

Investigating Voices with Ultrasound Tongue Imaging

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With acoustic measurement being very much the norm in phonetic studies, one may wonder what may be gained from the inclusion of articulatory data, which is generally more time-consuming, invasive and difficult to interpret. However, studies have highlighted the deficiencies of a purely acoustic approach, particularly with regards to the articulatory correlates of formant frequencies. It is clear that it is not as simple as F1 = tongue height and F2 = frontness, as the whole articulatory space is involved, including the contribution of the lips and tongue root and not just the anterior lingual location (Scobbie et al., 2012). In Harrington et al. (2011) for example, articulatory data revealed that GOOSE fronting could be a result of tongue-body fronting, lip unrounding or a combination of both in Standard Southern British English.

It seems clear then that to conduct a study on the location of the tongue, you need explicit articulatory data of the tongue. Ultrasound tongue imaging (UTI) is a powerful technique providing fine-grained articulatory information of the tongue. It is non-invasive, user-friendly, portable and above all, capable of imaging nearly the whole tongue in real time. It has been used to investigate a wide range of phonetic, phonological and sociolinguistic questions both in and outside of the laboratory (Davidson, 2012), ranging from studies on first language acquisition (Noiray et al., 2013) to the documentation of endangered languages.

As with all articulatory techniques, UTI does have certain limitations, notably regarding what we can and can't see and how we quantify the data. In this workshop, I plan to highlight these drawbacks and demonstrate the types of research questions that may be answered using UTI. After a short theoretical introduction, I will give a live demonstration of our ultrasound machine, including data collection and analysis.

References

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