The vowels in ‘pig’ vs. ‘tofu’: A contact-induced merger in Toronto Heritage Cantonese?

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HERITAGE LANGUAGE VARIATION AND CHANGE IN TORONTO
HTTP://PROJECTS.CHASS.UTORONTO.CA/NGN/HLVC
Nothing new in variationist research ... 

\[ \text{LOT} = \text{THOUGHT} \]

• BUT:
  – What about vowel mergers that are contact-induced?
  – This study involves influence from a linguistically dominant L2 (acquired as a child) on a heritage language (acquired as an L1).

Cantonese words:

- [tsy1] ZYU1
- [tew˨.fu˨] (DAU6) FU6

/y/ = /u/ merger?
On contact-induced mergers

• “It would be helpful to know more about the limitations on children’s ability to learn new dialects and on adults’ inability to learn them. Our knowledge of the diffusion of mergers is particularly inadequate, both for adults and children” (Labov 2007: 383)

• One of few examples of diffusion of merger discussed in Labov (2007, 2011) is Herold’s (1990, 1997) study of low-back merger in Northeastern Pennsylvania
Diffusion of merger example

LOT-THOUGHT merger developed in historic anthracite mining communities, but not in towns lacking a history of mining (Herold 1990, 1997).

These communities attracted many immigrants (particularly from Eastern Europe) in the late 19th and early 20th centuries.

Lack of similar contrast in these immigrant languages → LOT-THOUGHT merger in the English spoken by subsequent generations via contact-induced change.
• **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
  • Now the 2nd most spoken mother tongue (after English)
Contact Setting

**GEN 1 Speakers**
- Born and raised in HK, came to Toronto as adults, AND have lived in TO for > 20 years
- Variable levels of English knowledge

**GEN 2 Speakers**
- Grew up in TO
- Learned Cantonese primarily at home (L1)
- All linguistically dominant in English (L2) as evidenced from Ethnic Orientation survey questions

ENGLISH (L2 learned as child)

Possible L2 to L1 influence?

廣東話 (L1, not a societally dominant language in Toronto)

*Photo by Holman Tse, 2014*
A different type of contact setting

• Influence going the other direction
  – From societally dominant language to an immigrant language rather than the other direction as in Herold (1990, 1997)
  
  • Can different directions of influence lead to the same linguistic outcome?
Cantonese Monophthongs

Description following Zee (1999)

### TENSE (Open/Closed Syllables)

<table>
<thead>
<tr>
<th>Vowel</th>
<th>Example</th>
<th>Vowel</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>si, ‘silk’</td>
<td>a</td>
<td>sa, ‘sand’</td>
</tr>
<tr>
<td>y</td>
<td>sy, ‘book’</td>
<td>o</td>
<td>so, ‘comb’</td>
</tr>
<tr>
<td>e</td>
<td>se, ‘to lend’</td>
<td>u</td>
<td>fu, ‘husband’</td>
</tr>
<tr>
<td>œ</td>
<td>hoœ, ‘boot’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### LAX (Closed Syllables Only)

<table>
<thead>
<tr>
<th>Vowel</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>sik, ‘color’</td>
</tr>
<tr>
<td>o</td>
<td>Sok, ‘uncle’</td>
</tr>
<tr>
<td>e</td>
<td>set, ‘shirt’</td>
</tr>
<tr>
<td>œ</td>
<td>sep, ‘wet’</td>
</tr>
</tbody>
</table>
Merger between /y/ and /u/?

Cantonese has two high round tense vowels

Toronto English Vowel System

English has only one round tense vowel (phonetically fronted)

Does English influence on Cantonese mean change towards loss of /y/ vs. /u/ contrast?
## Distribution of /y/ vs. /u/

<table>
<thead>
<tr>
<th>Possible Onsets</th>
<th>/y/</th>
<th>/u/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labial</td>
<td>[pun˥] ‘to move’</td>
<td></td>
</tr>
<tr>
<td>Labio-dental</td>
<td>[fu˧˥], ‘bean curd or tofu’</td>
<td></td>
</tr>
<tr>
<td>Labio-velar</td>
<td>[wun˥], ‘bowl’</td>
<td></td>
</tr>
<tr>
<td>Alveolar</td>
<td>̃[tsy˥], ‘pig’</td>
<td></td>
</tr>
<tr>
<td>Palatal</td>
<td>[jy˥] ‘fish’</td>
<td></td>
</tr>
<tr>
<td><strong>Velar</strong></td>
<td>[kyn˥], ‘roll’</td>
<td>[kun˥], ‘public building’</td>
</tr>
<tr>
<td>Glottal</td>
<td>[hyn˥], ‘circle’</td>
<td></td>
</tr>
</tbody>
</table>

Minimal pairs possible only following velar onset
No clusters in Cantonese
The Data

• HLVC (Heritage Language Variation and Change) Project Corpus (Nagy et al 2009, Nagy 2011)
  – Digital recordings (.wav) of:
    • hour-long sociolinguistic interviews (spontaneous speech sample)
    • Ethnic Orientation Questionnaire responses
    • picture naming task responses
      – Fortuitously included words with /y/ and /u/
  – Recordings transcribed by native (including heritage) Cantonese speakers using the Jyutping Romanization system
## The 32 Speakers Analyzed

<table>
<thead>
<tr>
<th>Group</th>
<th>GEN 1</th>
<th>GEN 2</th>
<th>Homeland*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Range</td>
<td>46-87</td>
<td>20-44</td>
<td>16-77</td>
</tr>
<tr>
<td>Time in Hong Kong</td>
<td>Born and raised in Hong Kong</td>
<td>N/A</td>
<td>Born and raised in Hong Kong</td>
</tr>
<tr>
<td>Time in Toronto</td>
<td>Moved to Toronto as adults, lived in Toronto &gt; 20 years</td>
<td>Lifelong Toronto residents or have lived in Toronto since age of 4</td>
<td>N/A</td>
</tr>
<tr>
<td>English Proficiency</td>
<td>Variable, but Cantonese dominant</td>
<td>English dominant</td>
<td>Variable, but Cantonese dominant</td>
</tr>
<tr>
<td>TOTAL</td>
<td>N = 12</td>
<td>N = 12</td>
<td>N = 8</td>
</tr>
</tbody>
</table>

* Homeland speakers included to strengthen/weaken arguments for contact-induced change
Data Processing

• Prosodylab aligner (Gorman et al 2011) and Praat script used to obtain midpoint F1 and F2 of all usable tokens of the 11 monophthongs recorded
  – Words with onset glides /j, w/ excluded
  – Manual review of output to ensure accurate formant measurements

• Lobanov Normalization method used (Thomas & Kendall 2007)
Results: Intergenerational Comparison

Model of the F2 of /y/
Fixed effect: "generation"
Random Effects: speaker and word

<table>
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<th>Coefficient</th>
<th>Tokens</th>
<th>F2 Mean (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN 1</td>
<td>23</td>
<td>563</td>
</tr>
<tr>
<td>GEN 2</td>
<td>-23</td>
<td>321</td>
</tr>
</tbody>
</table>

r² [fixed] = 0.050, r² [random] = 0.331
r² [total] = 0.381

Model of the F2 of /u/
Fixed effect: "generation"
Random Effects: speaker and word

Generation n.s. for the F2 of /u/
N = 600

Fronted /y/ Sample
C2M44A

Retracted /y/ sample
C2M21B
Results: Diatopic Comparison

- ZYU1 retraction not found in Homeland
- Raising found instead and general peripheralization of the vowel space (consistent with Lee 1983)
Results: CAN % Score

- CAN % Score: Number of transcribed Cantonese words ÷ total number of transcribed words
- Speakers with higher CAN % Scores used more Cantonese in the interview (and generally less code-switching)

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$ r^2 [\text{total}] = 0.412, \ r^2 [\text{random}] = 0.3174, \ r^2 [\text{fixed}] = 0.0946 $  

$ r^2 [\text{total}] = 0.381 $  

Higher CAN % Scores

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$ r^2 [\text{total}] = 0.381 $  

Higher CAN % Scores
Pillai Scores for measuring merger

• A “summary [statistic] of the degree to which two distributions are kept distinct” (Hay et al 2006)
• An increasingly popular method used in sociolinguistic studies of mergers in progress (Nycz & Hall-Lew 2013)
• Continuous scale from 0 (suggests most merged) to 1.0 (suggests least merged)
  – Separate scores calculated for each individual speaker
  – No real standard for distinguishing btwn merged and not merged
  – BUT for reference: 0.300 or below for merger set in Hall-Lew (2009)
Range of Pillai Scores for /y/ vs. /u/ differences

N = 12  
N = 12  
N = 8

Opposite Direction
GEN 2 speaker with highest Pillai Score

/y/ vs /u/ (Lobanov normalized)
GEN 1 speaker sample

/y/ vs /u/ (Lobanov normalized)
GEN 2 speaker with lowest Pillai Score
Metalinguistic awareness of /y/ vs /u/?

1. C2F24A: uh, <syut3 gou1 ... jyu2 ... beng2> ... what’s so funny?
2. Interviewer: [(LAUGH) ]
3. C2F24A: [Did I say it wrong?]
4. Interviewer: Your pronunciation
5. C2F24A: [What?] ‘fish’
6. Interviewer: [I can’t ] say <jyu2> (IMITATING C2F24A)
7. C2F24A: Oh I said it right?
8. Interviewer: No, wait say it again.
10. Interviewer: OK. ‘tofu’ ‘pig’
11. C2F24A: “No, people say I say things weird [like] <dau6 fu6> or like <zyu1>
12. Interviewer: [yeah, it’s]
13. C2F24A: they all [say] I say it wrong!”
14. Interviewer: [yeah]
15. Interviewer: <zyu1> and <jyu2>, dau6 fu6> is right
17. Interviewer: Yeah, <zyu1> and <jyu2>, I think you said it wrong.
18. C2F24A: <zyu1> ‘pig’
19. Interviewer: [yeah! (LAUGH)]
20. C2F24A: [yeah! (LAUGH)]
Summary of Results

• F2 of ZYU1 significantly retracted for GEN 2
• Lack of the same change in Homeland Cantonese
• Lower CAN % Scores favor ZYU1 retraction and FU6 fronting
• Pillai scores show wide range
  – Some speakers maintain a strong distinction, others are more merged
• At least one speaker seems more merged in more spontaneous speech
• Some speakers notice these differences
Next Steps

- Comparative analysis with the English vowels from the same speakers
- Does Toronto English /u/ merge with Cantonese /y/ for speakers leading in /y/ vs. /u/ merger?
- Comparative data also available from Hoffman & Walker (2010) corpus showing Cantonese GEN 2 speakers with fronted GOOSE in English
- Further in the future: minimal pair data
Conclusion

• Few documented examples in variationist literature of contact-induced vowel mergers with exception of Herold (1990, 1997)
• Evidence presented of a case of contact-induced vowel merger
  – Contact going in the other direction
  – L2 (more dominant and learned as a child) to L1 rather than L1 to L2 influence
• But similar to Herold (1990, 1997) in showing how influence from a language (or languages) with one phoneme in one part of the vowel space can lead to merger in a language with two phonemes in the same part of the vowel space
• Amount of Cantonese spoken in interview appears to be important
  – Is this about linguistic dominance?
  – Is this about proficiency?
  – Is it about other factors?
  – A combination of these factors?
References

Slides will be available at: http://www.pitt.edu/~hbt3/presentations.html
Contact me at: hbt3@pitt.edu


NYCZ, JENNIFER.; and LAUREN HALL-LEW. 2013. Best practices in measuring vowel merger. Proceedings of Meetings on Acoustics 166ASA, 20:060008. ASA.

