Evidence from Appalachia

Individual Coherence & Covariation

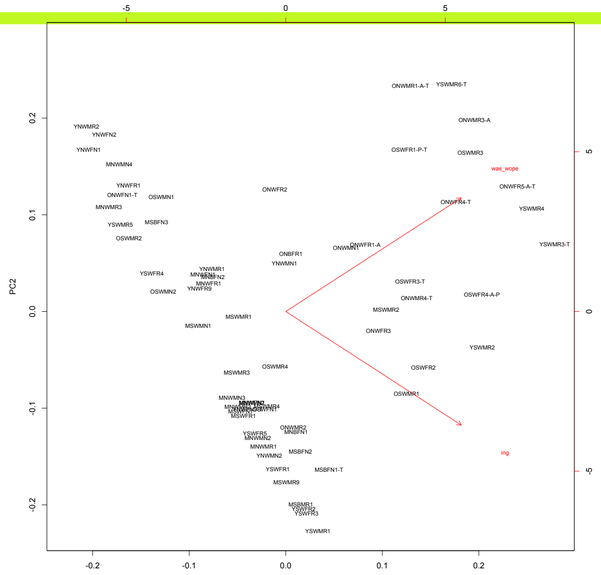
KIRK HAZEN, JANUARY 6, 2022

The Presentation Plan

1. Covariation & coherence: Multiple variables
2. Methodology for quantitative covariation study
3. Phonological & morphological variables
4. Correlation findings
5. Implications

Covariation & Coherence Studies

Previous work & main question



- Previously, I used Principal Component Analysis and Factor Analysis to derive indices of variables: a vernacularity index and a language change index. At an ADS talk in 2015, I suggested using the coordinates of individuals in factor analysis (promax) to build the indices. Promax allows the factors to be correlated.

- For this paper, the question is whether the production of certain variants from any individuals in this corpus are more or less frequent in relation to each other.

- As the main focus today, this presentation asks whether changing or stable variables have coherence at the level of the individual as separate from any particular intersection of social factors?

Coherence & Covariation

- A small but growing industry of coherence studies: Beaman & Guy (2022); Beaman (2021); ; Guy (2013), Guy & Hinskens (2016); and many others.
- "…whether there are people who lead several changes at the same time" (Nevalainen, Raumolin-Brunberg, and Mannila 2011:26)
- Foundational studies for this talk:
  - Tamminga (2019): correlation of changing variables and the use of residuals from lme
  - Tamminga (2021): leaders of language change and covariation patterns fluctuate over time
  - Dodsworth & Kohn (2021): supra-regional changes and their covariation in two communities: "If two supra-regional changes turn out to be significantly correlated within a community, then we can look at the social characteristics of the leaders and the more conservative speakers for clues as to why and how speakers adopt supra-regional changes and how such changes manage to spread."
- Tamminga & Wade (2021): We need more precise definitions of *what* is covarying *when* (unit and scope). In this paper:
  - Unit is the measure for the individual of a variable for their sociolinguistic interview
  - Scope is interspeaker variation within the speech community.

Methodology

Methods

- WV statewide survey of vowels with TextGrids were hand aligned and formants were measured with FAVE (Hazen 2018); Conversion to Z scores with NORM (Thomas & Kendall 2007). Filtered to exclude vowels with following liquids & nasals; also, duration > 0.06 seconds.
- Vowels have different measures of interest given their diachronic patterns.
- Leveled *was* and ING were quantified using standard variationist methods (Hazen 2008, 2014)
- As a study of covariation, a common quality was needed to correlate a speaker's performance of any particular variant. Following Tamminga (2019) and Dodsworth & Kohn (2021), residuals from mixed-effects models (with speaker as a *fixed* effect) were used in Pearson and Spearman correlations.
- As vowels had a linear measure and the morphological variables had binary variants, both lme and glm were used in R.

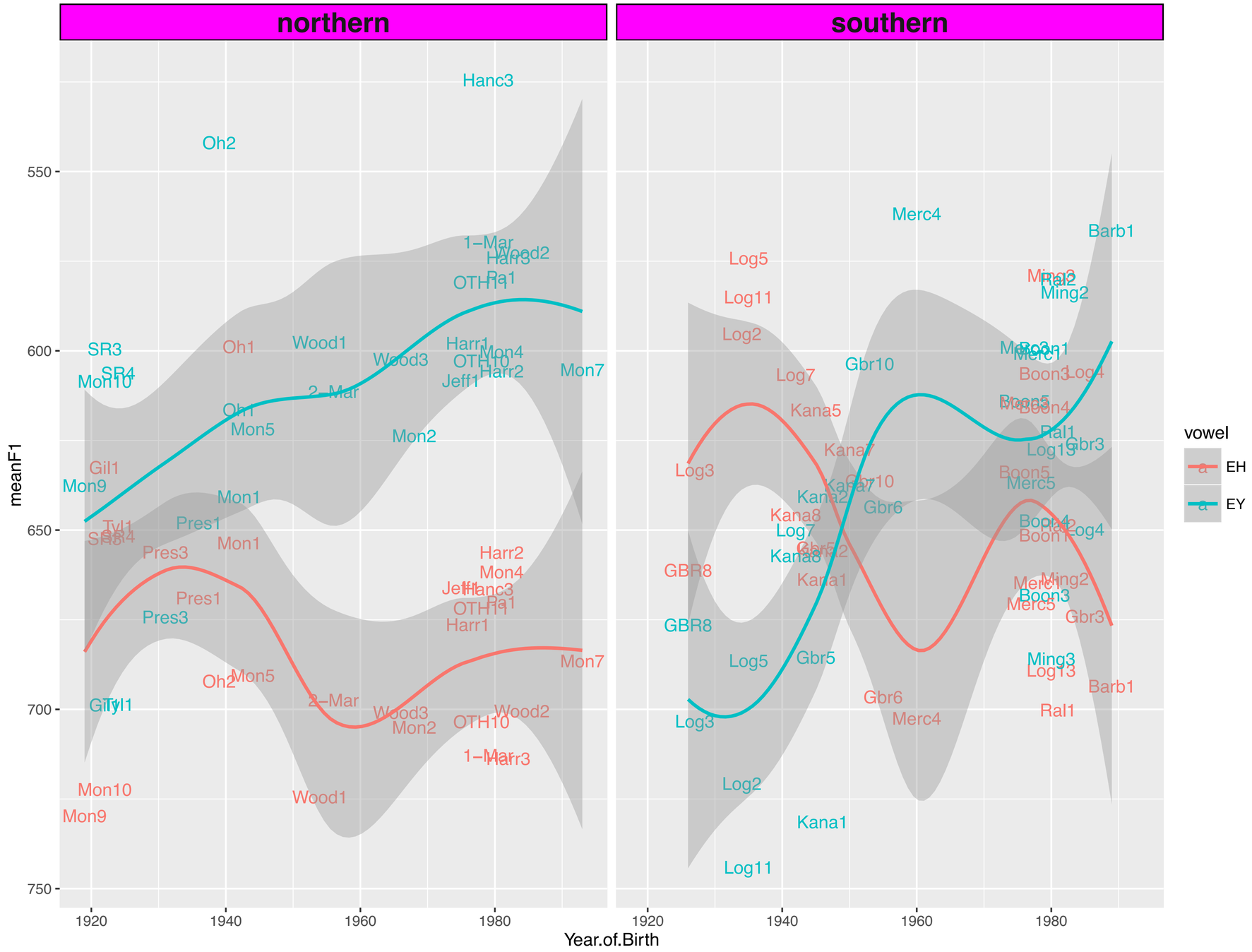
WVCEA: WV Corpus of English in Appalachia

Group	Sub-Group	Number of people
Age: Year of Birth	1919-1989	58
Gender	Female	29
	Male	29
Region	North	28
	South	30
Rurality	Rural	35
	Non-Rural	23
College experience	College (some)	44
	None	23
Social Class	Upper-Middle	17
	Lower-Middle	25
	Working	16

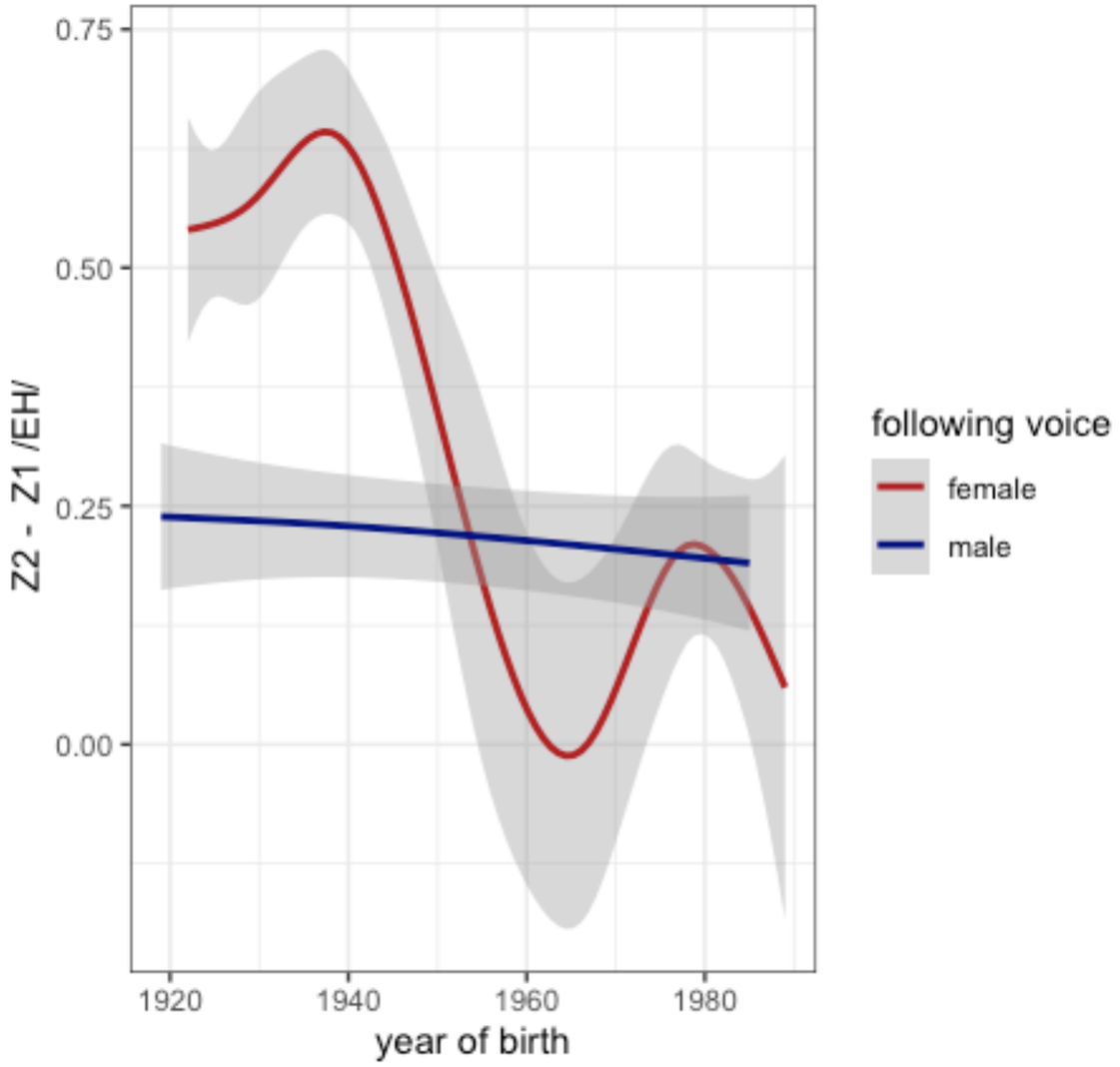
Variables under study

- PRICE nucleus raising Z2-Z1 (supra-regional change)
- DRESS nucleus lowering Z2-Z1 (Southern Vowel Shift (SVS) reversal, Stage 2)
- FACE nucleus raising Z2-Z1 (SVS reversal, Stage 2)
- KIT nucleus lowering Z2-Z1 (SVS reversal, Stage 3)
- FLEECE nucleus raising Z2-Z1 (SVS reversal, Stage 3)
- PRIZE offglide lengthening (Z-score delta 80% duration−20% duration) (SVS reversal, Stage 1)
- Leveled *was* (previously active change away from vernacular)
- Alveolar ING (stable variation but important social marking)

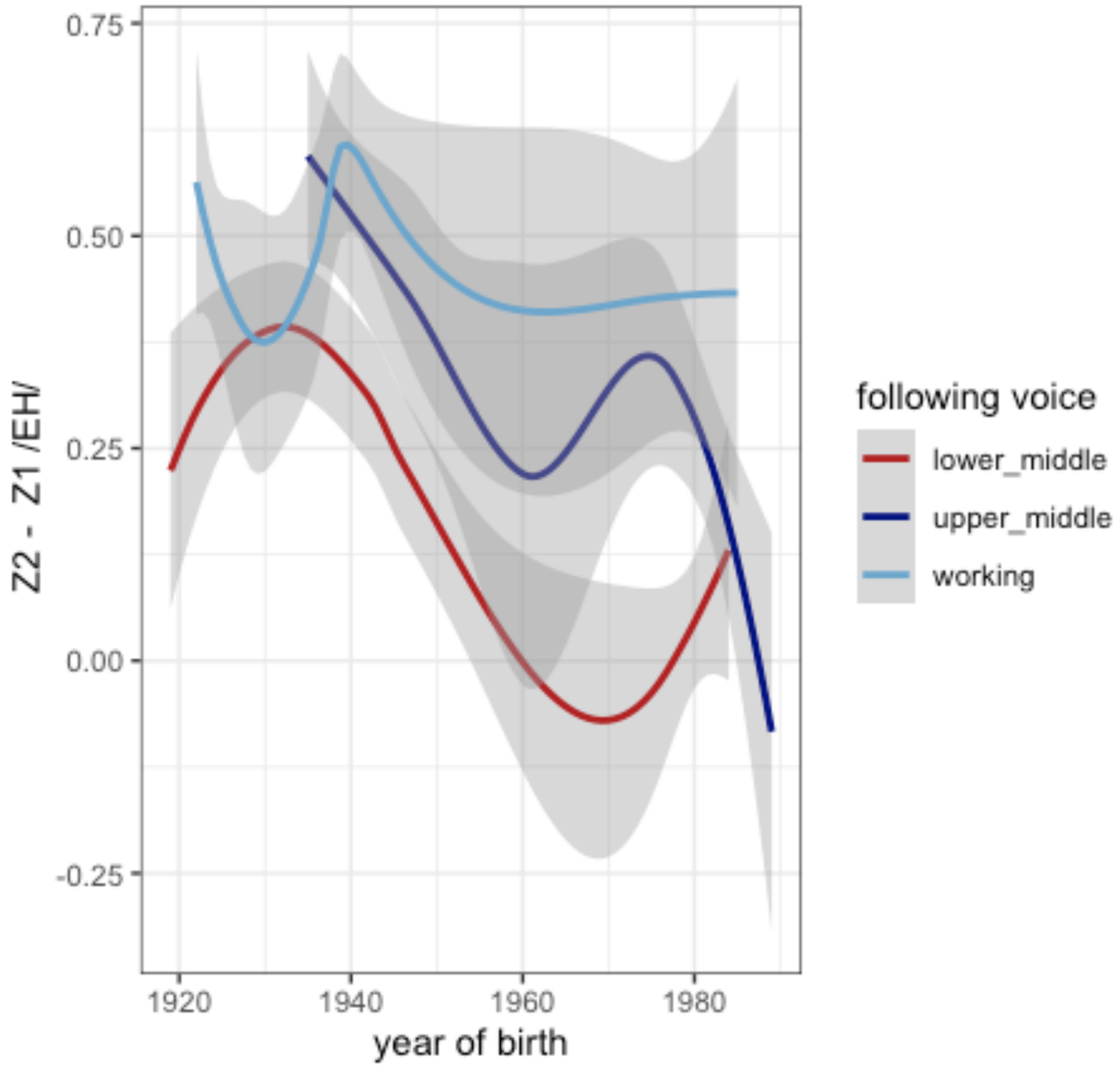
Phonological & Morphological Variables


F1 means for EH and EY by Year of Birth
northern
southern
meanF1
Year.of.Birth
550
600
650
700
750
1920
1940
1960
1980
vowel
EH
EY

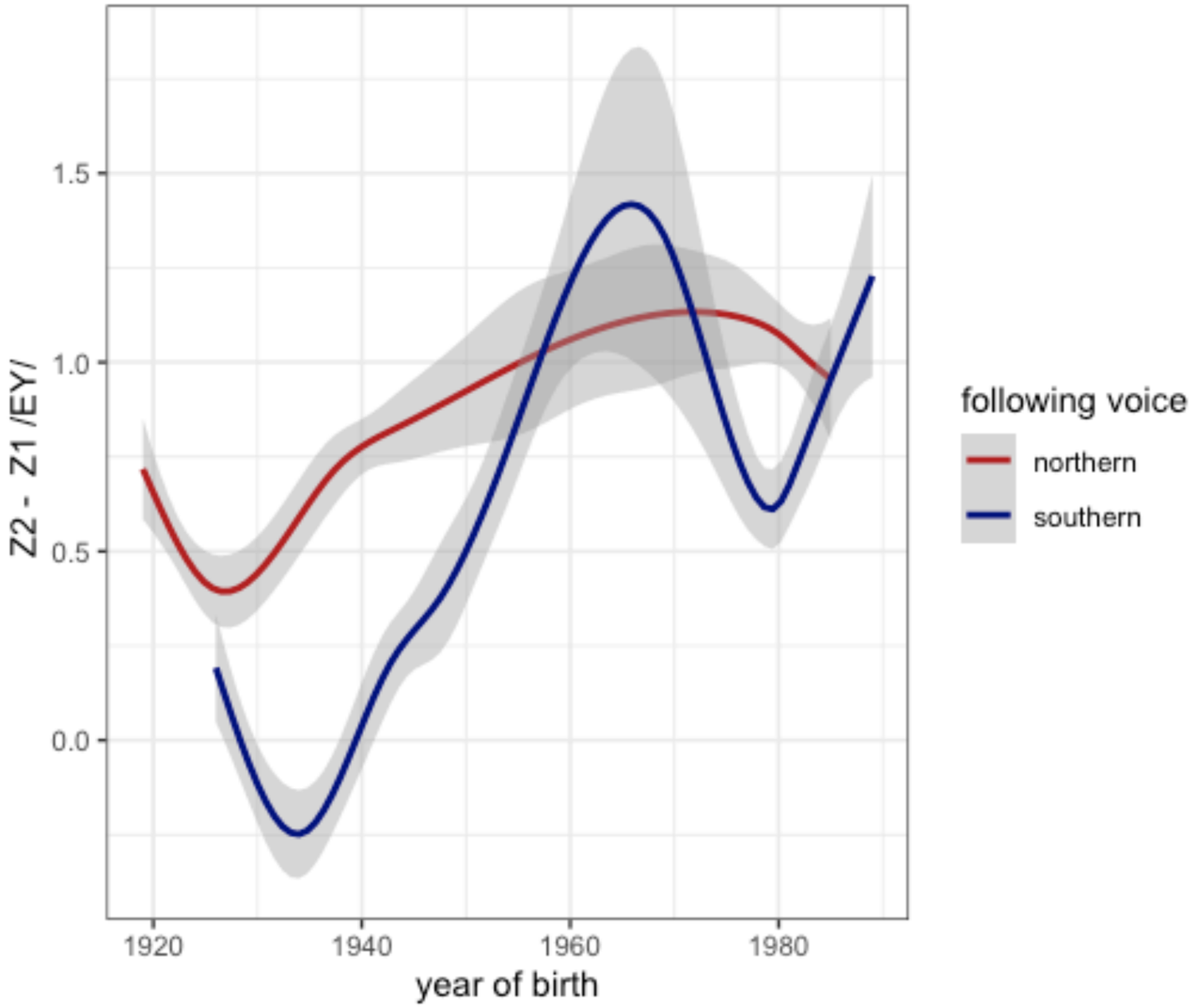
Z score for DRESS by gender



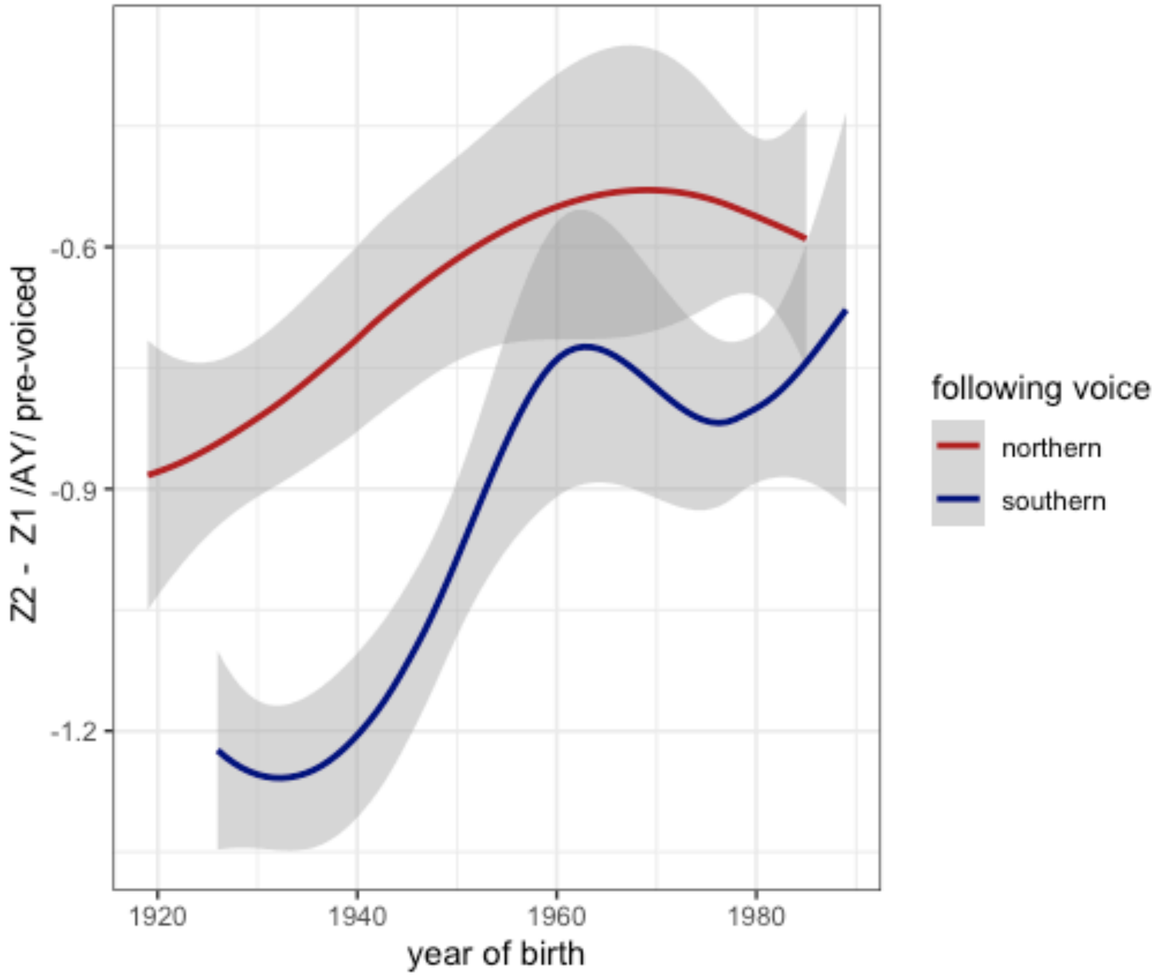
Z score for DRESS by social class



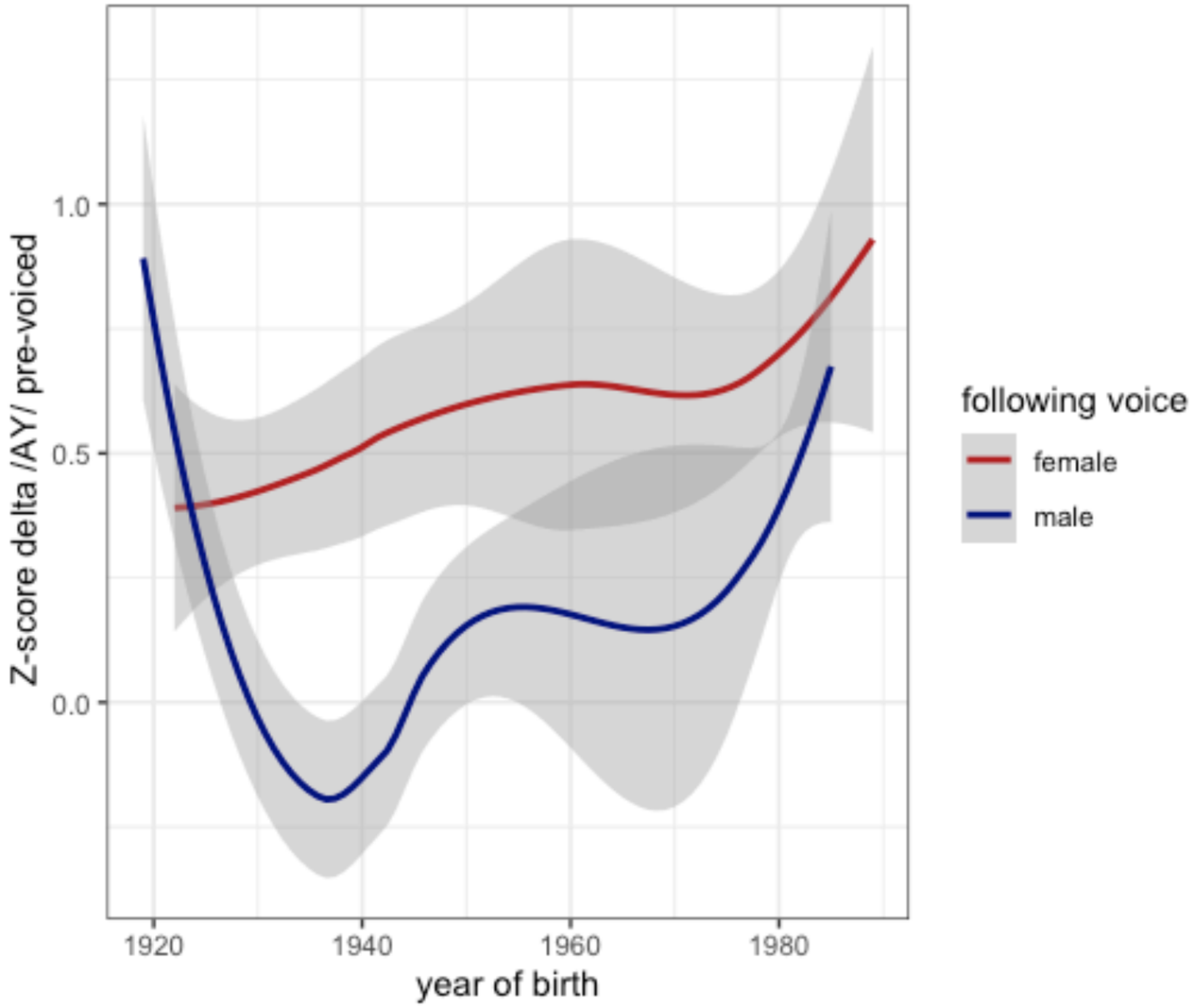
Z score FACE by region

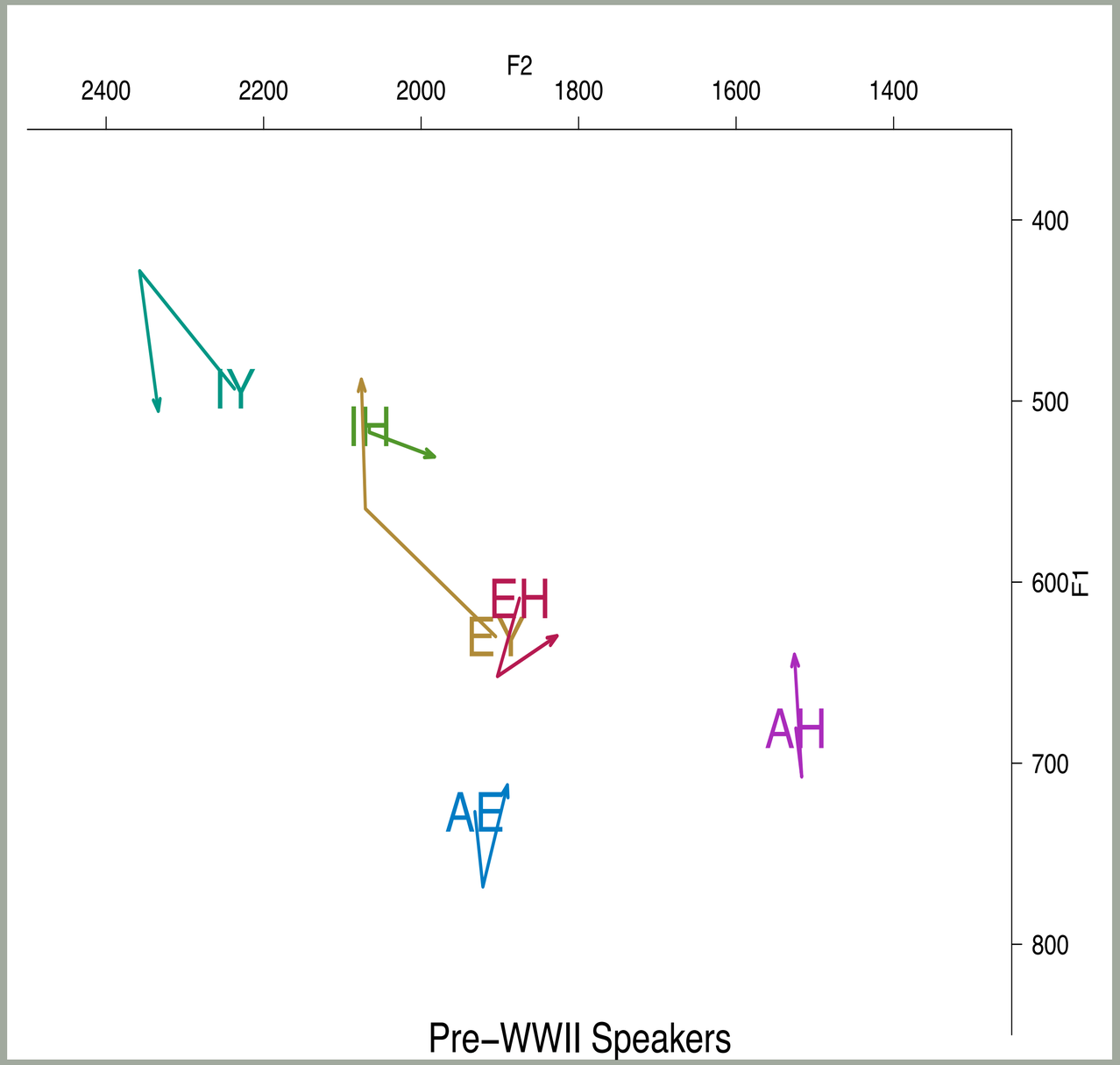


Z score delta for PRIZE glide by region

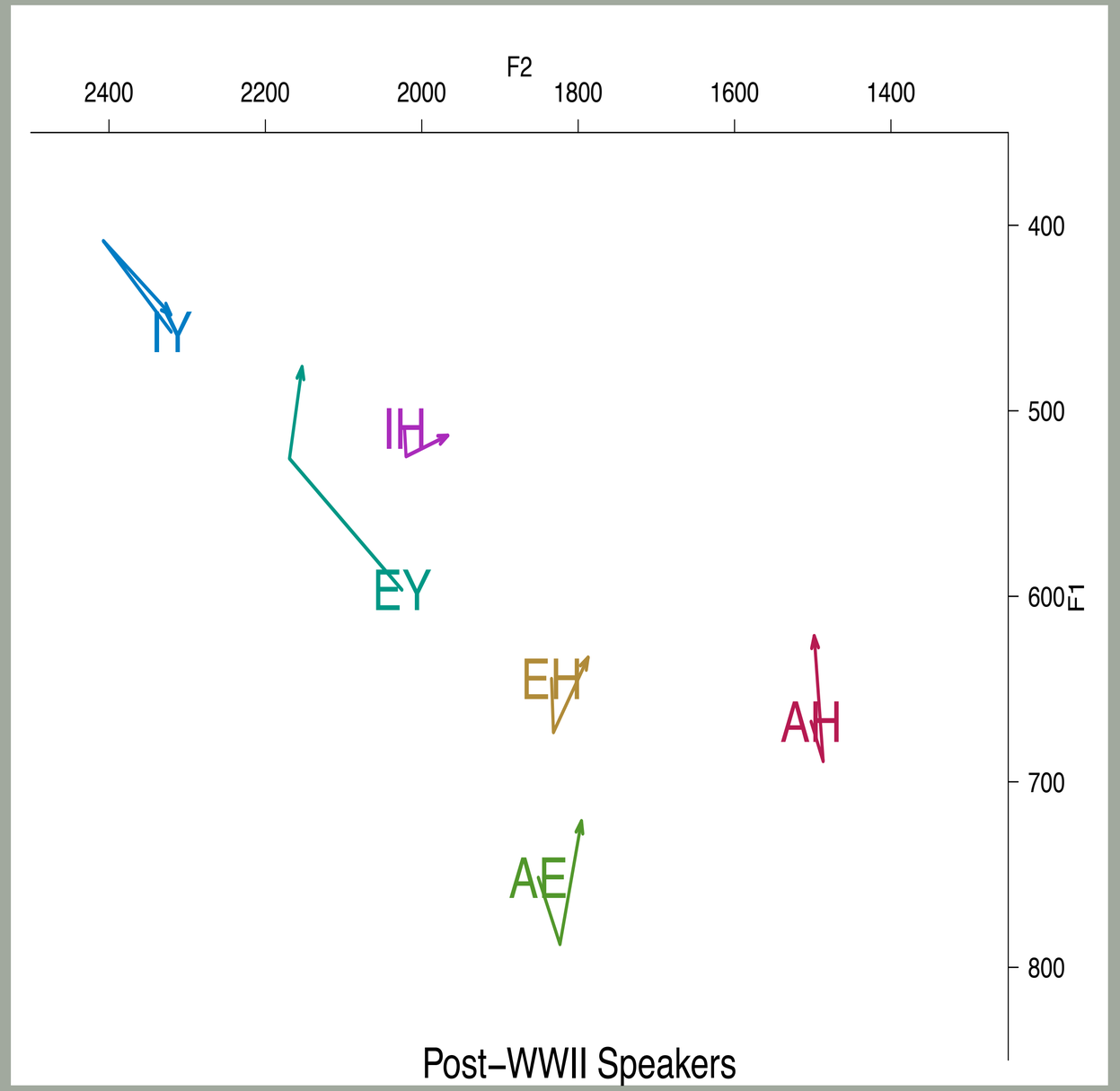


Z score delta PRIZE by gender

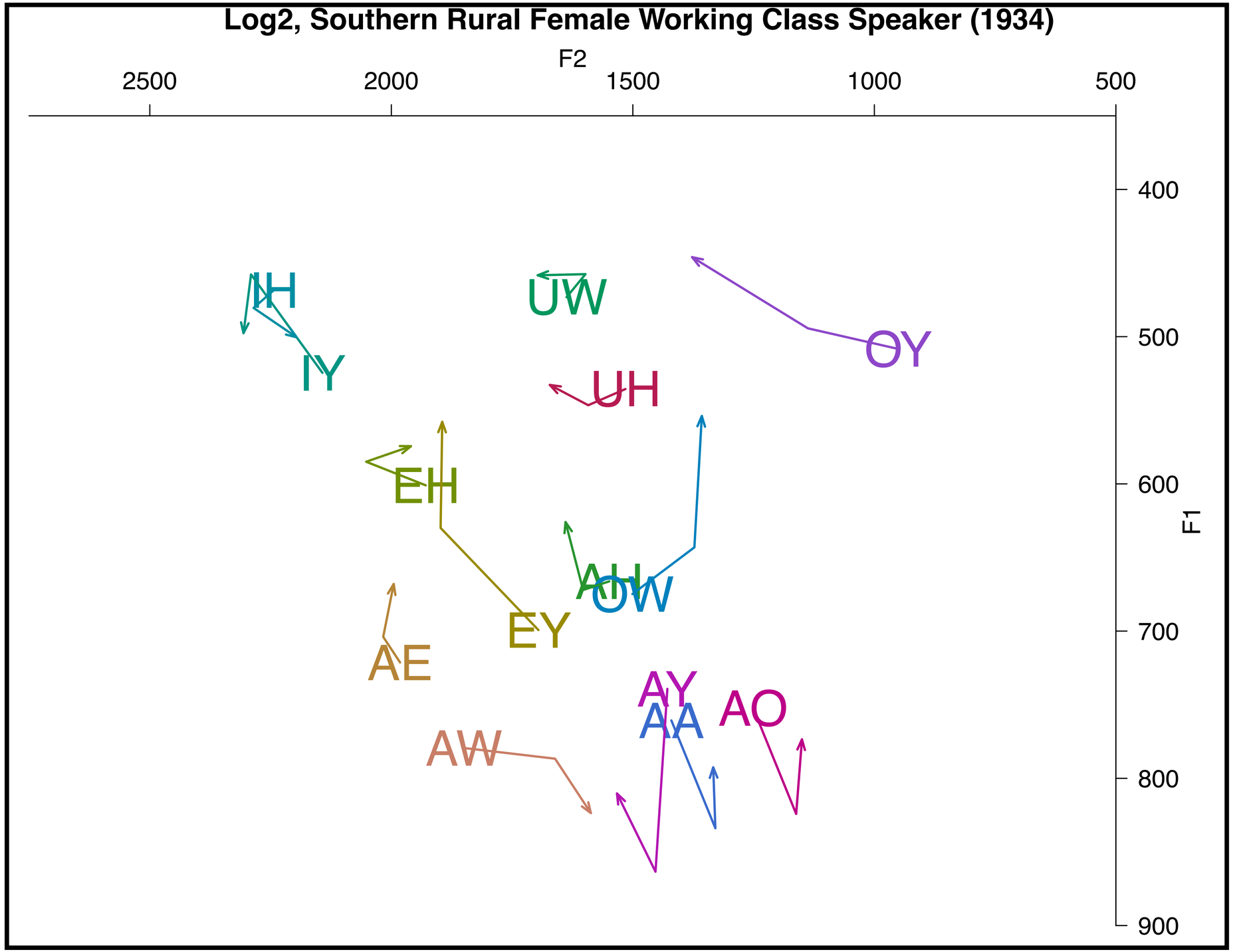


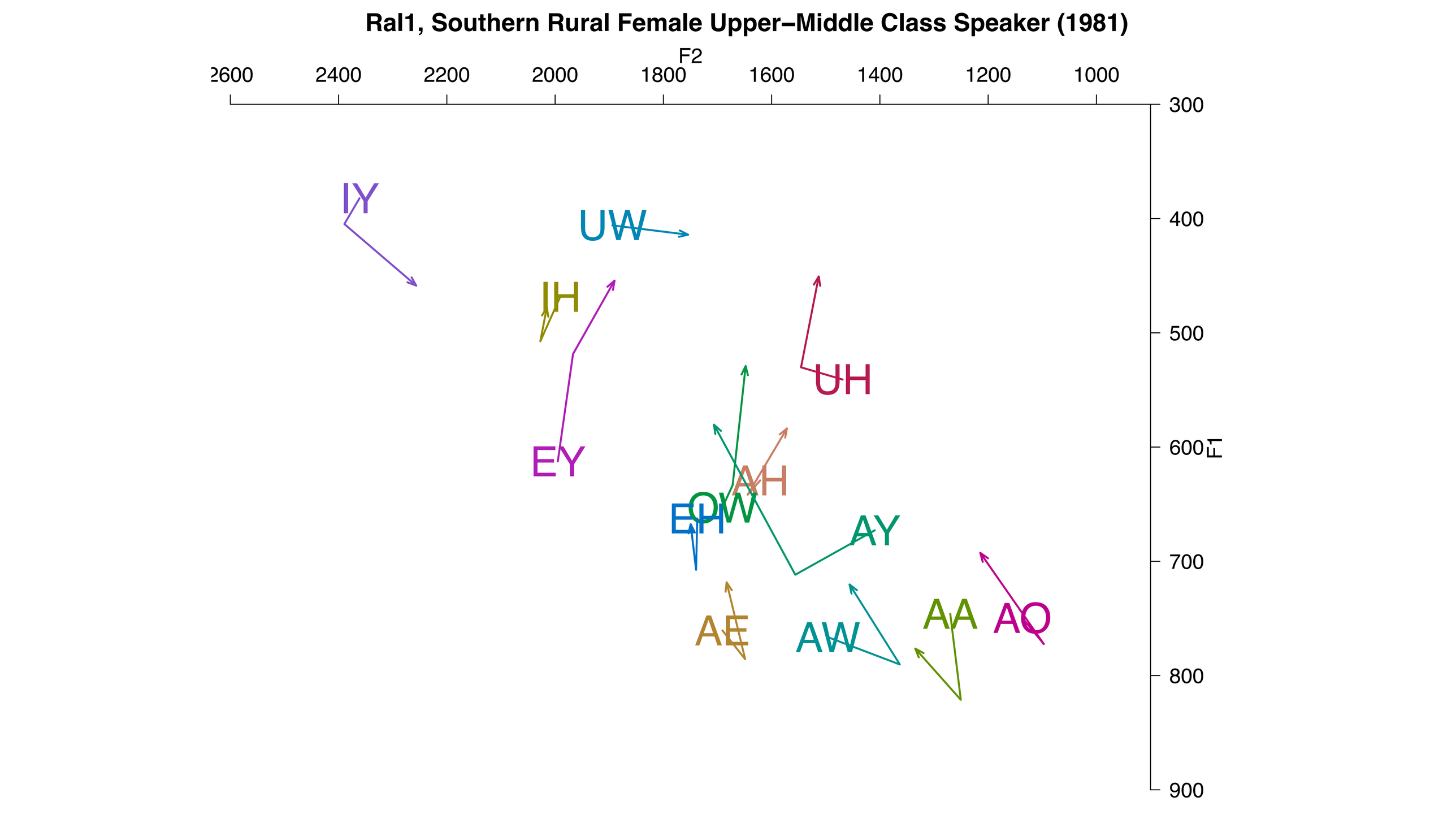


Pre–WWII Speakers

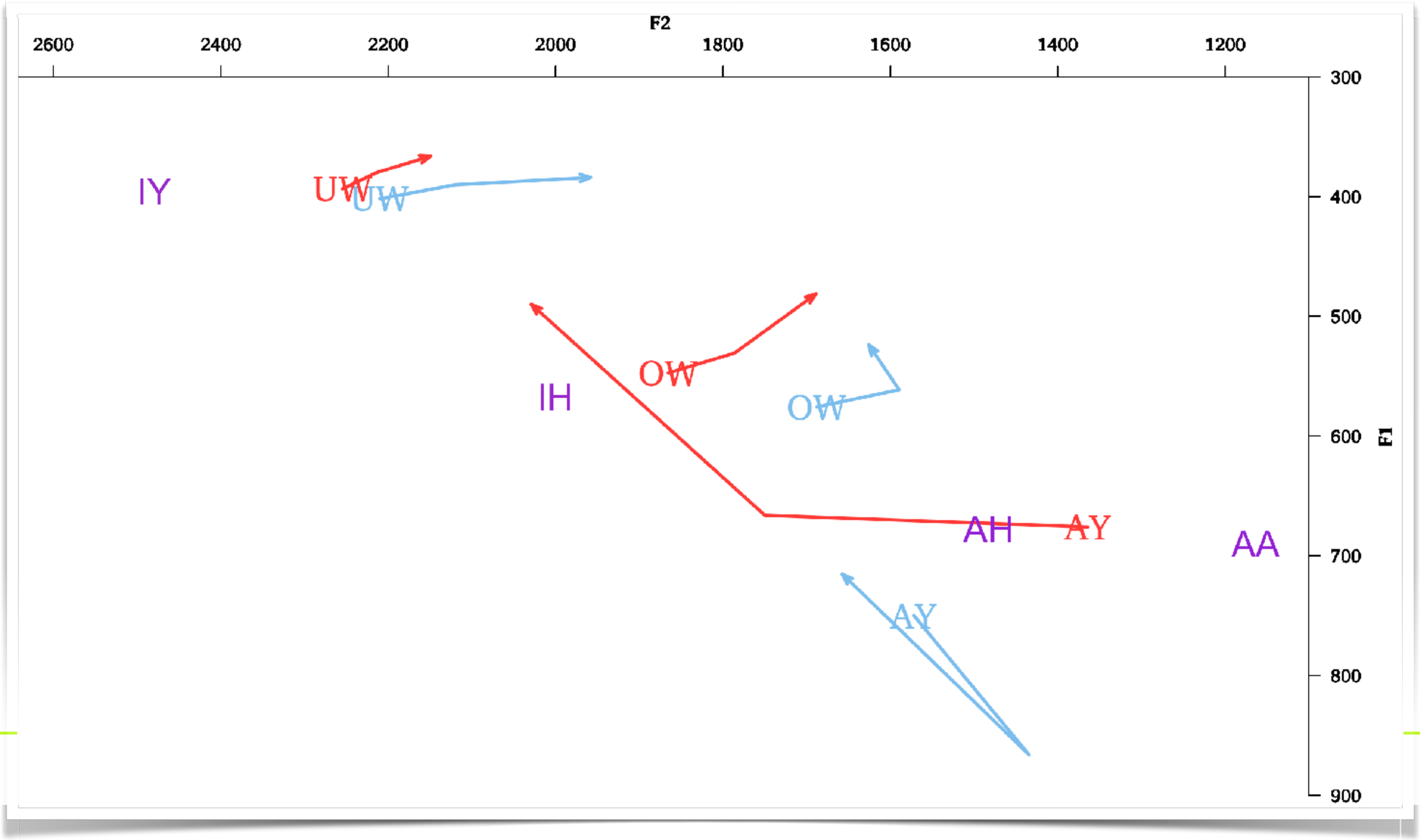


Post–WWII Speakers

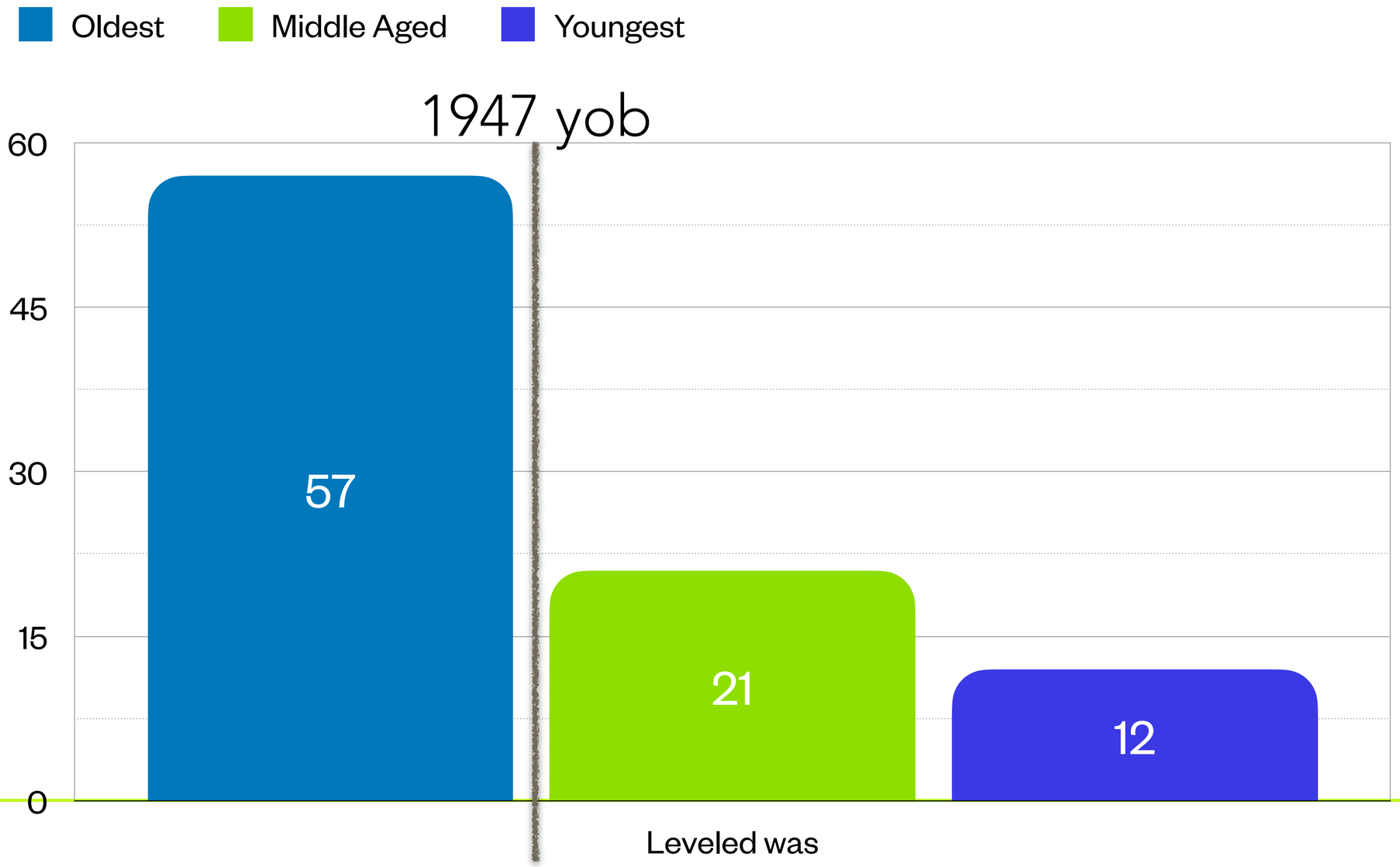

Log2, Southern Rural Female Working Class Speaker (1934)
F2
2500
2000
1500
1000
500
F1
400
500
600
700
800
900
IH
IY
UW
UH
OY
EH
EY
AH
OW
AE
AY
AA
AO
AW


Ral1, Southern Rural Female Upper–Middle Class Speaker (1981)
F2
2600
2400
2200
2000
1800
1600
1400
1200
1000
300
400
500
600
700
800
900
F1
IY
UW
IH
UH
EY
AH
OW
EH
AY
AE
AW
AA
AO

Northern WV rural speaker (b. 2004)



Leveled *was*


Oldest
Middle Aged
Youngest
1947 yob
60
45
30
15
0
57
21
12
Leveled was

Correlation Results

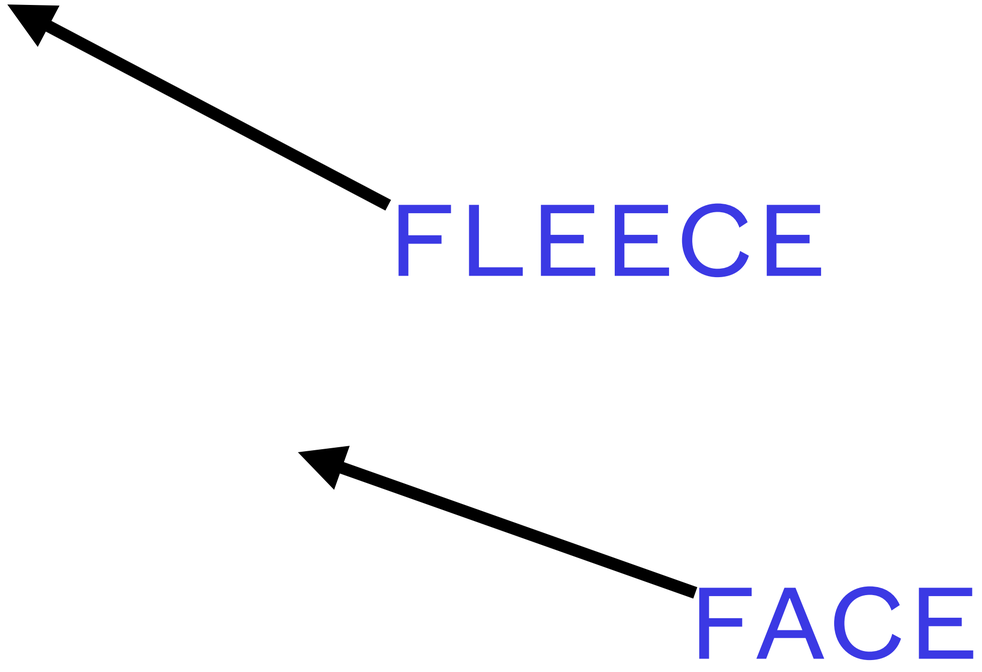
Variables and significant social factors

	Region	Gender	Social class	Rurality	College	Age
FLEECE raising						
KIT lowering						
FACE raising						
DRESS lowering						
PRICE raising						
PRIZE ungliding						
Leveled *was*			✅	✅	✅	✅
ING	✅	✅	✅	✅	✅	

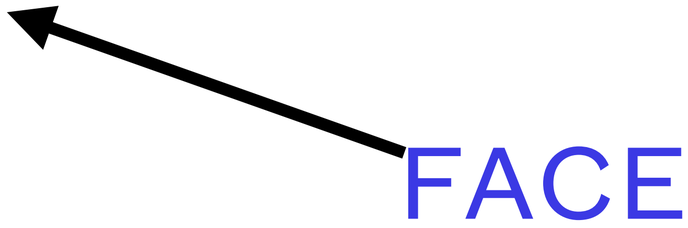
Significant correlations & one almost

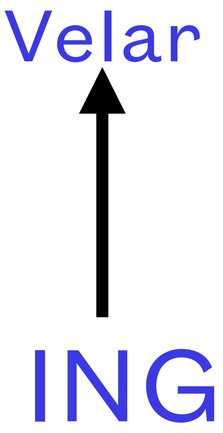
Pearson estimate	Pearson p-value	Spearman estimate	Spearman p-value	pair
0.39	0.0023	0.44	5.00E-04	FACE.FLEECE
0.27	0.0494	0.25	0.0629	FACE.ING
0.37	0.0054	0.34	0.0105	PRIZE.FACE
0.27	0.0444	0.24	0.08	PRIZE.ING
0.67	0	0.58	0	DRESS.KIT
0.29	0.0347	0.24	0.083	KIT.FLEECE
-0.34	0.0158	-0.24	0.0856	PRICE.DRESS
-0.24	0.0874	-0.16	0.2714	WAS.PRICE

FACE~FLEECE Correlation

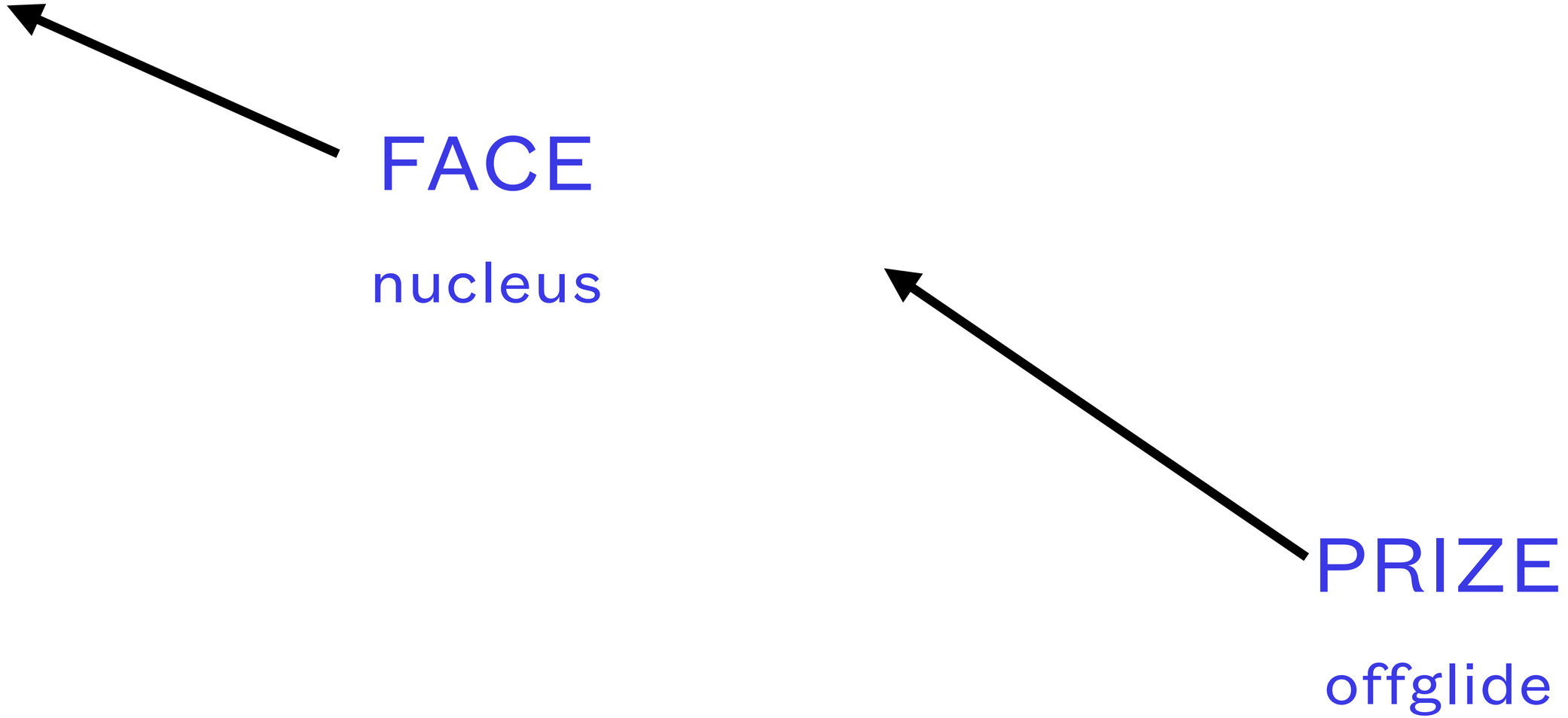


FACE~ING Correlation

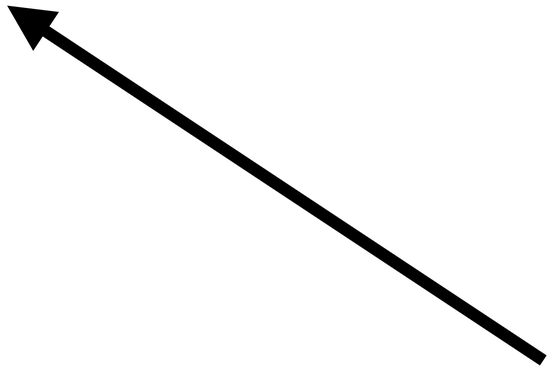




PRIZE~FACE Correlation



PRIZE~ING Correlation



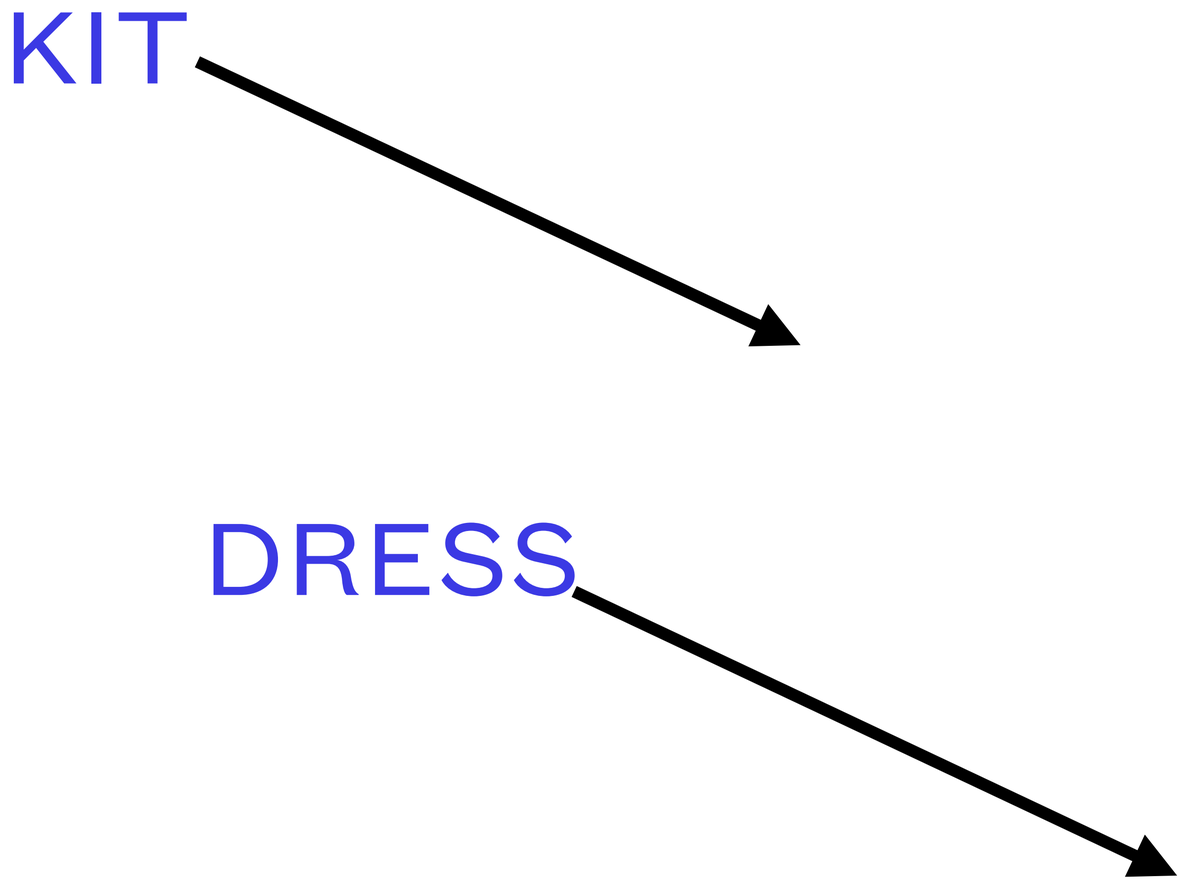
PRIZE

offglide

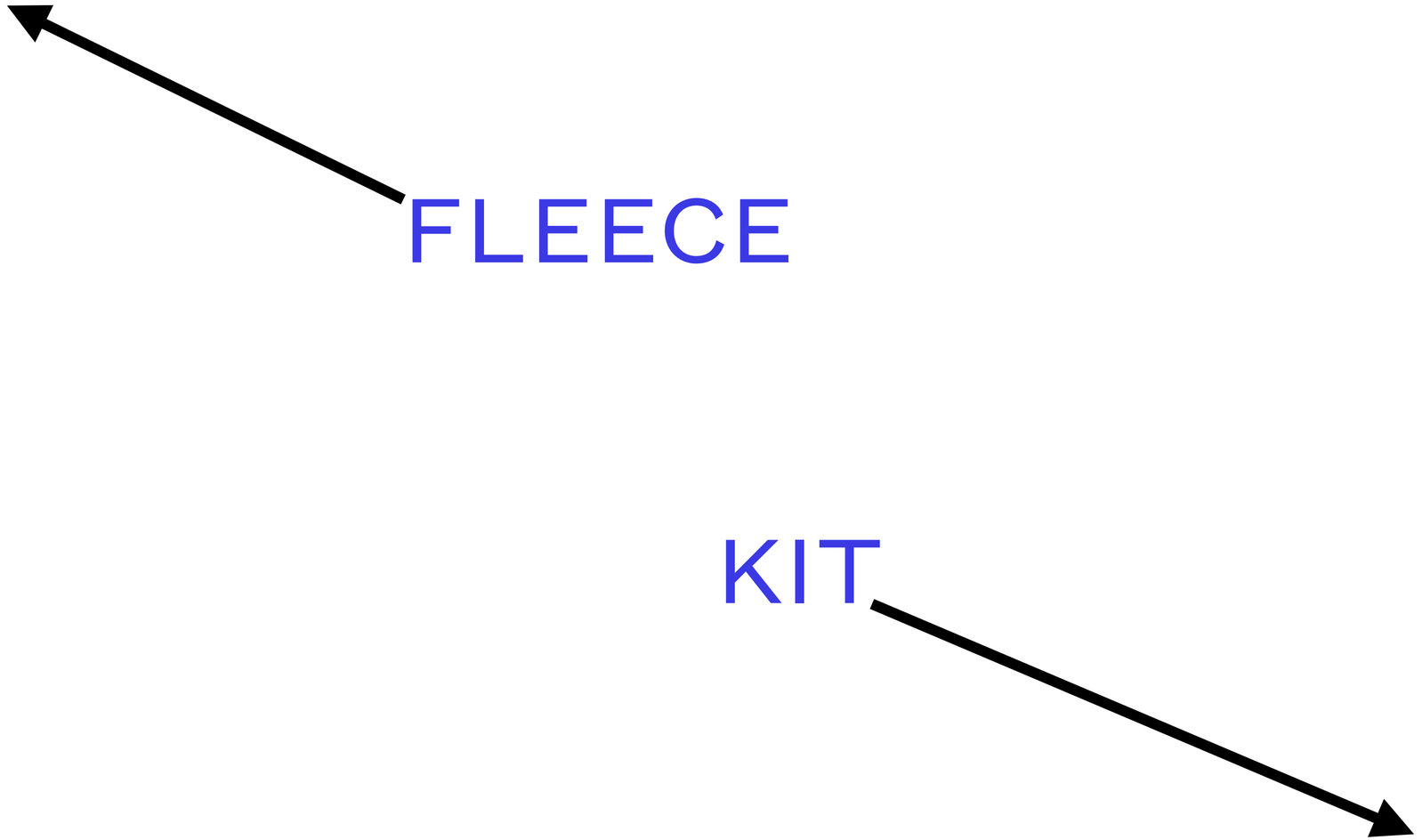
Velar

ING

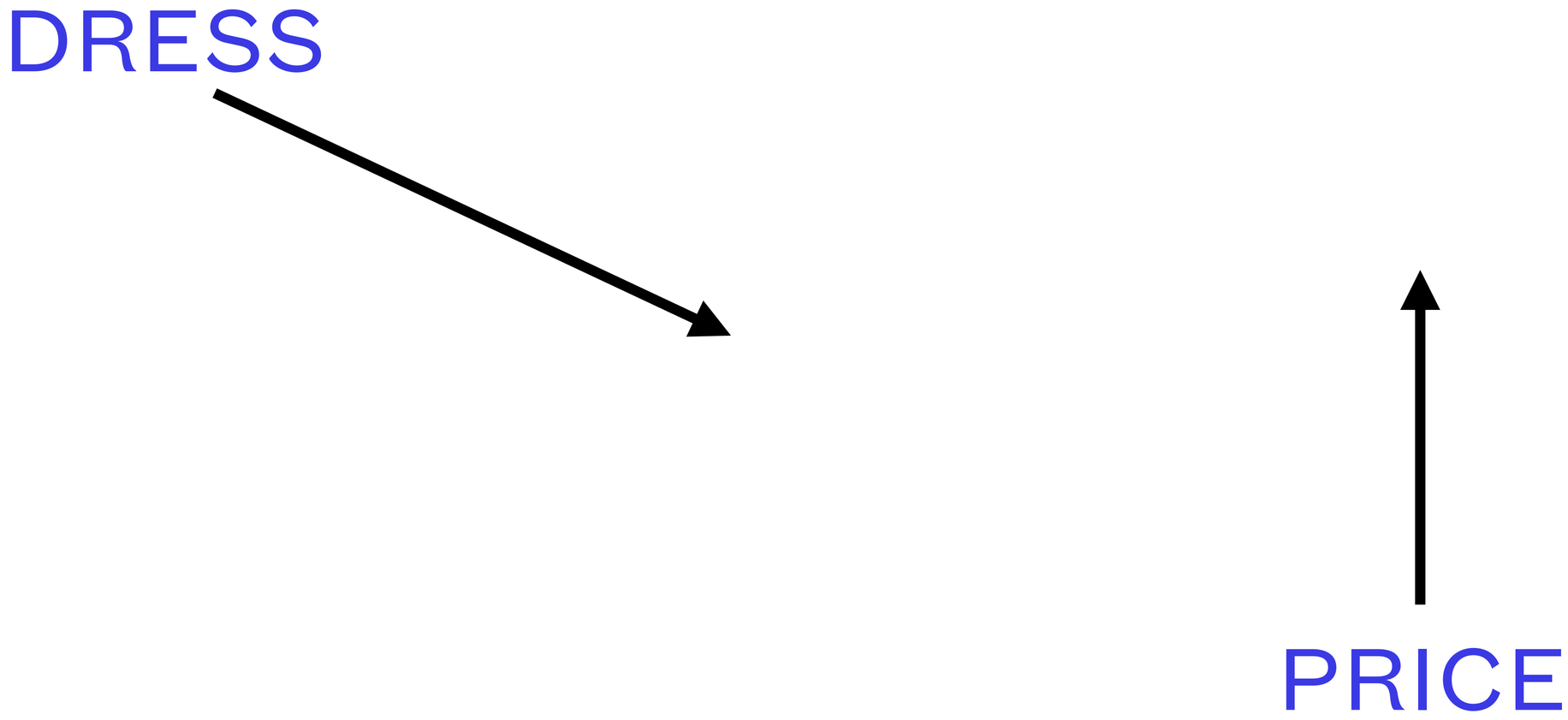
DRESS~KIT Correlation



KIT~FLEECE Correlation



PRICE~DRESS Correlation



Leveled Was~PRICE Almost Significant

Variables and significant social factors

	Region	Gender	Social class	Rurality	College	Age
FLEECE raising						
KIT lowering						
FACE raising						
DRESS lowering						
PRICE raising						
PRIZE ungliding						
Leveled *was*			✅	✅	✅	✅
ING	✅	✅	✅	✅	✅	

Implications

Take Aways

- Despite the changes in vowel space over time, the movement of any one vowel is not significant for age group or yob. Only leveled *was* had a significant difference by age group.
- Still, correlations do occur when looking at the entire data set.
- Correlations do occur between vowels and morphosyntactic variables.
- The correlation with the greatest level of significance (DRESS~KIT) is between the two variables that have received the most social commentary.
- This paper asks whether changing or stable variables have coherence at the level of the individual as separate from any particular intersection of social factors?
  - Yes, stable variables do have coherence separate from alignment of social factors (broadly).
  - The jury is still out as to whether variables undergoing change do also.

Next Steps

- Divide into early and later groups to check for significance within those groups between variables.
- Check Southern Vowel Shift Stages:
  - If these are *system* changes, then the distances between FLEECE and KIT as well as FACE and DRESS that matter.
  - The changes in their Euclidean distance may be significant for social factors.
- Include speakers from 21st century

Important People

- The West Virginia Dialect Project thanks the NSF (BCS0743489; BCS-1120156) and WVU for funding.
- We thank former and current research assistants of the WVDP for all their hard work.

- For more information on the WVDP: dialects.english.wvu.edu

Thank you!

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