The analysis of full pauses from different points of view has been proved to be significant in forensic voice comparison cases. For example, Künzel (1997) says that “Individuals tend to be quite consistent in using ‘their’ respective personal variant of the hesitation sound, in particular with respect to the optional addition of a bilabial nasal consonant and the colour of the vocalic component”. Also, Foulkes, Carrol & Hughes (2004) show how full pauses are equal or less variable than lexical vowels in terms of their formant values (and specially less variation in F3), and also that they show significant differences depending on sociolinguistic variables. And in Cicres & Turell (2005) and Cicres (2007) 19 acoustic parameters related to voice quality (González et al., 2002) of full pauses were investigated. Results showed that there were significant differences in fundamental frequency, shimmer, jitter, noise and aperiodicity parameters (in order of significance).

This paper presents preliminary results of a forensic phonetics identification study which aims at discriminate speakers in the forensic phonetics field. Discriminant analysis is used in order to classify full pauses using formant values and voice-quality acoustic parameters. 150 hesitation sounds were analysed from 15 speakers (of which 5 were real casework recordings). Due to the small size of the corpus and its non-significancy in terms of population distribution, data is not valid to be used with the likelihood-ratio framework.

Voice-quality parameters used in the analysis are those provided by the Voice report option in Praat (Boersma & Weenink, 2011): F0 (mean, median, standard deviation, minimum and maximum), percentage of unvoiced periods, jitter (local, rap, ppq, ddp), shimmer (local, dB, apq3, apq5, apq11, dda), and noise to harmonics ratio. Only 60 percent of the full pause is taken into account for the analysis. For a description of these variables, see Praat manual or González et al. (2002).

In occasions, a same speaker uses different kinds of hesitation sounds (with nasal component or without it, or sometimes lengthening final-word vowels). However, for this paper, only isolated vocalic hesitation sounds were considered for acoustical analysis.
Results show how classification is improved when voice-quality parameters are included in the analysis. Correct classifications reach 80% when all variables are included in the analysis, and 90% when men and women are analysed separately. Finally, because of the precision of the voice-quality measurements, they should not be taken into account when the recordings to be analyzed are of very different quality, or when they include high background noise levels. However, this methodology has been tested in some good-quality – known and unknown – real casework recordings, and results are still reliable.

References


