Articulatory, but not acoustic, target uniformity in Suzhou Chinese
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Target uniformity [2, 5]
Phonological content is biased toward similar phonetic implementation across segments
• e.g., feature bundle for [-ant] sibilant friction tends to be uniformly implemented, for same value of [-ant]
  » Spectral center of gravity (CoG) correlated, reflects front cavity length
Unclear which is constrained: articulatory targets or the articulations used to fulfill them

Suzhou Chinese 苏州话
Rich in sibilant sounds, including fricative vowels /ʐ/, /ʑ/ and apical vowels /ɿ/, /ɕ/
• Fully, modally voiced; light friction appropriate to place [7, 9]
The vowel series can be thought of as differing in value of [-ant]
• Vowels contrast for rounding, in parallel with high front vowels /ɨ, /ɨ̈/

Materials, method
Participants: 22 speakers (17 F)
Stimuli: CV monosyllables containing both fricative consonants and vowels
• Vowels occurring after fricatives and non-fricative onsets pooled in analysis (un-pooled in supplement)

Mandarin vowel series can be thought of as different in value of [-ant]

<table>
<thead>
<tr>
<th>[-ant]</th>
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</tr>
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<tbody>
<tr>
<td>Affricate</td>
<td>ts, tsʰ</td>
</tr>
<tr>
<td>Fricative</td>
<td>s, sʰ</td>
</tr>
<tr>
<td>Vowel, [-rd]</td>
<td>ɿ</td>
</tr>
<tr>
<td>Vowel, [-rd]</td>
<td>ɕ</td>
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Phonotactic restrictions:
• Apical([-ant]) vowels always follow [-ant] fricatives
• Fricative([-ant]) vowels follow [-ant] fricatives, but also and a wider variety of onsets
Known uniformity in articulation within [-ant] sets
• Mutually predictable, fricative-like tongue shapes used in each [-ant] series [3, 7]
• Constriction for [-ant] vowels is made non-uniformly by a minority of speakers

Present study
Does uniformity in lingual articulation lead to uniformity in frication acoustics (CoG)?
Goal: Assess relationships among fricative consonants’ and fricative/apical vowels’ CoG
Hypothesis: Because lingual articulatory uniformity holds, consistent additive effects of voicing, rounding should lower CoG, but correlations in CoG should hold

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Discussion
Uniform phonetic implementation in acoustics, but only to a point
• Unrounded fricative vowels’ CoGs correlate with those of appropriate fricatives; does not apply to the rounded fricative vowels
• Unexpected, since Sūzhōu Chinese speakers generally use fricative-like uniform tongue shapes within [-ant] sets [3]
Working interpretation: speakers are predisposed toward uniformity of single articulators, but this does not necessarily translate into uniformity in acoustics
• Articulatory implementation of tongue shape is constrained; produces uniform acoustics here and in [1]
• Acoustic outcome of uniform tongue shapes with added lip activity (and voicing) is not constrained
• Suggests gradual weakening of uniformity constraint as more co-occurring features are added

Next steps
• Retrying with more robust measures of fricative noise sources’ front cavity resonance, i.e. [6]
• Relate quantitatively to indices of tongue shape illustrated in [3]

Acknowledgements
Thanks to Pat Keating and Eleanor Chodroff for useful discussion; and Chen Zhang, Fumin Li, and Wang Feifan for logistical help. Data collection supported by ASA Stetson Scholarship in Phonetics and Speech Science.
Spectrogram examples

Note: fricative vowel symbols differ from rest of poster. $\text{[i]} = \text{[i]}, \text{[y]} = \text{[y]}$

References


