THE NEUROMUSCULAR REPRESENTATION OF SPEECH

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Errors in speech which break phonetic realization rules can yield important insights into the nature of the neuromuscular representation of speech.

An experiment[1] is described which provoked vowel-errors of this sort. The random sequencing of two stimuli, and the durations and intervals of their presentation to subjects, were controlled electronically. Stimuli were words of the form P _ P, containing a stressed vowel of Received Pronunciation, making a list of ten words arranged in 55 different pairs. Each pair was used in a 30-second trial, with the stimulus-duration and interstimulus interval both set at .3 sec for the first 15 seconds, then shortened to .2 sec. The task of each of 6 subjects was to pronounce the stimulus-word as accurately as possible immediately on its presentation.

Many vowel blends were produced. Some pairs of vowels were more susceptible to blending than others. An explanation is advanced which ascribes primary responsibility for the execution of a given vowel to a specified muscular system. Vowels blend only when their performance is normally achieved by different muscular systems, the intermediate vowel being the mechanically joint product of both systems acting simultaneously. When two vowels are normally performed by the same muscular system being adjusted to different degrees, then blends don't seem to occur, presumably because individual muscles cannot be given simultaneously contradictory commands.

The general principle of neuromuscular compatibility underlying this argument is clearly also applicable to the study of a number of areas: co-articulatory phenomena, natural classes in phonology, physiologically-motivated sound-change, and physiologically-based constraints on language-acquisition and second-language learning.

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(1) A fuller account of the experiment reported here will be published in Dechert, H.W. and Raupach, M. (Eds.) (1979) Temporal Variables in Speech: Studies in Honour of Frieda Goldman-Eisler, The Hague/Paris: Mouton.