

THE ROLE OF CONTEXT IN VOWEL PERCEPTION

Peter F. Assmann, Department of Linguistics
University of Alberta, Edmonton, Alberta, Canada

There is considerable evidence that vowel quality is determined largely by the frequency values of the first two formants. However, these values are known to differ between speakers. Other factors have been suggested for the English vowels eg. duration, diphthongization, fundamental frequency and higher formants. Alternatively, contextual information may be involved. Several normalization hypotheses have been proposed. One is that listeners make use of the relationship between formants of different vowels from the same speaker. A second hypothesis states that consonantal or prosodic context provides essential vowel information.

Strange et. al. (1976) emphasize the insufficiency of vowel-internal cues: high error rates are obtained for isolated vowels but not for CVC syllables, in both single-speaker and randomized multi-speaker conditions. Yet Kahn (1977) finds that his subjects make very few errors in the randomized multi-speaker condition. The present study investigates this discrepancy in terms of the following: variability in production, orthographic interference, training and task familiarity and dialect control. When these factors are controlled, listeners make few errors. The increase in errors from CVC's to isolated vowels is attributable to task-related, non-perceptual difficulties.

A second study examines the role of vowel-internal temporal cues. Vowels are artificially shortened by means of a windowing procedure. When temporal cues like duration and diphthongization are removed, errors of identification increase. Confusion errors are reduced when vowels are presented within a block from a single speaker, as compared with a randomized multi-speaker condition. Results are consistent with acoustic measures and lend some support to the relative formant normalization hypothesis. The findings are discussed in terms of "redundant" cues in speech perception.

References

- Kahn, D. (1977): "Near-perfect identification of speaker-randomized vowels without consonantal transitions", JASA 62, S101 (A).
- Strange, W., R. Verbrugge, D. Shankweiler, and T. Edman (1976): "Consonant environment specifies vowel identity", JASA 60, 213-221.