In American English, phonologically [+voice] stops are often unphonated in utterance-initial position (Lisker & Abramson 1964, Keating 1984, Davidson 2016)

One adjustment for initiating or maintaining phonation during the closure: enlarging the supraglottal cavity via tongue root advancement (Westbury 1983)

Westbury (1983): the tongue root is advanced in voiced stops in utterance-initial positions, but he did not distinguish between phonated and unphonated voiced stops

Ahn (2015): In American English, in utterance-initial position, speakers enlarge the vocal cavity via tongue root advancement whether or not the stop is phonated when compared to voiceless stops before the vowel /a/

Vowel

Voiced

Voiced

Results (note: (& voice] stops are often unphonated in utterance-initial position (Lisker & Abramson 1964, Keating 1984, Davidson 2016)

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The current ultrasound study extends beyond stops and back vowels:

(a) utterance-initial fricatives/affricates

Fricatives are not conducive to phonation either, because oral constriction pressure must be higher than glottal pressure (Othala 1994)

Cavity enlargement for voiced fricatives in medial position is reported (Narayanan et al. 1995, Proctor et al. 2009)

But, phonation in fricatives could also be enhanced by weakening of frication, which would not necessarily require tongue root advancement

(b) effect of height/frontness of the following vowel

/l/ & /l/: Is there still a little bit of room to advance or is the tongue already too far forward for front vowels?

3. Results

Vowel Spkr Bilingual POA Results: stops Results: fricatives/affricates
S1 (F) Spanish labial no phonation /b/ = /b/ both (phonated/unphonated) /v/ = /v/
S2 (M) Hebrew labial no phonation /b/ = /b/ both (phonated/unphonated) /v/ = /v/
S3 (F) no alveolar no phonation /ls/ = /ls/ both (phonated/unphonated) /z/ = /z/
S4 (M) Arabic velar/labial no phonation /d/ = /d/ both (phonated/unphonated) /t/ = /t/
S5 (F) Marathi velar/ alveolar no phonation /g/ = /g/ no phonation /k/ = /k/
S6 (F) Mandarin labial no phonation /b/ = /b/ no phonation /p/ = /p/
S7 (F) Spanish labial no phonation /b/ = /b/ both (phonated/unphonated) /t/ = /t/
S8 (F) Tamil alveolar no phonation /d/ = /d/ both (phonated/unphonated) /t/ = /t/
S9 (M) no velar/ alveolar no phonation /b/ = /b/ all phonated /t/ = /t/
S10 (F) Spanish velar/ labial no phonation /g/ = /g/ all phonated /k/ = /k/
S11 (F) no velar/ labial no phonation /g/ = /g/ no phonation /k/ = /k/

4. Discussion

- Stops/Affricates: Both phonated and unphonated voiced stops/affricates had more tongue root advancement than voiceless ones (see also Ahn 2015), with 2 cases of more advancement for phonated stops

- Fricatives: Both no tongue root difference between voiced and voiceless fricatives, and greater advancement for voice fricatives regardless of phonation were shown.

- Tongue root advancement may be less prevalent for fricatives because weakening of the frication can be used instead to facilitate the conditions for phonation.

- Effect of the following vowels: A prediction that tongue root advancement before /l/ might be limited by positioning requirements of the front vowel was weakly supported, esp. for fricatives.

- For stops, coarticulation may not limit the amount of advancement when it’s necessary

The potential effects of bilingual speakers: Articulatory specifications for other languages may interact with or counteract English settings.

Selected References