Coarticulation Dampening Properties of the Glottal Stop

Tredayne Bengil Cabanlit
Department of Linguistics, College of Liberal Arts and Sciences, University of Illinois at Urbana-Champaign

INTRODUCTION

Coarticulation
- Different phonemes require different movements of speech articulators.
- The transition of the articulators from one phoneme to the next is imperfect which changes the acoustics of adjacent phonemes.

The Glottal Stop #ʔ
- It is found in the middle of the word “uh-oh.”
- It requires a complete closure of the vocal folds followed by a sudden opening (Laver and John, 1994).
- The articulators above the larynx are not used (Ealing et al., 2005; Stemberger, 1993).

Coarticulation Dampening
- There is minimal resistance above the larynx, which can facilitate transitional movements.
- Glottals don’t block adjacent phonemes from affecting each other and are therefore “transparent” (Stemberger, 1993).

The Malayo-Polynesian language Cebuano will be used to examine the coarticulation properties of the glottal stop to see if the glottal stop can prevent a preceding /g/ from influencing the subsequent vowel.

METHOD

Participant
- 1 female native Cebuano speaker

Data
- 30 words were elicited for each of the utterance context #ʔV, gV, and gʔV for each vowel /a, i, u/.
- The formants F1 and F2 were extracted from each vowel in onset and mid positions.
- The onset measure was taken 20% of the way through the vowels’ relative durations.
- The midpoint measure was taken 50% of the way through the vowels’ relative durations.

HYPOTHESIS

- The glottal stop will be able to reduce coarticulation between phonemes with similar constrictions.
- F1 of /i/ and /u/ in the gʔV utterance context will be more similar to #ʔV than gV.
- F2 of /a/ and /i/ in the gʔV utterance context will be more similar to #ʔV than gV.

RESULTS

- **F1**
  - /a/:
    - Onset: gʔV is not significantly different from gV
    - Mid: gʔV is closer to #ʔV
  - /i/:
    - Onset: gʔV is closer to #ʔV but gʔV is not significantly different with either #ʔV or gV
    - Mid: gʔV is closer to #ʔV but #ʔV and gV are not significantly different
  - /u/:
    - Onset: gʔV is closer to #ʔV but #ʔV and gV are not significantly different
    - Mid: gʔV is closer to #ʔV but #ʔV and gV are not significantly different

- **F2**
  - /a/:
    - Onset: gʔV is not significantly different from #ʔV
    - Mid: gʔV is not significantly different from #ʔV
  - /i/:
    - Onset: gʔV is closer to #ʔV
    - Mid: gʔV is closer to #ʔV
  - /u/:
    - Onset: gʔV is closer to #ʔV
    - Mid: gʔV is closer to #ʔV

CONCLUSIONS

- The findings support the idea that the glottal stop plays a role in coarticulation.
- The glottal stop absorbs and dampens coarticulation effects from the preceding phoneme.
- The F1 of /i/ and /u/ had non-significant differences between the contexts which shows difference in tongue height was minimal in the first place.
- The F1 of /a/ was not prevented from having coarticulation effects from /g/ in the onset position but was prevented in the mid position likely due to the difference in tongue position between /g/ and /a/.
- The coarticulation effects for F2 in the onset and mid positions for all vowels were dampened by the glottal stop.

ACKNOWLEDGEMENTS

Thank you to Dr. Marissa Bartaz and Dr. José Ignacio Hualde for their mentorship.

REFERENCES