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The Pisan vowel system of read and spontaneous speech

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The availability of larger and more realistic samples of data allows the investigators to focus on connected speech processes. In the AVIP (*Archivio delle Varietà di Italiano Parlato*) corpus there are two kinds of speech data: quasi-spontaneous dialogues (map tasks collected in three different Italian towns - Pisa, Napoli and Bari) and words lists (nonsense words and meaningful words, the last ones including also the place-names uttered during the map task). The same subjects who were involved in the map task sessions also read the word lists. Such an experimental design permits the researchers to investigate the dynamics of vowel systems under speech style changes.

The paper analyses utterances of the Italian vowels both in quasi-spontaneous- and read speech; the data came from the speech of two young subjects from Pisa, recorded in the AVIP project. Works with a similar experimental design are now available for Castilian Spanish (Poch-Olivé & Harmegnies 1992, Harmegnies & Poch-Olivé 1992), Belgian French (Poch-Olivé & Harmegnies 1992), Catalan (Blecua et al. 1993), Portuguese (Delplancq et al. 1995-96), English (Deterding 1997) and Italian (Poch-Olivé & Harmegnies 1995: the speaker observed is from Napoli).

Duration, F1, F2, F3 and F0 of nearly 700 vowel utterances in laboratory and in quasi-spontaneous speech were measured. The vowel boundary was set at the point of disappearance of the second formant; measures of F1, F2 and F3 were taken at vowel midpoint over three consecutive frames whose values were averaged; the measurements were all checked by visual inspection of formant tracks overlaid on spectrograms. The data collected were presented in terms of F1/F2 diagrams on a Hz scale. As for duration, F1, F2, F3 and F0 sets of ANOVAs were run to test the effects of the variable 'stress' for the five vowels /i e a o u/ in stressed and unstressed position (as in Italian the stressed vowel couples /e ε/ and /o o/ are reduced respectively to /e/ and /o/ when unstressed, the unstressed data were compared with the stressed /e/ and /o/). In order to estimate how peripheral the vowels were, the Euclidean distance of each vowel from the centroid of all vowels in both speaking styles were calculated, and statistical results of the so computed values for each vowel and speech style were presented. The vowel space defined by the vowels in each speech condition differed also in terms of area, the overall area was obviously affected when the subjects changed speech style: the space was largest in the read speech condition and smallest in the quasi-spontaneous speech condition. Finally the formant variability (standard deviation, range, coefficient of variance) was observed (they were systematically greater in quasi-spontaneous speech than in the read speech). A lowered differentiation of the sounds in the quasi-spontaneous speech was therefore noticed.

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