ACOUSTIC-PHONETIC ANALYSIS OF SPEECH PRODUCED UNDER NOISE AND VARIOUS AUDITORY FEEDBACK

M Grenie and A-S Del Negro

Institut de Phonétique, Aix en Provence, France

The aim of this study was to analyze some of the major acoustic-phonetic changes that occur in French when speech is produced under high levels of white noise. Acoustical analyses were made on a nineteen word vocabulary spoken by two male and one female speakers in an anechoic chamber with 75, 85 and 95 dBa of white noise played at the level of the ears and with three levels of auditory feedback (loud, normal and high). Results concerning prosodic parameters are replications of results found in previous studies on English: high noise level induce changes in vocal pitch, amplitude and duration. In the frequency domain, some significant differences have been found in formant amplitude and frequencies. Shifts in relative energy of formants 2, 3 & 4 are observed on vowels for the three speakers with high noise. The experiments also show that we have to take into account the level of auditory feedback to explain acoustic changes. With a high level of auditory feedback it is possible, even in case of high noise, to reduce the Lombard effect and to produce speech that is not different from normal speech. These results are mainly discussed in terms of the specification of the acoustic changes that appear on words and phonemes when speech is produced under several levels of noise and auditory feedback; some proposals are made also to improve the performance of speech recognizers.