Do the acoustic and articulatory properties of coronal fricatives in Hul’q’umí’num’ explain their perceptual ambiguity when pronounced by L1 speakers?

Background:
- Salish fricatives: s/θ/ most differentiated by COG in L1 data
- s/θ/ most differentiated by intensity in L1 data

Methodology
- Participants: 1 L1 Speaker & 1 L2 Speaker
- Procedure: Acoustically analyzed previously-recorded Hul’q’umí’num’ sound files
- Analysis: Fricative Duration, Intensity & Center of Gravity (COG) measurements taken using Praat

Articulatory
- Participants: 1 L1 Speaker & 2 L2 Speakers
- Stimuli: Hul’q’umí’num’ word list of 17 words, with 25 target fricatives (s, θ, lh)
- Procedure: Coronal ultrasound (US) recordings taken by Tess Nolan at HLCC in Duncan, B.C.
- Analysis: tongue contours hand marked for each fricative using “ImageJ” program
  - contours were overlaid on single ultrasound image to create a visual representation of tongue grooving

Results
- L1 Fricative Tongue Contours
  - Figures 1–3:
    - show little variation in s and θ
    - θ articulations more variable in tongue shape
  - L1/L2 Comparison:
    - different articulation patterns for L2: θ
    - L2’s s shows similar patterns to L1
    - L2 US shows variability in θ and s

Acoustic Data
- Figure 4: Shows the longer duration of s in comparison to θ in L1 speech
- Figure 5: Shows high intensity of s in comparison to θ in L1 speech

Acoustic findings
- s/θ/ most differentiated by COG in L1 data
- s/θ/ most differentiated by intensity in L1 data

Discussion
- L1 results show support for perceptual ambiguity
  - θ shows significant variability in acoustic and articulatory data
  - s has distinct frequency range, where variability of θ causes frequency overlap
  - s has longer mean duration than θ, however variability in both s and θ causes overlap

L1 acoustic data shows possible influence of English first language
- s/θ/ very distinguishable by COG for L2
- frequency (a spectral property) differentiates s/θ in English

L2 acoustic data shows possible influence of English first language
- s/θ/ more variable in tongue shape
- θ has much more variable tongue grooving

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References