MICROTIMING OF TWO-CONSONANT CLUSTERS

Blanka Borovičková and Vlastislav Maláč, Academy of Sciences and Institute of Radiocommunication, Prague, Czechoslovakia

By the term microtiming differences of sound duration caused by the coarticulation processes are meant.

Subject

Clusters involving 80 consonants grouped into symmetrical VCCV sound combinations were analysed from this point of view. All differences in duration were expressed in a logarithmic scale, decichron, which is defined as $dC = 10 \log T_o/T$, where T_o is the average duration of a sound and T is the duration of the sound measured. It was found that the durational differences depend on 1) the position within the cluster (first or second), 2) the kind, 3) the environment of a given consonant. These influences were summed up in two equations.

The difference of the first consonant in a cluster is given by the equation:

$$\Delta C_1 = k_{nC1} + 0,2 + (n_{C2} - 3) \cdot 0,3 \quad /dC/ ,$$

where k is a coefficient which indicates a durational difference (in dC) for one of the five classes of consonants marked n; the second member of this equation represents the average extension of the first consonant duration; the influence of the second consonant is expressed by the third member of the equation. The difference of the second consonant is given by the equation:

$$\Delta C_2 = k_{nC2} - 0,7 + (3 - n_{C2}) \cdot 0,3 + (n_{C1} - 3) \cdot 0,3 \quad /dC/,$$

where the first member represents a correction of the consonant class; the second means the average shortening of the second consonant; the third member expresses the equalization tendency of the second consonant in the class differences (represented by the k coefficient); the last member represents again the influence of the first consonant on the second one.

Conclusion

Only 2,5% of the calculated consonants' durational difference in the two-consonant clusters deviate from the measured ones, within a set of 80 consonant clusters. We considered the perceptually significant differences only; i.e. greater values than 1 dC (roughly 20%).