Production quality of /r/ and /l/ liquids among Cantonese and Mandarin ESL learners.

Renamed

Production quality of /r/ and /l/ liquids among Beijing and Non-Beijing Mandarin ESL learners.

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Hypothesis

• If a language learner's L1 has a sound that is phonetically similar to only one of two contrasting sounds in an L2, that learner will be better at producing the L2 contrast.
Introduction

• All Mandarin dialects have a prevocalic liquid, a dental-alveolar lateral approximant. (Shareef, 2001)

• Beijing Mandarin (BM) has a post-vocalic variant that is phonetically similar to English /r/ sound. (Honorof, PC).

• Like English /r/, BM /r/ has two movements, tongue anterior raising and tongue root backing. (Gick et. al., 2003).
Predictions

• English L2 Speakers of L1 BM will produce not only more accurate post-vocalic /r/ sounds, but also:
  – More accurate pre-vocalic /r/.
  – More accurate /l/ sounds.
than L1 Other Mandarin (OM) speakers.
Experiment

• An experiment was conducted to determine the production quality of English /r/ and /l/ sounds in pre and post vocalic environments.
Method - Source Subjects

- 4 source subjects:

<table>
<thead>
<tr>
<th></th>
<th>Experienced</th>
<th>New</th>
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<tbody>
<tr>
<td>BM</td>
<td>Age: 37, Y: 7</td>
<td>Age: 35, Y: &lt;4</td>
</tr>
<tr>
<td>OM</td>
<td>Age: 43, Y: 12</td>
<td>Age: 25, Y: &lt;2</td>
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</tbody>
</table>

- Subjects were selected from a wider Ultrasound study with 6 Beijing dialect speakers and 13 other dialect speakers.
Methods - Source Stimuli

• Minimal pairs consisted of:
  – glass/grass - complex onset
  – lead/read - onset
  – collect/correct - intervocalic
  – deal/dear - coda
  – cold/chord - complex coda

• Stimuli were pronounced in the frame:
  “I say ______ again.”
Methods - Source Stimuli

- Participants were recorded with an Alkoa Prosound SSD 5000 and a Shure SM 58 microphone on MINI DV tapes.
- Seated Participants’ heads were steadied with a head rest and head bar.
- Stimuli were presented 10X each in pseudo-random order with baseline stimuli interlaced for 210 utterances.
- 10 minutes recording time.
Methods - Perception

- Stimuli from the 4 source participants were organized in 5 token sets from 5 minimal pairs each.
- Total 50 tokens each = 200 tokens.
- Stimuli placed in pseudo-random order on a soundtrack.
- 8 blocks of 25 = 200 tokens.
- Stimuli were presented to 13 monolingual native English speakers.
- 10 minutes listening time.
Methods - Analysis

• The perception records were compiled and statistically analysed to indicate:
  – Perception differences of Beijing and Other Mandarin ESL speakers.
  – Perception differences of /r/ and /l/ sounds.
  – Perception differences in various syllabic contexts.
Results - /r/ Perception Variance

Postvocalic /r/  

Prevocalic /r/  

/r/ by skill  

Red = incorrect, Green = correct

Difference in /r/ perception by coda is significant ($\chi^2 52.2$, $P < 0.0001$, $R^2 11.9\%$).

The Difference in /r/ perception of speakers is significant ($\chi^2 23.4$, $P < 0.0001$, $R^2 10.2\%$).

The Difference in /r/ perception of speakers is significant ($\chi^2 136$, $P < 0.0001$, $R^2 13.9\%$).
Results - /l/ Perception Variance

Postvocalic /l/

The Difference in /l/ perception of speakers is significant ($\chi^2$ 204, $P < 0.0001$, $R^2$ 34.3%)

Prevocalic /l/

The Difference in /l/ perception of speakers is significant ($\chi^2$ 115, $P < 0.0001$, $R^2$ 32.3%)

/l/ by skill

The Difference in /l/ perception of speakers is significant ($\chi^2$ 309, $P < 0.0001$, $R^2$ 25.3%)

Red = incorrect, Green = correct
Results - Variance by Experience

- Experienced OM speaker was easier to understand, $\chi^2 10.2, P = 0.001, R^2 1.76\%$.

- New BM speaker was easier to understand, $\chi^2 226, P < 0.0001, R^2 15.6\%$.

- Between speaker variance significant ($\chi^2 29.816, P = 0.003$, and $R^2 1.3\%$).
Discussion

• Results suggest with enough experience, speakers of both dialects acquire the r/l distinction such that native English speakers almost always understand them.

• Beginning BM English speakers produce both /r/ and /l/ distinction more accurately than OM speakers.
Discussion

• All speakers produce onsets more accurately than codas, new BM speakers produce r/l distinction more accurately in all contexts.
• Results vary for experienced speakers and bear further research.
• These results imply an interactive multidimensional matrix of phonetic sounds - future research will attempt to computationally model these relationships.
Conclusion

• The preliminary results suggest that the existence of Beijing’s affixal /r/ significantly improves the ability of new ESL speakers to make the r/l distinction, including /l/ production and prevocalic production.
• These results support the hypothesis that even 1 sound in an L1 help new speakers pronounce both of 2 minimal pairs in an L2.
References


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