Research Questions:
- What is the phonetic target of utterance-initial voiced stops in English: phonation during closure or short positive VOT?
  
  This study focuses on how the tongue root is employed to reach that phonetic target, comparing phonated voiced stops, unphonated voiced stops, and voiceless stops in utterance-initial position.

Hypothesis:
- If phonated voiced stops and unphonated stops show
  - the same tongue root position: speakers have short positive VOT as the phonetic target for both phonated and unphonated stops, but phonation can occur as a by-product of achieving that goal.
  - the different tongue root position: speakers have phonation during closure as the phonetic target for phonated voiced stops.

3. Results

Each figure shows SS ANOVA plots of two different speakers.

Alveolar (Figure 3) or Velar (Figure 4) POA: Both phonated (green curves) and unphonated (blue curves) voiced stops show more advanced tongue root than voiceless stops (orange curves). Other speakers whose plots are not shown here also show a similar pattern.

There is a clear distinction between voiced stops and voiceless stops in the tongue root position for the alveolar and velar places of articulation.

Labial stops do not participate in the pattern because they do not involve the tongue at all for the stop itself (Figure 5).

Speakers show variations: 3 speakers show pattern A, whereas 3 speakers show pattern B, and 2 speakers show other patterns.

4. Discussion

- Even without acoustic phonation during closure, the tongue root is advanced for voiced stops in comparison to voiceless stops for supraglottal cavity enlargement.
- Speakers may have short positive VOT as the target for both phonated and unphonated stops in utterance-initial position.
- Other articulatory adjustments are responsible for the presence or absence of phonation during closure.
- The production of phonation can be due to hyper-articulation (Baese-Berk & Goldrick, 2009; cf. hypercorrection in German: Jessen & Ringen, 2002).

5. Future Research

- How about other languages?
  - Spanish (language with pre-voicing)
  - German (language like English)
  - Thai (3-way: voiceless unaspirated, voiceless aspirated, voiced)
  - Hindi (4-way: voiced/voiceless*aspirated unaspirated)
  - Korean (no phonological voicing: lenis, forts, aspirated)

- Prediction: If tongue root advancement is related to the shorter VOT, Korean or Thai speakers also should show the difference in tongue root position between unaspirated vs. aspirated stops. But, if speakers of these languages don’t show tongue root advancement, then English ‘tongue root advancement’ is similar to languages with pre-voicing.

References


I would like to thank Dominique Bouvier for his help in analyzing the data for this study. I also thank Lisa Davidson, Gillian Gallagher, Tara McAllister, and the members of the NYU PEP Lab for their helpful comments.