

Establishing typicality: a closer look at F3

Vincent Hughes

Department of Language and Linguistics, University of York

vh503@york.ac.uk

Research into the forensic performance of individual formants has offered considerable evidence to support the traditional acoustic-phonetic view that whilst F1 and F2 encode broad phonetic contrast, higher formants may offer greater speaker-discriminatory potential (Peterson 1959, Ladefoged 2006, Clermont and Mokhtari 1998, Rose 2002). However, the comparative performance of formants has largely been assessed using posterior assessments of speaker-specificity (McDougall 2004, 2006; Clermont et al 2008). Using quadratic polynomial fittings of F1 to F3 from spontaneous tokens of /ai/ extracted from all 100 speakers in the DyVis database (Nolan et al 2009), this paper discusses issues relating to $p(H|E)$ -based voice comparison analysis (particularly the use of discriminant analysis, DA).

Further DA performance is compared with an analysis based on likelihood ratios (LRs). LRs based on F3 are found to only marginally outperform F1 and F2 with regard to the magnitude of same-speaker and different-speaker strength of evidence, as well system performance metrics (EER and C_{lr}). The poorer than expected F3 LRs are assessed with regard to the distributions of values within- and between-speakers for the best performing F3 coefficient: the constant. The data go some way to establishing F3 population statistics which may potentially be applied to voice comparison casework.

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