Heritage Language Maintenance and Phonological Maintenance in Toronto Cantonese Monophthongs?
-- But They Still Have an “Accent”!
Holman Tse
hbt3@pitt.edu

University of Pittsburgh
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Slides will be available at:
http://www.pitt.edu/~hbt3/presentations.html
How do the sound systems of a language change over time?

What characterizes HL phonology? Is it even different?

An under-researched area of HL speech (Rao 2016)

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

Variationist Approach: Is there evidence for “change in progress” (Labov 1994) in intergenerational differences in vowel production?
This Presentation

• First glimpse of inter-generational variation across ALL eight Cantonese monophthongs
  – Extends earlier analyses based on fewer vowels (Tse 2015; 2016; In Press; Accepted)

• Specific Research Questions
  – Is there evidence of vowel mergers?
  – Is there evidence of inter-generational low-level phonetic differences?
    • Two possible sources
      – Vowel Shifts?
      – Changes in phonetic conditioning?
Heritage Languages (HL)

• In HLVC Project context:
  – “mother tongues other than Canada’s two official languages (English and French)” (Nagy 2016:16)

• In my research:
  – Language spoken in diasporic context involving migration from “homeland” to “host country”
    • A social context with
      – Psycholinguistic implications (early bilingualism, early acquisition of two phonologically distinct languages) →
      – Implications for inter-generational change in usage patterns →
      – Implications for community-level change (contact-induced change)
Is HL Phonetics Different?

• “It is well known that bilingual speakers have different phonetic representations than do monolinguals (Caramazza et al. 1974; Bullock et al. 2004; Sundara et al. 2006), so the presence of a heritage ‘accent’ should not come as a total surprise.” (Polinsky & Kagan 2007)

• Low-level phonetic differences in vowels supported by studies of
  – French (Mack 1990), Western Armenian (Godson 2004), Korean (Baker & Trofimovich 2005), Arabic (Saadah 2011), Mandarin (Chang et al. 2011, Yang 2014), Spanish (Ronquest 2013)

• May be motivated by maximizing both language-internal and cross-linguistic distinctions (Chang et al 2011)
Is HL Phonology Different?

• “heritage speakers generally sound so native like – one could easily imagine that there would be no differences in phonological representations between the heritage language and the baseline, although that remains to be shown.” (Polinsky & Kagan 2007)

• Studies of HL vowels cited in previous slide show lack of evidence for vowel mergers
  – Supports Polinsky & Kagan’s (2007) claim

• Does not consider change in phonetic conditioning
  – Changes in phonetic conditioning Toronto Heritage Polish devoicing (Lyskawa et al 2016) → evidence for phonological change
The Specifics of Toronto Cantonese

Homeland Cantonese

Toronto Heritage Cantonese

1960s - 1997

- **1960s**: First large wave of immigration from Hong Kong (UK Colony ~90% Cantonese speakers) to Canada
- **1980s-1997**: More immigration, motivated by fears of handover to China
- **2011 Census**: 178,000+ (3.1%+ of population) Cantonese speakers in Toronto
  - 2nd most widely spoken language (after English)
Awareness of a Distinct Variety

“what bothers me, is that it’s not authentic Cantonese, but canadian cantonese [sic]”

“some of the accents are terrible, you can tell they’re Canadian cantonese [sic] speakers”

Internet discussion board comments cited in Nagy (2016:21)

• But what phonetic/phonological features characterize this “accent”?
  – Vowels? Below the level of conscious awareness?
Cantonese Monophthong System

- 8 contrastive monophthongs
  - 7 out of 8 vowels included in previous analyses (Tse 2015, 2016, In Press, Accepted)
  - Unanalyzed vowel is /e/

Extensive description in Yue-Hashimoto (1972) and Bauer & Benedict (1998)
The Data

• HLVC (Heritage Language Variation and Change) Project Corpus (Nagy et al 2009, Nagy 2011)
  – For more info:
    http://projects.chass.utoronto.ca/ngn/HLVC

• Corpus consisting of
  – Digital recordings (.wav) of ~ 40+ speakers X 8 languages
  – For each speaker
    • hour-long sociolinguistic interviews (spontaneous speech sample)
    • Ethnic Orientation Questionnaire responses
    • picture naming task responses
Speakers Examined

- Sub-set of speakers (N = 20) from the HLVC Corpus
- Self-reported Cantonese proficiency level: adequate for hour-long spontaneous conversation
- English code-mixing and switching allowed (observed for all speakers)

**GEN 1 Speakers (N = 10)**
- Ages 46-82
- Born and raised in Hong Kong, came to Toronto as adults, AND have lived in Toronto for > 20 years
- Variable levels of English proficiency

**GEN 2 Speakers (N = 10)**
- Ages 16-44
- Grew up in Toronto, learned Cantonese primarily at home
- Preference for using English across most contexts (based on responses to Ethnic Orientation Questionnaire)
Token Distribution Per Speaker

• Whenever possible
  – Cantonese tokens selected from after the first 15 minutes of interview
  – F1 and F2 measurements recorded (based on Praat calculated averages for steady-state portions)

• For each vowel
  – 10 tokens in open syllable context, 5 tokens in velar context \(\rightarrow\) 15 total
  – All Tone 1 (high level tone)

• Exceptions
  • Co-occurrence constraints
    • Ex: /e/ does not occur in open syllable context \(\rightarrow\) All tokens from closed syllable context
  • Low token frequency
    • first 15 minutes of interview, ethnic orientation questionnaire, and picture naming task recording also included
    • If still less than 15 tokens, other phonetic contexts also included

• 15 tokens X 8 vowels X 20 speakers X 2 formant measurements =
• GRAND TOTAL: 2400 vowel tokens (4800 formant measurements)
Analysis Procedures

- All formant measurements normalized using Lobanov technique in NORM suite (Thomas and Kendall 2007)

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

**Mixed Effects Modeling using R-brul (Johnson 2009) for each vowel category (or two vowel categories)**

**Dependent Variable**
- F1, F2

**Independent Variables**

**Fixed Effects**
- **For mergers:** Vowel Category
- **For inter-generational vowel shifts:** GEN
- **For phonetic conditioning:** following consonant
- **Post-Hoc:** preceding consonant

**Random Effects**
- Speaker, Word
### /i/ vs. /y/

<table>
<thead>
<tr>
<th></th>
<th>GEN 1</th>
<th>GEN 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>F2</td>
<td>**</td>
<td>***</td>
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</tbody>
</table>

Distinct; No merger

### Legend

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>n.s.</td>
<td></td>
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<tr>
<td>*</td>
<td>&lt; 0.05</td>
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<tr>
<td>**</td>
<td>&lt; 0.01</td>
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<td>***</td>
<td>&lt; 0.001</td>
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### /u/ vs. /ɔ/

<table>
<thead>
<tr>
<th></th>
<th>GEN 1</th>
<th>GEN 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>F2</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Distinct; No merger

### Mergers?

**GEN 1 Plot**

**GEN 2 Plot**
GEN 1
Is /ɛ/ significantly different from:

<table>
<thead>
<tr>
<th></th>
<th>/ɛ/</th>
<th>/œ/</th>
<th>/a/</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>***</td>
<td>*</td>
<td>***</td>
</tr>
<tr>
<td>F2</td>
<td>***</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Legend
n.s.  
* < 0.05  
** < 0.01  
*** < 0.001

Distinct; no merger

GEN 2
Is /ɛ/ significantly different from:

<table>
<thead>
<tr>
<th></th>
<th>/ɛ/</th>
<th>/œ/</th>
<th>/a/</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>F2</td>
<td>***</td>
<td>n.s.</td>
<td>***</td>
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Increasing /ɛ/ vs. /a/ distinction
Is GEN a significant predictor?

<table>
<thead>
<tr>
<th></th>
<th>/i/</th>
<th>/y/</th>
<th>/u/</th>
<th>/ɛ/</th>
<th>/œ/</th>
<th>/œ/</th>
<th>/a/</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>n.s.</td>
<td>*</td>
<td>n.s.</td>
<td>*</td>
<td>n.s.</td>
<td>**</td>
<td>n.s.</td>
</tr>
<tr>
<td>F2</td>
<td>n.s.</td>
<td>***</td>
<td>n.s.</td>
<td>*</td>
<td>n.s.</td>
<td>n.s.</td>
<td>*</td>
</tr>
</tbody>
</table>

Legend
n.s.  * < 0.05
** < 0.01
*** < 0.001

Vowel Shifts?

GEN 1 Plot

GEN 2 Plot
## Changes in Phonetic Conditioning?

<table>
<thead>
<tr>
<th>GEN 1</th>
<th>GEN 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2 of /e/</td>
<td>F2 of /e/</td>
</tr>
<tr>
<td>$r^2$ [fixed] = 0.318, $r^2$ [random] = 0.139</td>
<td>$r^2$ [fixed] = 0.00, $r^2$ [random] = 0.243</td>
</tr>
<tr>
<td>$r^2$ [total] = 0.457</td>
<td>$r^2$ [total] = 0.243</td>
</tr>
<tr>
<td>Preceding (p &lt; 0.01)**</td>
<td>NO FIXED PREDICTORS</td>
</tr>
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<tr>
<th>Coeff.</th>
<th>N</th>
<th>Mean (Hz)</th>
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<tr>
<td>/tsʰ/</td>
<td>82</td>
<td>1479</td>
</tr>
<tr>
<td>/tˢ/</td>
<td>74</td>
<td>1484</td>
</tr>
<tr>
<td>/t/</td>
<td>52</td>
<td>1450</td>
</tr>
<tr>
<td>/s/</td>
<td>23</td>
<td>1431</td>
</tr>
<tr>
<td>/kʰ/</td>
<td>-7</td>
<td>1411</td>
</tr>
<tr>
<td>/m/</td>
<td>-21</td>
<td>1366</td>
</tr>
<tr>
<td>/p/</td>
<td>-96</td>
<td>1317</td>
</tr>
<tr>
<td>/ ŋ/</td>
<td>-108</td>
<td>1306</td>
</tr>
</tbody>
</table>

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<td>/tsʰ/</td>
<td>17</td>
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<tr>
<td>/t/</td>
<td>50</td>
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<td>/m/</td>
<td>18</td>
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<tr>
<td>/s/</td>
<td>30</td>
</tr>
<tr>
<td>/tˢ/</td>
<td>2</td>
</tr>
<tr>
<td>/h/</td>
<td>1</td>
</tr>
<tr>
<td>/p/</td>
<td>24</td>
</tr>
<tr>
<td>/kʰ/</td>
<td>5</td>
</tr>
<tr>
<td>/l/</td>
<td>2</td>
</tr>
</tbody>
</table>

- All are coronal obstruents
- Coronal obstruents condition higher F2 among GEN 1
- BUT change in phonetic conditioning for GEN 2
More about /e/

- For HK Cantonese, /e/ vs. /a/ distinction described as primarily a length (quantity) contrast (cf. Bauer & Benedict 1998)
- But both F1 and F2 for /e/ vs. /a/ distinct for GEN 2
- Also GEN 2 fronting of /e/ AND stability of /a/
- Conclusion: /e/ vs. /a/ distinction becoming primarily a vowel quality distinction among GEN 2 speakers
More about /e/

- Greater standard deviation of F1/F2 means for GEN 2 speakers
- Loss of phonetic conditioning among GEN 2
Summary

1. Is there evidence of vowel mergers?
   – No, all 8 monophthong categories remain distinct for GEN 2 speakers

2. Is there evidence of inter-generational low-level phonetic differences?
   – Vowel shifts?
     • For /y/, /ɛ/, /ɔ/ and /ə/
   – Changes in phonetic conditioning?
     • Preceding coronal obstruents condition higher F2 for /ɛ/ among GEN 1 only
Conclusion

• “one could easily imagine that there would be no differences in phonological representations between the heritage language and the baseline” (Polinsky & Kagan 2007)
• If by “phonological representations”, we mean phonemic contrasts then yes
• BUT, Representations may also involve features (ex: lax vs. tense)
• Change from vowel quantity to quality distinction arguably a change in phonological representation
• also low-level phonetic differences may be influenced by different constraints (cf. Lyskawa et al 2016)→ evidence of phonological change → may have implications for long-term sound change
Next Steps

• Inter-generational comparison
  – Add more speakers and vowel tokens with the help of forced alignment (cf. Peters & Tse 2016)
  – Consider more phonetic contexts and lexical factors?

• Cross-community comparison
  – Is there evidence for the same changes in Hong Kong Cantonese? → Homeland data now available
  – To strengthen support for contact with Toronto English
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<tr>
<th>HLVC Cantonese RAs:</th>
<th>Collaborators:</th>
<th>Additional acknowledgements:</th>
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<tr>
<td>Abigail Chan</td>
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<td>Karen Chan</td>
<td>Alexei Kochetov</td>
<td>Scott Kiesling</td>
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<td>Tiffany Chung</td>
<td>James Walker</td>
<td>Shelome Gooden</td>
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<td>Rachel Coulter</td>
<td></td>
<td>University of Pittsburgh Dietrich</td>
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<tr>
<td>Radu Craioveanu</td>
<td></td>
<td>School of Arts &amp; Sciences and Linguistics Department</td>
</tr>
<tr>
<td>Joyce Fok</td>
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<td>Andrew Peters</td>
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<td>Josephine Tong</td>
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