Bay Area Spanish: regional sound change in contact languages

Annie Helms
University of California, Berkeley
annie_helms@berkeley.edu

Berkeley
UNIVERSITY OF CALIFORNIA

Overview

- Background
  - California Vowel Shift
  - Ethnicity and regional sound change
  - L1/L2 phonological space
- Research Question
- Methodology
- Results
- Discussion
- Conclusions

California Vowel Shift (CVS)

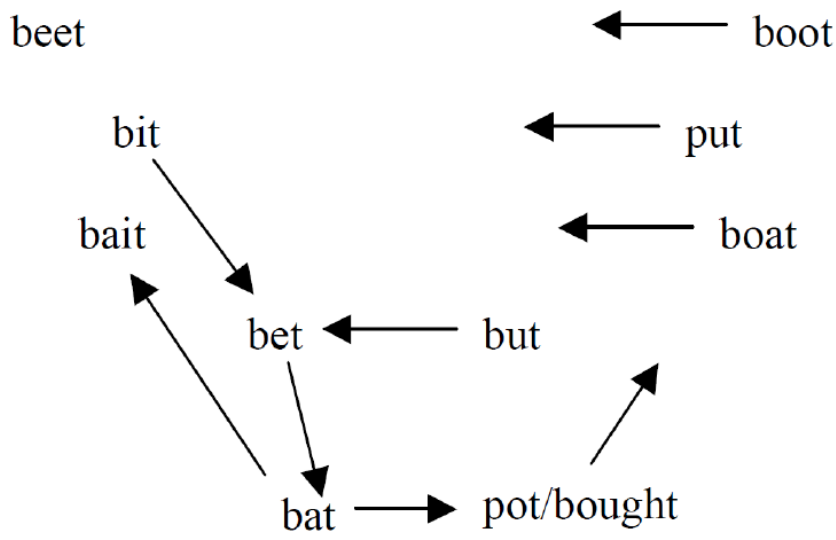


Figure 1: The California vowel shift, adapted from Eckert (2008)

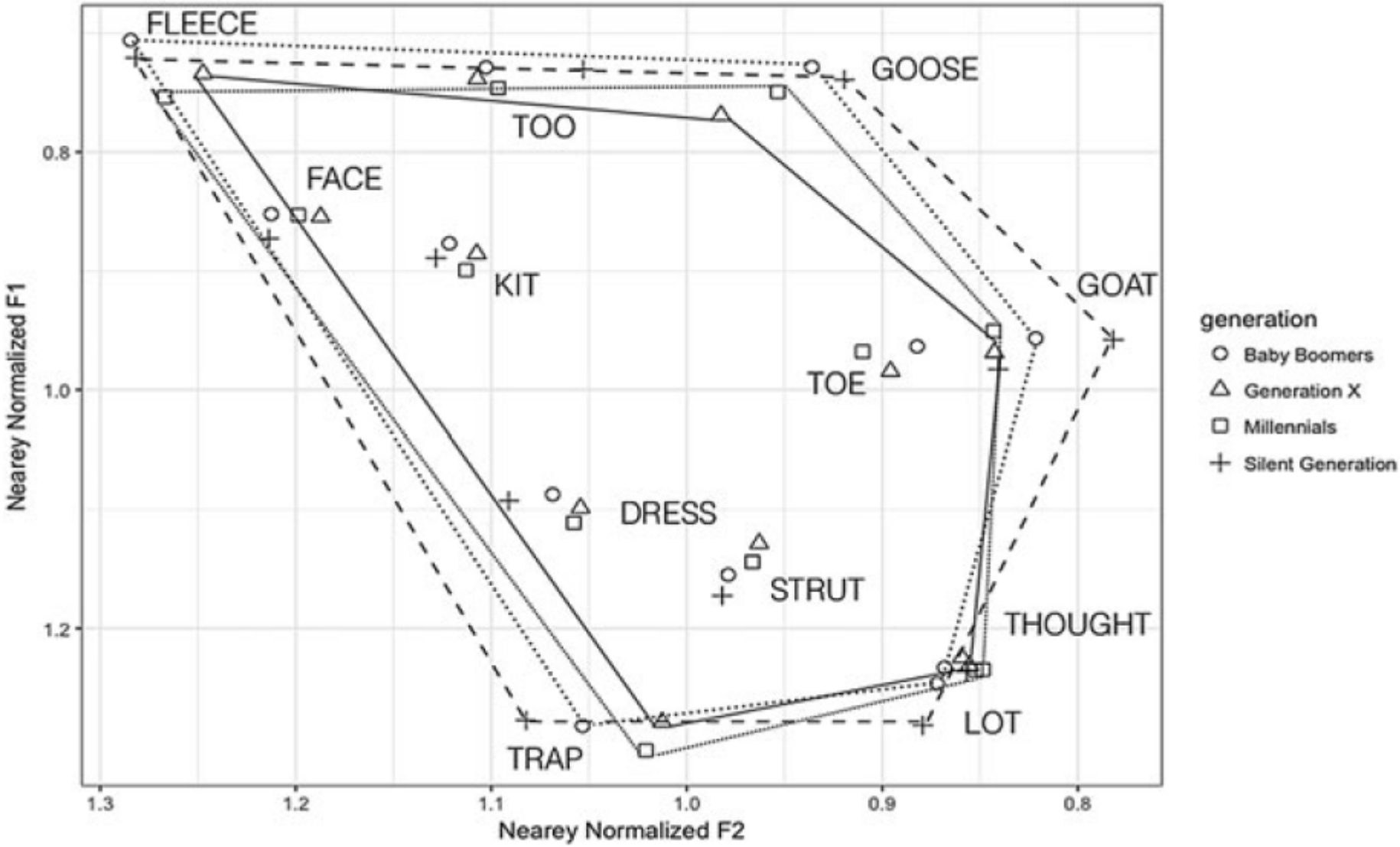
Hinton et al. (1987); Eckert (2008); Hall-Lew (2009); Cheng (2016); Podesva et al. (2015)

California Vowel Shift - compression

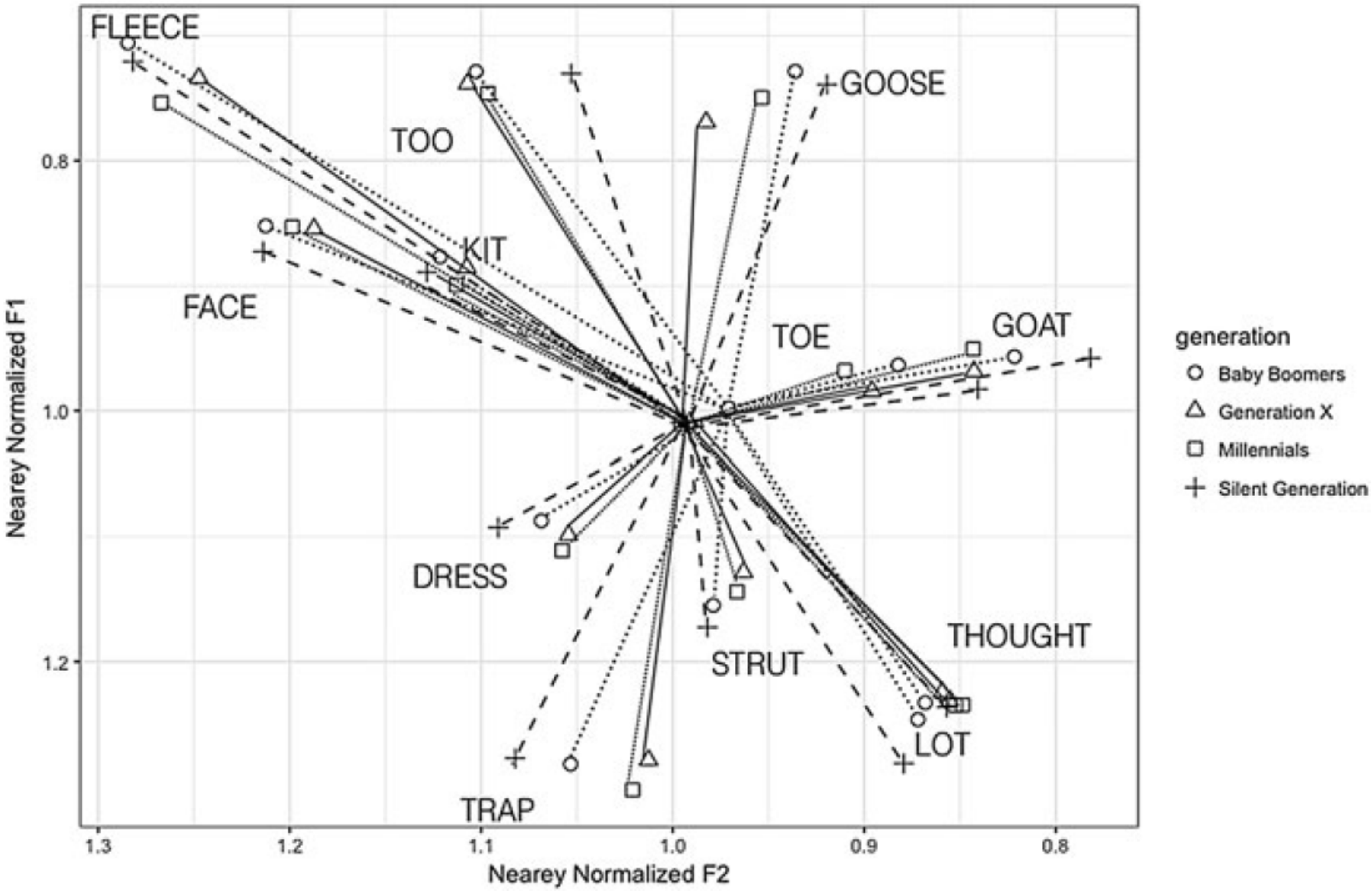
- D'Onofrio et al. (2019):
  - Vowel space compression as sociolinguistic variable with social index
- Compression has also been observed when speakers switch languages or switch speaking styles - Gick et al. (2004); Ramanarayanan et al. (2013); Wilson & Gick (2006)

California Vowel Shift - compression

- Articulatory setting:
  - "slightly lowered, open jaw and a relatively fronted lingual setting . . . [which] accounts not only for the front-back compression of the space, as a lowered jaw reduces the mobility of the tongue in this dimension, but it also accounts for the general lowering of the front vowels observed in the later stages of the shift, as a lowered jaw setting would result in a generally lowered tongue body, leading to lowered vocalic productions," (D'Onofrio et al., 2019: 212)



Vowel Space Area by generation, where the Silent Generation is the oldest and Millennials are the youngest (D'Onofrio et al., 2019).



Vowel Space Dispersion by generation, where the Silent Generation is the oldest and Millennials are the youngest (D'Onofrio et al., 2019).

Ethnicity in regional sound change

- California English spoken by:
  - Chinese Americans - Cheng (2016); Hall-Lew (2009); Hall-Lew et al. (2015); Wong & Hall-Lew (2014)
  - Korean Americans - Kim & Wong (2020)
  - Chicano speakers - Eckert (2008); Fought (1997, 1999, 2003); Godinez & Maddieson (1985)
- Ethnicity alone does not determine participation
- Depends on vowel and social networks

Chicano English

- Influence of Mexican Spanish substrate and regional Anglo English variety - Fought (1997, 1999, 2003); Godinez & Maddieson (1985); Roeder (2010); Konopka & Pierrehumbert (2008); Santa Ana & Bayley (2004)
- /u/- and /o/-fronting in California (CVS), but not in Chicago (Northern Cities Vowel Shift)
- English BOUGHT assimilated with Spanish /a/, slightly raised and backed as in CVS - Godinez & Maddieson (1985)

L1/L2 phonological space

- L1/L2 share phonological space - Flege (1995, 2002, 2005)
- Equivalence classification and perceptual assimilation
- Exposure and experience dictate properties of composite L1/L2 category – Flege (2002); Yeni-Komshian et al. (2000)
- **Spanish vowel space of Spanish-English bilinguals may show influence from California English**

Research questions

- Through processes of perceptual assimilation of peripheral vowels (/i/, /u/, /a/) or phonetic interference:
  - Is vowel space of Bay Area Spanish more compressed than that of Mexican Spanish (monolingual)?
  - Does Bay Area Spanish vowel space compression vary across age and speaking style?

Corpora

- Corpus of Bay Area Spanish (CBAS) – Davidson (2016)
  - Sociolinguistic interviews and word list elicitations
  - Spanish-English bilinguals, 18+ years in Bay Area
- Dummy set using means, std. dev. from vowels produced by 5 female monolingual Spanish speakers at the Universidad Autónoma de Baja California - Grijalva et al. (2013)
- Monolingual Mexican Spanish control:
  - Monolingual Spanish varieties have been characterized as relatively invariable - Lipski (2009); Hualde (2013); Tomás (1977)

CBAS participants

- 6 speakers selected, all L1 Spanish-L2 English
- Heritage varieties of Spanish: Mexican, Guatemalan, El Salvadoran, Nicaraguan, Peruvian
- Stratified by age (18-25 years, 40+ years)
- Each age group: (females: n=2; males: n=1)

	Younger (18-25 years)	Older (40+ years)
Speaking Profiency		
Spanish	0.83 (0.17)	0.61 (0.25)
English	0.95 (0.10)	0.83 (0.28)
Listening Proficiency		
Spanish	0.95 (0.10)	0.83 (0.17)
English	1.00 (0.00)	0.95 (0.10)
Cultural Identity		
Spanish	1.00 (0.00)	0.83 (0.00)
English	0.83 (0.23)	0.78 (0.25)
Age Learned (years)		
Spanish	Birth (0.0)	Birth (0.0)
English	5.3 (2.3)	8.0 (9.8)
Daily Use with Friends		
Spanish	0.17 (0.29)	0.27 (0.46)
English	0.83 (0.29)	0.73 (0.46)
Daily Use with Family		
Spanish	0.50 (0.50)	0.57 (0.51)
English	0.50 (0.50)	0.43 (0.51)
Daily Use at Work		
Spanish	0.40 (0.10)	0.20 (0.26)
English	0.60 (0.10)	0.80 (0.26)

Table 1: Self-reported sociodemographic information across age groups for selected speakers in CBAS, mean responses are out of 1.0 (unless otherwise indicated) and are listed with standard deviations in parentheses.

Analysis – formant extraction

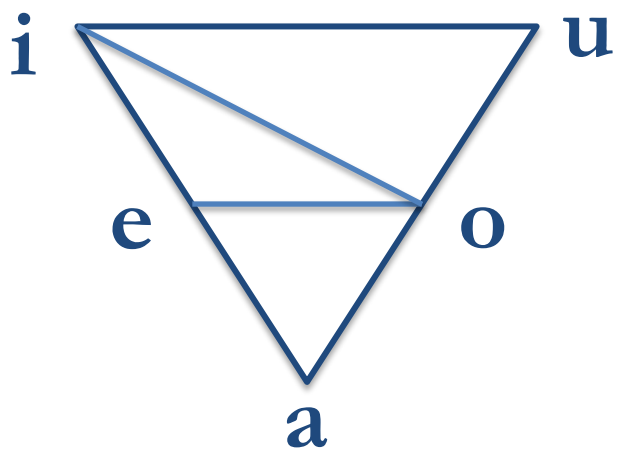
- CBAS-Control comparison:
  - Only female speakers (CBAS: n=4; Control: n=5)
  - Raw formant values at midpoint, CBAS: formants extracted from word list elicitations using ELAN and Praat script - ELAN (2019); Boersma & Weenink (2018); Lennes (2003)
  - Diphthongs and outliers removed
    - Min: 1st quartile – (1.5 x Interquartile Range)
    - Max: 3rd quartile + (1.5 x Interquartile Range)
  - CBAS vowels: n=1,329; Control vowels: n=1,000

Analysis – formant extraction

- Analysis within CBAS:
  - Formant values at midpoint extracted from word list elicitations and sociolinguistic interviews using ELAN and Praat script - ELAN (2019); Boersma & Weenink (2018); Lennes (2003)
  - Diphthongs and outliers removed
  - Normalized with ΔF Normalization - Johnson (2019)
  - Vowels: n=4,448

Analysis – vowel space area

- Area - D'Onofrio et al. (2019)
  - Vowel space divided into three triangles with vertices: /a/, /e/, /o/; /e/, /o/, /i/; and /i/, /u/, /o/
  - Area of each triangle calculated with Heron's formula
  - Summed to yield vowel space area

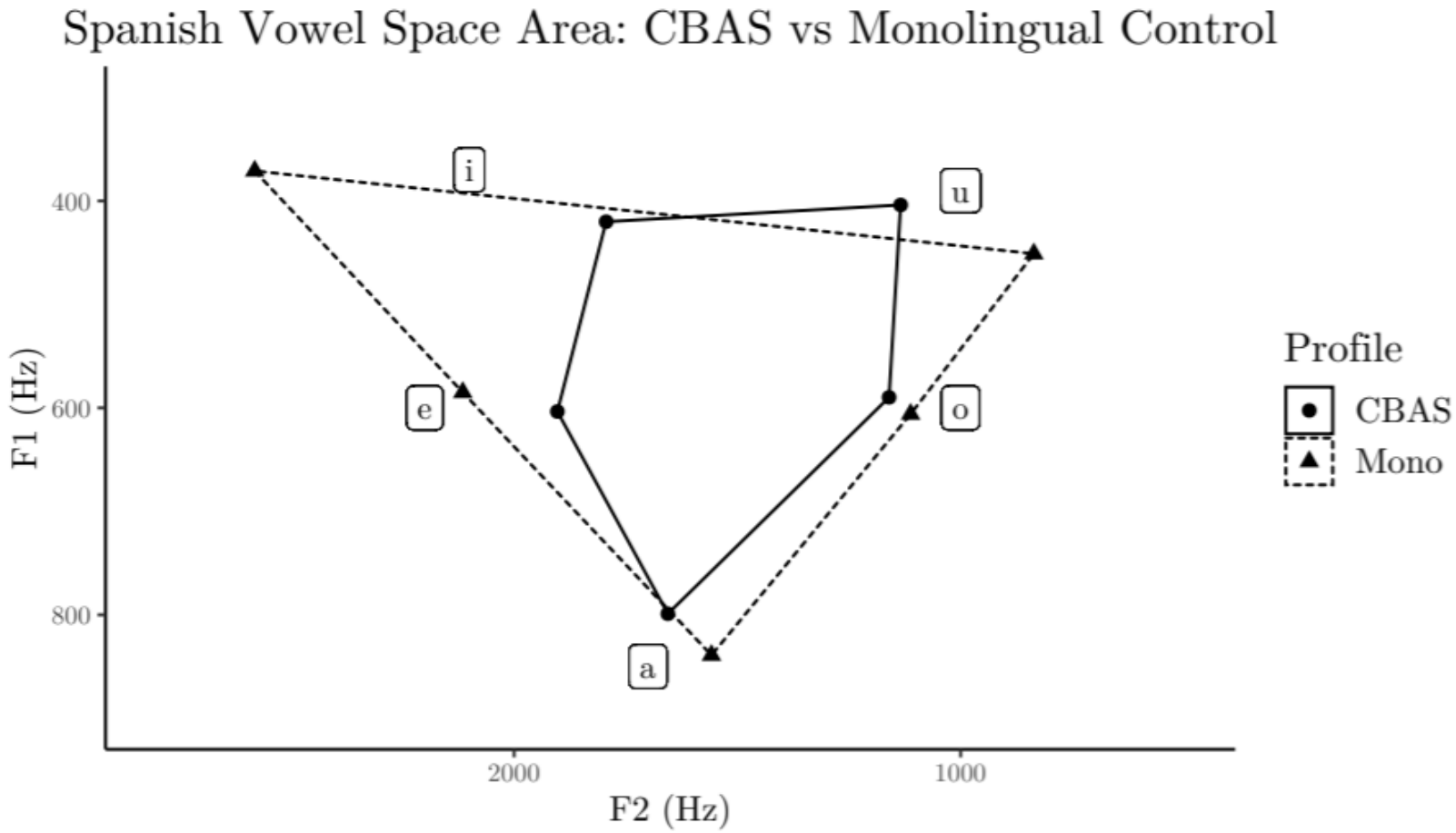


Analysis – vowel space dispersion

- Dispersion - D'Onofrio et al. (2019)
  - Centroid of vowel space calculated (by speakers)
  - Distances calculated from centroid to centroid of each vowel
  - Distances averaged to yield vowel dispersion

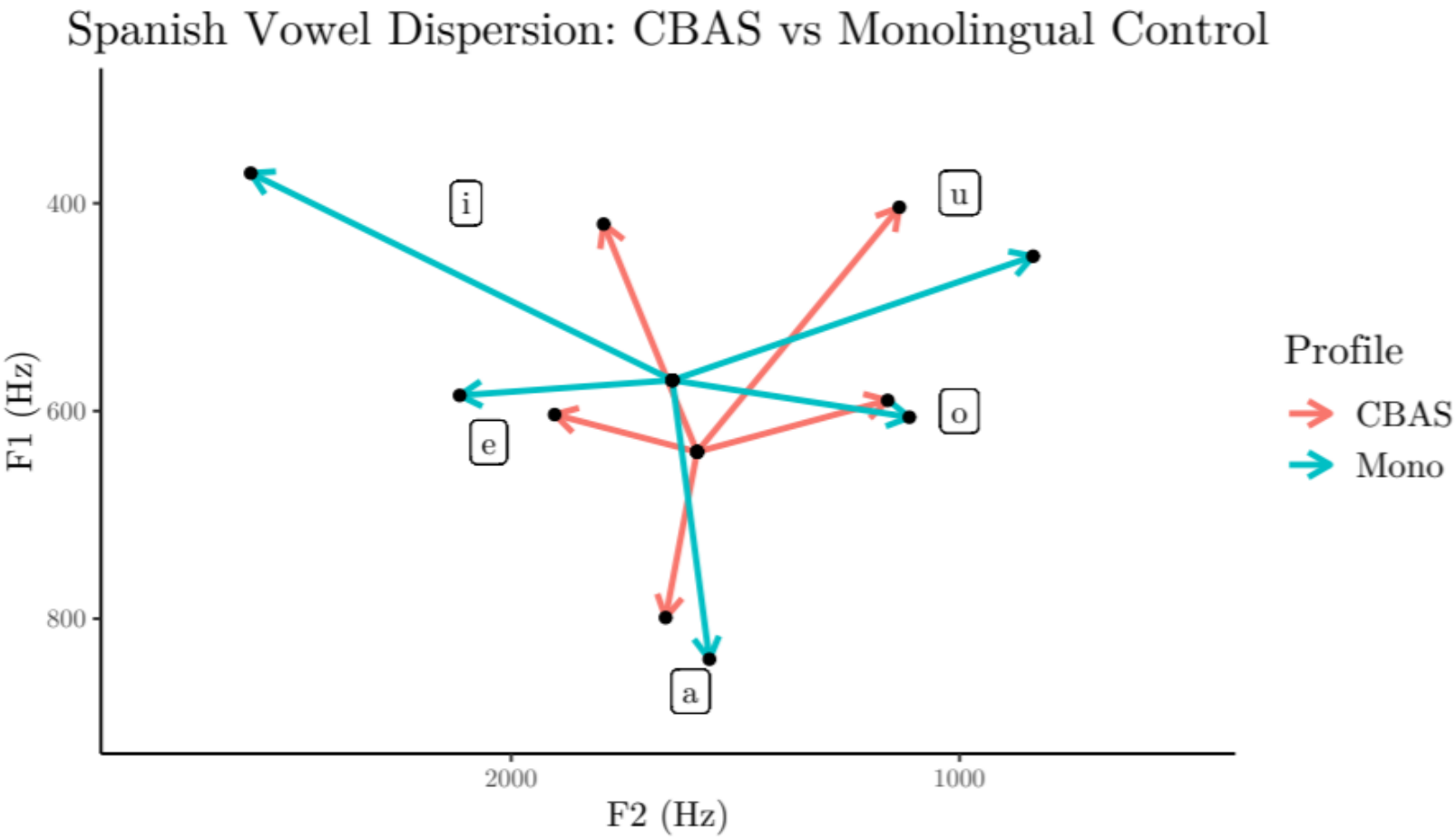
Analysis – regression models

- CBAS-Control:
  - Fixed effects linear regression models
  - DV: vowel space metric (area, dispersion)
  - IV: Profile (CBAS or monolingual)
- CBAS analysis:
  - Mixed effects linear regression models
  - DV: vowel space metric (area, dispersion)
  - IV: Age (older, younger) * Style (interview, word list)
  - Random intercept: Participant



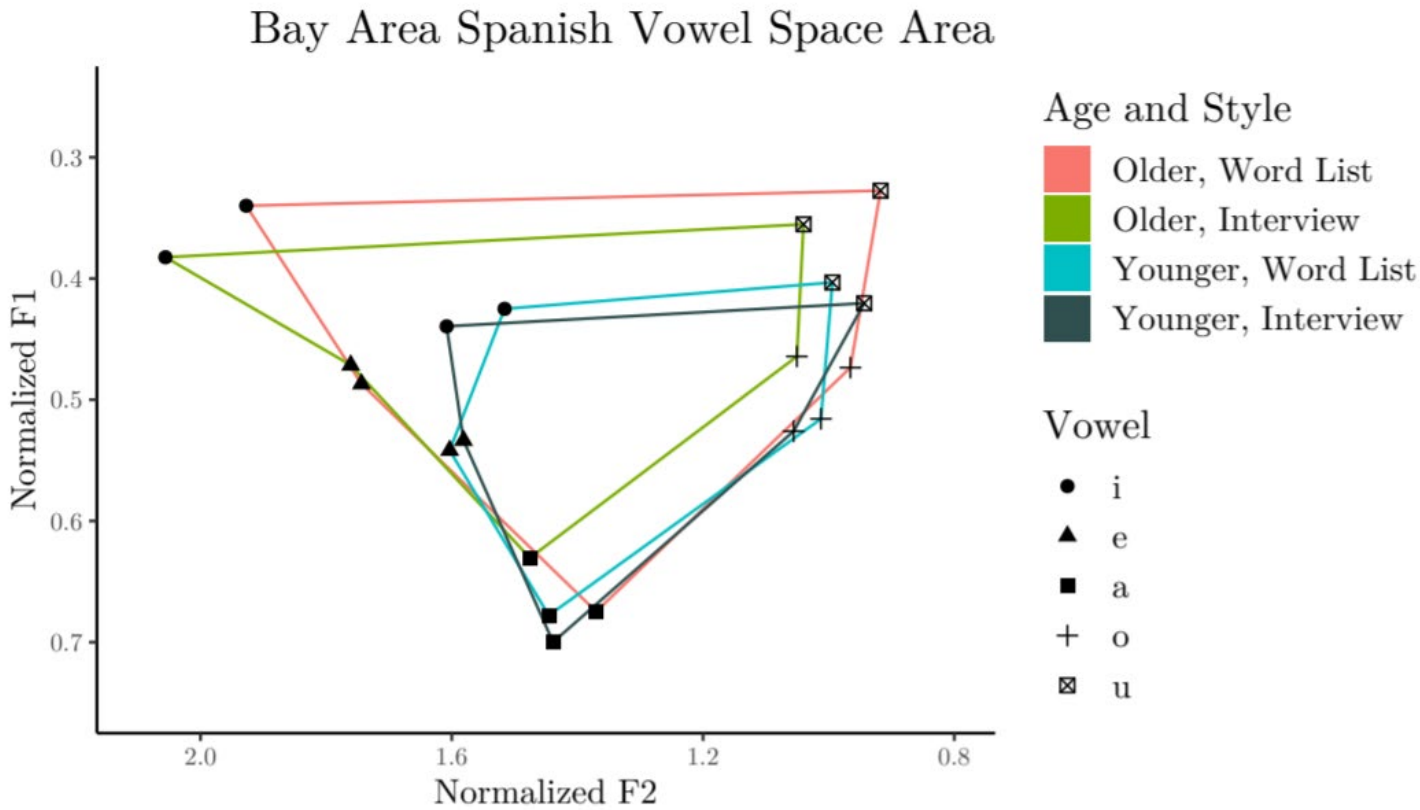
	Estimate	Std. Error	t-value	p-value	
(Intercept)	222224	42327	5.250	0.00192	**
Monolingual	148207	59859	2.476	0.04807	*

Table 2: Regression coefficients for the fixed linear effects model predicting vowel space area. The Intercept coefficient is bilingual speakers in CBAS.



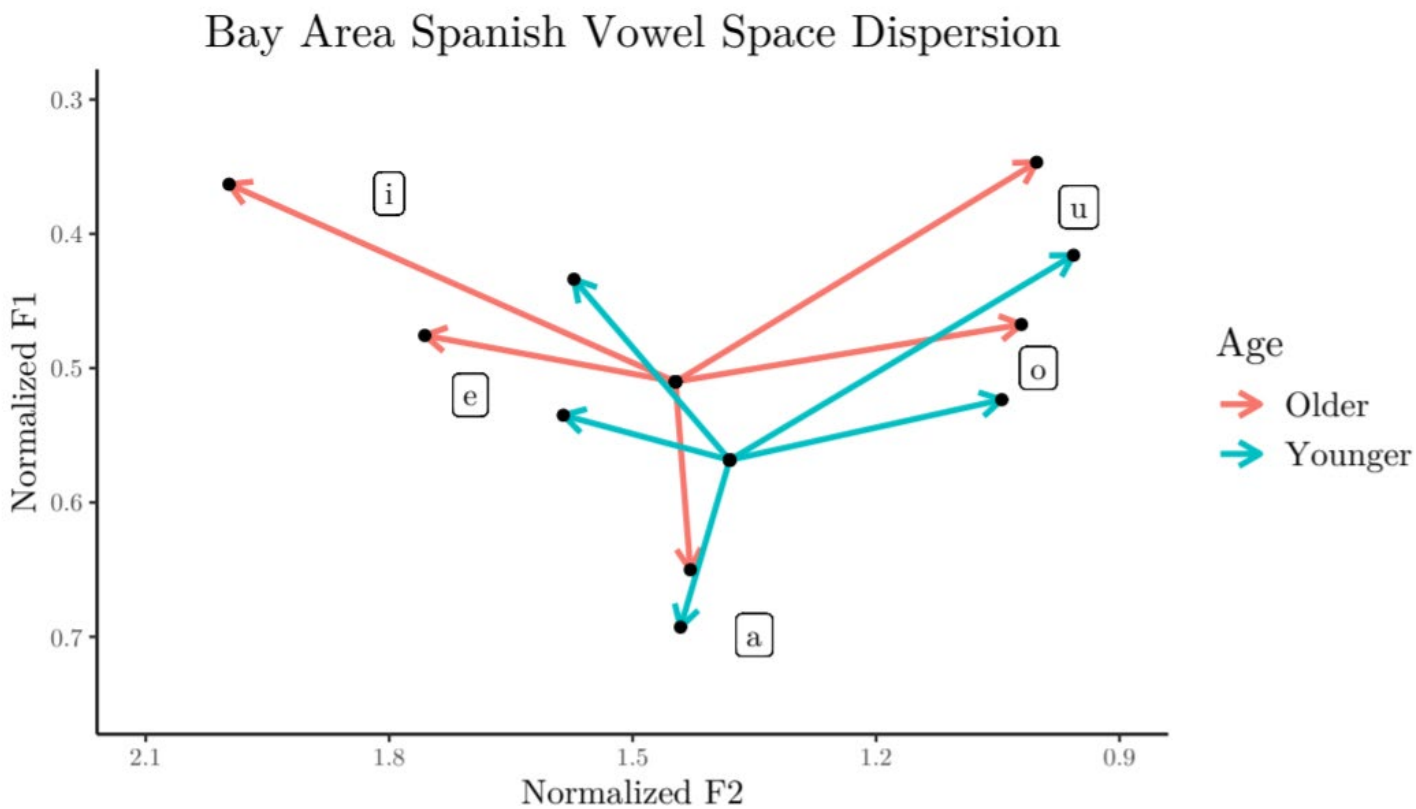
	Estimate	Std. Error	t-value	p-value	
(Intercept)	387.45	33.05	11.723	2.32e-05	***
Monolingual	225.08	46.74	4.816	0.00295	**

Table 3: Regression coefficients for the fixed linear effects model predicting vowel dispersion. The Intercept coefficient is bilingual speakers in CBAS.



	Estimate	Std. Error	df	t-value	p-value	
(Intercept)	0.19500	0.02023	9.21999	9.637	4.08e-06	***
Interview	-0.04878	0.01921	6.00000	-2.539	0.0442	*
Younger	-0.08128	0.02861	9.21999	-2.841	0.0189	*
Interview: Younger	0.03501	0.02717	6.00000	1.289	0.2450	

Table 4: Regression coefficients for the mixed linear effects model predicting vowel space area. The Intercept coefficient is word list data produced by older speakers.



	Estimate	Std. Error	df	t-value	p-value	
(Intercept)	0.416012	0.028908	9.545884	14.391	8.65e-08	***
Interview	-0.032794	0.028704	6.000005	-1.142	0.2968	
Younger	-0.099073	0.040882	9.545884	-2.423	0.0369	*
Interview: Younger	-0.001205	0.040593	6.000005	-0.030	0.9773	

Table 5: Regression coefficients for the mixed linear effects model predicting vowel dispersion. The Intercept coefficient is word list productions by older speakers.

Discussion

- Dialectal variation in Spanish vowel space
  - Holistic view of vowel space may reveal further dialectal variation
  - Variability in situations of contact - Guion (2003); O'Rourke (2010); Willis (2005)
  - Source languages can be regional varieties

Discussion

- Bay Area Spanish:
  - Same effect of age seen in CA English - D'Onofrio et al. (2019)
  - Effect of style - Ramanarayanan et al. (2013)
  - Challenges research that is limited to ethnicity and regional sound change (English) participation

Discussion

- Historic Anglo-centric focus of regional varieties in U.S.
  - Broaden scope beyond ethnicity and participation in sound change
  - Regional markers should extend beyond variants in English
- Bilingual category representation
  - Not limited to F1, F2 measurements
  - Holistic measures of vowel space

Conclusions

- Bay Area Spanish shows contact influence from regional variety (California English)
- Broadens the scope of what are/should be considered 'regional varieties' in the United States
- Future work should more fully investigate this contact variety of Spanish and the social and linguistic factors that influence compression

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