Like a Square Peg in a Round Hole: Why Contour Shape Matters for Learning New Intonation Patterns

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Introduction

- Imitation across typologically distinct dialects
  - Requires approximating phonetic details of phonological structures not in the D1 system
  - D1-D2 imitation is not limited by strong category assimilation as in D1-D1 [1] or high cognitive demand as in L1-L2 [2]
  - Reveals the type and granularity of phonetic detail that can be accessed/implemented by the production system from recently experienced speech events
- D’Imperio & German (2015) [3]:
  - Singapore English (SgE) speakers imitated early F0 peak timing of stress-initial American English (AmE) target words utterance-initially in declaratives
  - No phonetically similar pattern in SgE inventory
- Contour shape marks intonational contrasts in some varieties (Neapolitan Italian [4], German [5].)
- Y/N questions in Singapore English vs. Am. English
  - Phonetic similarity: Final rising pattern
  - Contour shape: SgE has later rise with no dip (lacks L*), no inflection (i.e., concave versus s-shape)

Issues

- Contour shape: Can the contour shape of recently experienced tokens be accessed/implemented by the production system?
- Perceptual assimilation: Compared to peak timing, does phonetic similarity of Y/N contours limit speakers’ ability to match phonetic detail of AmE targets?

Methods

- Tasks: Baseline reading (D1) + imitation of AmE speaker
- Target words: trisyllabic, initial stress, sentence-final
- Participants: 18 males, bilingual in SgE/Mandarin
- Measures: Mean F0 of 12 intervals within each target word
- Comparison 1: F0 at timestep X condition
- Comparison 2: Curvature (deg. of inflection) - 3rd coefficient of a 3rd order polynomial regression-fitted to F0 time series

Results

- F0 scaling (Comparison 1): At each timestep, speakers modified F0 towards the AmE targets (task x time interaction: est.max = 26.1, tmax = 7.83, p < 0.0001)
- Curvature (Comparison 2): Speakers produced more highly inflected contours during imitation (est. = -4.52, t = 2.35, p < 0.05), high degree of overlap with baseline
- Item-by-item accuracy of curvature depends on self-reported exposure to AmE (r² = 0.0755, p = 0.14)

Discussion

- Perceptual assimilation: Speakers imitated phonetic details of F0 scaling in different regions despite superficial phonetic similarity between D1/D2 contours
- Contour shape is not immediately accessible by the production system
  - Speakers may not perceive differences in shape due to effects of perceptual assimilation
  - Producing complex contours may require articulatory practice
- Suggests that imitated tokens are variants of a D1 category whose scaling parameters have been adjusted to provide a better phonetic match to the AmE targets
- Recruitment of native categories does not preclude the imitation of phonetic details as suggested by [1]

References


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