Cue weighting after a tone-split in Tamang (Tibeto-Burman, Nepal) A perception study of stop initial words
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Introduction

- Tamang: close to Tibetan. = 2000K speakers.
- A transphonologization: Tone split (general pattern)
  \[ \text{[vowel]} > \text{H (modal) vs. L (breathy)} \]

Method

- Who: 28 participants (14M + 14F, mean age: 49, from 33 to 79)
- Where: Kathmandu and Risiangku village of Nepal
- What: synthesized stimuli
  - carrier sentence \( Ptsu \ X-pa’ \) This is \( X \) (A) or ‘Someone X’s this’ (V.)
  - Forced choice among 4 pictures
    \( 1-pa-pa \ ‘thin’; \ 2-pa-pa ‘harsh’; \ 3-pa-pa ‘bring’; \ 4-pa-pa ‘pile up’ \)
  - NB: perfect quadruplet at a plain stop => target words have a vowel length difference (ambiguous vowel duration was used in all stimuli)
- Variables: 4 \( \times \) 2 \( \times \) 3 \( = \) 24 stimuli (already too long for some older villagers)
- Synthesized parameters

F0 onset | prevoiced | voice quality of V1 | V1 slope | V2 slope
--- | --- | --- | --- | ---
115 Hz | yes | modal (H1-H2 = 2.5dB) | rising (+10 Hz) | rising (+5 Hz)
130 Hz | yes | breathy (H1-H2 = 7dB) | falling (−20 Hz) | falling (−15 Hz)
145 Hz | no | super breathy (H1-H2 = 12dB) | yes | yes
160 Hz | no | yes | yes | yes

This study

Research question

- CI prevoicing: marginal in production of plosive CI
- breathiness: secondary/enhancing cue of low F0 (see Kuang & Liberman 2015)

Discussion

- old features/cues continue to be used in perception
- H/L emphasized in this study, because of historical perspective, but each of the 4 tones has its profile: e.g., T3 is breathier and has higher pitch than T4. (Hence, perception results are also influenced by properties other than H or L)
- In perception of high vs. low tones in Risiangku Tamang:
  - F0 (the new cue): most important, main component of the tone
  - If we consider markedness for redundant cues:
    - modal phonation signals H tone, while breathy is unmarked
    - CI prevoicing signals L tone, while CI voicelessness is unmarked
    - loss of oldest cue after phonologization is production-driven: similar pattern observed in Afrikaans (Coetzee et al. 2018) and in Dutch (Pingeot 2015): (some) speakers who devoice in production still use CI voicing in word identification

Results

- CI prevoicing, although rare in production, carries the decision for Low tone in perception (>50%) whatever the associated features (H/L pitch or Voice quality)
- RT \( \times \) if High F0 contradicts CI prevoicing
- fastest RT for lowest F0+breathy, whatever CI prevoicing
- modal voice has become associated with high tone (congruent H + Modal \( \Rightarrow \) fastest RT ; clashing L + Modal \( \Rightarrow \) 60% H responses)
- breathy voice does not prevent high tone identification in %, but slows down the RT, esp. if the pitch if not Highest

Based on glottal opening degree settings in VocalTractLab (Birkholz)