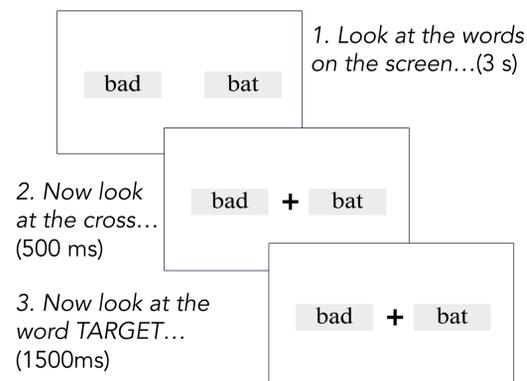


## Background

- Coda glottalization: /t/ → [ʔ̥, ʔ]/\_σ
- Two enhancement accounts for why glottalization occurs:
  1. Glottalization is used to enhance [-voice] feature of voiceless stops [1, 2].
    - Are listeners faster in recognizing glottalized voiceless stops?
  2. Glottalization is used to enhance /t/ in particular [2].
    - Are listeners faster in recognizing glottalized /t/ than /p/?
- In American English, commonly found for coda /t/, and (to a lesser extent) coda /p/ [1, 3, 4].
- Both accounts assume that glottalization should be beneficial to listeners.

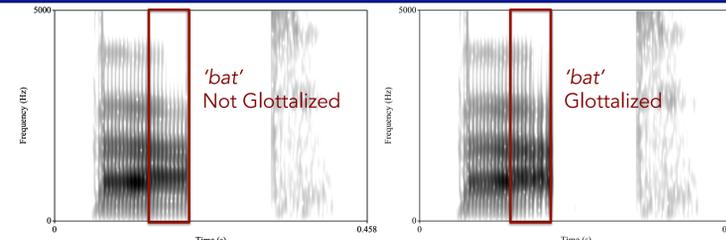
## Method

- 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

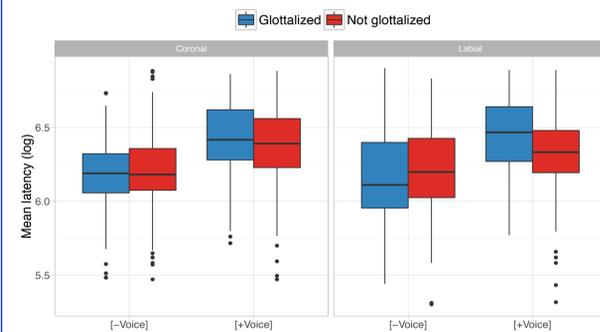
- Recorded by female Californian English speaker
- Original vowels extracted and resynthesized - spliced back into original C\_C frames (Klatt Synthesizer in Praat)
- Only difference is in glottalization on the vowel



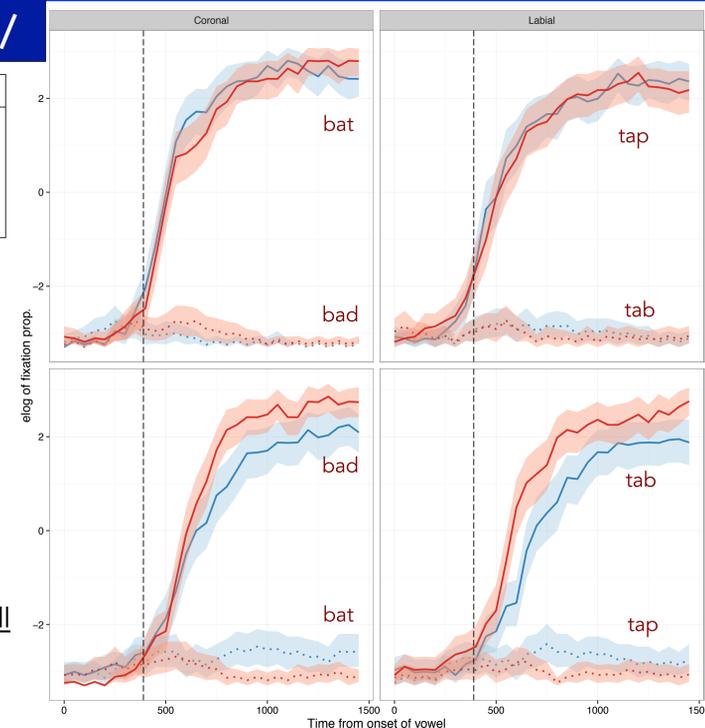
## I. Voicing: /t/ vs. /d/; /p/ vs. /b/

Q: Does glottalization enhance voiceless stops?

/t/	/d/	/p/	/b/
bat	bad	tap	tab
sat	sad	cap	cab
mat	mad	nap	nab
not	nod	mop	mob



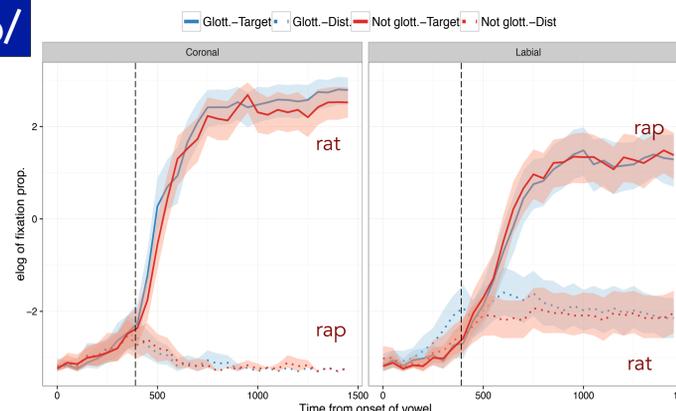
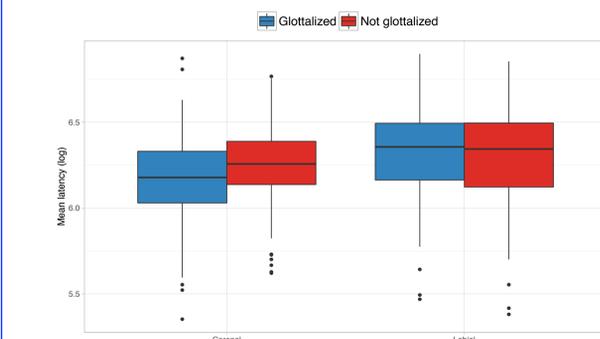
- Voiced stops are recognized more slowly overall
- For voiced stops – poorer recognition when presented with glottalized tokens



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

Q: Does glottalization enhance /t/?

/t/	/p/
shot	shop
cot	cop
rat	rap
pot	pop



- 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 voiced coda stops.
- Nor does it aid in recognizing words with coda /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.

➢ No strong evidence for enhancement accounts

## Selected References

[1] Seyfarth, S. & Garellek, M. (2015). Coda glottalization in American English. *Proc. 18th ICPHS*. / [2] Keyser, S.J. & Stevens, K.N. (2006). Enhancement and overlap in the speech chain. *Language*, 82, 33-63. / [3] Huffman, M. (2005). Segmental and prosodic effects on coda glottalization. *J.Phon.*, 33, 335-362. / [4] Pierrehumbert, J. (1994). Knowledge of variation. *Papers from the parasession on variation, 30th meeting of the Chicago Linguistic Society*. Chicago: CLS, 232-256. / [5] Beddor, P.S., McGowan, K.B., Boland, J.E., Coetzee, A.W. & Brasher, A. (2013). The timecourse of perception of coarticulation. *JASA*, 133, 2350-2366. / [6] McQueen, J.M. & Viebahn, M.C. (2007). Tracking recognition of spoken words by tracking looks to printed words. *The Quarterly Journal of Experimental Psychology*, 60, 661-671.

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