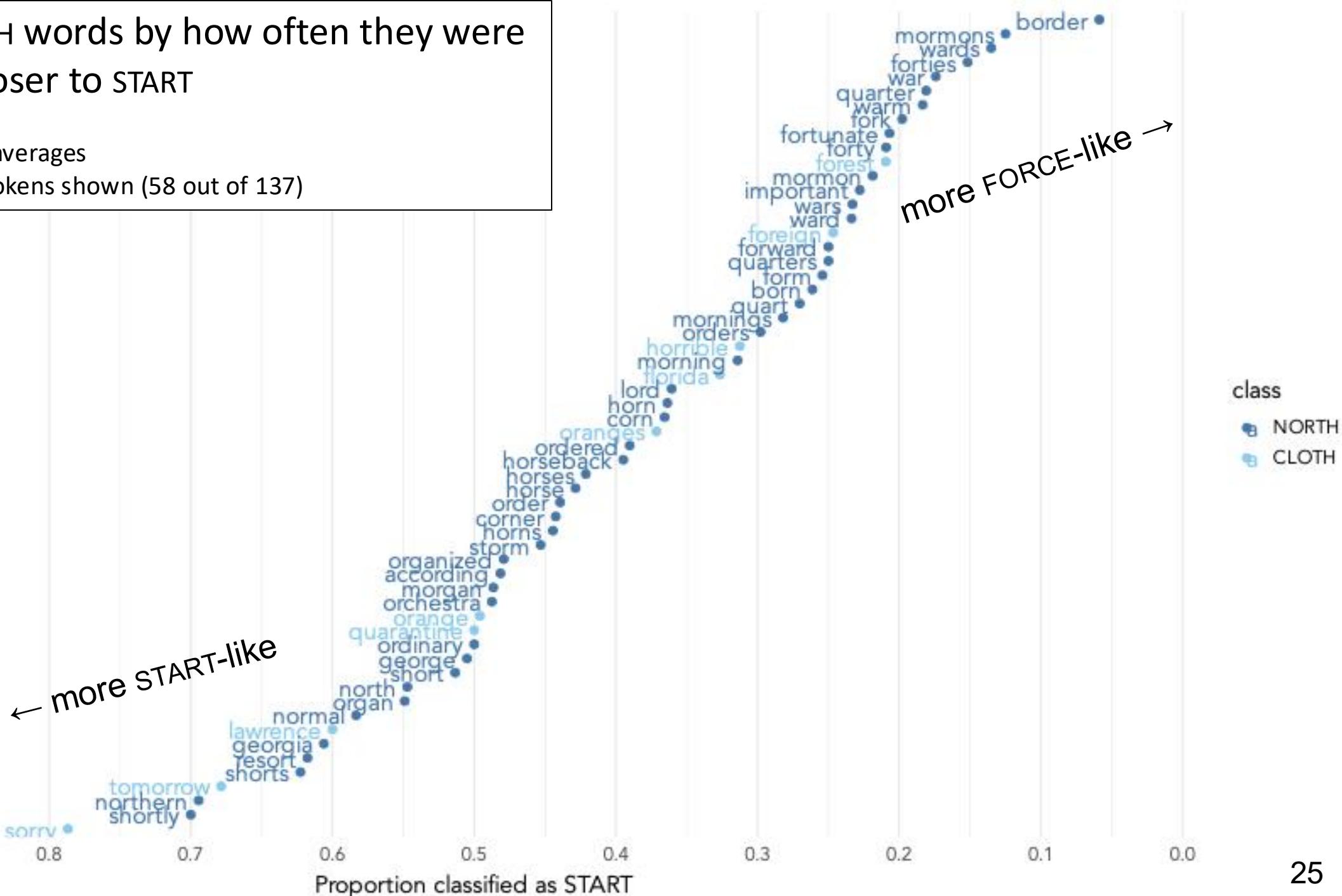
## **Results (word-level analysis)**

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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

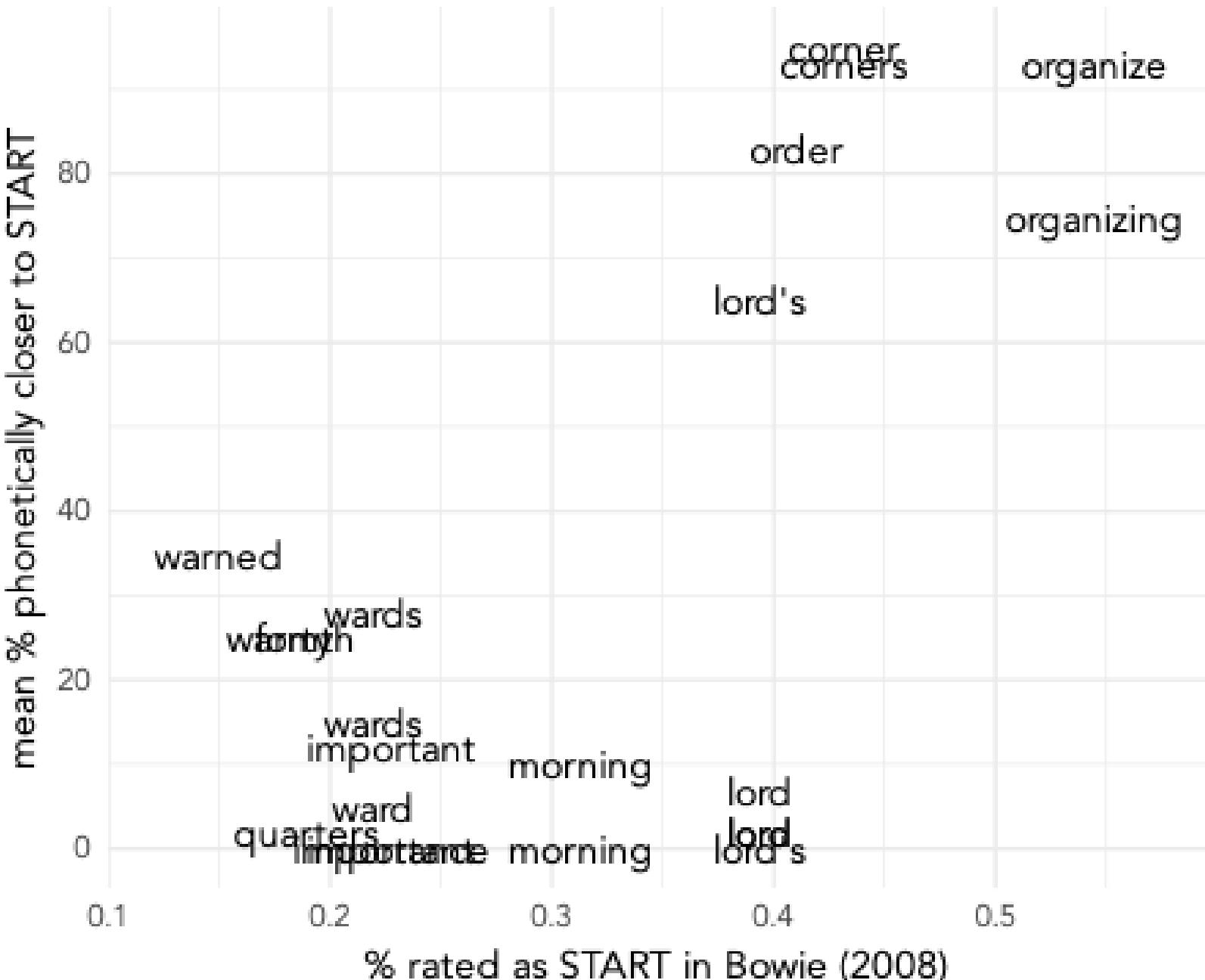
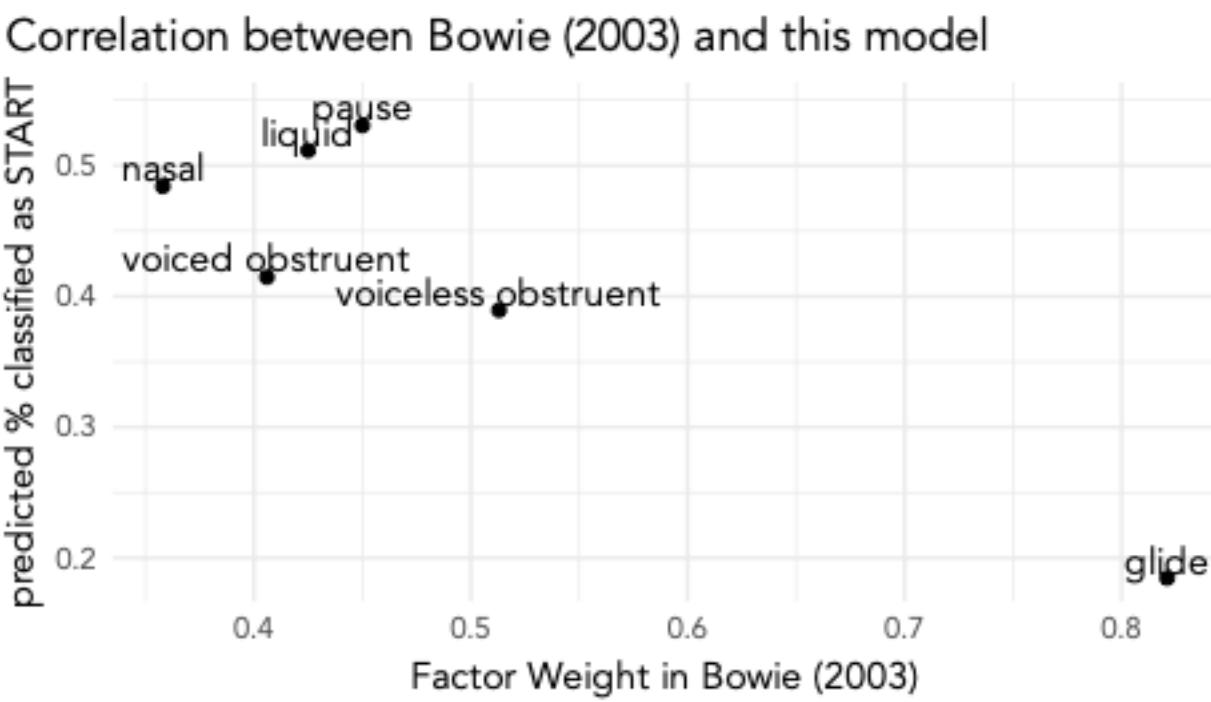
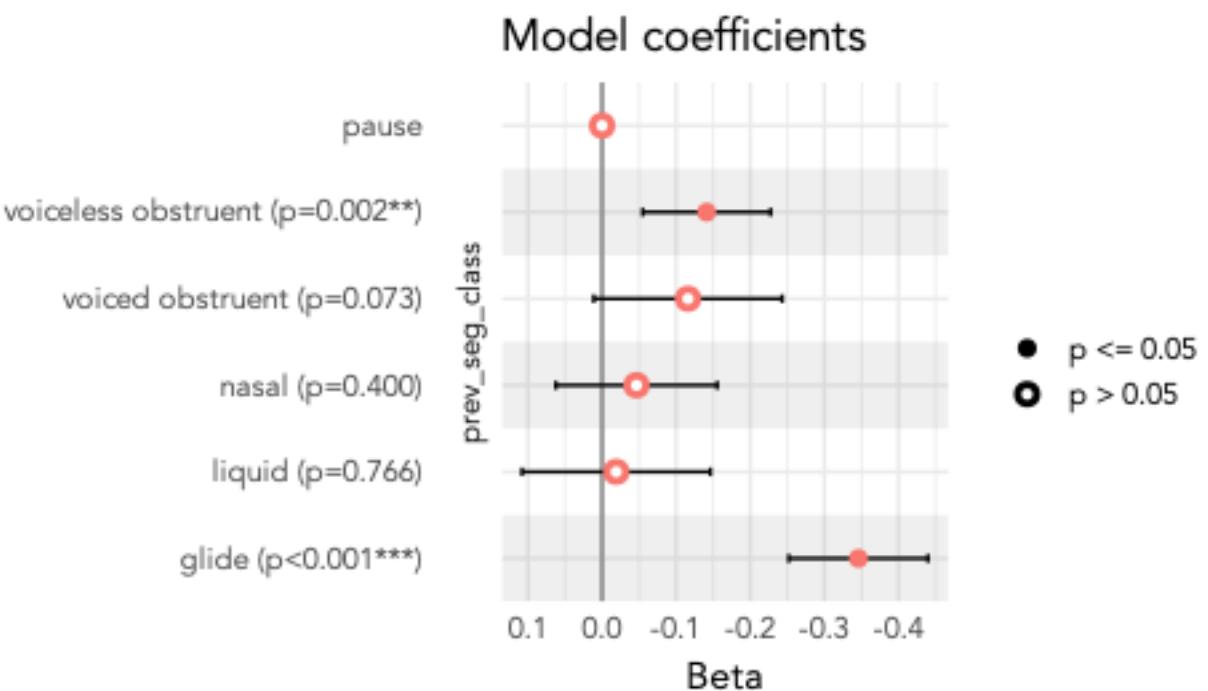
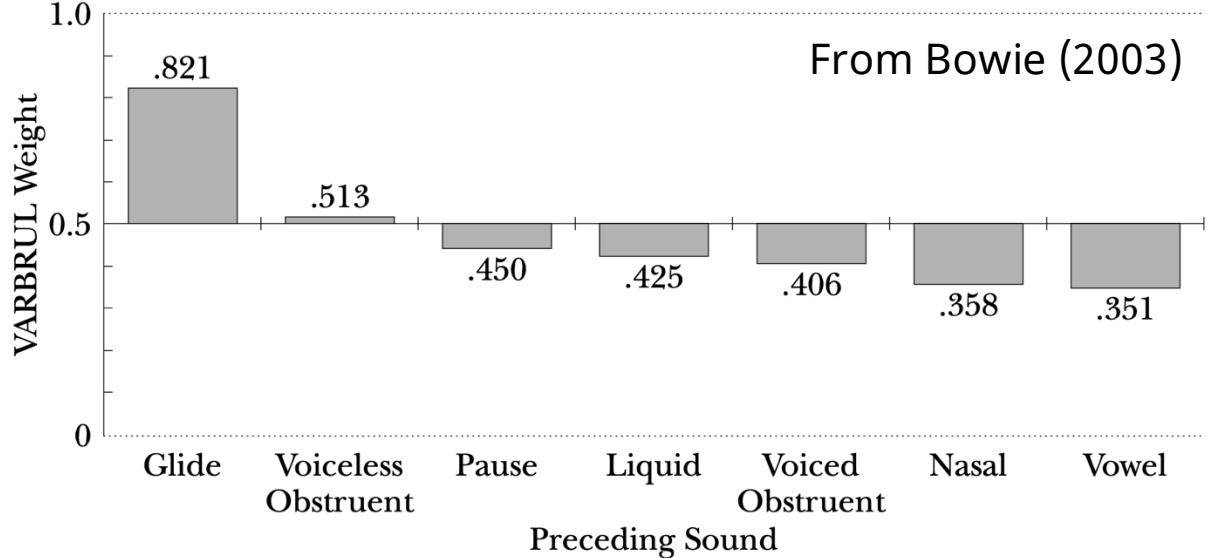


figure 4

## VARBRUL Weights for Preceding Sound



# Interim Summary

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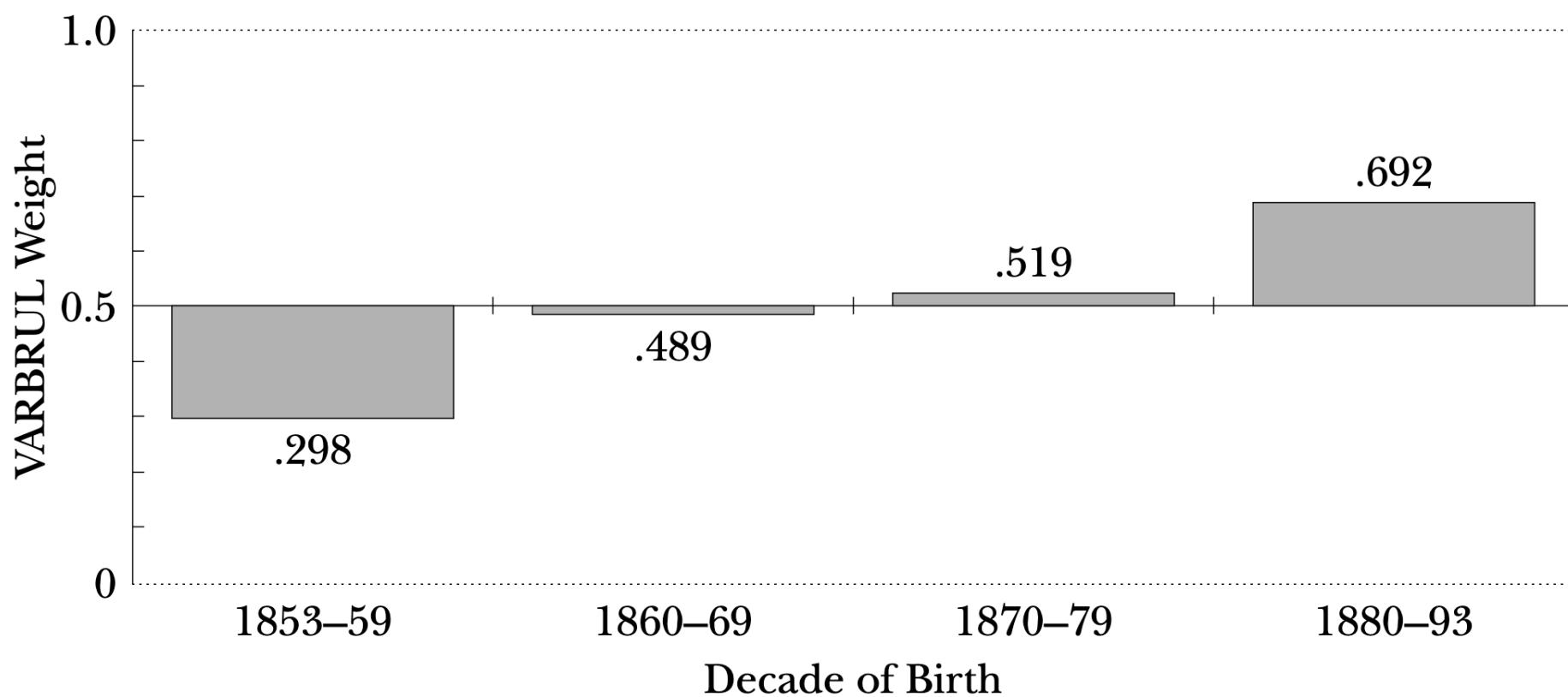
- Massive variation in NORTH and CLOTH
  - No real difference between NORTH and CLOTH.
  - Previous /w/ and voiceless obstruents inhibit lowering.
- Some indication of consistency across speakers.
  - Some NORTH words are usually FORCE-like while others are usually START-like.
  - However, inconclusive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

## Results (speaker-level analysis)

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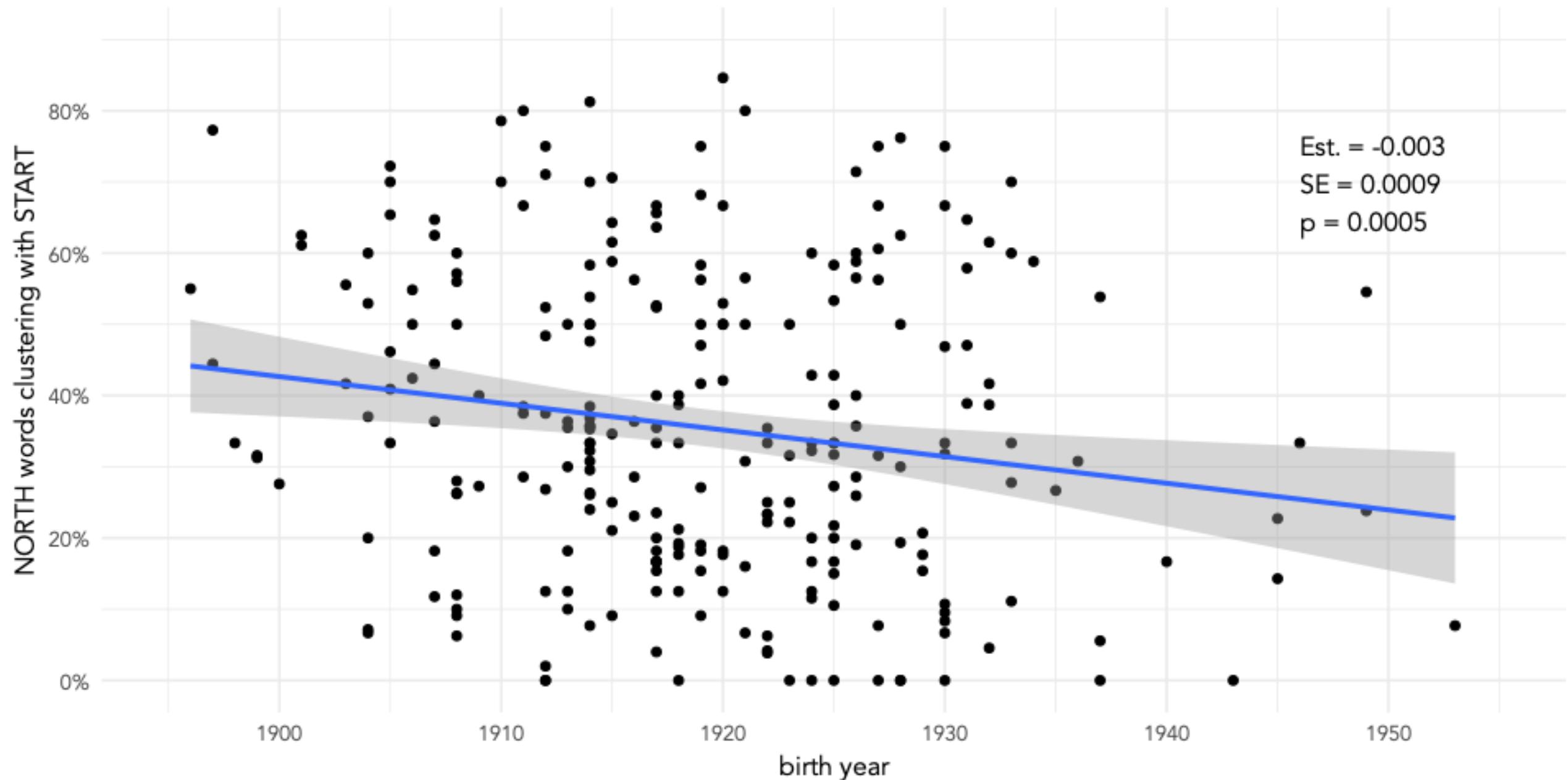
From Bowie (2003)

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



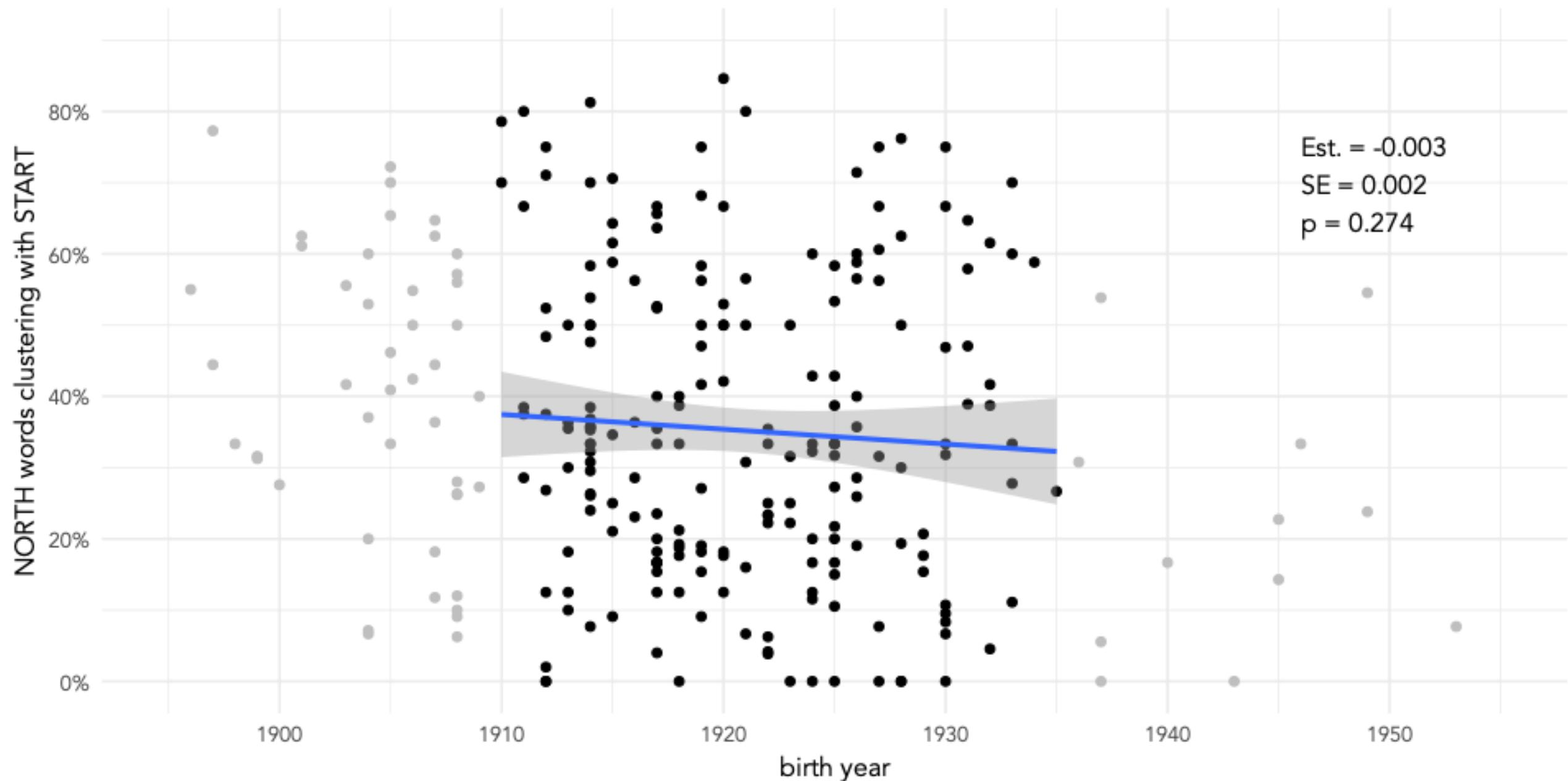
# Percent of NORTH words clustering with START, by birth year

Higher values suggest more cord-card merger

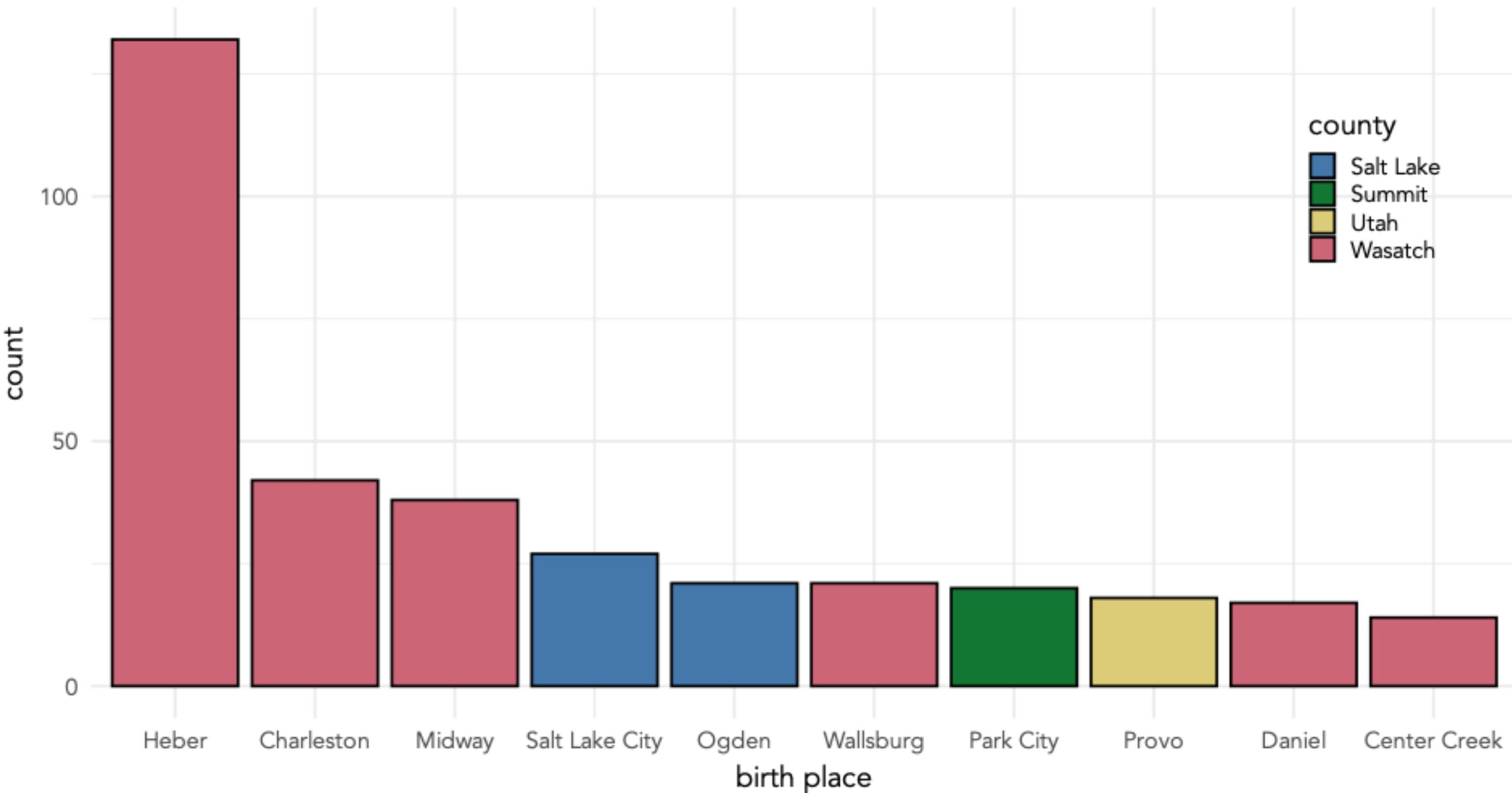


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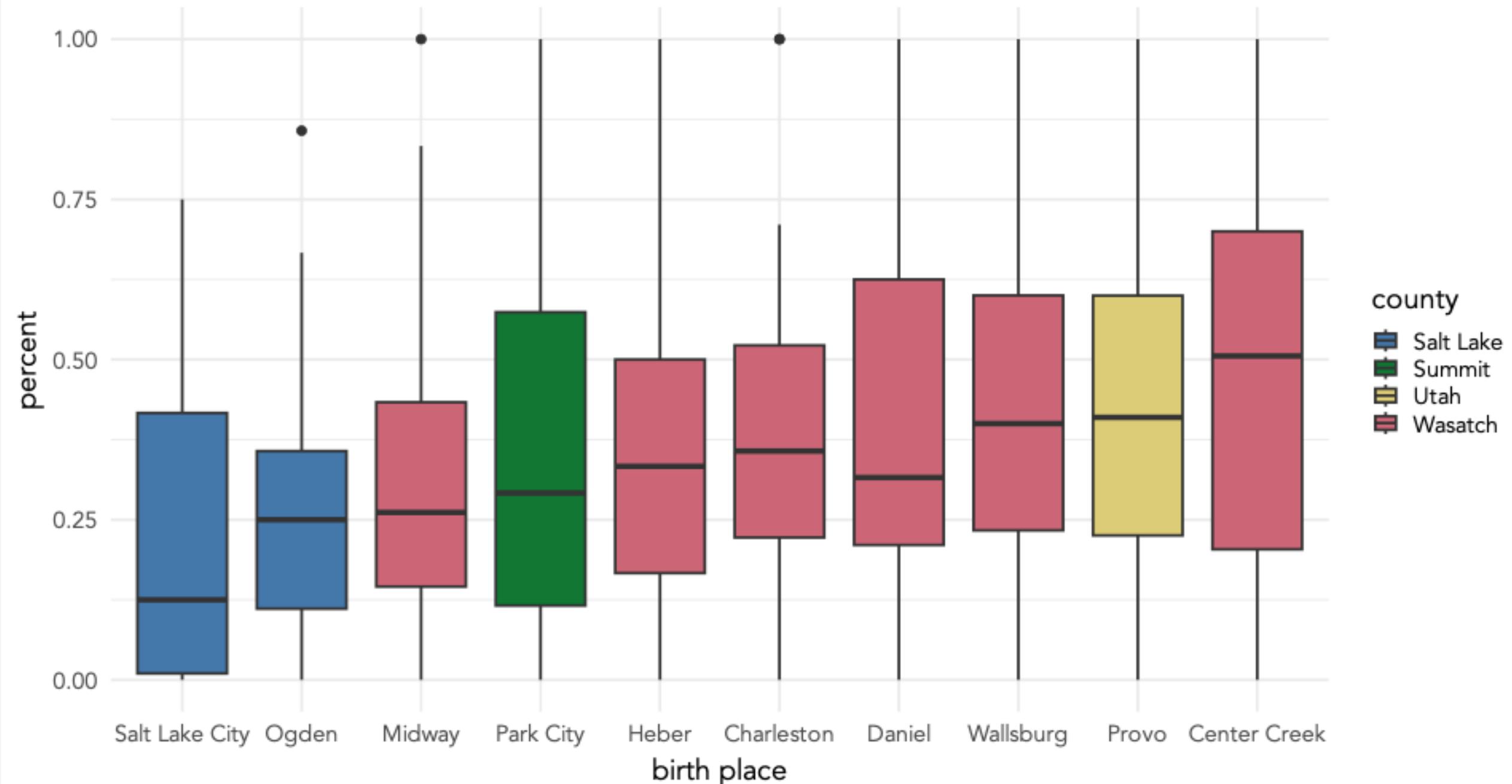
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## Speaker birth places (only top 10 cities shown)



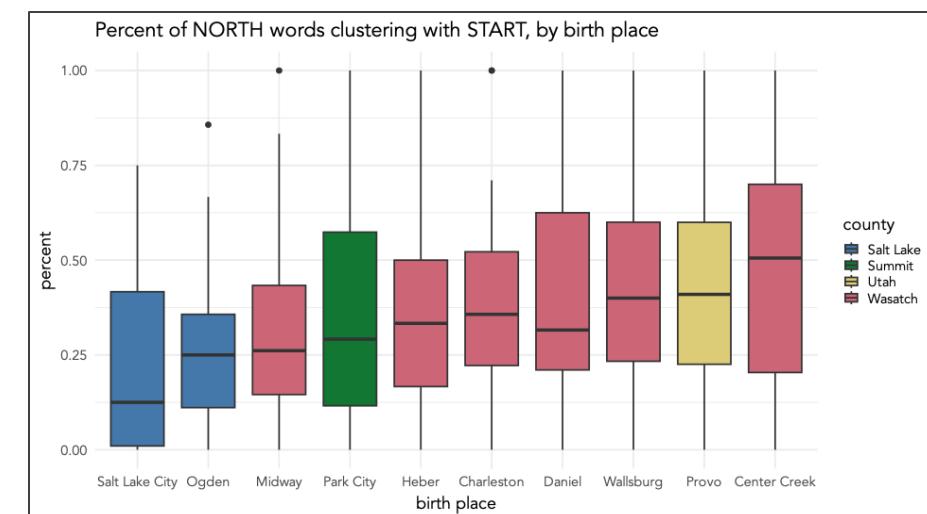
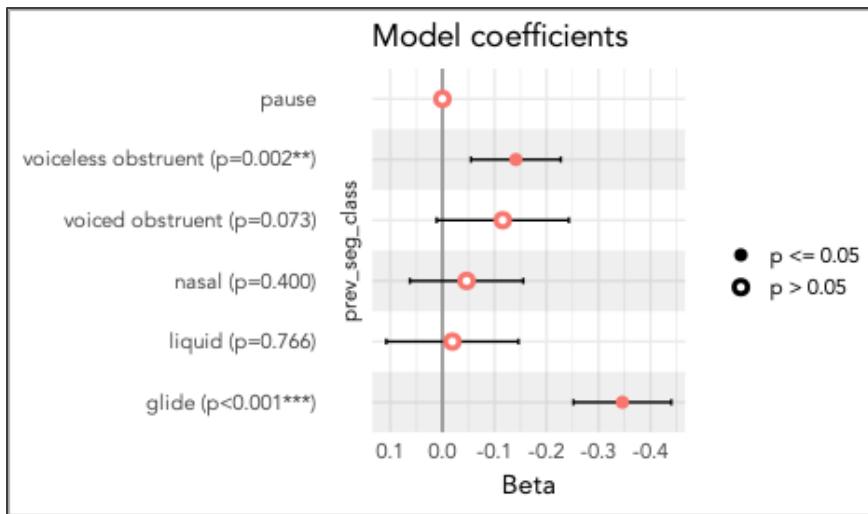
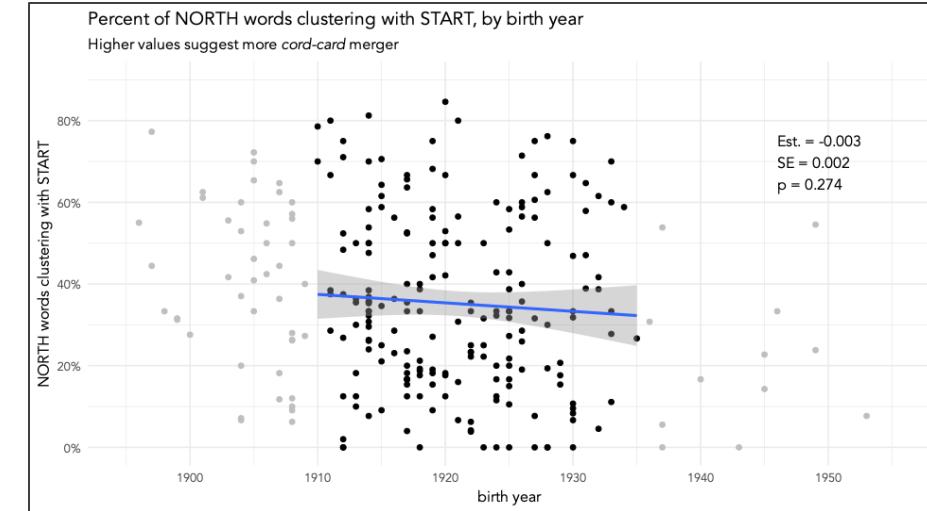
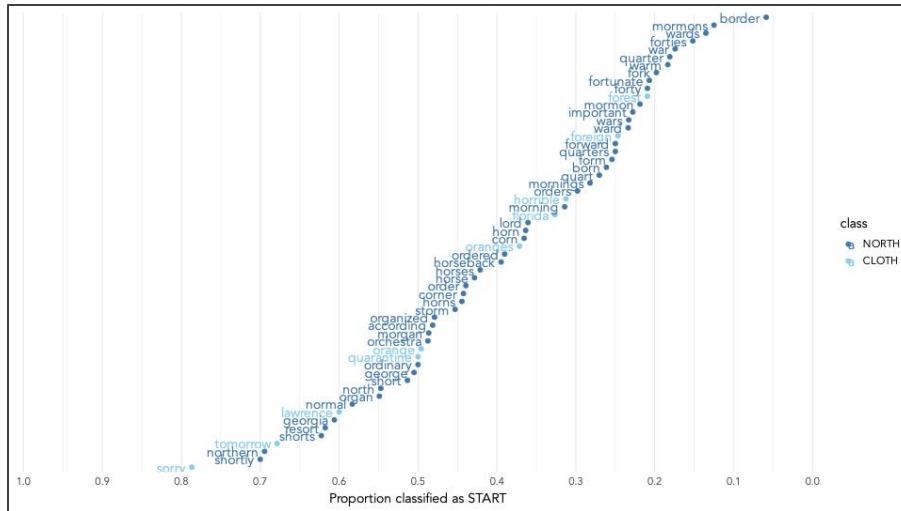
# Percent of NORTH words clustering with START, by birth place



## Discussion and Conclusions

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# Variation in NORTH



# Utah's CORD-CARD merger(?)

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- Was it really merged?
  - This might be a merger by transfer in progress.
  - Even the most “merged” people had ≈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.

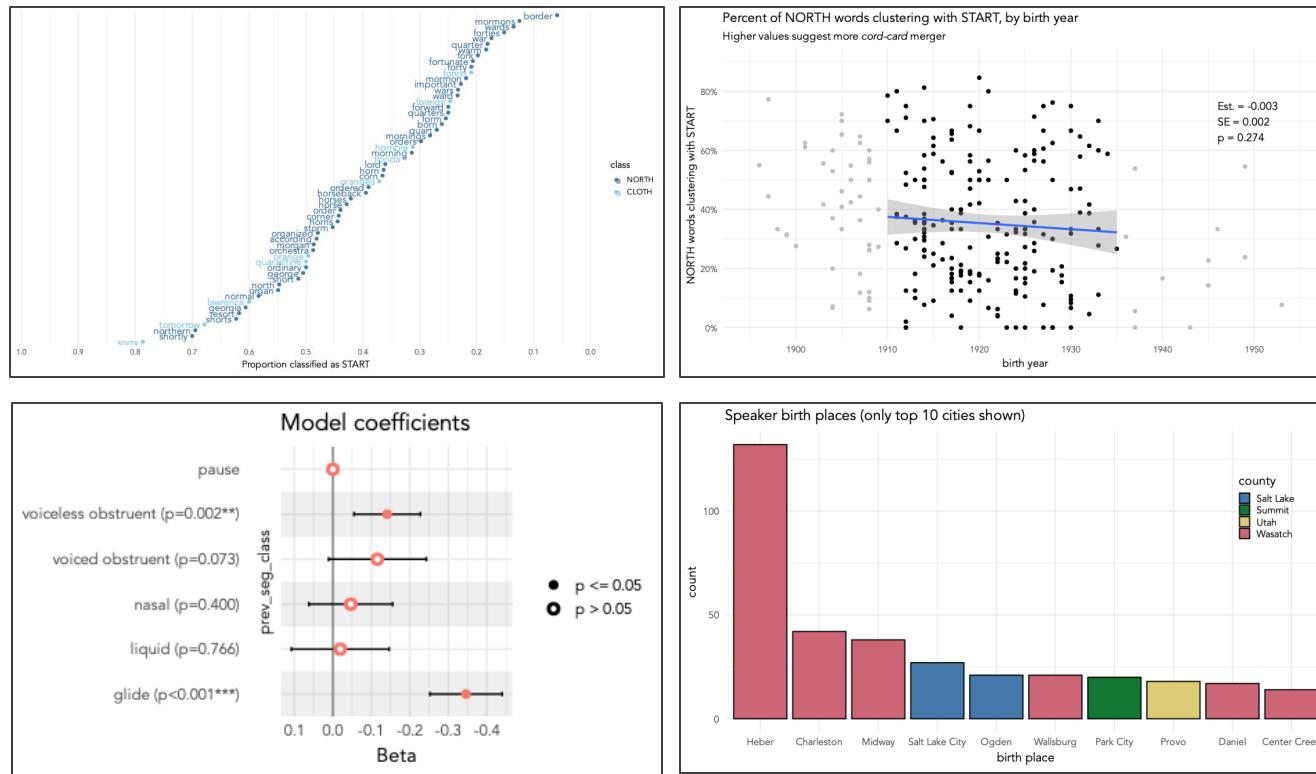
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## Acknowledgements

## Community members:

Norm Kohler family, Sharka Fabian,  
Jim Kohler, Wasatch Historical Society

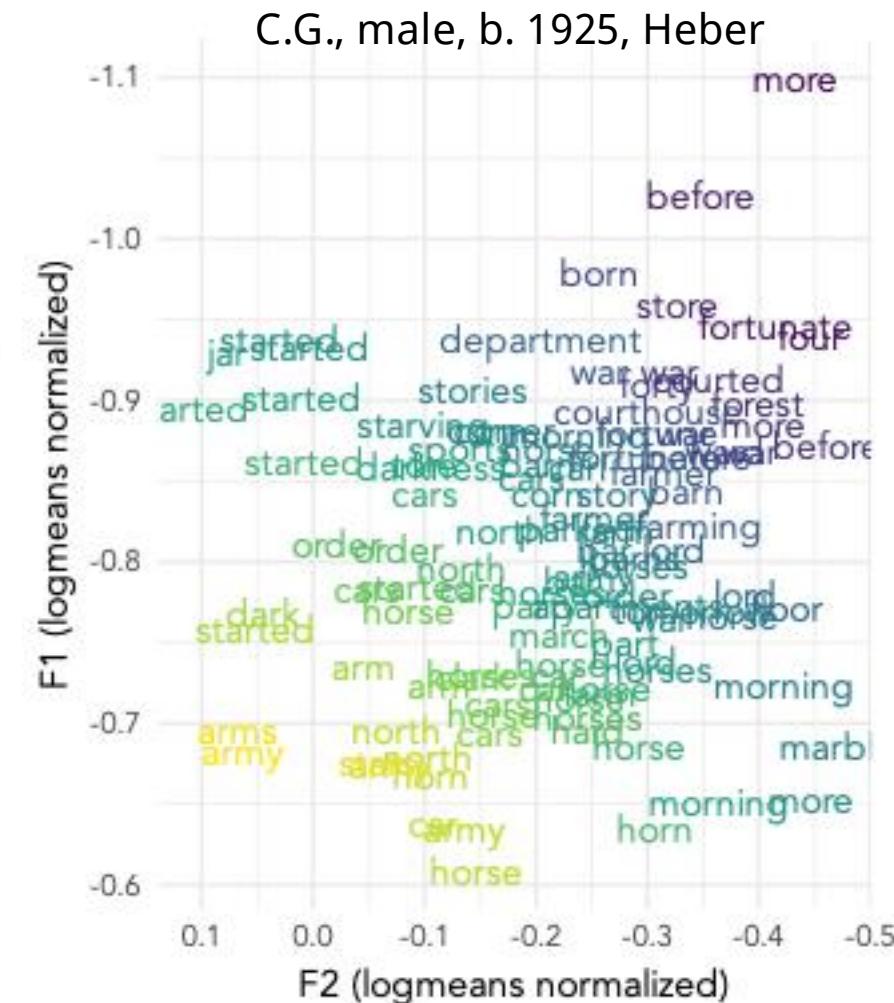
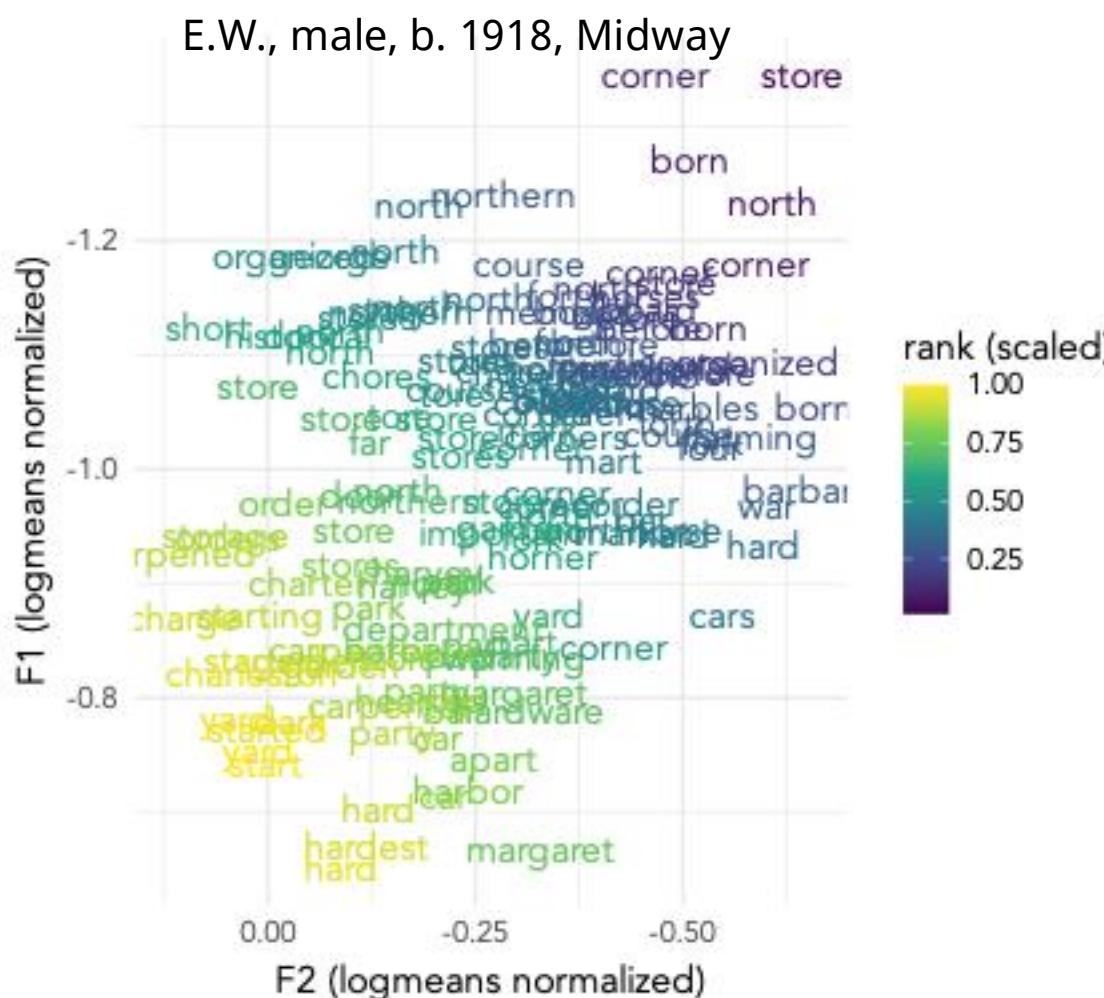
**Student workers:** Jess Shepherd, Hallie Davidson, Alex Lyman, BYU's Office of Digital Humanities

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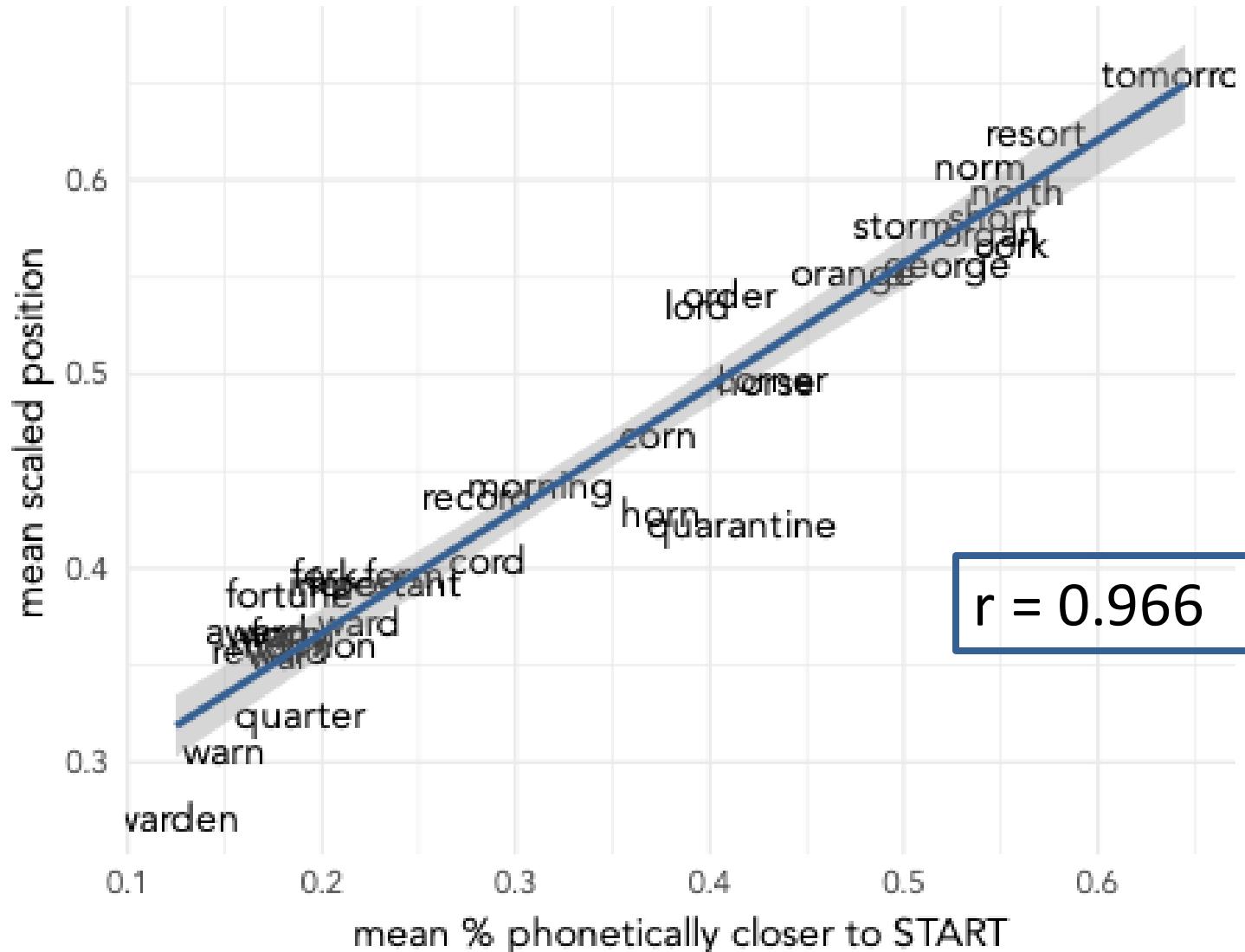
# Bonus Slides!

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# Measuring Merger (method 2)



## Correlation between the two merger analysis methods



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

