Effects of talker’s dialect labeling and listener’s language experience on the perception of nasal codas in Shanghai Mandarin

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PLC47 Talk
Talker dimension

Social information

Listener dimension
Talker dimension

• Perceived socio-demographic information of the talker:
  • Gender (Eklund and Traunmüller, 1997; Strand, 1999; Johnson, Strand and D’Imperio, 1999; Strand and Johnson, 2016; Lai, 2021)
  • Age (Drager, 2011; Koops, Gentry and Pantos, 2008)
  • Race/ethnicity (Staum Casasanto, 2010)
Talker dimension

- Perceived dialectal background:
  - Top-down dialect labels (Niedzielski, 1999; Lev-Ari and Peperkamp, 2016; Schertz, Kang and Han, 2019; McGowan and Babel, 2020)
  - Counter-example: Lawrence (2015)
    - Investigate the impact of dialectal labels by replicating Niedzielski’s 1999 paradigm
    - Different variable and language context
    - No significant effect of dialect labeling was found
    - The author’s interpretation suggests that the impact of dialect labeling on speech perception may be influenced by linguistic context
Listener dimension

- Listeners’ socio-demographic status:
  - Age (D’Onofrio, 2021; Hay, Warren and Drager, 2006; Drager, 2011; Hay and Drager, 2010)
  - Gender (Hay, Warren and Drager, 2006; Drager, 2011; Hay and Drager, 2010)
  - Social class (Hay and Drager, 2010)
- Language experience (Sumner and Samuel, 2009; Lev-Ari and Peperkamp, 2016; Lev-Ari, 2018; Schertz, Kang and Han, 2019; Voeten, 2021)
- Language attitude (Walker et al.; 2018)
• In this experiment, I focus on the following two effects:

Talker dimension  Social (regional) labeling

Listener dimension  Language experience

• I explore how these social factors affect Shanghai Mandarin speakers’ discrimination of -in and -iŋ
Predictions

- **Talker’s dialect label** and **listener’s language experience** both play a role on the perception of ambiguous /in~iŋ/ stimuli

<table>
<thead>
<tr>
<th>Social labeling influences speech perception</th>
<th>Talker’s Standard Mandarin Speaker label facilitates higher $iŋ$-selection rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language experience influences speech perception</td>
<td>Listeners with more language experience with Standard Mandarin have higher $iŋ$-selection rate</td>
</tr>
</tbody>
</table>
- **Beijing Mandarin**
  - Well-accepted as a standard variety of Standard Mandarin

- **Shanghai Mandarin**
  - To a large extent similar to Standard Mandarin
  - Shows Wu dialect influence, differing from Standard Mandarin in some features
The *in*-*iŋ* contrast in Mandarin

- Standard Mandarin: /in/ as [in] v. /iŋ/ as [iŋ]
- Shanghai Mandarin: /in/ as [iŋ] and /iŋ/ as [iN] in formal speech
- Low social awareness of the phonetic variation for Shanghai Mandarin speakers

Recap: What is ambiguous in formal Shanghai Mandarin is closer to -*iŋ* in Standard Mandarin
Methods

• Within-subject design matched-guise study
  • Two conditions (Shanghai Label vs. Beijing Label) in separate blocks
  • Make up by personal stories of the talker in text - young women in their twenties, similar SEs
• Stimuli that are phonetically ambiguous to Shanghai Mandarin speakers
• Forced choice between 2 characters (an in-word vs. an iy-word) on screen
Please determine which character you heard.
If you think the character you heard is on the left side of the screen, press the left arrow key.
If you think the character you heard is on the right side of the screen, press the right arrow key.

This is an -in word
Language experience

6 questions from an end-of-experiment questionnaire

• Approximately how many teachers do you have from elementary to high school from North China? (previous teacher)
• About how many of your childhood friends (before the age of 18) were from North China? (previous friends)
• About how many of your friends from North China have you interacted with in the last year? (current friends)
• How much time did you live in North China before you turned 18? (previous residence)
• Approximately how much of the last year have you lived in North China? (current residence)
• When you were a child, were your primary caregivers from North China? (caregiver)
• In order to condense language experience responses into a single parameter

• Performing principal component (PCA) analysis on the six dimensions
  
  • Responses to all 6 questions are positively correlated with PC1 (57.0% of the variance)

  • I’ll use PC1 to represent a participant’s **language experience** to Standard Mandarin in the following models
Logistic mixed-effect regression model

• A total of 1788 valid responses from 76 participants

• Fixed factors:
  • **Key factors:** talker’s social label * participant’s language experience (PC1)
  • Experimental setting: block * within-block item order (rescaled to 0-1)
  • Stimuli: tone, initial, word frequency (in vs. inj)

• Random effects:
  • by-participant random intercept
  • *Models with random slopes have no significant improvement over models with only random intercepts (p=0.313) and have similar outputs*
## Within-subject results

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>z value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label (Beijing v. grand mean)</td>
<td>-0.037</td>
<td>0.246</td>
<td>-0.152</td>
<td>0.879</td>
</tr>
<tr>
<td>language experience</td>
<td>0.186</td>
<td>0.051</td>
<td>3.616</td>
<td>0.000</td>
</tr>
<tr>
<td>block (block 1 v. grand mean)</td>
<td>-0.099</td>
<td>0.098</td>
<td>-1.005</td>
<td>0.315</td>
</tr>
<tr>
<td>within-block order</td>
<td>-0.621</td>
<td>0.235</td>
<td>-2.646</td>
<td>0.008</td>
</tr>
<tr>
<td>word frequency (in v. iŋ)</td>
<td>-1.124</td>
<td>0.811</td>
<td>-1.386</td>
<td>0.166</td>
</tr>
<tr>
<td>initial (consonant v. grand mean)</td>
<td>-0.414</td>
<td>0.088</td>
<td>-4.717</td>
<td>0.000</td>
</tr>
<tr>
<td>tone (tone 1 v. grand mean)</td>
<td>-0.315</td>
<td>0.083</td>
<td>-3.786</td>
<td>0.000</td>
</tr>
<tr>
<td>tone (tone 2 v. grand mean)</td>
<td>-0.074</td>
<td>0.094</td>
<td>-0.788</td>
<td>0.431</td>
</tr>
<tr>
<td>tone (tone 3 v. grand mean)</td>
<td>0.340</td>
<td>0.119</td>
<td>2.865</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>Label : language experience</strong></td>
<td><strong>-0.014</strong></td>
<td><strong>0.030</strong></td>
<td><strong>-0.476</strong></td>
<td><strong>0.634</strong></td>
</tr>
<tr>
<td><strong>block : within-block order</strong></td>
<td><strong>0.067</strong></td>
<td><strong>0.168</strong></td>
<td><strong>0.401</strong></td>
<td><strong>0.689</strong></td>
</tr>
</tbody>
</table>

Table 4: Model output of /in~iŋ/ selection with the within-participant data
Within-subject results
## Between-subject results

<table>
<thead>
<tr>
<th></th>
<th>Est.</th>
<th>S. E.</th>
<th>Z Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>label (Beijing v. grand mean)</td>
<td>-0.080</td>
<td>0.547</td>
<td>-0.146</td>
<td>0.884</td>
</tr>
<tr>
<td>language experience</td>
<td>0.176</td>
<td>0.068</td>
<td>2.593</td>
<td>0.010</td>
</tr>
<tr>
<td>within-block order</td>
<td>-0.755</td>
<td>0.337</td>
<td>-2.241</td>
<td>0.025</td>
</tr>
<tr>
<td>word frequency (in v. iŋ)</td>
<td>-2.882</td>
<td>1.172</td>
<td>-2.460</td>
<td>0.014</td>
</tr>
<tr>
<td>initial (consonant v. grand mean)</td>
<td>-0.448</td>
<td>0.125</td>
<td>-3.578</td>
<td>0.000</td>
</tr>
<tr>
<td>tone (tone 1 v. grand mean)</td>
<td>-0.331</td>
<td>0.119</td>
<td>-2.783</td>
<td>0.005</td>
</tr>
<tr>
<td>tone (tone 2 v. grand mean)</td>
<td>-0.148</td>
<td>0.134</td>
<td>-1.108</td>
<td>0.268</td>
</tr>
<tr>
<td>tone (tone 3 v. grand mean)</td>
<td>0.427</td>
<td>0.167</td>
<td>2.548</td>
<td>0.011</td>
</tr>
<tr>
<td>Label : language experience</td>
<td>-0.002</td>
<td>0.068</td>
<td>-0.029</td>
<td>0.977</td>
</tr>
</tbody>
</table>

Table 5: Output of the model for between-participant data collected from the first experimental block
Results from Block 1 only
Summary

• Social labeling effect not found
  
  • No significant difference of /iŋ/ selection between the two conditions, either between-subject or within-subject

• Language experience has effect on speech perception
  
  • Consistent with our expectation: participants with more language experience with Standard Mandarin have higher iŋ-rate

• No interaction effect between the talker’s dialect label and the listener’s language experience.
## Summary

<table>
<thead>
<tr>
<th>Has <strong>Social labeling</strong> effect on speech perception</th>
<th>(Talker’s) <strong>Beijing</strong> condition has <strong>higher</strong> (iŋ)-rate</th>
<th>✗</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has <strong>Language experience</strong> effect on speech perception</td>
<td>Participants with <strong>more</strong> language experience with Standard Mandarin have <strong>higher</strong> (iŋ)-rate</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Interaction</strong> between talker’s social labeling and listener’s language has effect on speech perception</td>
<td>(iŋ)-rates between -condition differ more for participants more experienced with Standard Mandarin</td>
<td>✗</td>
</tr>
</tbody>
</table>
Discussion questions

• Does the uneven distribution of participants’ Standard Mandarin experience have an influence?
  • Vast majority of participants have relatively limited experience with Standard Mandarin

• Label construction: How to balance between control variables and sufficient credibility?
  • The social-labeling construction may not be convincing enough
  • Identity of talkers established with plain text
  • No voice or photo clues provided

• How does formality influence it?
• How does the social awareness of this variable play a role in this context?
Acknowledgements

• This study is one of my qualifying papers for my PhD program. I am deeply grateful to my exceptional committee, Meredith Tamminga and Gareth Roberts, for their invaluable guidance and support throughout this process.

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Thank you!

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From the norming test

The average selection rate of /ıŋ/ by item. The initial consonant and tone of the stimulus item are labeled on the data points. Blue dashed lines indicate the range of 0.25-0.75. The red dashed line indicates the mean /ıŋ/ selection rate within the new subset.
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