Perception of Glottalization in Varying Pitch Contexts in Mandarin Chinese

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1 Glottalization and pitch
- Glottalization often associated with low pitch because of its characteristics: low F0, damping and aperiodicity.
- In Mandarin Chinese, most frequent glottalizations in the pitch valley of falling-rising Tone 3 (see Figure 1), and sometimes at the end of falling Tone 4 (Ding and Helbig [5]).

2 AXB listening experiment

2.1 Hypotheses for Mandarin Chinese listeners
- Majority of full responses.
- No influence of preceding pitch contour because of tone language background.

2.2 Creation of modal and glottalized stimuli

<table>
<thead>
<tr>
<th>Initial contour</th>
<th>Fall</th>
<th>Mid</th>
<th>Rise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall vs Mid</td>
<td></td>
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<tr>
<td>Fall vs Rise</td>
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<tr>
<td>Mid vs Rise</td>
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</tbody>
</table>

2.3 Procedure of AXB experiment

2.4 Chinese listeners
- N=21, 20-27 years old, students at Tongji University in Shanghai.

3 Results of test comparisons

4 Discussion

4.1 Influence of initial pitch
- No influence of initial pitch on Chinese listeners because of Mandarin tone system: a lexical tone assigned to each syllable.
- Function of prosodic features across languages influences perception of glottalization:
  - Mandarin Chinese and Swedish: pitch essential or contributing to lexical meaning -> listeners not influenced by pitch of preceding syllables.
  - German and English: pitch assigned on the intonational level -> listeners influenced by large-scale pitch contour.

4.2 Rise responses
- Significantly more rise responses by Chinese listeners because of association with falling-rising Tone 3.
- Liu and Samuel [7] found that Tone 3 is perceived with the same accuracy even if its rising portion is missing, and also correctly perceived most of the times even if consisting only of the rising portion.

5 Conclusions
- Glottalization not necessarily perceived as falling pitch.
- The different sizes of pitch domains relevant in each language, and even the internal phonological structure itself, appear to influence how listeners perceive pitch information or respond to glottalization.

References

Download the paper here.