

ARTICULATORY TIMING IN VOICELESS FRICATIVES

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This paper presents some airflow data on the production of intervocalic voiceless fricatives by German speakers, points out some interesting features, and suggests a (micro-)model to account for them.

The speech sounds concerned ([f, s, ʃ, x] and later also [ç]) originally occurred in the word final position of verbs spoken in a frame at two speeds and with three variations in sentence stress. The data consisted of measurements made from airflow and laryngograph traces of four native speakers, later supplemented by curves from VCV sequences pronounced by two phoneticians. The majority of traces exhibit the characteristic twin peaks of airflow observed by other investigators, some of whom have also offered the explanation that these are the result of timing differences between glottal and supraglottal articulation (Klatt et al., 1968, 48). Amplitudes for apicals and labials are in general lower than those for tongue body fricatives. With the latter it was found that peaks immediately adjacent to homorganic vowels (i.e. [ç + i] and [x + u]), if present at all, are lower than those next to a vowel requiring a different tongue position - the highest peaks being those adjacent to [a].

In other words, it seems that the longer the tongue has to move from one segment to the next, the higher the rate of airflow reached at the transition. A possible explanation for this might be that the motor commands for the movements of the supraglottal articulations are given at a fixed point in time relative to those for the abduction and adduction of the vocal folds, so that the discrepancies in the timing of these actions, and hence the amplitudes of the airflow peaks, would be to a great extent a function of the difference in place of articulation for vowel and consonant.

Reference

Klatt, D.H., K.N. Stevens and J. Mead (1968): "Studies of articulatory activity and air flow during speech", Annals of NY Academy of Sciences 155, 42-55.