

Spot the Difference: A comparison of the ejective~plain and uvular~velar stop contrast in L1 and L2 speakers of Hul'q'umi'num'

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Introduction

- Hul'q'umi'num' is one of the 23 languages that make up the Salish language family
- It is one of three different dialects and is spoken on Vancouver island (Dunlop, Gessner, Herbert & Parker, 2018)
- In this study, the ejective~plain contrast is analyzed as well as the uvular~velar contrast between a new learner and fluent speaker
- Documenting the difference between the learners is beneficial for the community in terms of pedagogical tools in hopes to assist current and future learners

Research Question

What are the differences in acoustic correlates across varying proficiencies of Hul'q'umi'num speakers between the plain stops /kw qw/ and ejectives /kw' qw'/?

Methodology

Recordings were taken from two Hul'q'umi'num speakers, with varying levels of proficiency

- L2 second language learner
- Fluent L1 speaker
- 16 words were recorded, 8 for each research team member, using the GE logiq E ultrasound machine.
- 8 words with the following stops in word initial position:

2 /k^w/ 2 /k^w'/
2 /q^w/ 2 /q^w'/

PROCEDURE

Recordings were analyzed in the speech analysis software PRAAT

- VOT
- F0 perturbation
- Burst intensity
- Two spectral measures
- ImageJ was used to compare the uvular/velar contrast in ultrasound images
- These results were compared to observe the contrast differences between speakers

Results

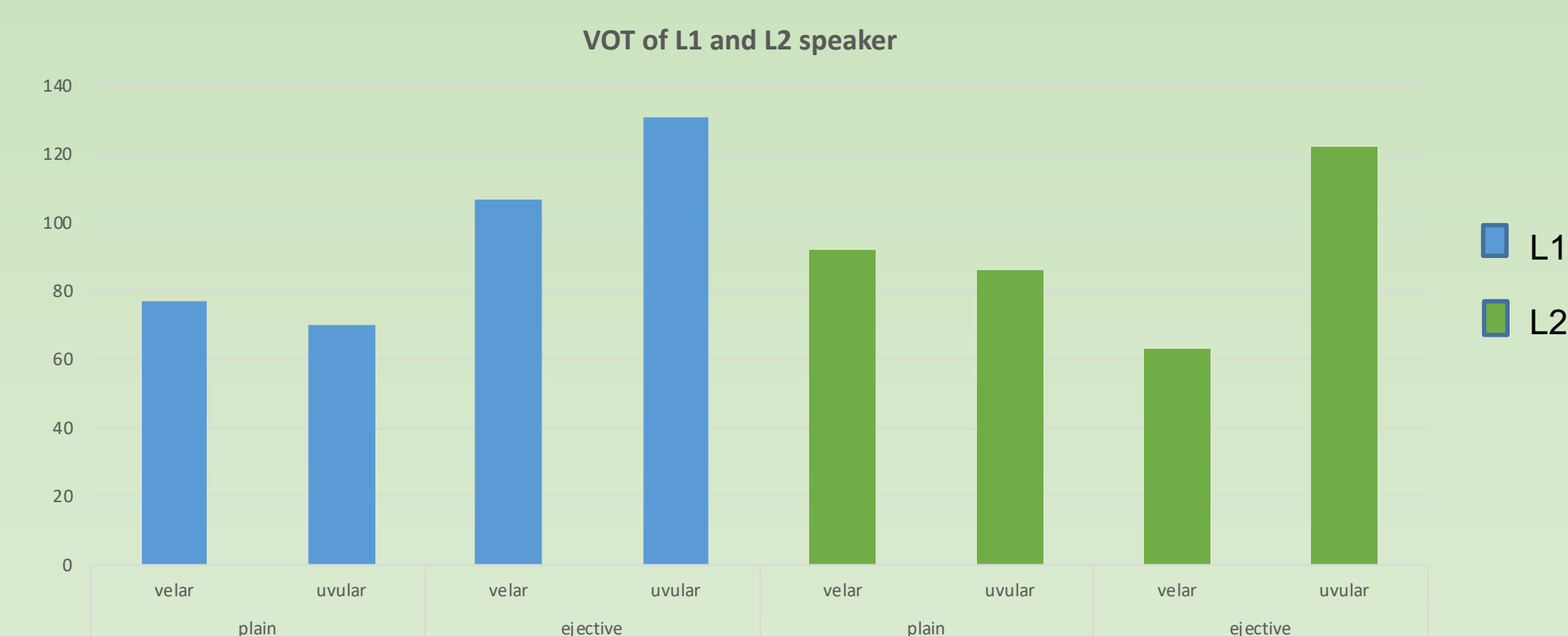


FIGURE 1: Voice onset time (VOT) of the ejective~plain and velar~uvular contrast between the L1 and L2 speakers.

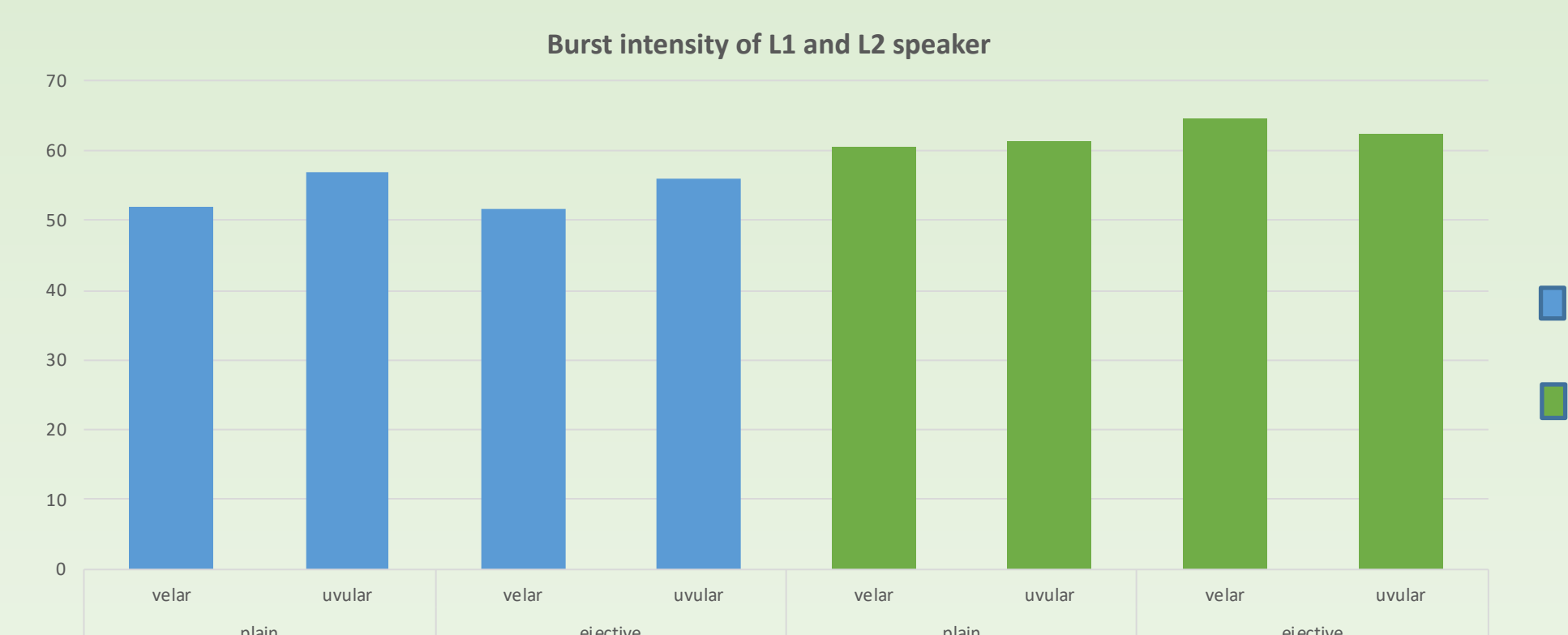


FIGURE 2: Burst intensity of the ejective~plain and velar~uvular contrast between the L1 and L2 speakers

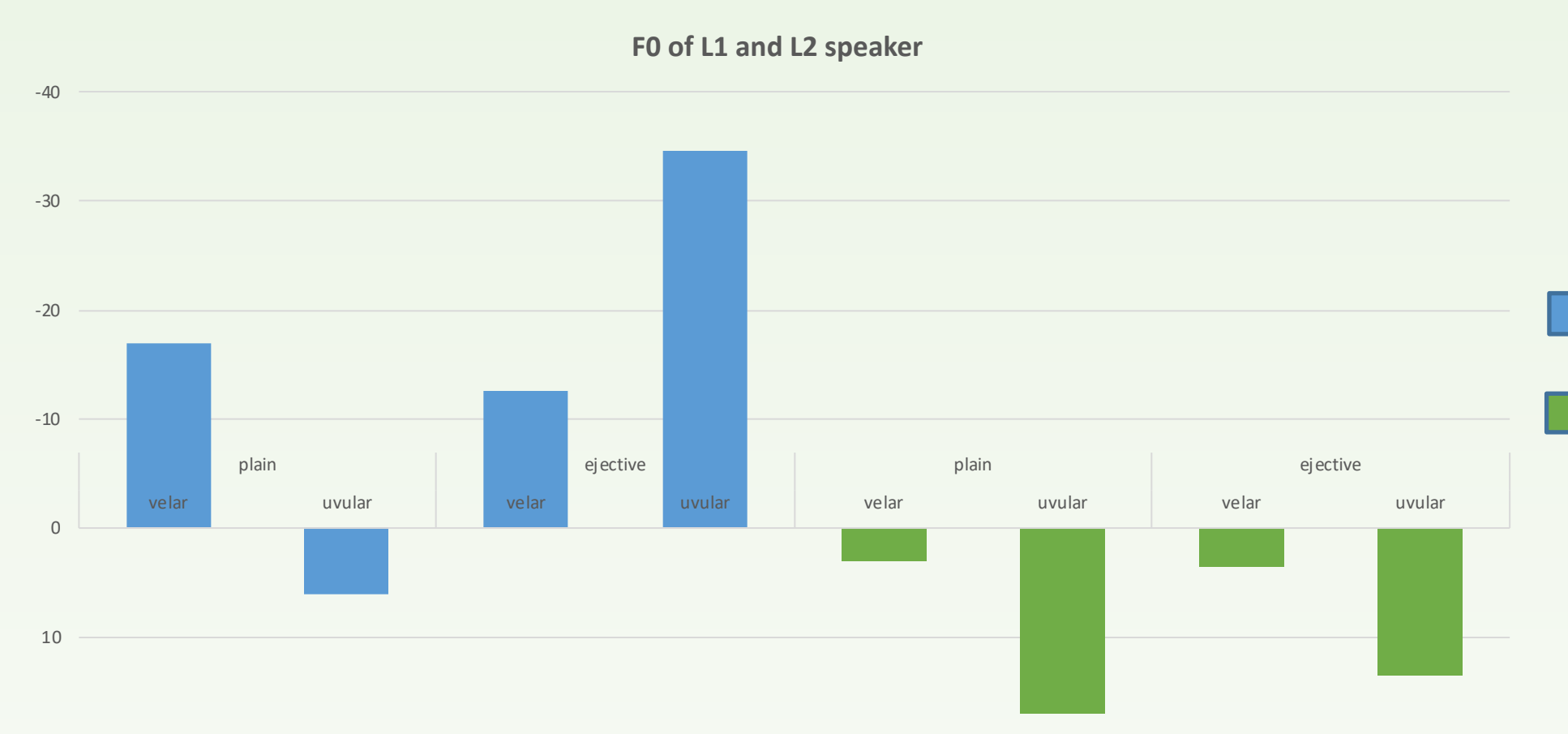


FIGURE 3: F0 perturbation of the ejective~plain and velar~uvular contrast between the L1 and L2 speakers

- Center of gravity measured for uvular~velar contrast: mean energy concentration of fricatives
- Standard Deviation: Deviation of spectral values from the center of gravity

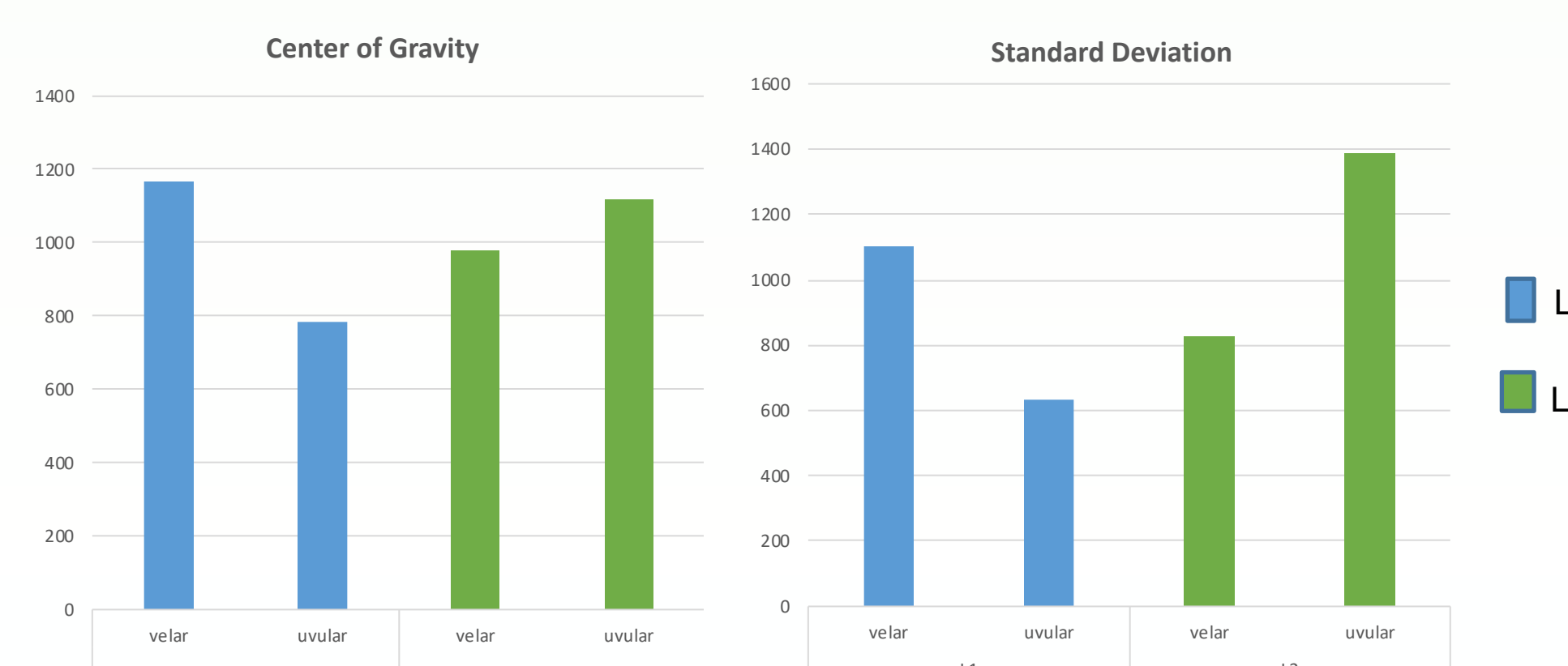


FIGURE 5: Center of gravity and standard deviation of the velar~uvular contrast between the L1 and L2 speakers.

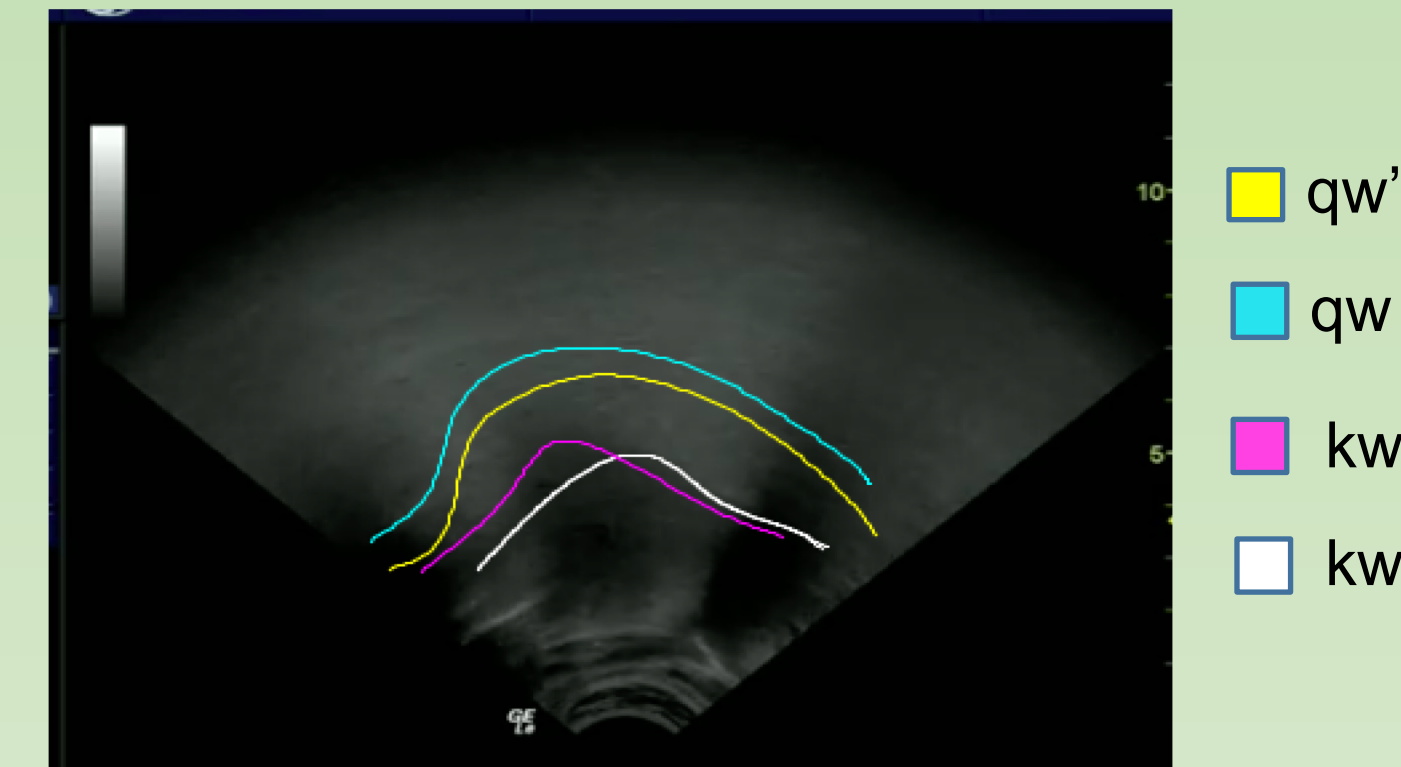


FIGURE 6: Ultrasound image of uvular~velar and ejective~plain contrast in word medial position of L1 speaker.

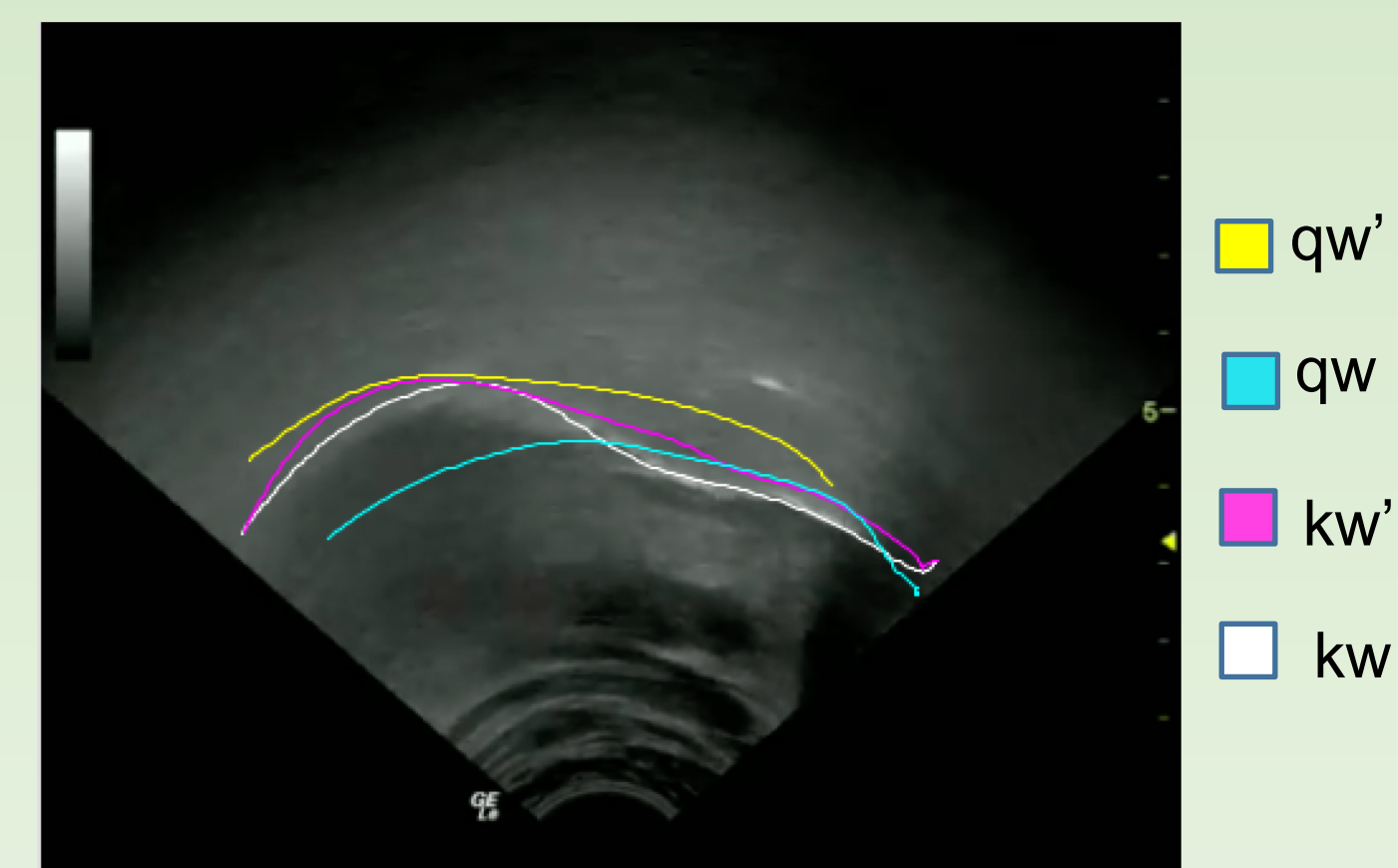


FIGURE 7: Ultrasound image of uvular~velar and ejective~plain contrast in word initial position of L2 speaker.

Discussion

VOT

- L1 speaker: longer VOT for ejectives indicating a distinction in the ejective~plain contrast
- L2 speaker: difficulty with the ejective~plain contrast specifically with the velar stop

Burst Intensity

- L2 speaker: slightly higher burst intensity overall however no consistent differences between contrasts
- This suggests that burst intensity may not be a reliable correlate for determining differences between either contrast

F0

- L1 speaker: lower F0 perturbation in following vowel specifically in ejectives indicating a contrast in ejective and plain stops
- L2 speaker: no noticeable differences between plain and ejectives, suggesting they are not making this distinction

Center of Gravity and Standard Deviation

- L2 speaker: high center of gravity for uvulars indicating difficulty in the velar~uvular contrast

Ultrasound Imaging

- Ultrasound images correlate with the findings in our data as they show that the L2 speaker is not making noticeable differences when articulating these sounds

Conclusion

- Overall, the results show that there are differences in the ejective~plain and uvular~velar contrast between L1 and L2 speakers
- This indicates that the L2 speaker may have difficulty with these contrasts
- The results from this study may contribute to developing Hul'q'umi'num teaching resources for improving the ejective~plain and uvular~velar contrast in L2 speakers in order to maintain proper distinctions in Hul'q'umi'num

Limitations

- Limited number of speakers and tokens
- Only accounted for sounds in one position in the word
- Ultrasound images of L1 speaker were taken from a different speaker as tongue contour in original L1 speaker was not distinguishable
- Distance between research team members
- Time constraints

Future Research

- Future research can include these sounds in word medial and word final position to observe if these differences occur elsewhere
- Analyzing these words within a phrase as opposed to in isolation may give further insight into how these sounds contrast in the language

Acknowledgements

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References

Dunlop, B., Gessner, S., Herbert, T., & Parker, A. (2018). Report on the status of B.C. First Nations Languages. Retrieved from [http://www.fpcc.ca/files/PDF/FPCC-
LanguageReport-180716-WEB.pdf](http://www.fpcc.ca/files/PDF/FPCC-LanguageReport-180716-WEB.pdf)