SPECTRAL AND PERCEPTUAL ASPECTS OF VOWEL COARTICULATION

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Formant transitions, or more general acoustic characteristics, of vowel transitions in CV- and VC-type syllables are known to carry information about the preceding, or following, consonant as well as about the vowel itself. Although for instance Haskins' locus theory and Lindblom's model give some way of describing these phenomena, based on experiments with synthetic speech, a full description of what is actually occurring in real speech is far from being available.

A study to come up with some of these data should include both acoustic measurements on actual speech, and a perceptual evaluation of the significance of its dynamic characteristics.

Detailed spectral data for a subset of Dutch CV- and VC-transitions are now available both for isolated words and for words in a read-aloud story (Schouten and Pols, 1979). The CV- and VC-transition patterns were found to be quite consistent over speakers and conditions. Perceptual experiments have been conducted to specify the extent to which vowel transitions contribute to the identification of preceding or following plosives in Dutch CVt or tVC words. Large differences were found between initial voiced and unvoiced plosives (Pols and Schouten, 1979).

These experiments will be replicated for a full set of American English plosives. Experiments are also planned to extend these perceptual studies to all consonants. Another laborious but interesting extension is to use running speech, or to isolate stimuli from running speech.

This information will tell us more about the contribution of dynamic speech characteristics to speech perception, and will also contribute to improve automatic speech recognition procedures.

References

Schouten, M.E.H. and Pols, L.C.W. (1979): "Vowel segments in consonantal contexts: a spectral study of coarticulation-Part I", JPh forthcoming.

Schouten, M.E.H. and Pols, L.C.W. (1979): "CV- and VC-transitions: a spectral study of coarticulation-Part II", JPh forthcoming.

Pols, L.C.W. and Schouten, M.E.H. (1979): "Identification of deleted consonants", JASA forthcoming.