

# Ultrasound tongue imaging as a visual feedback in L2 pronunciation training

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The aim for many L2 learners is to sound as native-like as possible and many equate this with segmental accuracy. Such productions can be difficult to achieve, mainly because in L2 learning, production relies on perception which is not always accurate (e.g. Flege, 1995). Lingual articulation is particularly challenging in L2 learning since it is mostly not visible during speech and because it is rather difficult to explain and to understand descriptions of tongue position, shape or movement. Ultrasound (US) has been successfully used as a visual feedback tool for lingual articulation in speech therapy. Several studies reported significant improvements in articulation, reduced time needed for therapy, long-term effects and transfer to non-treated sounds, both for children and adults (i.a. Bernhardt et al., 2005). Application to L2 learning has been rather limited, with Gick et al. (2008) reporting on an improvement of English liquids in three Japanese learners after only one 30 minute US session. The main aim of the research presented here is twofold: (1) to evaluate the effect of using US tongue imaging as a visual feedback in L2 pronunciation training by comparing it to a “traditional” classroom training; (2) to explore the effect of different speech material (vowels in isolation, vs. real words). Seven advanced Japanese learners of French, students of a course on “French phonetics for L2 learners”, took part in this study. In addition to following the course curriculum, four of them received three 45 minute US training lessons, focused on improving the contrast between French high front vowel /y/ and high back vowel /u/. These vowels are often realized as a phone close to high non-front Japanese [ɯ] (Kamiyama & Vaissière, 2009) by Japanese learners. All speakers were recorded at the beginning of the course (T1), before the US lessons, and six weeks later (T2), during which four learners had US lessons. Same four learners were recorded again two months later (T3) to evaluate long-term effects. One native French speaker was also recorded. All participants produced 10 repetitions of vowels in isolation and words with articulatory and acoustic data being recorded simultaneously. Tongue contours were analyzed in terms of describing their shape/position and by comparing their highest point (as an indication of a place of constriction). Additionally, vowels produced in isolation have been perceptually evaluated by French native speakers. The results show that ultrasound lessons had a beneficial effect on the pronunciation of the two French vowels and on acquiring their contrast. Three out of four speakers showed improvements at T2 and T3, while the control speakers did not show comparable results. Greater change and contrast were observed for vowels in isolation than for those in words.

## References

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