

The dark side of the tongue: the feasibility of ultrasound imaging in the acquisition of English dark /l/ in French learners

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Most varieties of English have traditionally been known to distinguish two allophones for the phoneme /l/: a clear variant [l] in onset position, and a dark one [ɫ], found in syllable coda. French, on the other hand, has just one allophone of the equivalent phoneme, which is largely similar to the clear variant in English. Experimental research has shed new light on the production of the English allophonic contrast. Notably, the tongue dorsum is said to retract and the tongue body to lower during the production of the dark allophone (Sproat & Fujimura, 1993). This finding conflicts with traditional generative representations of [ɫ] with the feature [+back] and with Ladefoged's analysis as velarisation (Ladefoged, 1982). As French does not have such a pronunciation and as the majority of learners in France do not undergo explicit pronunciation training prior to university, we hypothesised that French learners of English do not pronounce the dark variant in the same way as native English speakers. As the allophones of /l/ in English do not, by definition, constitute a phonemic opposition, the use of one of these allophones in all contexts would not necessarily hinder comprehension. However, if learners wish to conform to English pronunciation norms, i.e. Received Pronunciation, which is generally the variety taught in France, learning how to distinguish these two allophones is encouraged (Cruttenden, 2008). The overall aim of this study was to establish whether or not ultrasound imaging is a feasible method in a pronunciation training environment to improve French learners' acquisition of the allophones of /l/.

In order to assess this hypothesis, the tongues of 10 French learners of English and 10 native English speakers were imaged using ultrasound during the production of /l/ in various contexts (word initially and word finally, preceding and following the vowels /i/ and /u/). In order to draw comparisons between the articulations of /l/ in the two languages, French participants pronounced words in English and in French with /l/ in the same context (for example, ENG "peel" [pi:l] and FR "pile" [pil]).

Ultrasound data illustrated that most of our French participants do indeed distinguish the two /l/ allophones of English in their production in one way or another. It is worth noting that even amongst native Anglophone speakers, the articulation of the dark variant of /l/ varied greatly from one individual to another. This variation is almost certainly a reflection of physiological differences, as well as differences in individual pronunciation habits, and the fact that we did not control head and probe movement during experimentation, unlike other researchers have done previously (Scobbie et al., 2008; Stone, 2005). Using Edgetrak, ultrasound images were converted into a set of 30 coordinates for statistical analysis. Our data illustrated a significant difference between the average highest point of the tongue in native speakers and in French learners of English, the Anglophone tongue being in a more posterior position than the French. There was a significant difference between the light and the dark variant in both native Anglophone speakers and in learners. However, there was no significant difference between the average highest point of the dark variant for the learners and the clear for the Anglophones. We concluded that if we are able to observe differences between the tongue positions of English native speakers and those of learners during the pronunciation of [ɫ] through ultrasound visualisation, ultrasound could be a viable and effective method of direct visual feedback for learners. Other ultrasound studies have drawn similar conclusions (Gick et al., 2008; Tateishi & Winters, 2013; Tsui, 2012; Wilson, 2014).

Our next move will be to test whether the observed articulatory difference produced by French learners conveys a reliable and native-like perceptual difference. If this is not the case, then articulatory trainings with visual feedback involving ultrasound tongue imaging will be performed.

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