EFFECTS OF PRIOR CUE STRENGTH IN PERCEPTUAL ADAPTATION TO ACOUSTIC DIMENSION REWEIGHTING

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Abstract 4pSC58

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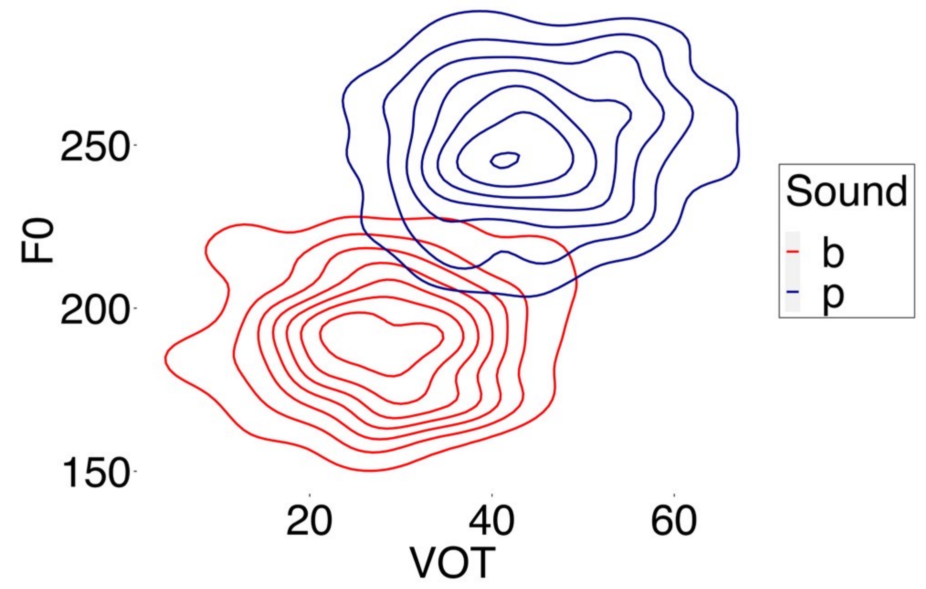
Introduction & Background

- VOT is the main cue to word-initial stop voicing in English, but F0 plays a role as a secondary cue
- In other languages (e.g. Korean), F0 is the primary cue, with VOT being secondary
- The primary cue can be downweighted if another cue is shown to be more informative in reinforcement learning (Harmon, Idemaru, & Kapatsinski, 2019)



Harmon, Z., Idemaru, K., & Kapatsinski, V. (2019). Learning mechanisms in cue reweighting. *Cognition, 189*, 76–88.

Stimuli

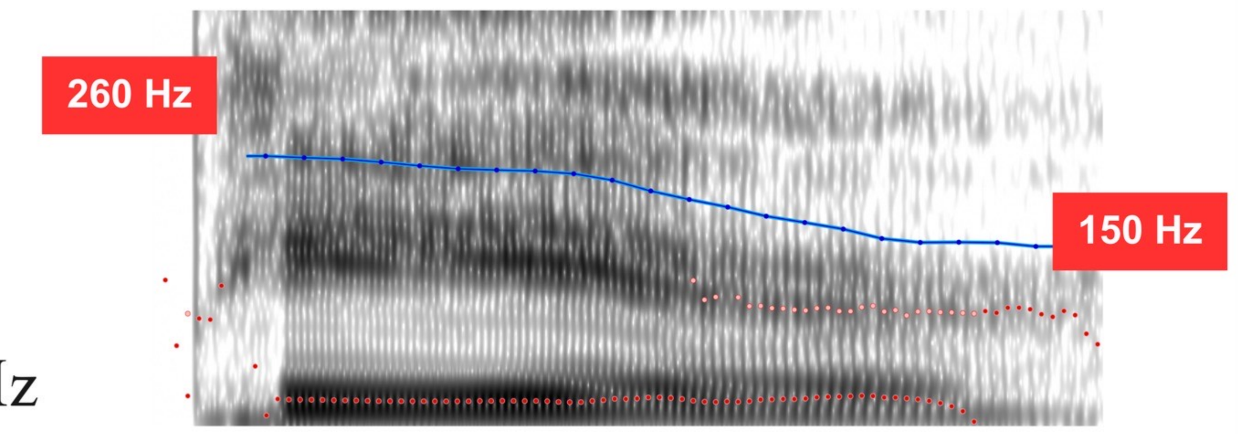
Experiment 1: 4 “words” (beer/pier, bear/pear, deer/tier, dare/tare)

- training: different VOT sets for each “word”
  - VOT: 10ms difference in close condition, 30ms far. F0: 10Hz difference close, 40Hz far
- pre- and post-testing: all combinations of VOTs and F0s

Experiment 2 (beer/pier only):

- training & testing: VOTs 20 and 50, F0s 180 and 260

Example Pitch Contour

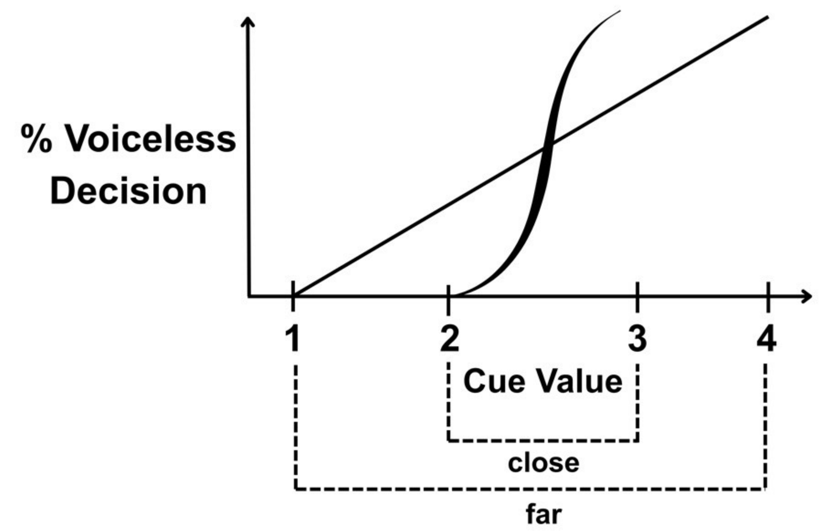


Feedback:
higher F0 is always voiceless, and VOT does not impact feedback

Aims

- test prediction that a combination of **more extreme values of non-informative cue** and **less extreme values of informative** cue will best promote dimensional reweighting
- test generalization of this learning to a different place of articulation than prior studies

F0 and VOT Values Predicted to Promote Upweighting of F0 and Downweighting of VOT



Design

Pre-testing

identify stop voicing using identification task

Training with Feedback

8 training groups:

- B/P trained or D/T trained
  - VOT close/far
  - F0 close/far

Testing

same audio files as pre-testing

F0 Discrimination

on all combinations of the group’s training files to confirm that participants can hear difference in F0s

Participants

Prolific users (US English L1).

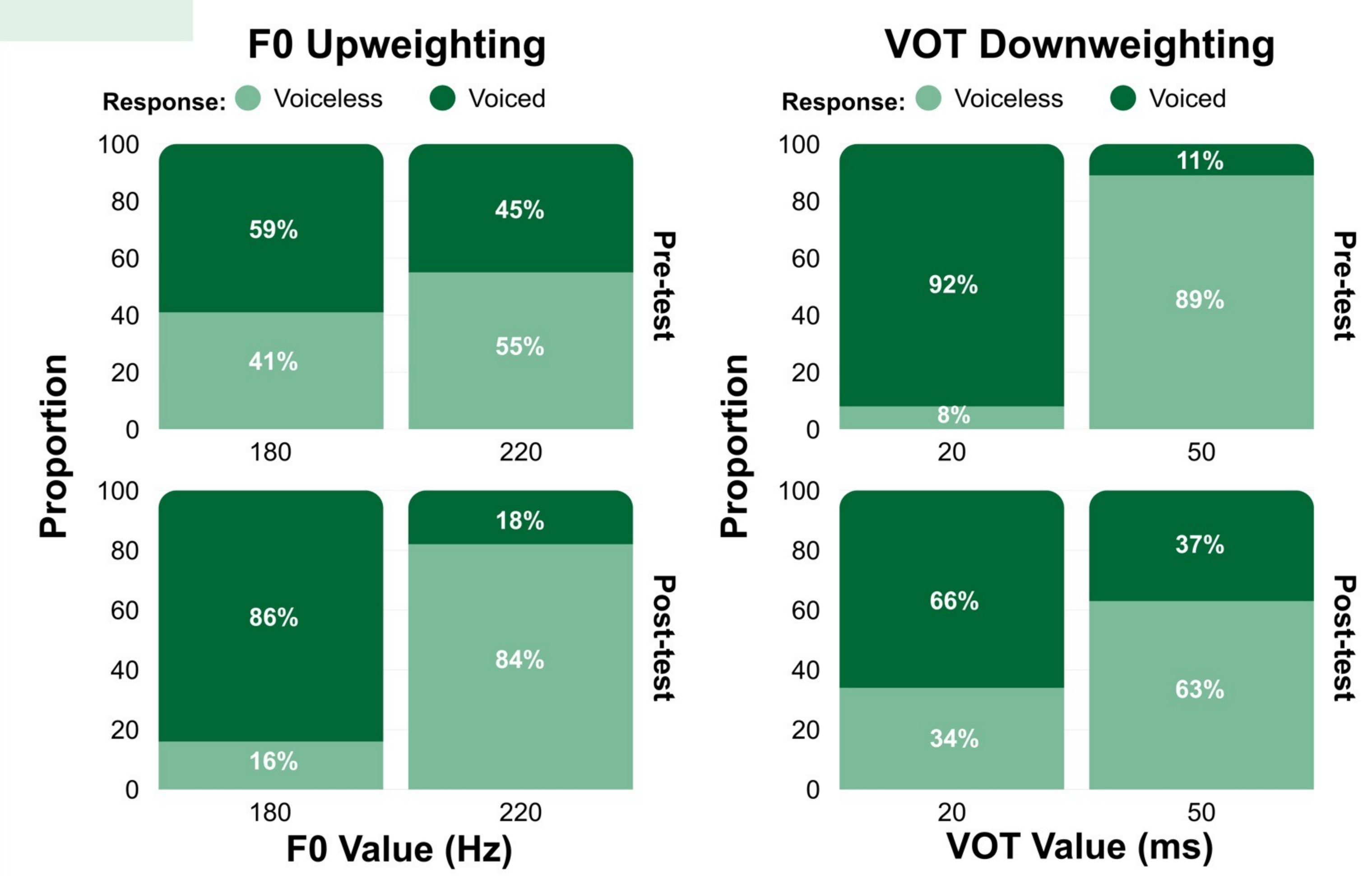
Exp 1: N=160, Exp 2, N=50

Results Exp 1:

- F0 upweighting not found in any group
- Non-significant VOT downweighting found in far VOT, far F0 group
- Ability to discriminate between F0s was very low
  - for 10Hz difference: 31% accurate, 40Hz difference: 48% accuracy, same pitch: 75% accuracy

Exp 2: F0 upweighting and VOT downweighting both found in post-test

Cue Reweighting Post-Training



Conclusions

- Reweighting is possible, but not if F0 difference is imperceptible to participants
- This inability to hear the difference in F0 values may explain the lack of support for hypothesis
- Or is this more of a memory issue?
  - ~3000 ms between stimuli

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