Contrast Maintenance and Innovation in Toronto Heritage Cantonese High Vowels
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Research Goals

Sound Change
How do the sound systems of a language change over time?

Heritage Language Phonology
What characterizes HL phonology?

Heritage Language (HL)
In Canada: a non-official and non-indigenous language

More generally: an immigrant minority language

One of the oldest areas
One of the newest areas of modern linguistics

What inter-generational differences can we find in the vowel system of HL speakers?

Variationist Approach: “Change in Progress” as evidenced in synchronic variation = “change in apparent time”
Variationist Sociolinguistics and Vowels


CHANGE FROM ABOVE
Generally more noticeable to people, non-linguists talk about it

Example:
“Fou[r]th Floo[r]” in New York City English

CONSONANTS TYPICALLY INCLUDED

Photo by H. Tse (2013)

CHANGE FROM BELOW
Typically not noticed by speakers (non-linguists), may have important implications for internal motivation behind sound change

VOWELS TYPICALLY INCLUDED

http://www.ling.upenn.edu/phono_atlas/ICSLP4.html

Figure 1. The Northern Cities Shift
Sound Change in Cantonese

<table>
<thead>
<tr>
<th>Sound Change</th>
<th>Environment</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>n- → l-</td>
<td>onset</td>
<td>nei5 → lei5</td>
<td>2nd person pronoun</td>
</tr>
<tr>
<td>gwo/kwo → go/ko</td>
<td>Before “o”</td>
<td>gwok3 → gok3</td>
<td>‘country’</td>
</tr>
<tr>
<td>-k → -t (coda)</td>
<td>coda</td>
<td>baak3 → baat3</td>
<td>‘hundred’</td>
</tr>
<tr>
<td>k &gt; h</td>
<td>only in ‘keoi5’</td>
<td>keoi5 → heoi5</td>
<td>3rd person pronoun</td>
</tr>
<tr>
<td>ng &gt; 0</td>
<td>onset</td>
<td>ngo5 → o5</td>
<td>1st person pronoun</td>
</tr>
<tr>
<td>ng &gt; m</td>
<td>syllabic nasal</td>
<td>ng5 → m5</td>
<td>‘five’</td>
</tr>
<tr>
<td>ng &gt; n</td>
<td>coda</td>
<td>saang1 → saan1</td>
<td>‘to grow/produce’</td>
</tr>
</tbody>
</table>

- All consonants
  - Above the level of conscious awareness
  - People talk about “laan5 jam1” (‘lazy speech’, Matthews & Yip 2011: 4)
- Studies of Tonal Mergers (Bauer et al 2003, Mok et al 2013)
- Vowels
  - Not mentioned as part of laan5 jam1 (appear to be below the level of conscious awareness)

Matthews & Yip 2011: 36-37
Vowel Research on Cantonese

• Mostly focused on “normative” descriptions
  – Bauer & Benedict (1997): Discussion of debates over transcription
  – Zee (2003): Acoustic study
    • 50 male and 50 female speakers (not normalized)
    • But all college age (18-21) → not an age stratified sample
• Exception (aside from HLVC research)
  – Lee (1983)
    • Found more peripheral vowels among HK speakers (N=3) than among G(w)ong2 Zau1 (Canton/Guangzhou) speakers (N=3)

• Vowel variation seems to be below the level of conscious awareness among Cantonese speakers
  – And among Cantonese linguists too!
  – Lack of variationist vowel studies of Cantonese
HL Vowel Research

• Also understudied topic (but see Godson 2004, Ronquest 2013)
• Chang et al 2011
  – compared HL and L2 English-Mandarin bilingual speakers
  – HL speakers maximize language-internal and cross-linguistic distinctions due to early exposure to two languages

L2 Mandarin

Distinct but with ENG phonetic influence

assimilation vs. dissimilation (both influenced by English)

HL Mandarin

Phonological considerations inhibit fronting

L2 Phonology ≠ HL Phonology
Summary of Tse (2015)

Cantonese Vowels (Red)

- iː ~ i
- ɪk/ɪŋ
- æɡ, æN

Toronto English Vowels (Brown)

- u
- ʊk/ʊŋ
- æ

Contrasts maintained across 5 vowel categories
Allophonic distinctions across 2 categories maintained
Lack of /u/-fronting
Allophonic splits innovated
Current Presentation

Two vowels not considered in Tse (2015) to be added to analysis: /œ/ and /y/

1. Are vowel contrasts maintained across two generations of Cantonese speakers in Toronto for 7 out of the 8 canonical monophthongs?

2. Is there evidence of influence from contact with Toronto English and if so what is the nature of this influence?
   – assimilation or dissimilation?
Data

- Heritage Language Variation and Change (HLVC) in Toronto Project (Nagy 2011)
- Includes hour-long sociolinguistic interviews (spontaneous speech), Ethnic Orientation Questionnaire, and Word List (Picture based task)

**GEN 1 Speakers**
- Born and raised in HK, came to TO as adults, AND have lived in TO for > 20 years
- Variable levels of English proficiency (L2 bilinguals)

**GEN 2 Speakers**
- Grew up in TO
- Learned Cantonese primarily at home
- Universal knowledge of English (HL or early bilinguals)

Chinatown East (Riverdale) in Toronto, ON. Photo by Holman Tse, 2014
<table>
<thead>
<tr>
<th>Generation</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C1M46A</td>
<td>C1F50A</td>
<td>N=9</td>
</tr>
<tr>
<td></td>
<td>C1M59A</td>
<td>C1F54A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C1M61A</td>
<td>C1F58A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C1M62A</td>
<td>C1F78A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C1F82A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>C2M21D</td>
<td>C2F16A</td>
<td>N=8</td>
</tr>
<tr>
<td>grew up in HK</td>
<td>C2M27A</td>
<td>C2F16B</td>
<td></td>
</tr>
<tr>
<td>(Ages: 42-82)</td>
<td>C2M44A</td>
<td>C2F16C</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C2F20A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C2F21B</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C2F16A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>grew up in TO</td>
<td>C2F16B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ages: 16-44)</td>
<td>C2F16C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C2F20A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C2F21B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>N=7</td>
<td>N=10</td>
<td>Grand Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N=17</td>
</tr>
</tbody>
</table>
Token Distribution Per Speaker

<table>
<thead>
<tr>
<th>Vowel</th>
<th>Open Syllable</th>
<th>Closed Syllable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>/aː/</td>
<td>15</td>
<td>0</td>
<td>N = 15</td>
</tr>
<tr>
<td>/ɛː/</td>
<td>10</td>
<td>5</td>
<td>N = 15</td>
</tr>
<tr>
<td>/iː/</td>
<td>10</td>
<td>5</td>
<td>N = 15</td>
</tr>
<tr>
<td>/ɔː/</td>
<td>10</td>
<td>5</td>
<td>N = 15</td>
</tr>
<tr>
<td>/uː/</td>
<td>5</td>
<td>10</td>
<td>N = 15</td>
</tr>
<tr>
<td>/œː/</td>
<td>0</td>
<td>15</td>
<td>N = 15</td>
</tr>
<tr>
<td>/yː/</td>
<td>10</td>
<td>5</td>
<td>N = 15</td>
</tr>
</tbody>
</table>

TOTAL N = 105

- 17 speakers X 7 vowels X 15 tokens = GRAND TOTAL = 1785 tokens
  - Watts & Fabricius Modified Normalization technique (Fabricius et al 2009)
- Closed Syllable = pre-velar for all except /yː/  
  - N for each context depended on general frequency in spontaneous speech
- All Tone 1 (high-level) except for /uː/ and /yː/ due to low frequency
Brul (Johnson 2009)

Note: Step-up and Step-down match in all results reported, Best Step-down shown in all cases

Dependent Variable
F1, F2

Independent Variables

Fixed Effects
Social: GEN, Sex, Age, EOQ
Linguistic (depends on vowel): velar context, syllable type, Tone
Factor Group GEN:Sex:Velar

Random Effects
Speaker, Word

Mixed Effects Modeling for each vowel category

Mixed Effects Modeling for each vowel category
Vowel contrasts maintained across two generations

GEN n.s. in any model except for:

**F2 for /i/**

- $r^2$ [fixed] = 0.023,
- $r^2$ [random] = 0.267

GEN ($p = 0.00934^{***}$)

<table>
<thead>
<tr>
<th>Coeff.</th>
<th>N</th>
<th>Mean (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN 2</td>
<td>22.439</td>
<td>120</td>
</tr>
<tr>
<td>GEN 1</td>
<td>-22.439</td>
<td>135</td>
</tr>
</tbody>
</table>
High Vowel Allophones

F1 for /i/
$$r^2 \text{ [fixed]} = 0.200, \ r^2 \text{ [random]} = 0.287$$
Velar ($p = 0.000272^{***}$)

<table>
<thead>
<tr>
<th>Coeff.</th>
<th>N</th>
<th>Mean (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ik/ing]</td>
<td>22.173</td>
<td>85</td>
</tr>
<tr>
<td>[i:]</td>
<td>-22.173</td>
<td>170</td>
</tr>
</tbody>
</table>

GEN and all other variables: n.s.

F1 for /u/
$$r^2 \text{ [fixed]} = 0.207, \ r^2 \text{ [random]} = 0.148$$
Velar ($p = 8.86 \times 10^{-9}^{***}$)

<table>
<thead>
<tr>
<th>Coeff.</th>
<th>N</th>
<th>Mean (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[uk/ung]</td>
<td>24.985</td>
<td>172</td>
</tr>
<tr>
<td>[u:]</td>
<td>-24.985</td>
<td>83</td>
</tr>
</tbody>
</table>

GEN and all other variables: n.s.

Allophonic distinctions maintained (also shown in previous HLVC work and in Tse Forthcoming, which used a different normalization technique and 20 speakers)
Some overlap

Increasing separation
Also in Tse
(Forthcoming)

Peripheralization
F2 for /i/ 
$r^2$ [fixed] = 0.023, $r^2$ [random] = 0.267 
GEN (p = 0.00934)***

<table>
<thead>
<tr>
<th></th>
<th>Coeff.</th>
<th>N</th>
<th>Mean (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN 2</td>
<td>22.439</td>
<td>120</td>
<td>1889</td>
</tr>
<tr>
<td>GEN 1</td>
<td>-22.439</td>
<td>135</td>
<td>1869</td>
</tr>
</tbody>
</table>

F2 for /y/ 
$r^2$ [fixed] = 0.277, $r^2$ [random] = 0.314 
Sex (p=0.00836)***

<table>
<thead>
<tr>
<th></th>
<th>Coeff.</th>
<th>N</th>
<th>Mean (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>56.047</td>
<td>105</td>
<td>1792</td>
</tr>
<tr>
<td>F</td>
<td>-56.047</td>
<td>150</td>
<td>1667</td>
</tr>
</tbody>
</table>

Age (p=0.00632)***

| Coefficient | 3.029 |

F2 for /u/ 
$r^2$ [fixed] = 0.086, $r^2$ [random] = 0.318 
Age (p=0.00749)***

| Coefficient | 2.263 |

Expanded vowel space
Summary

Maintenance

- Vowel contrasts (7 categories) for all speakers
- Allophones of /i/ and /u/
  - Lower before velars for all speakers

Innovation

- Evidence for split in /i/ allophones
- Fronting of /i/ + retraction of /y/ and /u/
  - Expansion of vowel space among youngest (GEN 2) speakers
Research Questions Addressed

1. Are vowel contrasts maintained across two generations of Cantonese speakers in Toronto for 7 out of the 8 canonical monophongs?
   Yes

2. Is there evidence of influence from contact with Toronto English and if so what is the nature of this influence?
   Yes, dissimilation rather than assimilation best describes inter-generational differences (supporting Chang et al 2011 study of Mandarin)
Discussion

• Early bilingualism means early exposure to TWO phonological systems resulting in improved ability of making BOTH language internal AND cross-linguistic distinctions (Chang et al 2011)
  – Accounts for lack of vowel mergers among GEN 2 speakers = (lg internal)
  – Accounts for expanded vowel space among GEN 2 speakers possibly to accommodate both English and Cantonese vowels
  – → YES, English influence present but not assimilatory (as in L2 phonology), rather dissimilatory
  – Not typical of what we expect in contact-induced change possibly due to the general lack of attention paid to the effects of early bilingualism
Next Steps

• Inter-generational comparison
  – Add more speakers and vowel tokens with the help of forced alignment (cf. Peters & Tse, WICL-3)

• Cross-variety comparison
  – To confirm hypothesis of dissimilation rather than assimilation with Toronto English vowels (cf. Hoffman & Walker 2010)

• Cross-community comparison
  – Is there evidence for the same changes in Hong Kong Cantonese?
  – To strengthen support for contact with Toronto English → Homeland data now available
Conclusion

“Deficit” Perspective of HLs

- HL speech is characterized by attrition and even “Incomplete Acquisition” (cf. Montrul 2008)

“Conservative” Perspective of HLs

- HL speech is conservative because it preserves features that have been lost in the Homeland variety (cf. NWAV 44 panel on conservatism in HL’s)

Towards a Variationist or Dialectological Perspective of HLs

- No evidence for attrition in HL phonology
- Evidence for both maintenance (conservatism) and innovation possibly due to interaction with another phonological system
- Also: evidence for low-level phonetic differences just as has widely been observed across different dialects of English
  - Toronto Cantonese not different! \(\rightarrow\) A new Yue dialect? (cf. Nagy 2016)
Additional Acknowledgements

• Naomi Nagy, U of T Linguistics Dept., Scott Kiesling, Shelome Gooden, U of Pittsburgh Linguistics Dept. and Dietrich School of A & S
• WICL-1/3 Organizers
• Slides will be available at: http://www.pitt.edu/~hbt3/presentations.html
• 多謝晒!
References (1/2)


TSE, HOLMAN. Forthcoming. Variation and Change in Toronto Heritage Cantonese: An Analysis of Two Monophthongs Across Two Generations. Asia Pacific Language Variation.