Overview

**Objectives:** use lingual ultrasound to examine production strategies of the fricative vowel, a vowel with an additional fricative noise source, in Suzhou Chinese

**Rationale:** Not only a less-documented and “exotic” speech sound, but also intracategorical sound change in progress, interesting inter-speaker variability

A first question: articulatory uniformity. Keating (2003) observes that some speakers exhibit similar or shared production strategies for acoustically similar goals. Are fricative vowels produced like acoustically similar fricative consonants by at least some speakers?

Materials and methods

Frame (Ling, 2009): ‘I say ___ for you to hear’

Stimuli (8 reps, rand. order) via teleprompter:

| p- | 烟 | 烟 | 凹 | 蛙 |
| p̃ | 烟 | 烟 | 凹 | 蛙 |
| p̃̃ | 烟 | 烟 | 凹 | 蛙 |
| p̃̃̃ | 烟 | 烟 | 凹 | 蛙 |

- Four native speakers of Suzhou city variety 20M, 21F, 51M, residing in Berkeley, CA
- Ultrasound (107 fps), audio (48 kHz) collected Ultrasonix SonixTablet, C9-5/10 microconvex transducer, Articulate Inst. Ltd. head-set; sync audio via AKG 535 EB mic
- Audio transcription force-aligned (Yuan & Liberman, 2008) and hand-corrected
- Ultrasound images proc. with EdgeTrak (Liet al., 2005); contours from target segment midpoints
- SSANOVA splines fit to data (Davidson, 2006)

Results I: Younger speakers

**Uniformity observed.** Single acoustic outcome (noise generation in /i̯a/ and /i̯e/) maps to single broadly /i̯a/-like strategy, distinct from canonical [i] productions
- All three young speakers produce /i̯a/ with /i̯a/-like tip-up strategy;
- All exhibit dorsum lowering and root retraction to some extent relative to /i̯a/:

Results II: Older speaker

**Uniformity not observed.** Oldest participant (age 51) exhibits distinct noise production strategies in /i̯a/ and /i̯e/:

- Effectively identical strategies for 01, “overshoot” in [i̯a] for 05, 07; optimization for articulatory ease?

Discussion

Suzhou /i̯a/ production comes in at least two variants: a /i̯a/-like tongue posture and an /i̯a/-like one

This may be generational: generational change within /i̯a/; category could be described as adoption of uniform strategies for fricative noise production over time

- Speaker 08 has a /i̯a/-strategy and a /i̯a/-strategy
- All other speakers appear to implement single /i̯a/-strategy

More speculative: do speakers like 01 propagate structural regularity? Phonological inventories have series due to efficient re-use of features (Clements, 2003); for younger speakers, /i̯a/ and /i̯e/ may be nearly the same phone, but [i̯e] voice. Over time, responsible for e.g. Feature Economy?