November 11, 2022

Cross-linguistic comparisons of high vowels within individual speakers of Toronto Heritage Cantonese"

Holman Tse, *St. Catherine University*

Cross-linguistic comparisons of high vowels within individual speakers of Toronto Heritage Cantonese

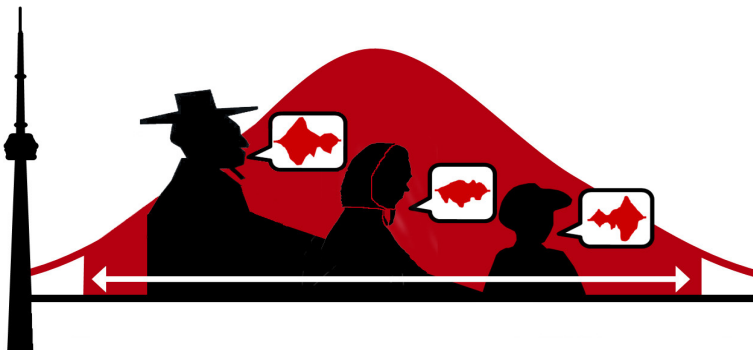Workshop on Immigrant Languages in the Americas (WILA 13)

November 11, 2022

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Introduction

- Focus on Toronto Heritage Cantonese in contact with Toronto English
- Linguistic focus on three vowels
  - Cantonese /y/ and /u/ (henceforth 'y' and 'u')
  - English /u/ (henceforth 'UW' or 'GOOSE vowel')
- Data from the HLVC in Toronto Project (WILA 13 am plenary)
- General Question
  - How can individual-level cross-linguistic comparisons help better account for variation in Toronto Cantonese /y/ vs. /u/?

Linguistic Context: Cantonese

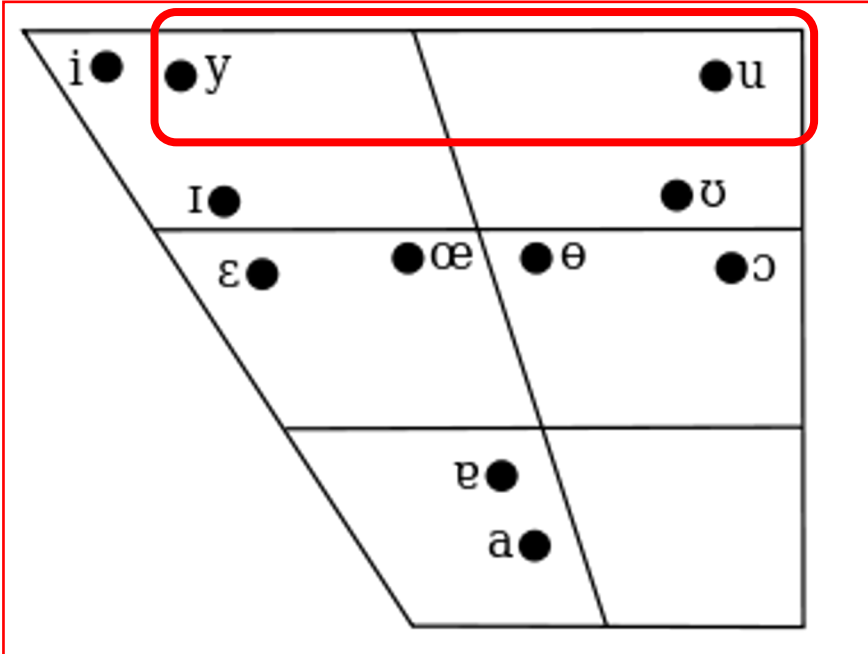Cantonese Monophthongs (Zee 1999)

Image from Wikipedia

/y/   vs.   /u/

捲   館

gyun2   *gun2*

[kyn˧]   [kun˧]

('roll')   ('building')

high front round tense   high back round tense

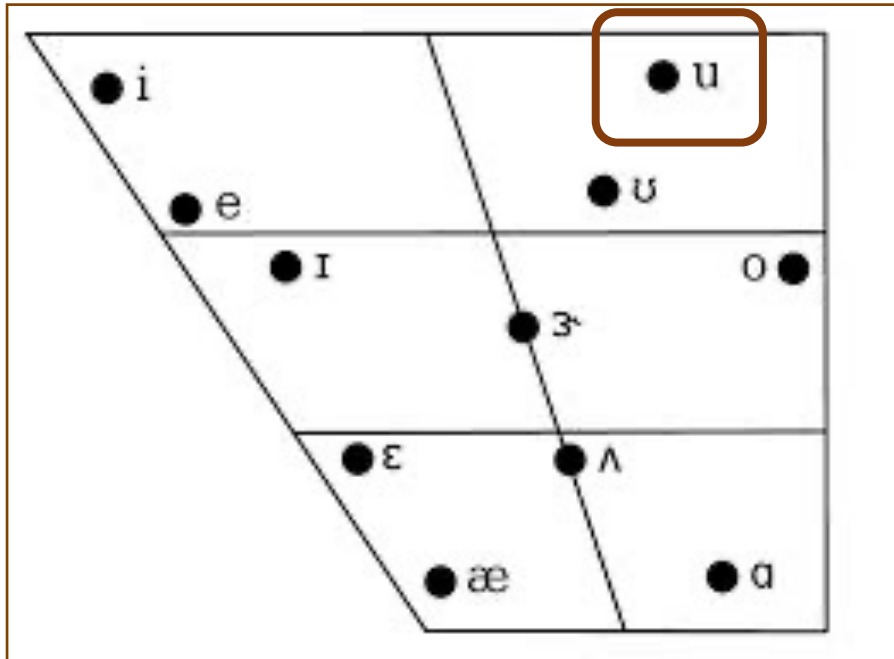# Linguistic Context: Toronto English

Toronto English Vowel System
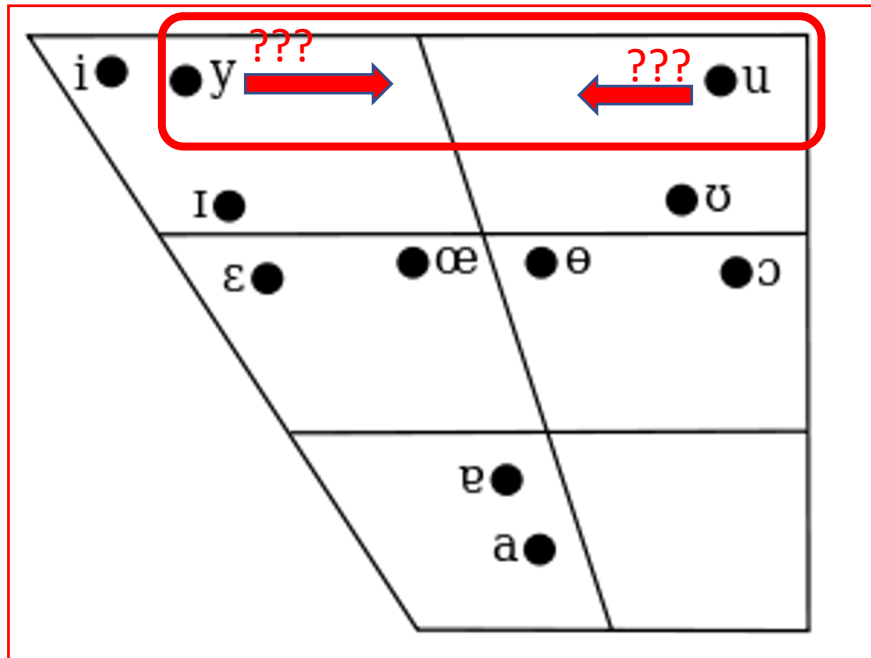

Image from Wikipedia

/u/

goose

[gus]
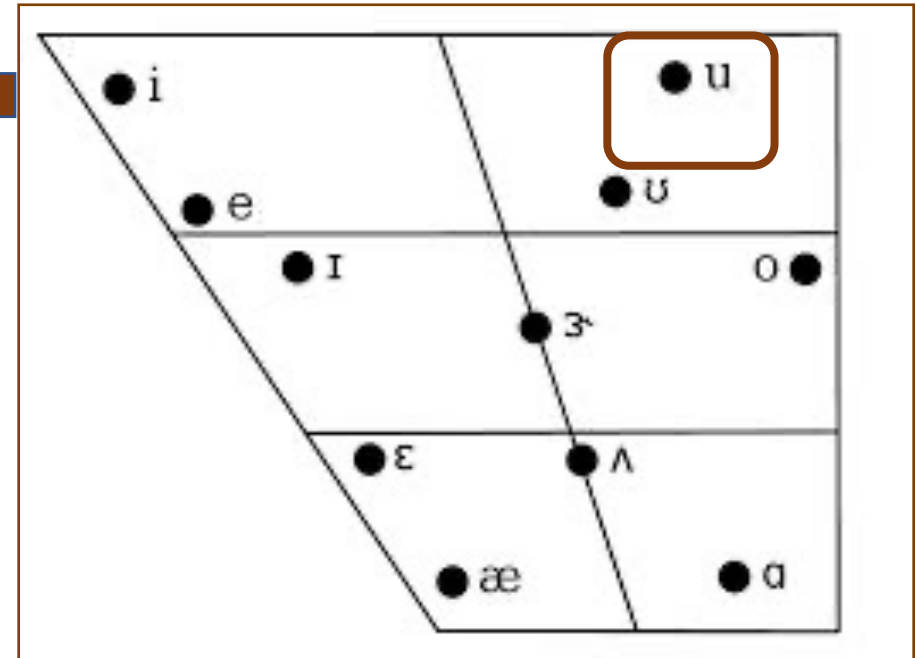
('henceforth 'UW' or 'GOOSE vowel')
Described as phonetically fronted (Boberg 2011)

Hypothesis

Cantonese Monophthongs (Zee 1999)

Toronto English Vowel System

Does /y/ retract? (**phonetic assimilation**)
Does /u/ front? (**phonetic assimilation**)
Both of the above? (**phonological influence**)

Data Source: The HLVC Corpus

- HLVC (Heritage Language Variation and Change) Project Corpus (Nagy 2011, WILA 13 Plenary)
  - Digital recordings (.wav) of hour-long sociolinguistic interviews (spontaneous speech sample) following Labov's (1984) methods and protocols
  - Includes multiple generations of speakers of 10+ languages including Cantonese
  - Recordings of Homeland speakers also available
  - Comparable recordings of Toronto English spoken by the same ethnic groups (Contact in the City Corpus, Hoffman & Walker 2010)

HERITAGE LANGUAGE VARIATION AND CHANGE IN TORONTO
HTTP://PROJECTS.CHASS.UTORONTO.CA/NGN/HLVC

UNIVERSITY OF
TORONTO

The HLVC Corpus – Set up for addressing language contact

1. Inter-generational Comparison

    a) Are there even differences to talk about?

2. Cross-linguistic Comparison

    a) Is there a similar structure/feature in the source language?

        a) If Yes, contact argument is strengthened
        b) If No, contact argument is weakened

3. Diatopic (Two places) Comparison

    a) Is the same structure/feature found in the Homeland variety?

        a) If Yes, contact argument is weakened.
   b) If No, contact argument is strengthened.

Intergenerational and Diatopic Comparisons (Tse 2019)

Tense Vowels (mean F1/F2 ± 1 SD), N=22,346
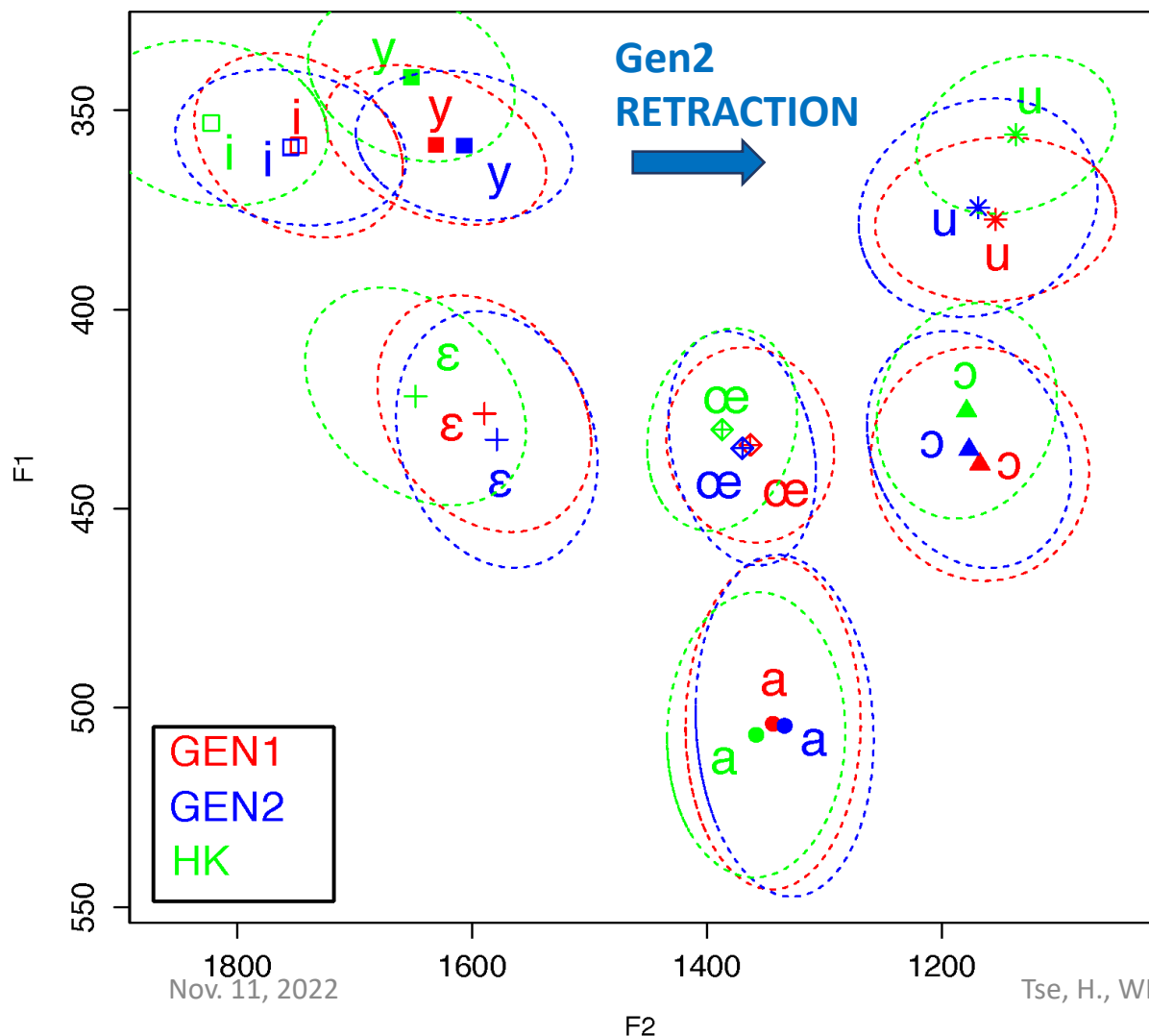
- **Inter-generational comparison of 11 vowels**
  - Overall maintenance of F1/F2 production for all vowels except for /y/ retraction
  - /y/ retraction goes against Labov's (2011) Principles of vowel chain shifting
  - ***Contact argument strengthened***
- **Diatopic Comparison**
  - /y/ retraction not found in Hong Kong, but several vowels have shifted (based on age) ***Contact argument strengthened***
- **Cross-linguistic**
  - Not part of study, but potential source structure exists (ex: previous slide)

Within the Gen2 group
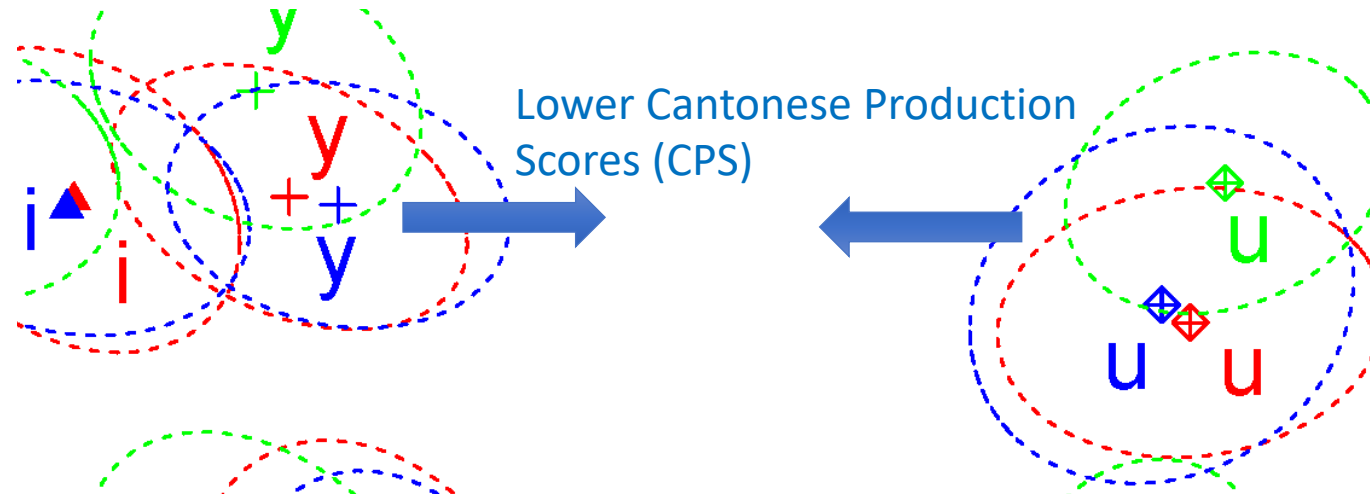
- Tse (2022)
  - Both /y/ retraction and /u/ fronting more likely among speakers with lower Cantonese Production Scores (proficiency proxy)
  - Suggests possible merger and English phonological influence

- Tse (Forthcoming)
  - Both /y/ and /u/ are among the least frequently occurring vowels in Cantonese.
  - The /y/~/u/ contrast also has very low functional load (only 5 minimal pairs exist)
  - These two facts may contribute to loss of phonetic distinctiveness (based on Pillai Scores)

Sound Samples
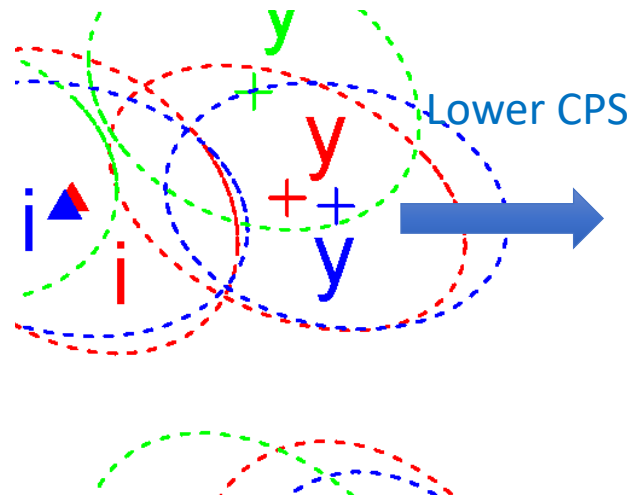
| zyu1, 豬, 'pig'	
Fronted /y/ Sample (canonical)	**Retracted /y/ sample (English-influenced?)**
C2M44A	C2M21B
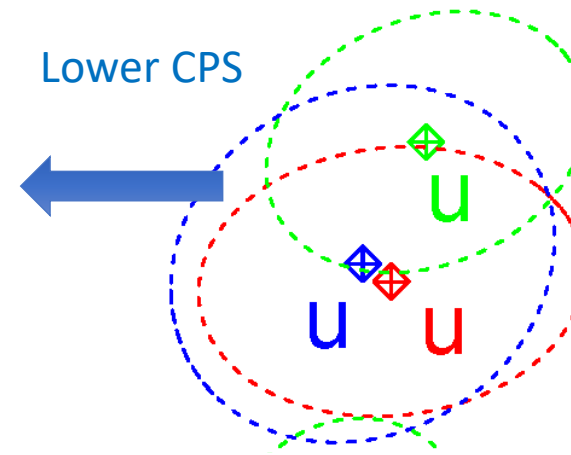
gun3, 罐, 'can'	
Fronted /u/ Sample (English-influenced?)	**Retracted /u/ sample (canonical)**
C2F24A	CXF16A

What is missing?

- Cross-linguistic comparison addressed indirectly
  - Based on general information about Toronto English vs. Cantonese phonology rather than on actual Toronto English speech produced by the speakers who produce these Cantonese variants
  - Comparison with a different set of Cantonese-English bilingual speakers rather than on the same individual speakers (ex: Cui et al 2014; Hoffman & Walker 2010)

Research Questions

- Based on acoustic measurements of BOTH the Cantonese and English spoken by the same individual speakers:
  - Q1) Is UW more similar to /y/ or /u/?
  - Q2) How does /y/~UW~/u/ production vary based on group (Homeland, Toronto Gen1, Toronto Gen2), Pillai Scores (to measure /y/~/u/ merger), and Cantonese Production Scores (a proficiency proxy)?
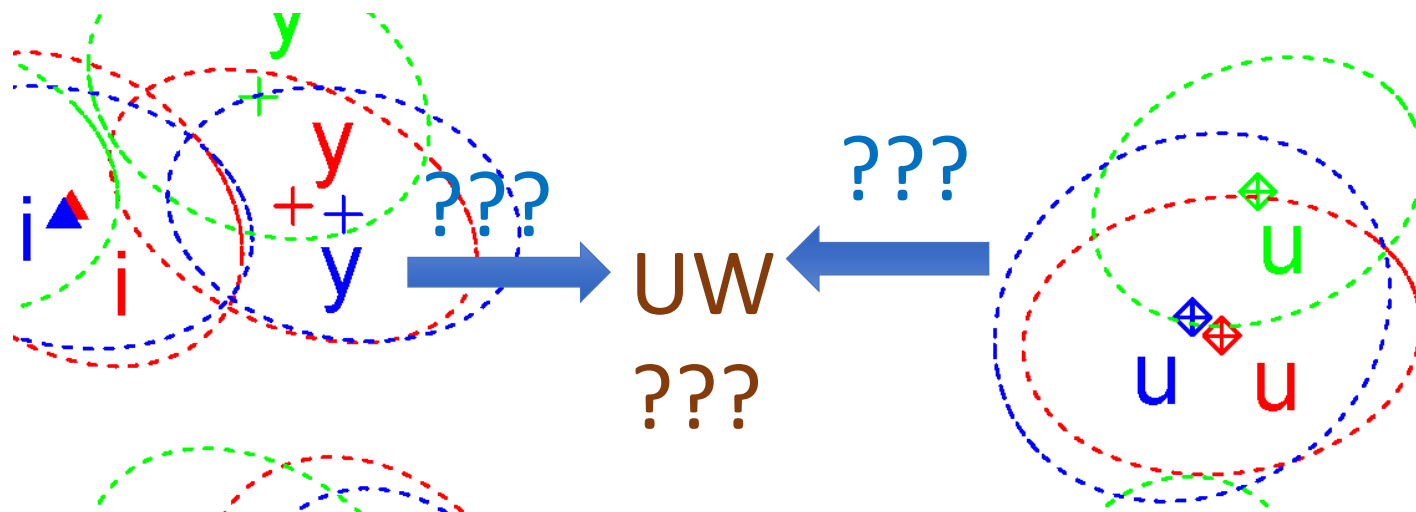
General Procedures

- Started with unnormalized formant measurements from the same set of 32 speakers used in earlier studies (Tse 2019)

- Added unnormalized formant measurements from an additional 6 speakers with help from Prosodylab forced alignment (Gorman et al 2011), Praat scripting, and manual checking

- Added formant measurements of all usable tokens of English UW produced for all 38 speakers
  - What makes this possible is that speakers were allowed to use English as often as was natural to them in the HLVC interviews, although the interview was designed to be primarily in Cantonese
  - Speakers varied substantially in how much English vs. Cantonese produced

Token Selection

- Words with preceding glides excluded for all three vowels
  - Ex: *jyu4* ('if') 如, *wu4* ('lake') 湖, *cute* [kjut] (UW) all excluded
- /u/ includes only open syllable, coda /t/, or coda /n/ contexts
- Pre-/l/ and pre-/r/ contexts excluded for UW
- Grand Total = 1646 tokens

Group	/y/	UW	/u/
Homeland	79	10	55
Gen1	453	77	359
Gen2	319	183	111
	851	**270**	**525**

Participant Selection

- Only speakers with at least 4 tokens of each vowel were selected

| Group	# of Participants Included	# of Participants Eliminated
Homeland	2	6
Gen1	9	6
Gen2	11	4
TOTAL	**22**	**16**

Analysis Procedures

- Q1) Is UW more similar to /y/ or /u/?
  - Regression models run for each individual speaker using Rbrul (Johnson 2009)
    - Dependent variable: unnormalized F2 (Hz)
    - Independent variable: vowel category (/y/ vs. UW or /u/ vs. UW)
  - Significant results interpreted as non-assimilation
  - Non-significant results interpreted as cross-linguistic assimilation
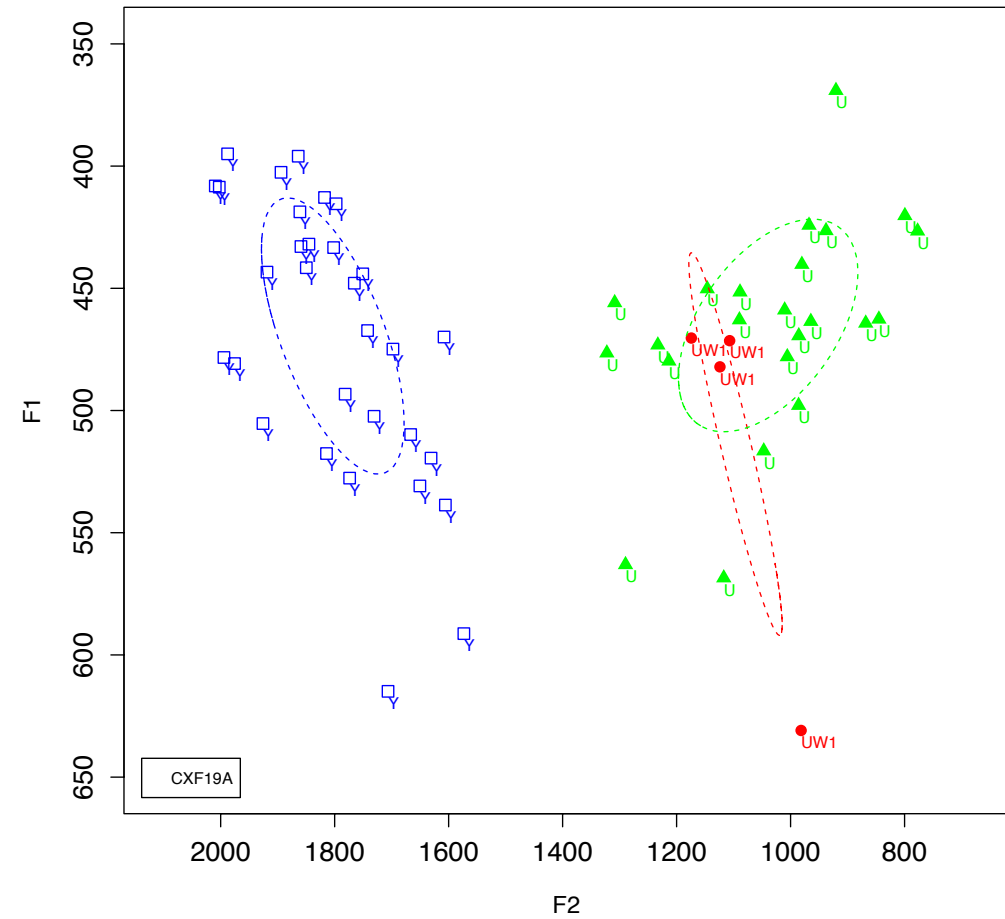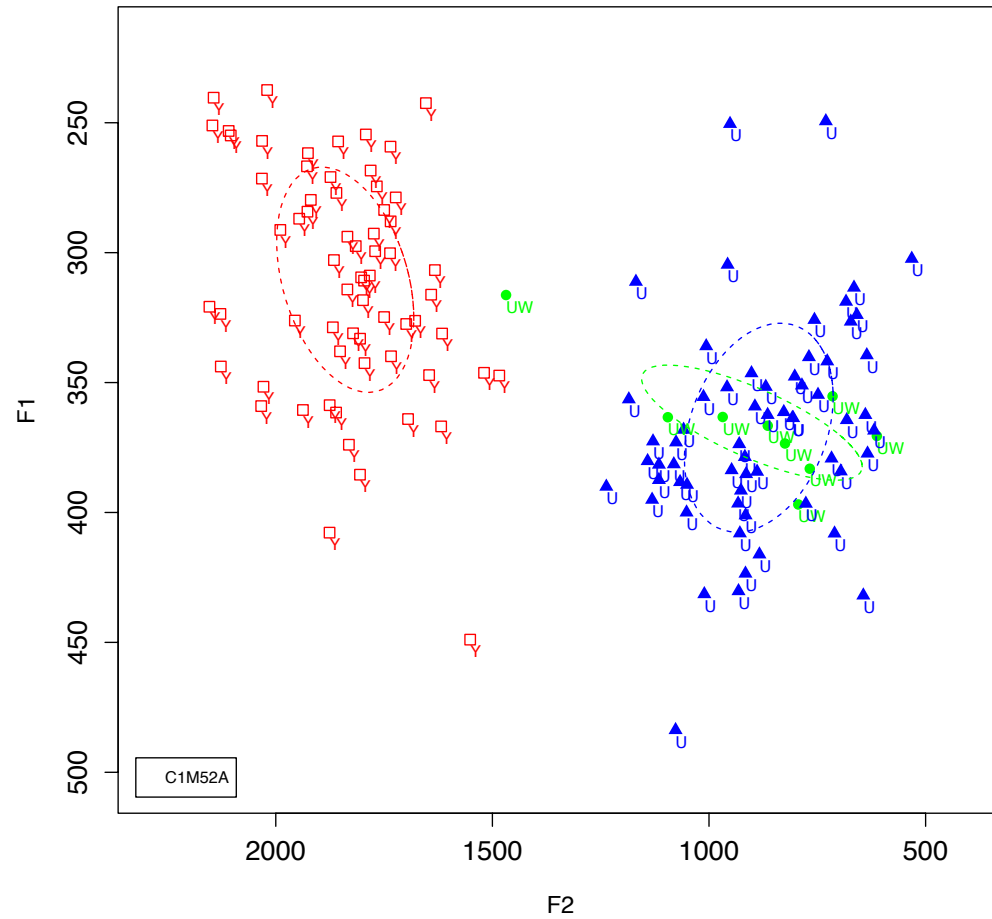
Q1 Results

- Three different patterns identified
  - Pattern 1 (/y/ ≠ UW ≠ /u/)
  - Pattern 2 (/u/ = UW)
  - Pattern 3 (/y/ = UW)

Pattern 1 (/y/ ≠ UW ≠ /u/)
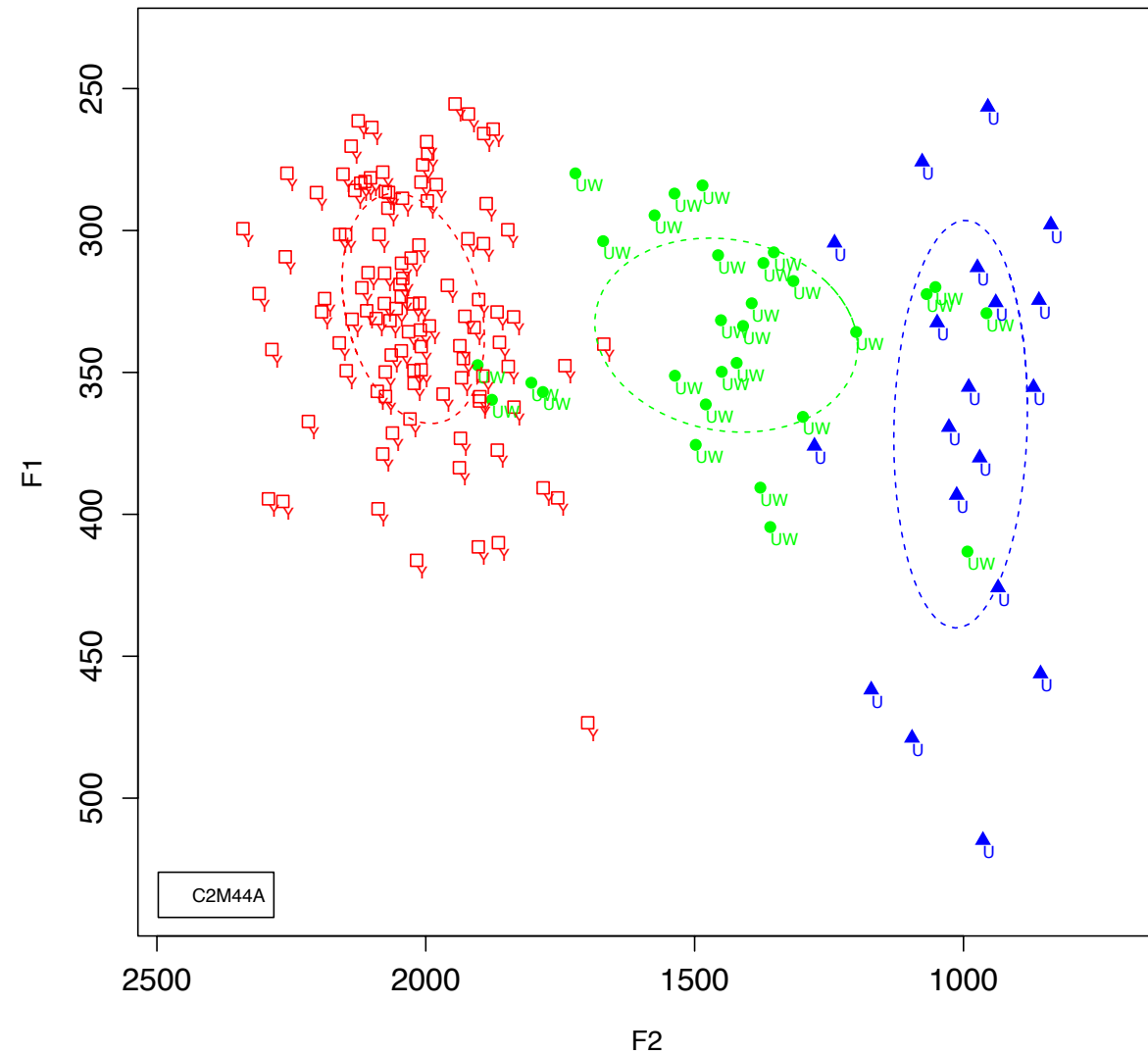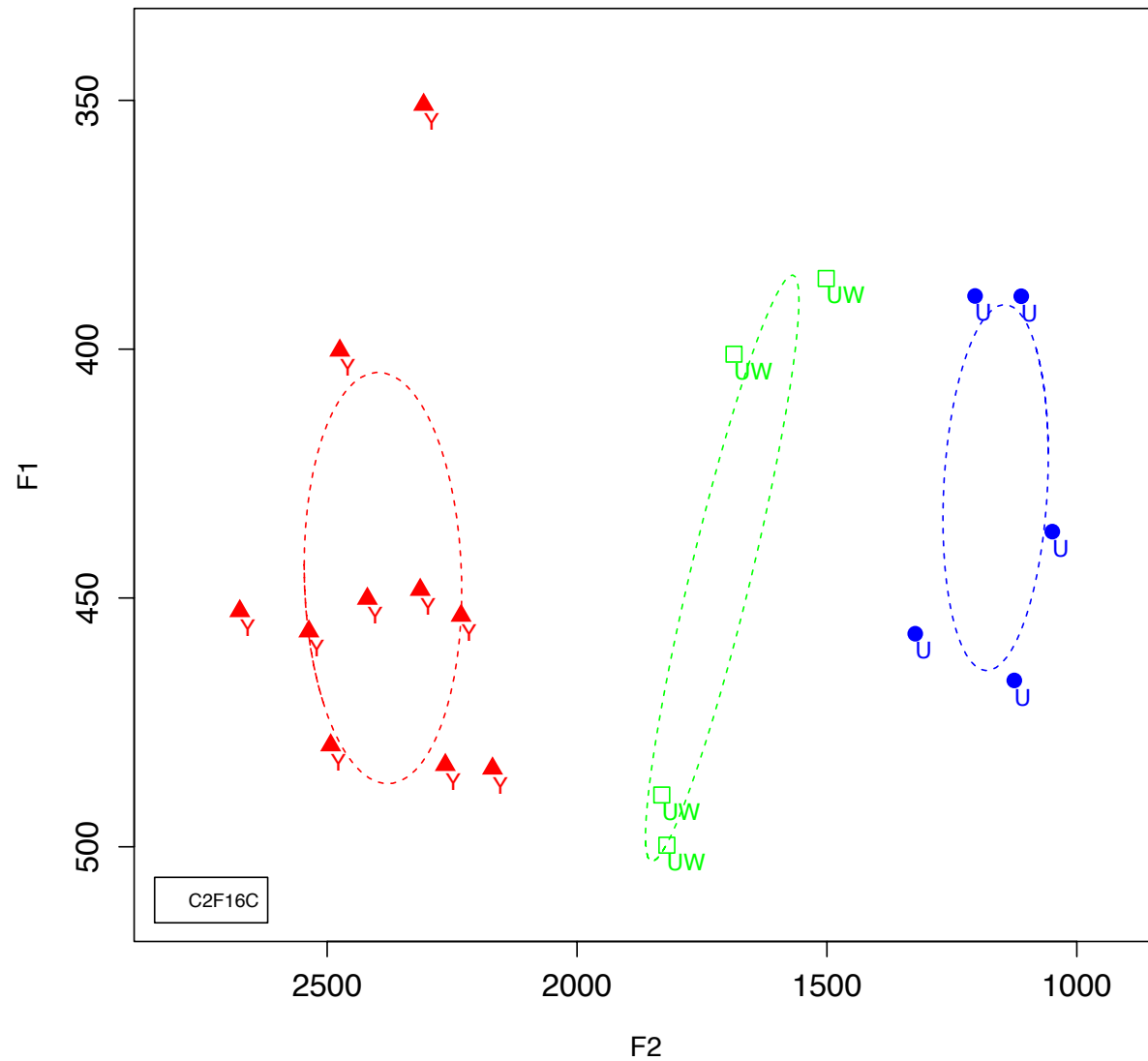
Pattern 2 (UW = /u/)

Pattern 3 (/y/ = UW)
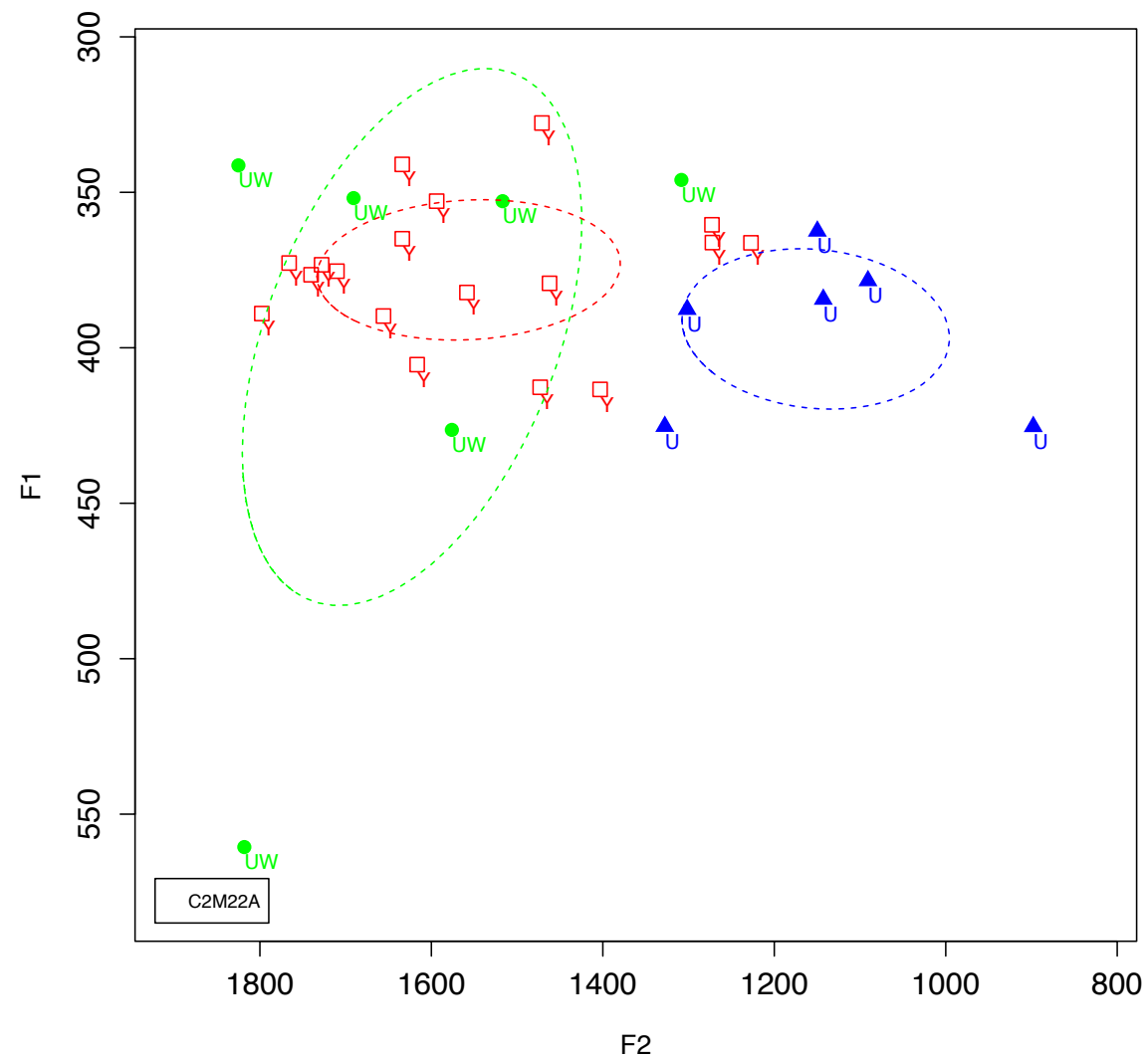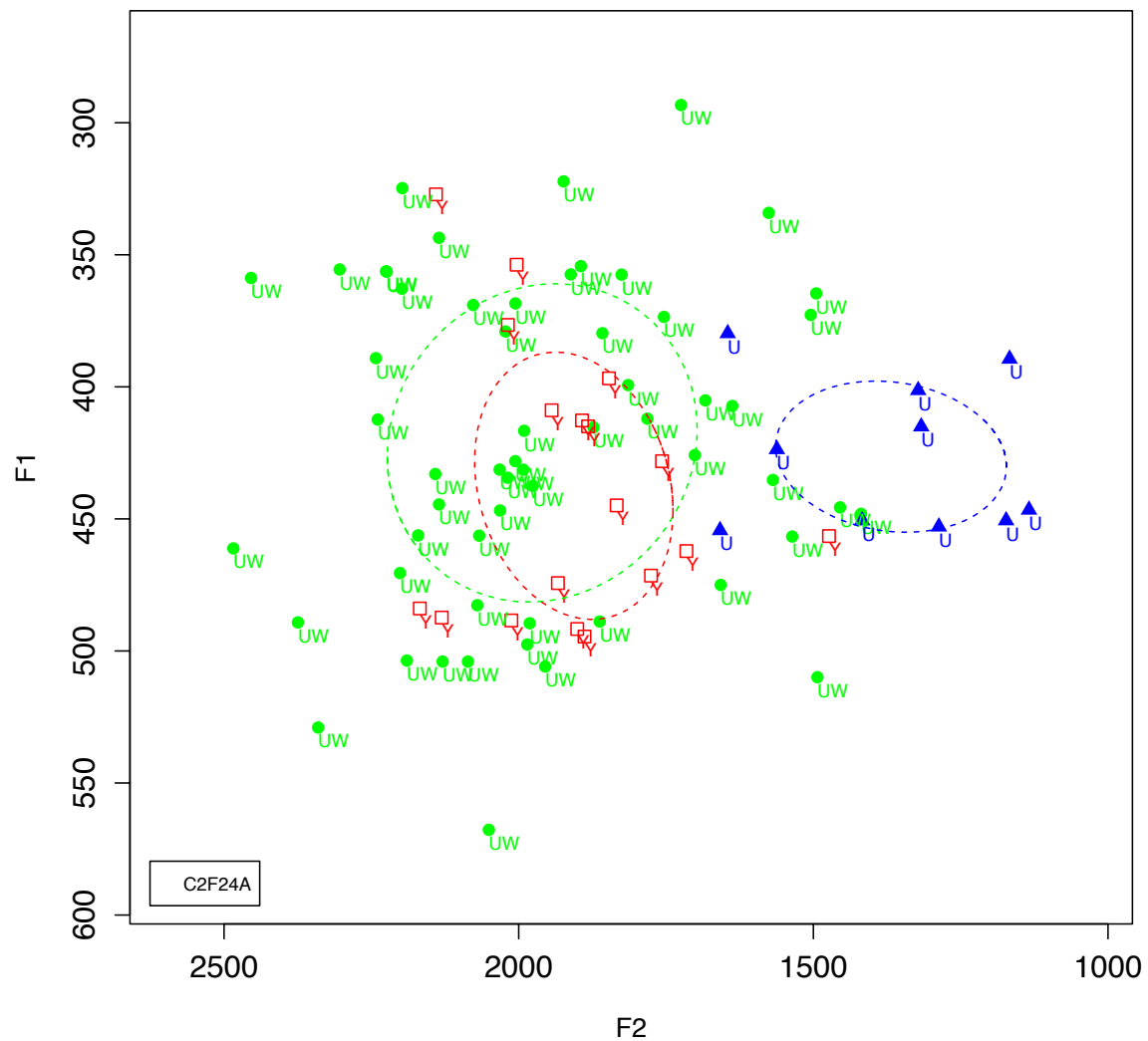
Q2 Analysis Procedures

- The three patterns were grouped by the following variables
  - Group
    - Homeland, Gen1, Gen2
  - Pillai Scores (Nycz & Hall-Lew 2015)
    - Measures vowel distinctiveness based on results of a MANOVA test run for each individual speaker (dependent: F1/F2; independent: /y/ vs /u/)
    - Continuous scale from 0 to 1
    - Lower scores indicate less distinctiveness (ex: more merged)
    - Commonly used in sociolinguistic studies of vowel mergers
  - Cantonese Production Score (Tse 2022)
    - % of transcribed text produced in Cantonese
    - Designed as a proficiency proxy score

Speakers with high PSs

PS = 0.901

PS = 0.897
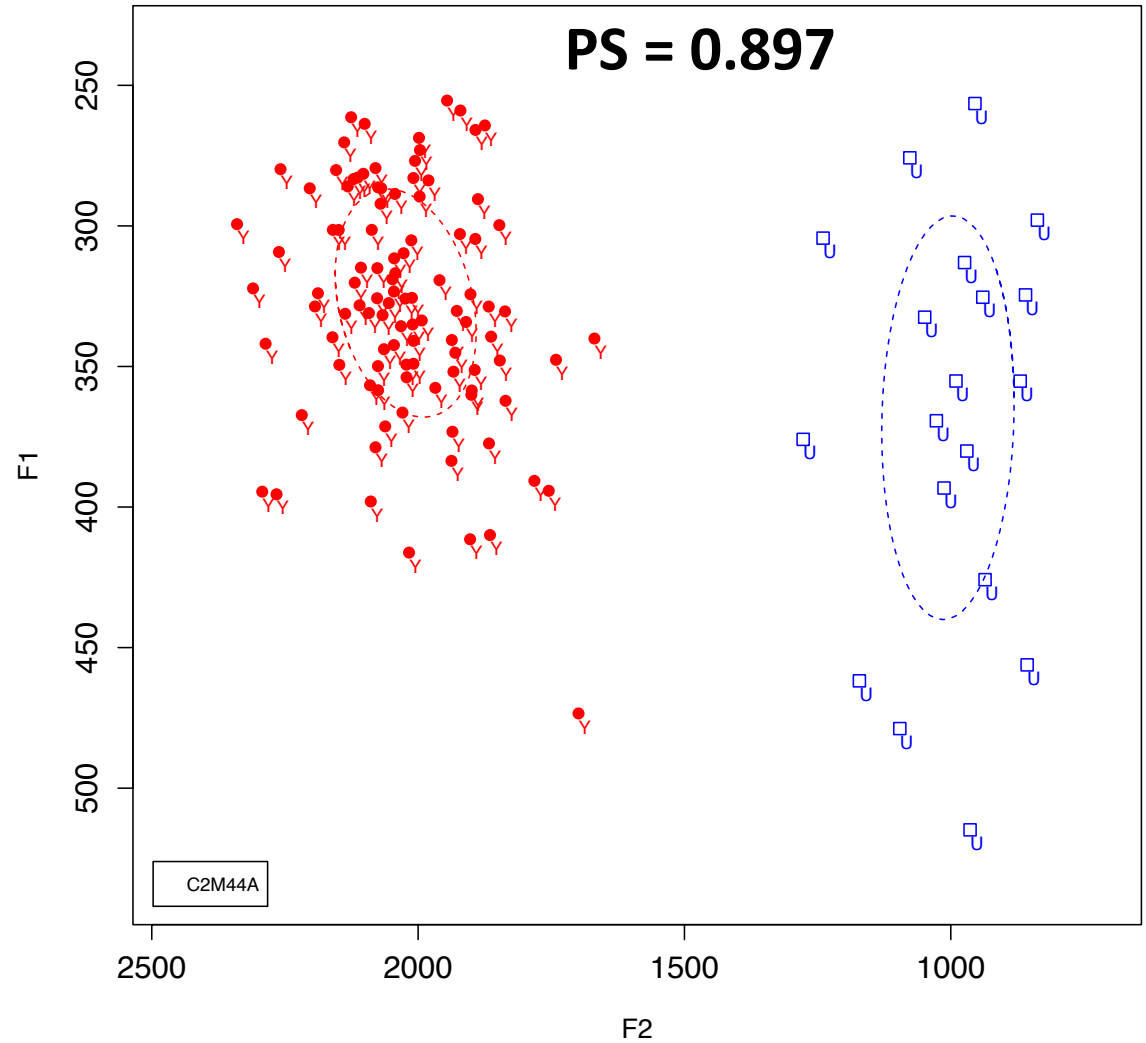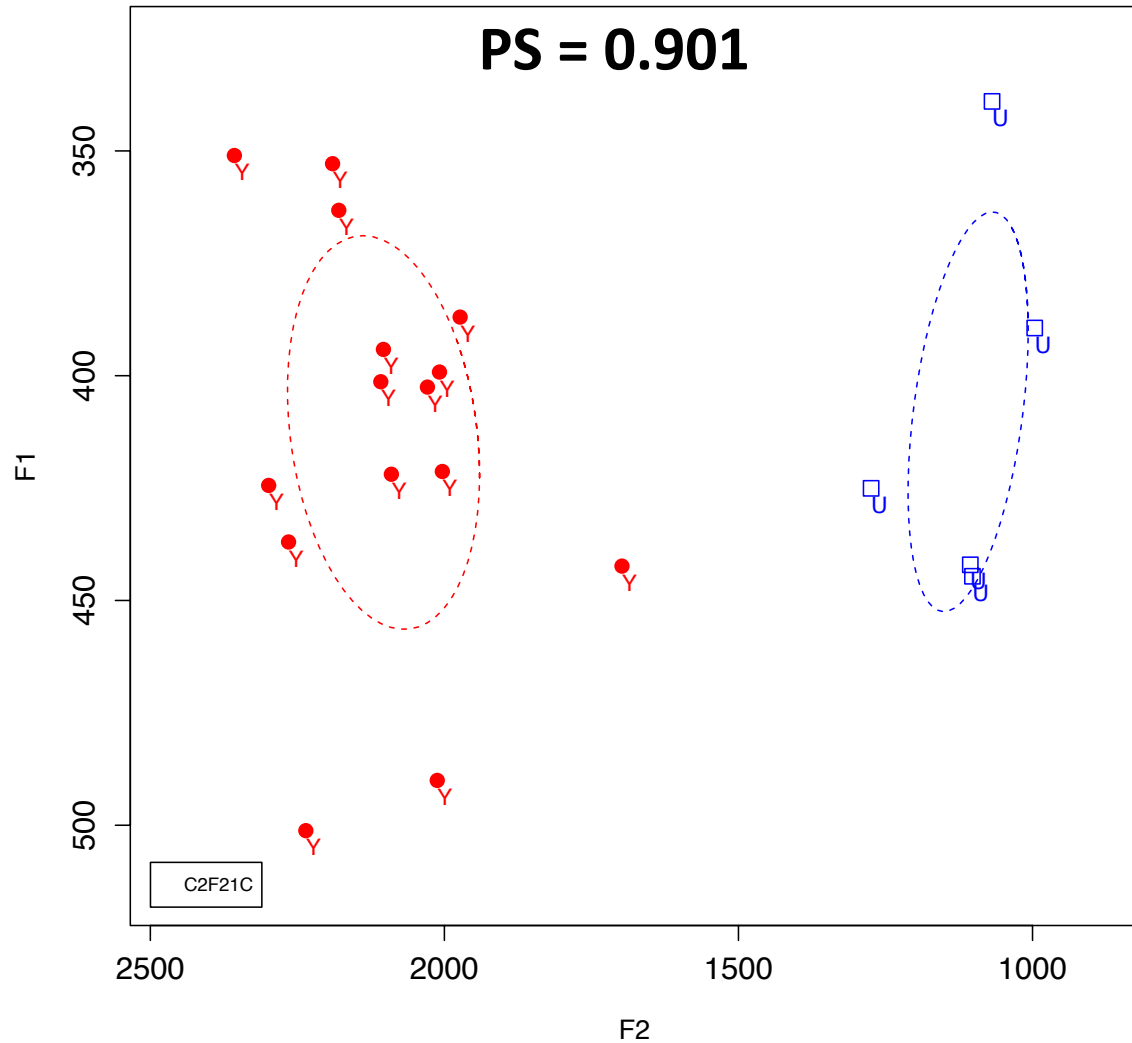
# Speakers with the lowest PSs

Q2 Results by Group

Pattern 1 (/y/ ≠ UW ≠ /u/)
Pattern 2 (/u/ = UW)
Pattern 3 (/y/ = UW)
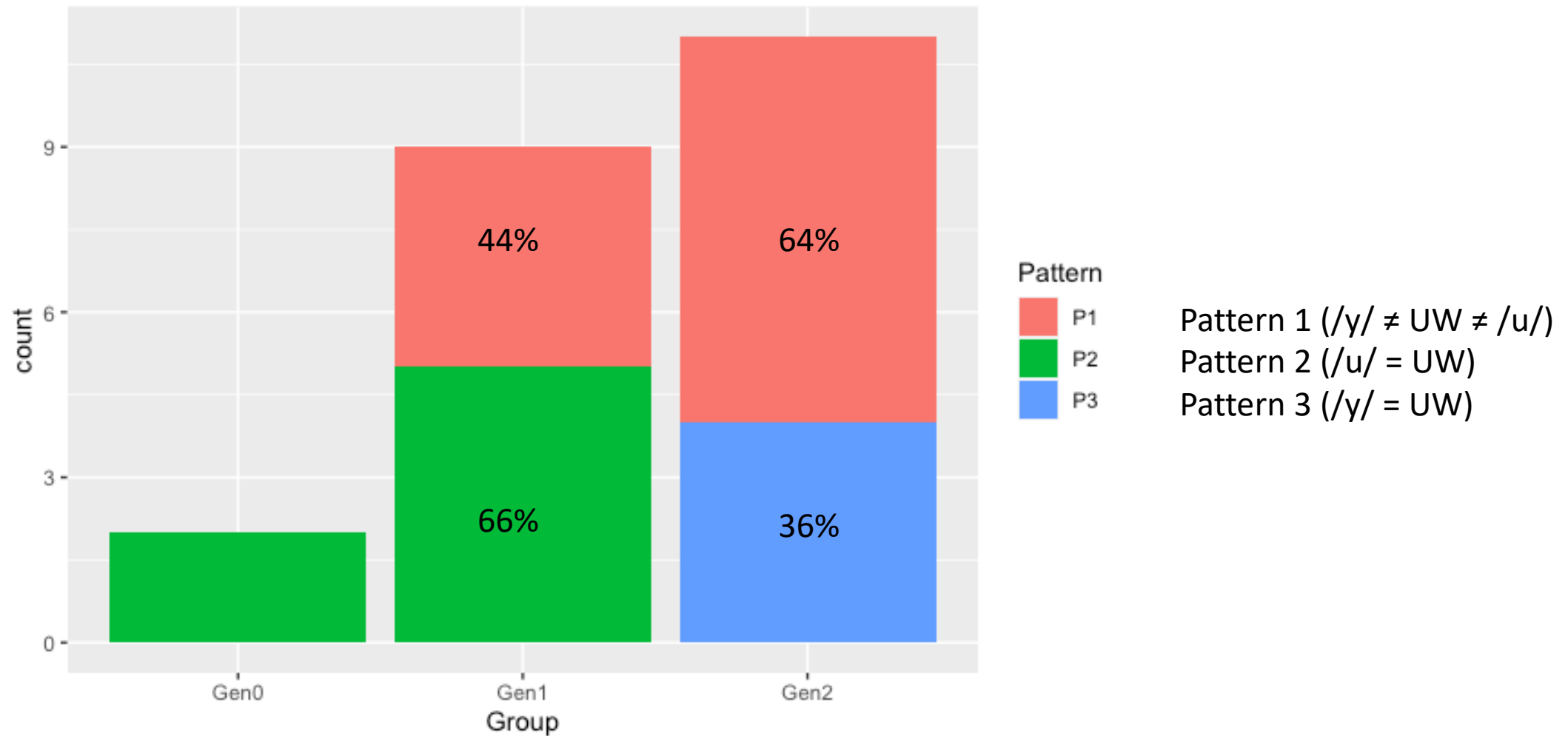
Q2 Results by Pillai Scores
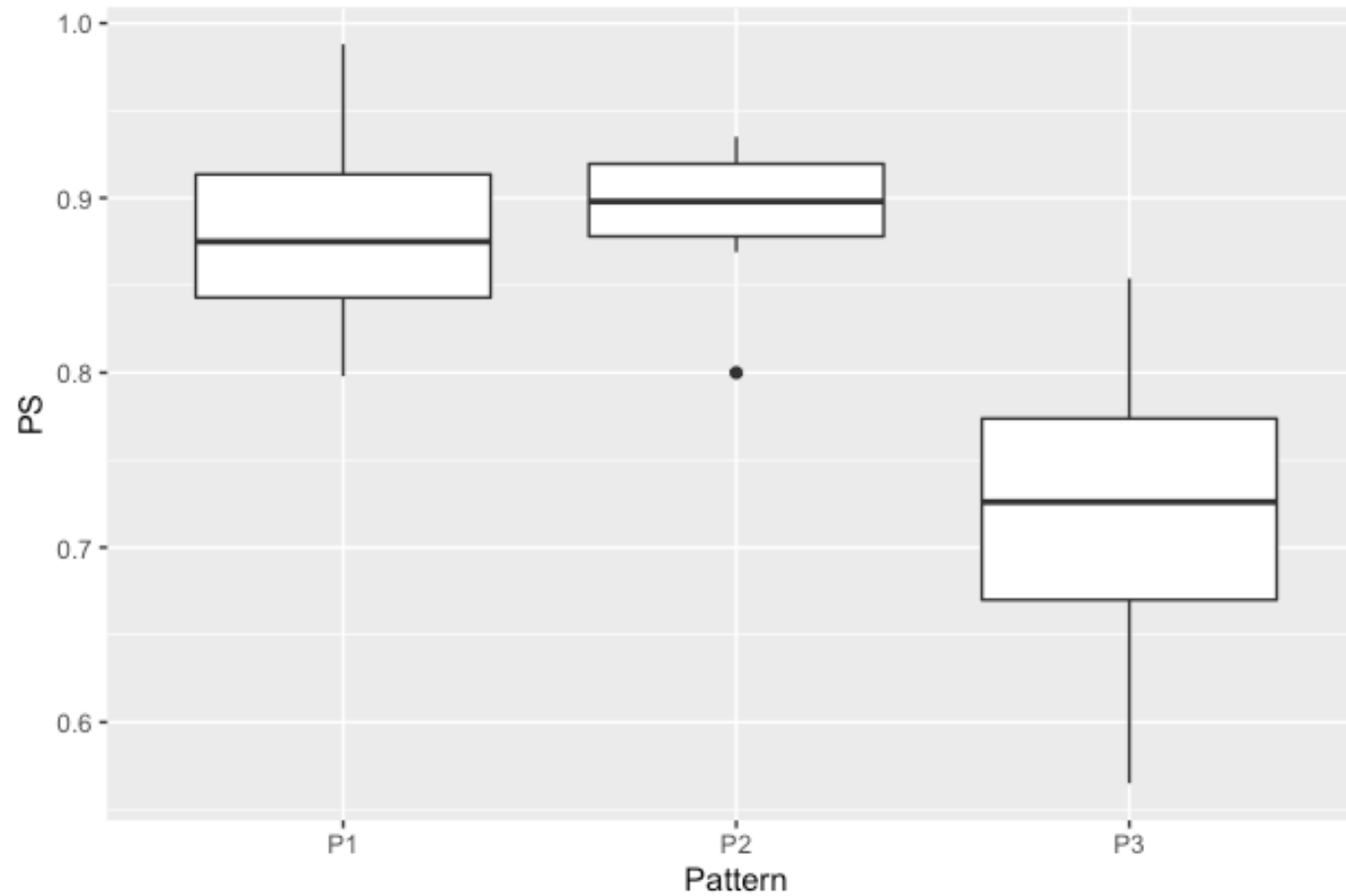
Pattern 1 (/y/ ≠ UW ≠ /u/)
Pattern 2 (/u/ = UW)
Pattern 3 (/y/ = UW)

Q2 Results by CPS
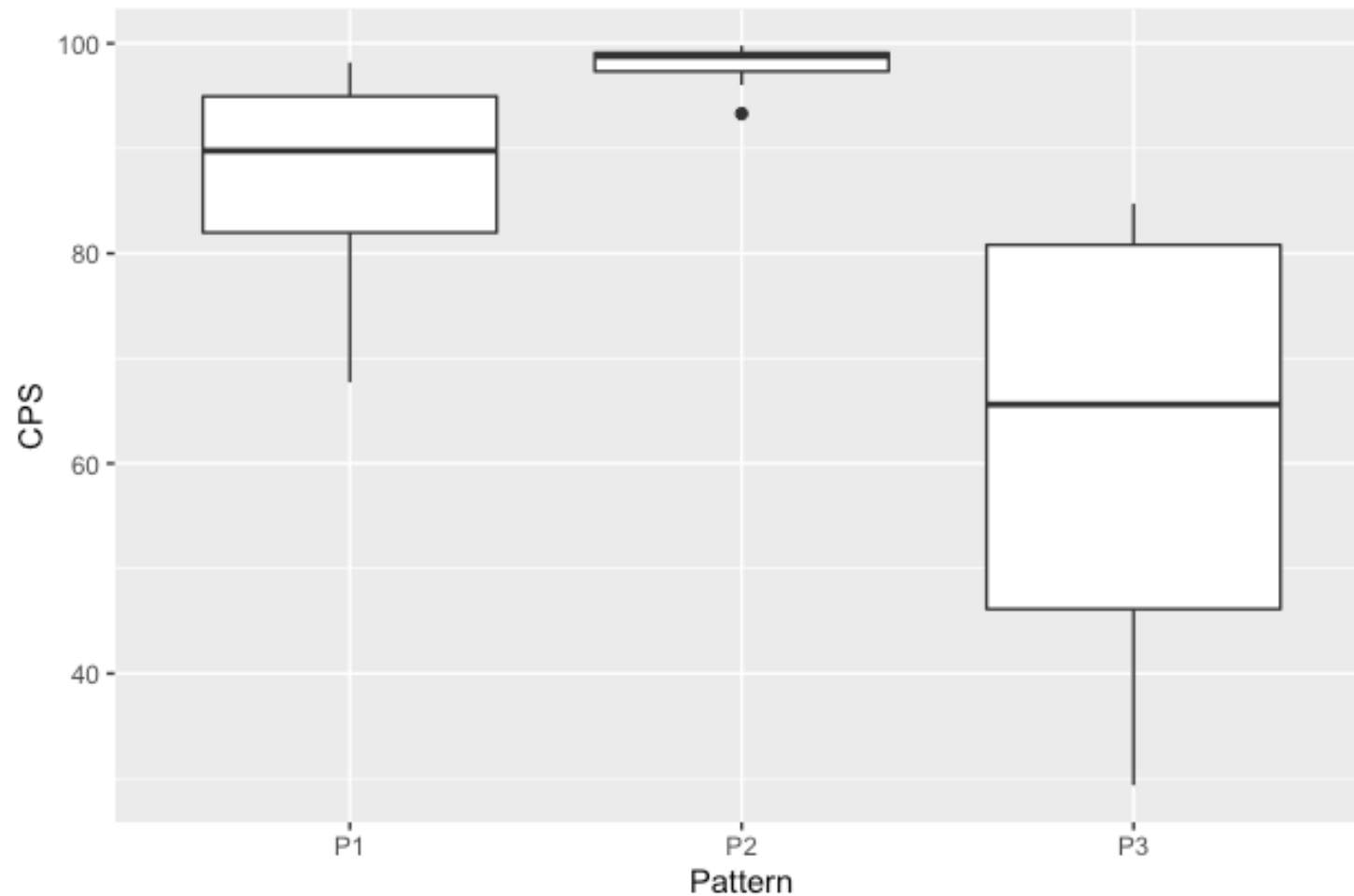
Pattern 1 (/y/ ≠ UW ≠ /u/)
Pattern 2 (/u/ = UW)
Pattern 3 (/y/ = UW)

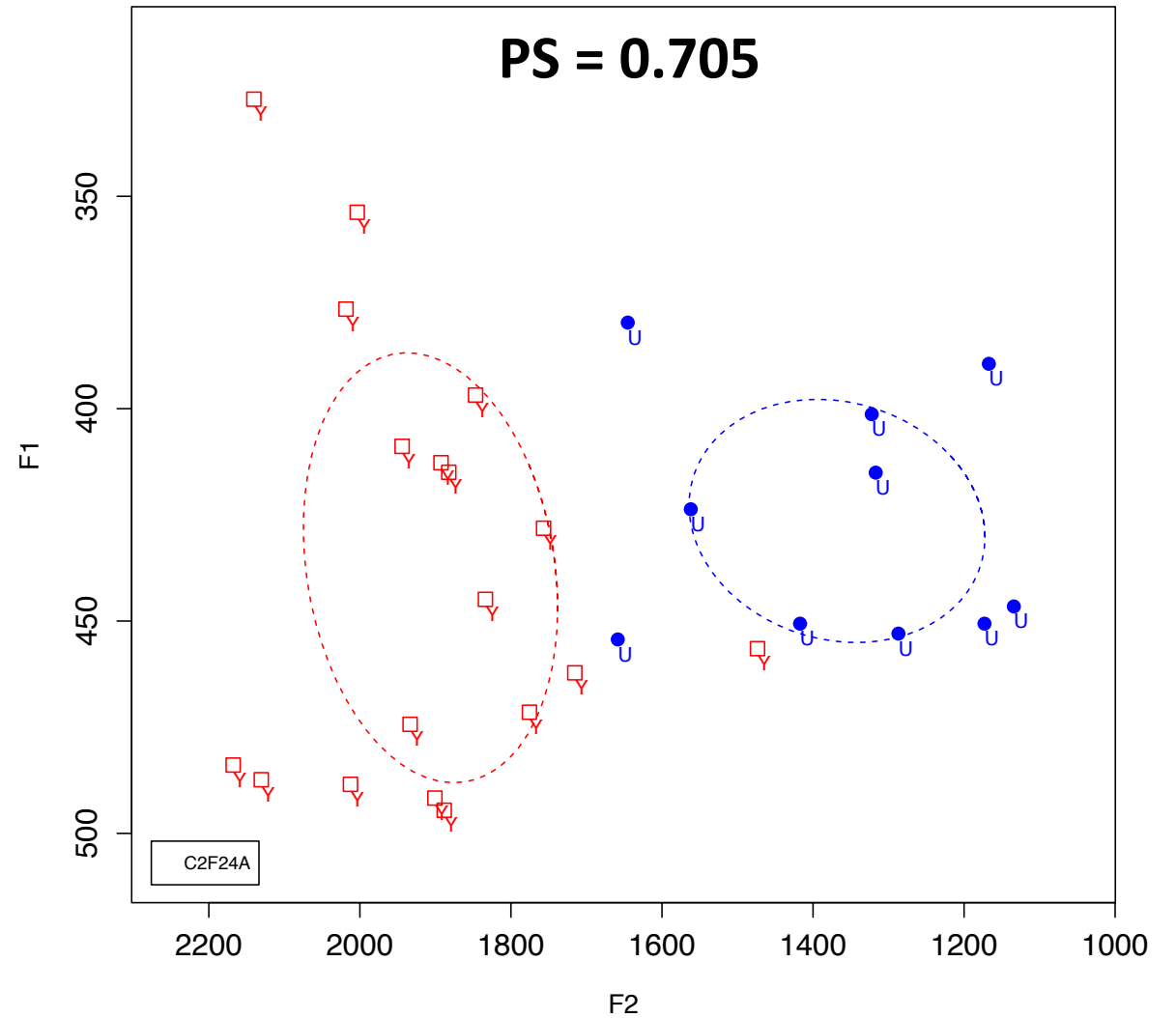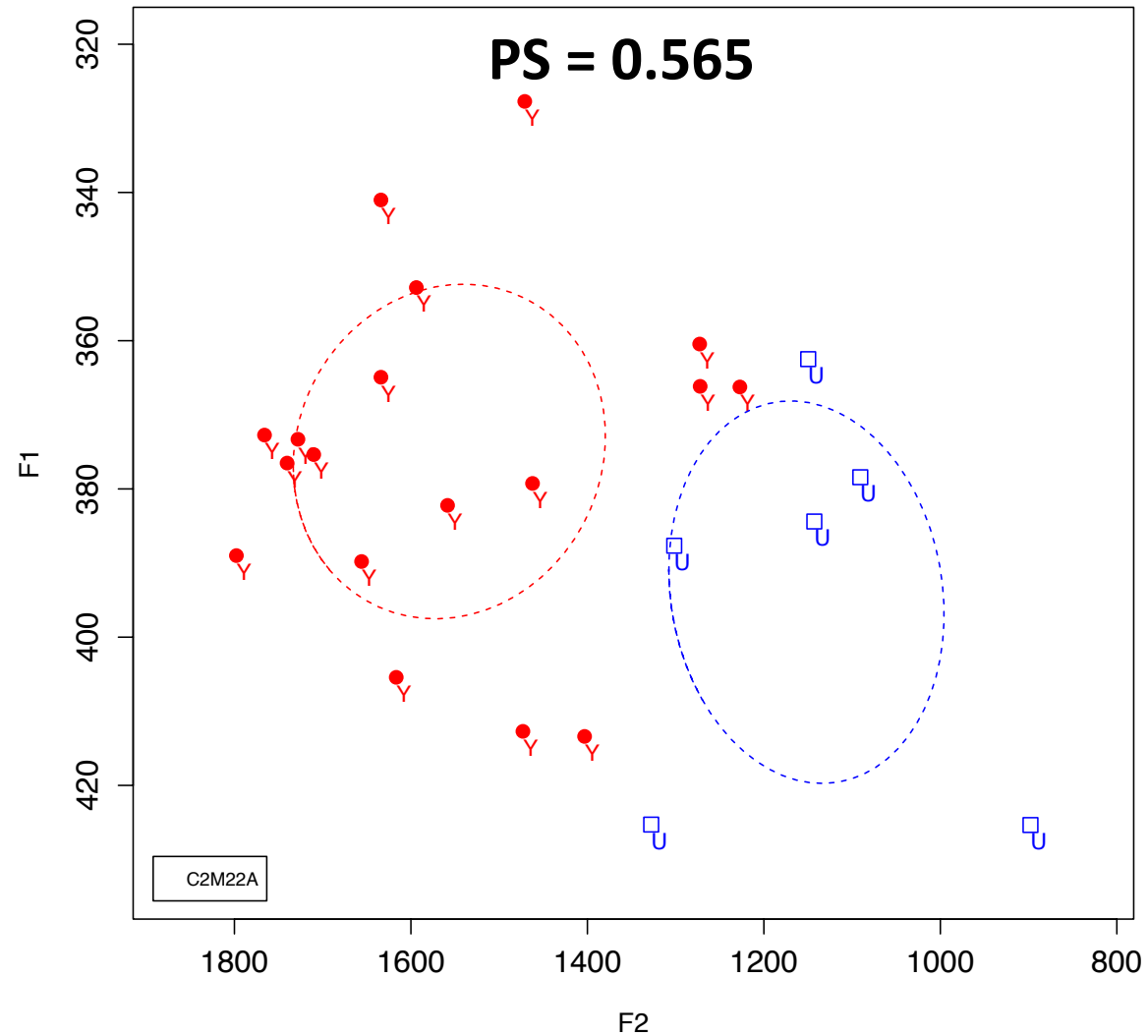# Results Summary

- Q1) Is UW produced more similarly to /y/ or /u/?
  - It depends on the individual speaker.
  - Three distinct patterns observed
    - P1: /y/ ≠ UW ≠ /u/, (n =11)
    - P2: UW = /u/, (n = 7)
    - P3: UW = /y/, (n = 5)

- Q2) How does /y/~UW~/u/ production vary?

	Pattern	Group	Pillai Scores	CPS
P1	/y/ ≠ UW ≠/u/	Gen1 and Gen2 only	high	high
P2	UW = /u/	Homeland and Gen1 only	high	high
P3	/y/ = UW	Gen2 only	low	low

Discussion

- Results show how individual-level cross-linguistic comparisons can help better account for /y/~/u/ variation among Toronto Cantonese speakers

- More specifically, they suggest loss of /y/~/u/ distinctiveness (Tse, forthcoming) is motivated primarily by cross-linguistic assimilation of /y/ = UW rather than UW = /u/ (found only among Homeland and Gen1)

- Including Gen1, Gen2, and Homeland speakers showed different ways of converging English with Cantonese (/y/ = UW, UW = /u/)

- At the same time Gen2 speakers are more likely to produce three distinct vowels than Gen1 speakers
    - The majority of Gen2 speakers sampled show no evidence of English-influence
    - While group level analysis showed Gen2 /y/ retraction, this study suggests Gen2 group is better characterized in terms of variation between two patterns (phonetic convergence with English vs. non-convergence with English)
    - Group-level /y/ retraction (Tse 2019) is thus an epiphenomenal consequence of convergence with English among a subset of Gen2 speakers

Conclusion

- This study highlights the importance of multiple sets of comparisons in the study of phonetic variation in a heritage language context

- In addition to inter-generational, group-level cross-linguistic, and diatopic comparisons, this study considered individual-level cross-linguistic comparisons.

- These cross–linguistic comparisons revealed three distinct patterns in terms how vowel production of two different languages interact (and do not interact) with each other.
  - Thus, they highlight variation, so while focusing on variation in vowel fronting/retraction is meaningful in sociophonetic studies of monolingual speakers/communities, variation in how phonological categories interact with each other in individuals is also worth investigating in studies of phonetic variation in bilingual/multilingual speakers/communities.

- If "the individual is the ultimate locus of contact" (Weinreich 1953, p.6), comparing two phonological systems within the same individual speakers to determine whether they have converged or not becomes essential in understanding the underlying mechanisms behind contact-induced sound change

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Naomi Nagy

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Funding for HLVC Project:

SSHRC, University of Toronto

Other Research Support:

ST. CATHERINE UNIVERSITY

University of Pittsburgh

UNIVERSITY OF TORONTO

Social Sciences and Humanities Research Council of Canada

Conseil de recherches en sciences humaines du Canada

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Slides will be available on:

https://holmantse.github.io/