

# Language identification based on articulatory setting: EPG study of Polish learners of English

Grzegorz Krynicki

Adam Mickiewicz University, Poznań

krynicky@amu.edu.pl

Before making an utterance, speech organs adopt a language-specific preparatory posture that reflects the language's articulatory setting (Gick et al. 2004). The posture during speech-ready intervals produced by Polish natives with near-native pronunciation of English has been shown to adjust to the language they are about to speak (Święciński 2012). When preparing to speak in English, their tongue assumes the position that is by approx. 2mm more front and 2mm higher compared to Polish.

The aim of this study was to test this observation by means of electropalatography (EPG) and to explore the possibility of using articulatory setting for automatic language identification. The language data included Polish and English speech recorded from two advanced Polish learners of English. The material consisted of speech elicited by means of questions and image prompts. The former were 25 general knowledge questions and 4 questions prompting narratives, each synthesised in Polish and English and presented in random order. The images illustrated 21 common nouns and were preceded by a header indicating the language expected in the response. The order of the images was also randomized. The articulatory data were obtained for absolute rest intervals, speech-ready intervals and inter-speech pauses. From the raw articulatory data, 10 dimensionality reduction indices (Hardcastle et al. 1991) were derived. For statistical analysis, linear discriminant analysis was used. As the classification variable, the expected language of the utterance was used. As the independent variables, the values of the indices for that utterance were adopted. 90% of each subject's articulatory data were used for training, and the remaining 10% was used as a test set in a cross validation setup. The final result was the mean of these partial classification results.

The presented results of the classification support the claim about the existence of articulatory settings and their learnability by advanced EFL learners. The classification rates are discussed in relationship to different elicitation methods on the one hand, and different types of intervals during which the articulatory setting was probed on the other. Possible consequences of this finding that may support multilingualism are outlined.