

INTER-ARTICULATOR PROGRAMMING IN THE PRODUCTION OF SWEDISH
OBSTRUENTS

Anders Löfqvist, Department of Phonetics, Lund University, Lund,
Sweden

Much work within the area of motor control in speech has been devoted to the problem of temporal and spatial coordination of the movements of the various articulators. The production of voiceless obstruents requires a precise temporal control and coordination of several articulatory systems. The tongue, the lips, and the jaw are engaged in the formation of the constriction or occlusion; the soft palate is elevated in order to close the entrance to the nasal cavity and prevent air from escaping that way; the glottis is abducted in order to prevent vibrations of the vocal folds. The present paper reports on some work aimed at elucidating certain aspects of motor control during the production of Swedish obstruents and obstruent clusters.

Registrations comprised a photoglottogram for information on glottal movements, oral egressive air flow and oral air pressure for information on supraglottal articulations, and the signal from a larynx microphone. These registrations were further supplemented with EMG recordings from certain laryngeal muscles.

The results indicate the importance of the temporal coordination of oral release and adduction of the vocal folds for the control of aspiration in voiceless stops. In obstruent clusters the glottis has been found to behave in a manner predictable from the aerodynamic requirements for the production of the respective segments, i.e. the need of an egressive air flow during fricatives and periods of aspiration in stops. In some instances of laryngeal coarticulation the results were not in agreement with those expected on the basis of current theories of motor control in speech. Thus, in some obstruent clusters two successive peaks of glottal opening gestures were found where only one would have been expected. The results will be discussed in relation to current theories of motor control in speech and to laryngeal feature specifications for obstruents. The laryngeal articulation for Swedish obstruents would seem to be best explained as a ballistic opening and closing gesture which is intrinsically tied to certain segments. The temporal relationship between this gesture and the supralaryngeal articulations is important, whereas its size would seem to play a minor role.