A Visual Feedback Tool for German Vowel Production

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A prototype visual feedback tool is proposed to help L2 German learners improve their production of German vowels. For non native German speakers, correct vowel production can be difficult due to a relatively large inventory of vowels which are similar in their acoustic qualities and/or duration. For L2 learners whose native language does not distinguish between these similar vowels, they may be lumped together and all perceived as the nearest vowel category in the learners L1 (Flege, 1995). This perception deficit can carry over to production, where some L2 speakers are not able to adequately produce German vowel minimal pairs (Hirschfeld, 1994). In order to encourage better perception and production of these vowel, the tool being proposed adds a visual feedback modality to listening and repetition exercises.

The tool, which is implemented as a script for the software program Praat (Boersma and Weenink, 2014), aims to measure and represent vowel F1 and F2 values and duration within a graphical interface. The interface provides several buttons which can be clicked to play back examples of acoustically similar vowels produced by various native German speakers, for example, the pair /iː/ and /ɪ/, or the triple /iː/ /ɪ/ /eː/. Upon playback, a point is plotted in an 2-D acoustic space representing the F1 and F2 formants, and a colored bar is drawn representing vowel duration. The users can then record their own productions of the vowels, which are analyzed and plotted with dots and bars of a different color. The vowel plotting procedure can be repeated as many times as the users like, which allows them to see if changes in their vowel productions are getting closer or farther from the model German vowels.

The concept underlying the tool is that a simple visual representation of acoustic and temporal properties of a vowel may be helpful in guiding L2 learners towards better vowel production, especially for vowel pairs which are acoustically similar. By having a visual reference of *distance* from their target, L2 learners may find it easier to adjust their tongue position and vowel lengthening/shortening to arrive at a more native like production.

During the development of this prototype tool, some of the methods used to measure and display the vowels need to be tested further. Therefore, discussion will be given to identifying drawbacks with the system and potential improvements for the future. Included in this discussion are alternatives for vowel detection, different paradigms of visual representation, incorporating F3 formant information, and more specific vowel targets based on age and gender. The use of Praat as the platform to develop the system is also a product prototyping process. Future versions of the system will be coded as a stand alone program which allow for greater flexibility and expandability of visual feedback features.

References

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