

Sociophonetic variability in the production of Spanish /e/ by Catalan-Spanish bilinguals in Barcelona

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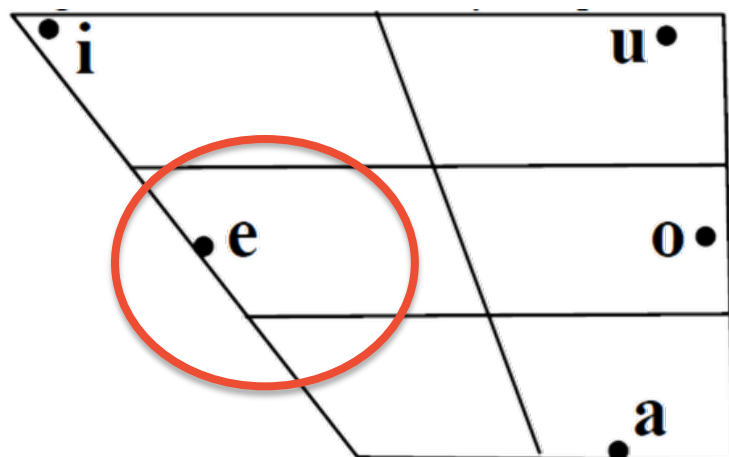
Background

- Barcelona has the lowest percentage of L1-Catalan speakers within Catalonia (Lleó et al., 2008: 186)
- Study of Catalan (the minority language) has thus far been favored over the study of Spanish (the majority language), presumption of unidirectionality of Spanish on Catalan (Galindo Solé 2003: 18)
- Weakening of Catalan vowel contrast in Barcelona demonstrate contact with Spanish (Lleó et al., 2007; 2008; 2009)
- Strengthening of Catalan linguistic policies in schools, generational gap in access to prescriptive norms

Spanish and Catalan Vowel Spaces

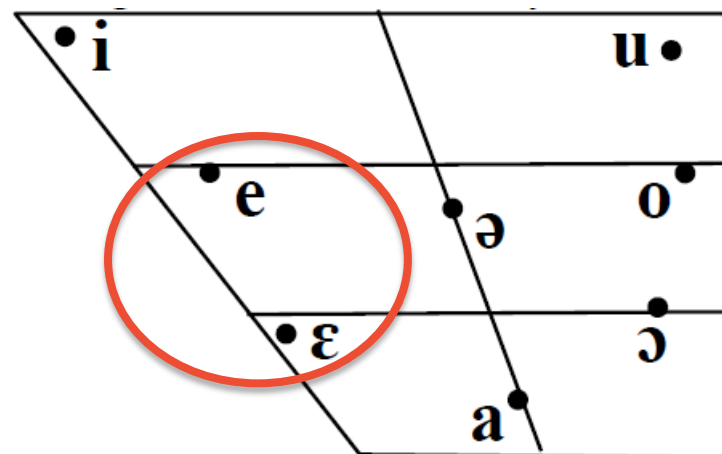
Spanish

(Ladefoged & Johnson, 2015: 237)



Catalan

(Carbonnell & Listerri, 1999: 62)



Literature Review

- Speech Learning Model (Flege, 1995, 2002, 2005)
 - the L1 and L2 co-exist in a mutual phonological space and may influence one another
 - perceptual assimilation between L1 and L2 category results in composite L1-L2 category
- Behavioral plasticity and ability to perceptually discriminate between vowel contrasts in L2 decreases with age, despite widespread societal bilingualism (Pallier, Bosch & Sebastián-Gallés, 1997)

Research Question

- **(Q)** Is there a cognate effect from Catalan in the production of Spanish /e/?
 - **(H)** When there is a Catalan cognate, Spanish /e/ will assimilate towards the corresponding Catalan vowel (Spanish /e/ will have lower F1 with Catalan /e/ and higher F1 and lower F2 with Catalan /ɛ/)

Methodology

- Bilingual Language Profile (Birdsong, Gertken & Amengual, 2012)
 - ☒ As categorical factor:
 - Raw scores in language history, attitudes, use, and proficiency scaled and submitted to k-means clustering
 - Catalan-dominant and Spanish-dominant groups identified
 - Factor-crossing necessary to fill cells, but would have created less interpretable model
 - ☑ As continuous factor:
 - used continuous dominance score outputted by BLP algorithm
- Sociolinguistic interview
- Spanish wordlist
- Catalan wordlist

Participants

- Residents of Barcelona for 18+ years
- Speakers of Spanish and Catalan - BLP Catalan-dominance scores range from 118-201
- Age – gap of 15 years to allow for apparent time comparison
- Gender – self-identified
- All recruited via flyers at the University of Barcelona (Catalan is language of instruction, unless a student petitions otherwise)

	Male	Female	Total
18-25 yrs	4	6	10
40-60 yrs	3	4	7
Total			17

Wordlists

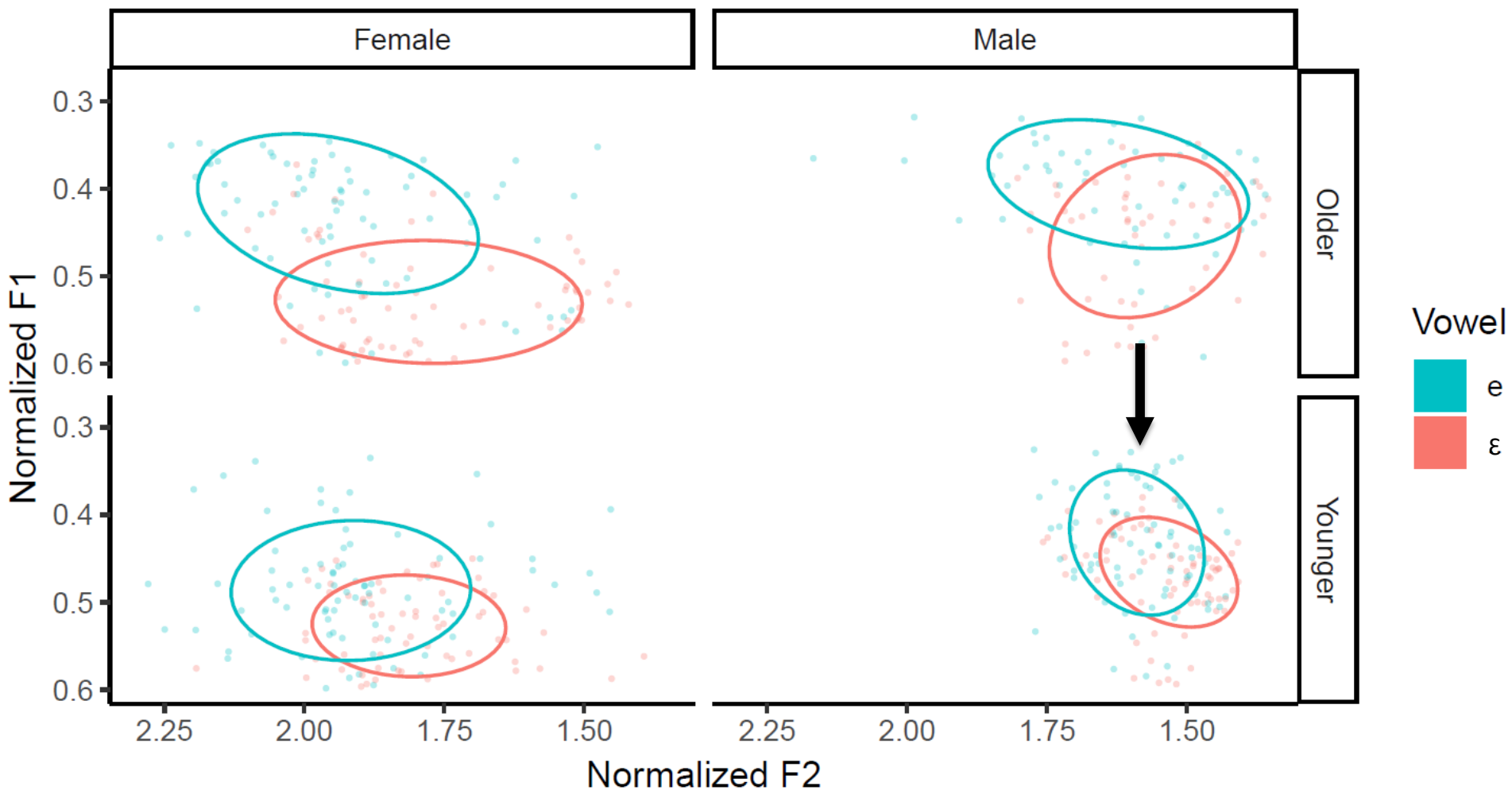
- Stress controlled
- Exclusion of following segments /j/, /x/, /r/ which alter /e/ F1 (Hualde, 2014: 115)
- Frequency controlled according to NIM corpus (Guasch et al., 2013)
- 60 Spanish words
- 40 Catalan cognates determined by phonetic dictionary (Moll & Alcover, 2002)

Spanish Word	Catalan Cognate	Cognate Vowel
aumento	augment	/e/
inteligencia	intel·ligència	/e/
elementos	elements	/ɛ/
pena	pena	/ɛ/
madera	---	none
parece	---	none

Analysis

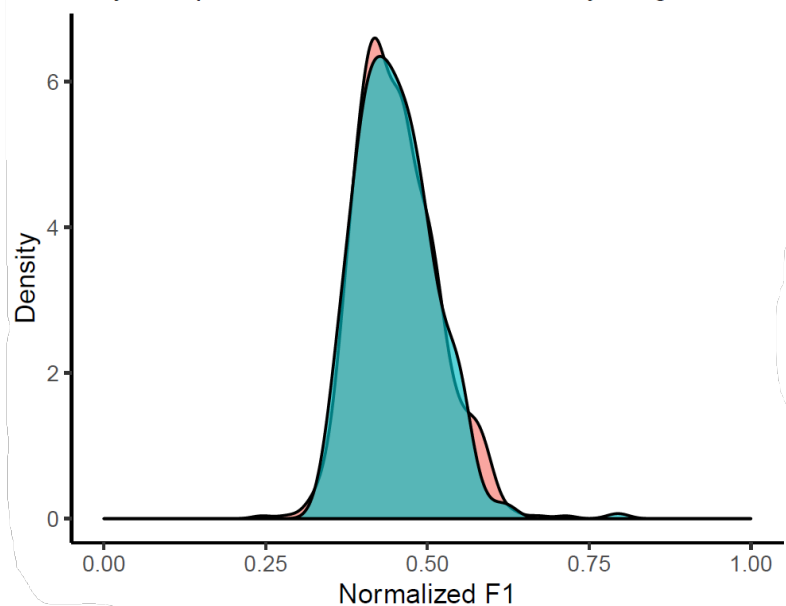
- Formant measurements at midpoint of Spanish /e/, Catalan /e/ and Catalan /ɛ/ (1,700 vowels total) extracted in Praat (Boersma & Weenick, 2019)
- Normalized using Lammert and Narayanan ΔF normalization (Johnson, 2018)
- Formant measurements submitted to mixed effects linear regression models, where participant and token always included as random effects, with the following 3-way interaction term:
 - DV ~ Gender * Age * Catalan dominance

Catalan Mid-Front Vowel Space

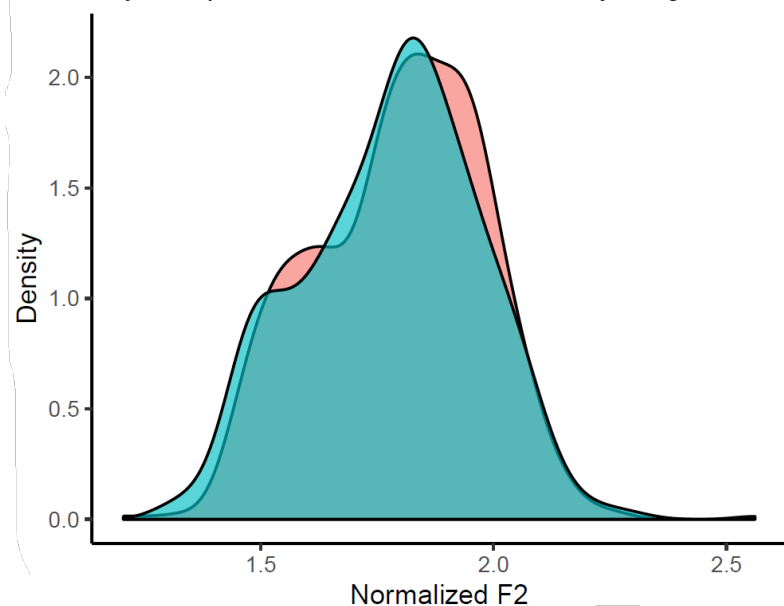


$F1 \sim \text{Gender} * \text{Age} * \text{Catalan dominance}$

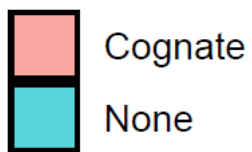
Density of Spanish F1 Measurements by Cognate Status



Density of Spanish F2 Measurements by Cognate Status



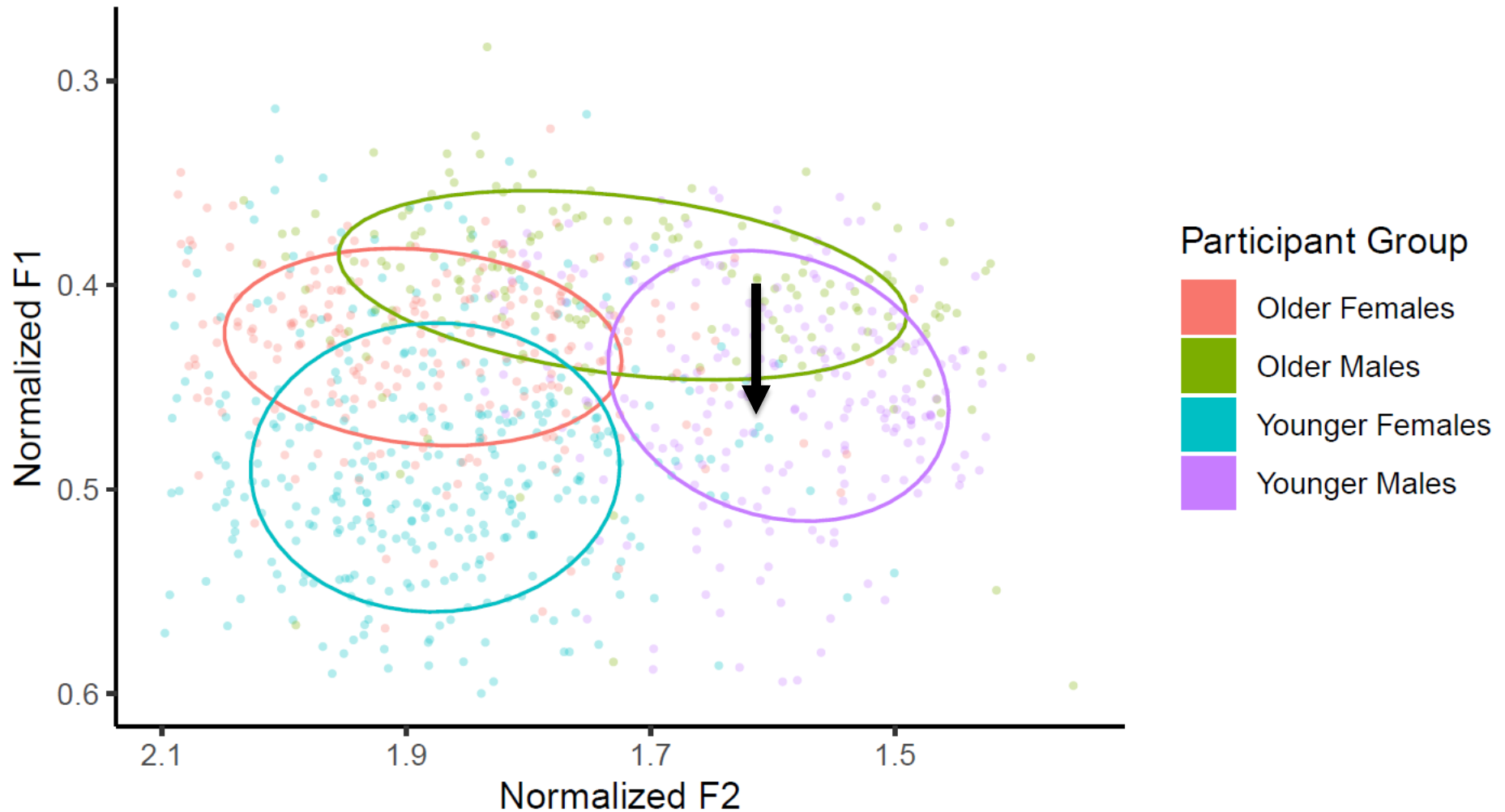
Cognate Status



Lower vowel

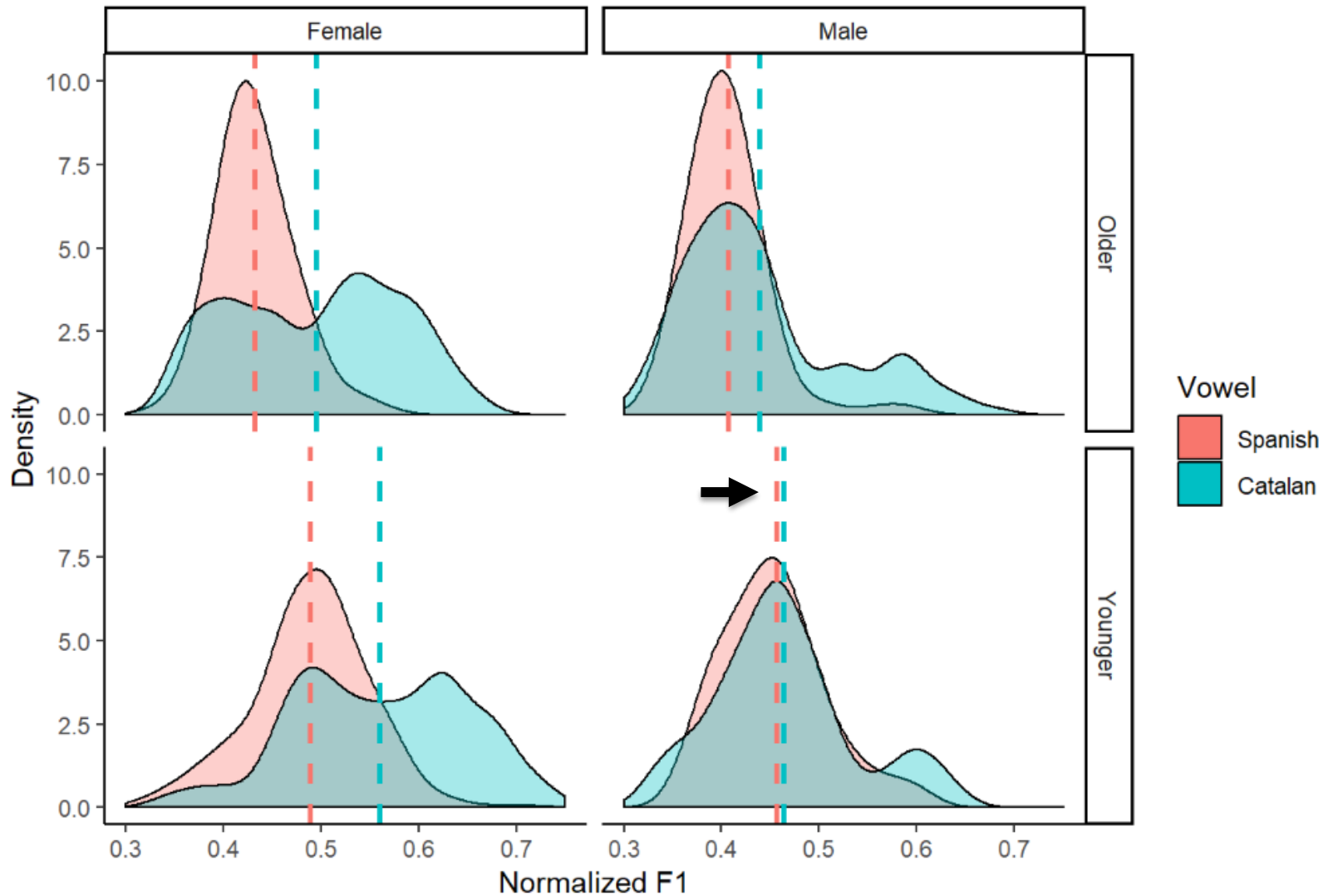
More fronted vowel

Spanish /e/



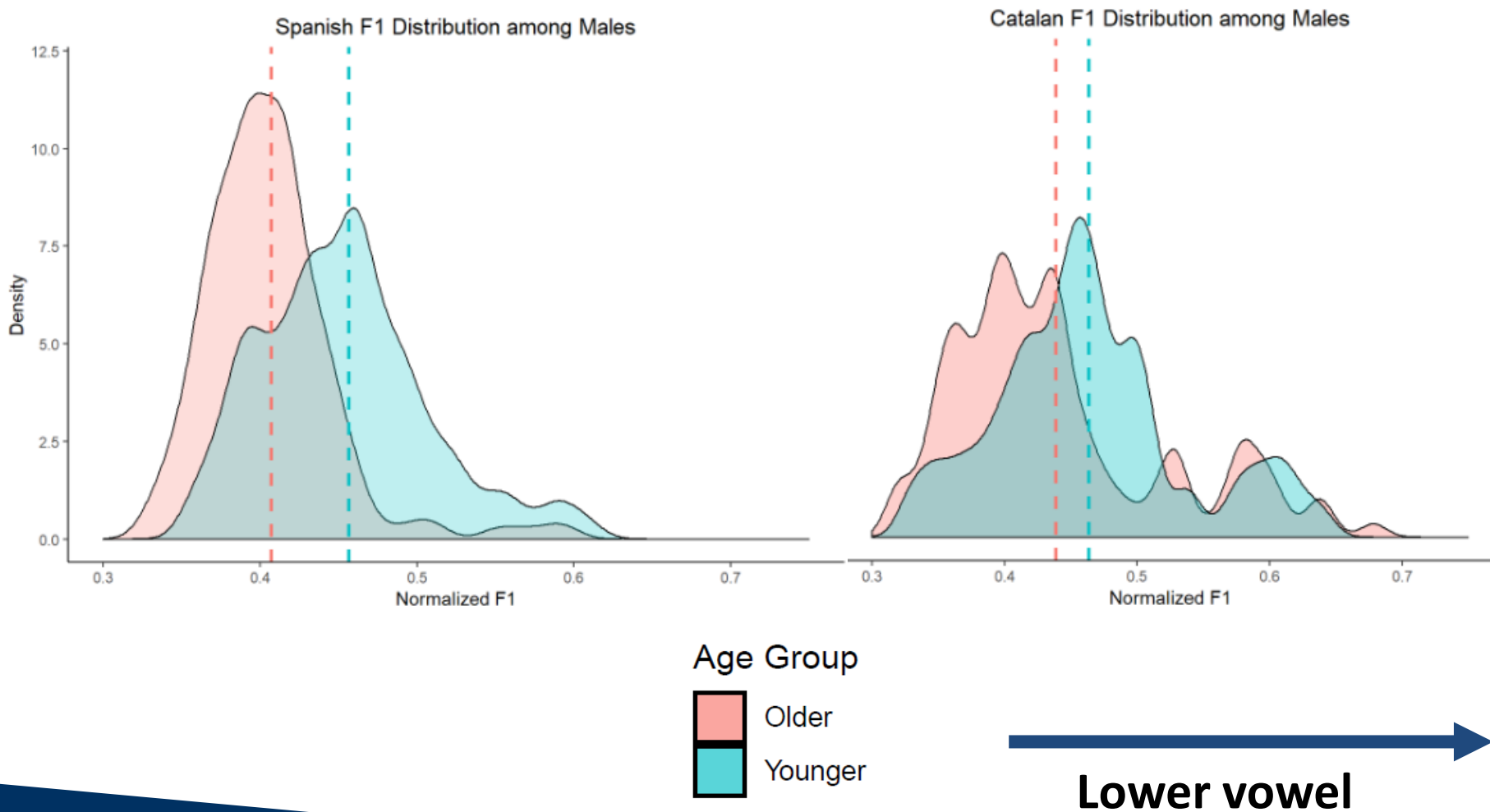
F1 ~ Gender * Age * Catalan dominance

Density plots of F1 across Social Group



Lower vowel

Vowel category area ~ Age * Gender
(F1 Interquartile range x F2 Interquartile range)



Discussion

- No social group maintains a significant contrast between Catalan /e/ and /ɛ/ - ongoing merger in Barcelona (Lleó et al., 2007; 2008; 2009)
- Absence of cognate effect
- Catalan dominance only a significant predictor of Catalan F1 productions (greater dominance yields lower vowels)
- F1 of Spanish and Catalan increasing in apparent-time for males, conflated in young males (also attested in perception of Barcelona bilinguals in Pallier et al., 1997)
- Phonological area of Spanish /e/ increasing in apparent-time, area of Catalan front-mid vowels stable

Conclusions

- Bi-directional contact-induced change between Spanish and Catalan in Barcelona, often unequal influence (Davidson, 2020)
- Features indexed with lower vowels, increased phonological area?
 - Future matched guise task
- Increased Catalan linguistic policies may affect production
 - Younger speakers have access to prescriptive Catalan norms in school, older speakers do not
 - Participants shared anecdotally that students are taught in school that Catalan /e/ is the same as Spanish /e/, perhaps contributing to greater conflation between vowels in the two languages over time

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