## St. Catherine University

From the SelectedWorks of Holman Tse, PhD

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# Is There Cross-linguistic Influence of English /u/ on Toronto Cantonese High Round Vowels? 

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## Is There Cross－linguistic Influence of English／u／ on Toronto Cantonese High Round Vowels？

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Heritage Language Variation and Change in Toronto HITP：／／PROJECTS ．CHASS ．UTORONTO．CA／NGN／HLVC

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## Introduction

- Linguistic focus on three vowels
- Cantonese $/ \mathrm{y}$ / and $/ \mathrm{u}$ / (henceforth ' y ' and ' u ')
- English /u/ (henceforth 'UW')
- Population focus on second-generation (Gen2) Toronto heritage Cantonese speakers
- Question
- Given widespread English-dominance, does English UW influence Cantonese /y/ vs. /u/ production?


## The Two Cantonese Vowels

Cantonese Monophthongs (Zee 1999)


Image from Wikipedia

| /y/ | vs. | /u/ |
| :--- | :--- | :--- |
| 捲 |  | 館 |
| gyun2 |  | gun2 |
| [kyn1] |  | [kun1] |
| ('roll') |  | ('building') |

high front round tense

high back round tense

## The Toronto English Vowel

Toronto English Vowel System


Image from Wikipedia

## 'UW'

goose<br>[gus]

English has only one high round tense vowel (phonetically fronted), (cf. Boberg, 2011)

## The Data

- HLVC (Heritage Language Variation and Change) Project Corpus (Nagy 2011)
- Digital recordings (.wav) of hour-long sociolinguistic interviews (spontaneous speech sample) following Labov's (1984) methods and protocols
- Participants were told that the interviews were to be primarily in Cantonese, but they were allowed to code-switch into English as often as was natural.
- This makes it possible to analyze both English and Cantonese vowels coming from the same individual speakers.
- However, this has not really been done up until this point
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## Societal Context: Toronto, Canada


http://www.whereig.com/images/cities/toronto-location-map.jpg


Photo by Holman Tse, 2014

- Home to one of the largest concentration of Cantonese speakers in North America
- Cantonese is the most common mother tongue other than English/French reported in the Toronto Census Metro Area (Statistics Canada 2017)
- 260,355 speakers (4.4\% of population)


## Previous HLVC Research: Group Comparisons



Photos by Holman Tse, 2014


- Gen1 (1 ${ }^{\text {st }}$ generation)
- Immigrated to Canada as adults and have lived in Canada for $20+$ years
- Generally Cantonese-dominant in an English-dominant region
- Gen2 (2 ${ }^{\text {nd }}$ generation)
- Parents meet criteria for Gen1
- Includes those who grew up in Canada and have lived continuously in Toronto since age 5 or younger.
- Generally English-dominant speakers of Cantonese
- Hong Kong (Homeland)
- Lifelong Hong Kong residents
- Generally Cantonese-dominant in a Cantonese-dominant region


## Previous HLVC Research：Group Comparisons



Tse（2019）：
－／y／is the only vowel that showed a significant F1／F2 difference between Gen1 vs．Gen2
－／y／is significantly retracted for Gen2 speakers
－Lack of significant Gen1 vs．Gen2 difference for／u／

| zyu1，豬，＇pig＇ |  |
| :---: | :---: |
| Fronted／y／Sample （canonical） | Retracted／y／sample （English－influenced？） |
| C2M44A 4－ | C2M21B－ |
| gun3，罐，＇can＇ |  |
| Fronted／u／Sample <br> （English－influenced？） | Retracted／u／sample （canonical） |
| C2F24A ${ }^{\text {P）}}$ | CXF16A 「o） |

## Previous Research Focusing on Gen2 Variation



- Tse (In Press) showed
- Within Gen2 group, /y/ retraction AND /u/ fronting greatest among those with lower Cantonese Production Scores (CPS), a proficiency proxy based on relative amount of Cantonese produced in spontaneous speech samples involving code-switching
- Tse (Accepted) showed
- Gen2 speakers have the most variation in Pillai Scores (a measurement of vowel distance)
- $/ \mathrm{y} / \sim / \mathrm{u} /$ may be driven by low functional load in interaction with English dominance


## Does this all mean English influence?

## - Aforementioned studies argued 'yes', BUT

- Addressed this question indirectly
- Assumption of English influence based on general information about Toronto English phonology
- Actual Toronto English speech from heritage Cantonese speakers not analyzed
- Focused on group-level effects rather than on individual speaker patterns
- Inter-speaker variation in $/ \mathrm{y} / \sim / \mathrm{u} /$ production is clear
- Not clear how Cantonese and English interact with each other in the same acoustic space


## Research Questions

- By comparing acoustic measurements of BOTH the Cantonese and English spoken by the same individual speakers, the following questions are addressed:
- Q1) Is English UW produced more similarly to /y/ or /u/ in terms of F2?
- Q2) How does this vary across individual speakers based on Pillai Scores?
- Q3) What does variation suggest about the interaction between UW, /y/, and /u/?



## Participants Selected

|  | $/ \mathrm{y} /$ | UW | $/ \mathrm{u} /$ |
| :--- | :---: | :---: | :---: |
| C2F20A | 16 | 11 | 9 |
| C2F21B | 53 | $z$ | 75 |
| C2F21C | 15 | 17 | 5 |
| C2F22A | 44 | 8 | 26 |
| C2F24A | 18 | 58 | 10 |
| C2F41A | 25 | 10 | 6 |
| C2M21B | 7 | 11 | 9 |
| C2M21G | 40 | 3 | 6 |
| C2M21D | 24 | 10 | 9 |
| C2M22A | 18 | 6 | 6 |
| C2M27A | 21 | 15 | 6 |
| C2M44A | 103 | 29 | 19 |
| TOTAL | 291 | 175 | 105 |

- Tse (In Press) analyzed 12 Gen2 speakers
- Speaker codes used
- C: Cantonese
- 2: Gen2 (grew up in Toronto)
- $M=$ male ( $n=6$ ), $F,=$ female ( $n=6$ )
- Age at time of recording (20-44)
- A, B, C, D, etc (to distinguish speakers)
- For current study, only speakers with at least 5 tokens of each vowel included
- Two speakers from Tse (In Press) excluded


## Participants Selected

|  | $/ \mathrm{y} /$ | UW | $/ \mathrm{u} /$ |
| :--- | :---: | :---: | :---: |
| C2F20A | 16 | 11 | 9 |
| C2F21C | 15 | 17 | 5 |
| C2F22A | 44 | 8 | 26 |
| C2F24A | 18 | 58 | 10 |
| C2F41A | 25 | 10 | 6 |
| C2M21B | 7 | 11 | 9 |
| C2M21D | 24 | 10 | 9 |
| C2M22A | 18 | 6 | 6 |
| C2M27A | 21 | 15 | 6 |
| C2M44A | 103 | 29 | 19 |
| TOTAL | 291 | 175 | 105 |

- F2 measured (in Hertz) for each vowel token
- 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
- F2 not normalized since focus on individual speakers


## Analysis Procedures

- Q1) Is English UW produced more similarly to /y/ or /u/ in terms of F2?
- 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)
- Q2) How does this vary across individual speakers based on Pillai Scores?
- Vowel production patterns analyzed along with Pillai Scores (Nycz \& HallLew, 2015), which were calculated and presented in Tse (Accepted)


## Q1 Results

| Speakers | /y/ vs. UW | UW vs. /u/ |
| :--- | :--- | :--- |
| C2F20A | $* * *$ | $* *$ |
| C2F21C | $* * *$ | $* * *$ |
| C2F22A | $* * *$ | $* * *$ |
| C2F24A | n.s. | $* * *$ |
| C2F41A | n.s. | $* * *$ |
| C2M21B | n.s. | $* * *$ |
| C2M21D | $* * *$ | $* * *$ |
| C2M22A | n.s. | $* * *$ |
| C2M27A | $*$ | $*$ |
| C2M44A | $* * *$ | $* * *$ |

- Significant differences indicate distinctly produced vowels
-     * $(p<0.05)$
- ( $p<0.01$
- $p<0.001$
- Non significance indicates overlapping vowel production
- Four speakers have overlapping /y/~UW production (for F2)
- Zero speakers have overlapping UW~/u/ production (for F2)


## Q2 Results

| Speakers | Pillai Scores | $/ \mathrm{y} / \mathrm{vs}$. UW |
| :--- | :---: | :---: |
| C2M27A | 0.926 | $*$ |
| C2F21C | 0.901 | $* * *$ |
| C2M44A | 0.897 | $* * *$ |
| C2M21D | 0.875 | $* * *$ |
| C2F20A | 0.869 | $* * *$ |
| C2M21B | 0.854 | n.s. |
| C2F22A | 0.852 | $* * *$ |
| C2F41A | 0.747 | n.s. |
| C2F24A | 0.705 | n.s. |
| C2M22A | 0.565 | n.s. |

- Pillai Scores based on a continuous scale from 0 to 1
- Higher score indicates more distinct pronunciations of $/ \mathrm{y} /$ vs. /u/
- Lower scores indicate less distinct pronunciations (more merger)
- Lower scores correspond with overlapping /y/ vs. UW production

Speakers with high PSs


## Speakers with the lowest PSs




## Plots with UW included




## Plots with UW included




## Plots with UW included




## Plots with UW included




## Discussion

- Q1) Is English UW produced more similarly to /y/ or /u/in terms of F2?
- UW universally distinct from /u/ for all 10 speakers
- UW is more fronted than /u/ for all 10 speakers
- For some speakers UW overlaps with /y/ while for others it is between /y/ and /u/
- Q2) How does this vary across individual speakers based on Pillai Scores?
- High PS speakers produce three distinct vowels
- Low PS speakers have cross-linguistically merged UW and /y/, while /u/ generally remains distinct.


## Discussion

- Q3) What does variation suggest about the interaction between UW, $/ \mathrm{y} /$, and $/ \mathrm{u} /$ ?
- Since UW is phonetically fronted, English-dominant speakers may perceive more similarity between UW and $/ \mathrm{y} /$ than between UW and $/ \mathrm{u} /$.
- NOTE: Similar findings in Chang et al (2011) for heritage Mandarin speakers
- This could then in turn motivate cross-linguistic merger in production between UW and /y/ while /u/ remains relatively stable.
- Cantonese $/ \mathrm{y} / \sim / \mathrm{u} /$ merger appears to be an epiphenomenal result of $/ \mathrm{y} / \sim \mathrm{UW}$ cross-linguistic merger
- Even among the speakers with the lowest Pillai Scores, /y/ remains phonetically distinct from /u/.
- /u/ still fronts among speakers with the lowest Pillai Scores, but not as much as /y/ retracts


## Next Steps

- More speakers from HLVC Corpus to analyze
- Especially important given low functional load and low token frequency (Tse, Accepted)
- Analysis based on very few tokens per speakers
- Lack of minimal pair data from the same individual speakers
- More consideration needed of phonetic context
- Near complementary distribution relationship between /y/ and /u/
- /y/ with preceding coronals and velars
- /u/ with preceding labials and velars
- Toronto English has an allophonic UW distinction with more fronting with preceding coronals (ex: TOOT) than elsewhere (ex: GOOSE)


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## Questions?

- Holman Tse
- Email: hbtse110@stkate.edu
- Slides will be available at: https://holmantse.github.io/
- HLVC is also source of data for WICL-6 Session 3A presentations:
- Leung et al., "Lazy Pronunciation in Toronto Heritage Cantonese"
- Li et al., "Tonal Aspects of Cantonese-English code-switching ..."
- New URL:
- HTTPS://NGN.ARTSCI.UTORONTO.CA/HLVC/O 0 HOME. PHP

