Online perception of coda glottalization in American English

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**Background**

- Coda glottalization: /t/ → [t̚, ʔ]/...
- Two enhancement accounts for why glottalization occurs:
  1. Glottalization is used to enhance [-voice] feature of voiceless stops [1, 2].
  2. Glottalization is used to enhance /t/ in particular [2].
   - Are listeners faster in recognizing glottalized voiceless stops?
   - Both accounts assume that glottalization should be beneficial to listeners.

**Method**

- Eye-tracking study (following [5, 6])
- 60 AmE listeners (UCLA Psych. Pool)
- All target words were paired monosyllabic CVC English words – minimal pairs (in orthography as well).

**Stimuli**

- Recorded by female Californian English speaker
- Original vowels extracted and resynthesized - spliced back into original C,C frames (Klatt Synthesizer in Praat)
- Only difference is in glottalization on the vowel

**I. Voicing: /t/ vs. /d/; /p/ vs. /b/**

Q: Does glottalization enhance voiceless stops?

```
<table>
<thead>
<tr>
<th>Vowel</th>
<th>/t/</th>
<th>/d/</th>
<th>/p/</th>
<th>/b/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Glottalized</td>
<td>bat</td>
<td>tap</td>
<td>bat</td>
<td>tap</td>
</tr>
<tr>
<td>Glottalized</td>
<td>bad</td>
<td>cap</td>
<td>mat</td>
<td>mop</td>
</tr>
</tbody>
</table>
```

- Voiced stops are recognized more slowly overall
- For voiceless stops – poorer recognition when presented with glottalized tokens

**II. Place of articulation: /t/ vs. /p/**

Q: Does glottalization enhance /t/?

```
<table>
<thead>
<tr>
<th>Vowel</th>
<th>/t/</th>
<th>/p/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Glottalized</td>
<td>shot</td>
<td>shop</td>
</tr>
<tr>
<td>Glottalized</td>
<td>ra</td>
<td>rap</td>
</tr>
</tbody>
</table>
```

- Overall poorer recognition of /p/ words
- Glottalized /t/ words recognized marginally faster than non-glottalized /t/
  - Glottalization does not facilitate recognition of voiceless stops or /t/ words

**Discussion**

- Glottalization does not aid in recognizing words with voiceless coda stops.
  - But, glottalization inhibits recognition of words with voiceless coda stops.
    - Nor does it aid in recognizing words with /t/ (vs. /p/).
  - Though listeners are aware that glottalization is not associated with [+voice], they do not use it to recognize /t/ or [-voice] codas faster.
  - Here and in spontaneous speech, glottalization is strongest at end of vowel:
    - Potential benefits to word recognition might be too late to be used reliably.

**Selected References**


**Acknowledgements**

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