Studies on the speech of the deaf. II

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In the first part of this study (published in STL-QPSR 3/1965) a spectrogram segmentation technique has been described. On the basis of the segment feature pattern we have an objective tool for the description of an utterance and of its possible abnormalities.

Anyhow, the method has some lacks. By definition the segment boundaries coincide with a change in the feature composition. An exact determination of segment boundaries is very difficult in some instances and by slight shifts of the timing of features new segments can arise which are of short duration and usually unimportant. The other disadvantage of our earlier approach was that the time duration of the segments was not indicated.

A representation of features as a function of time is perhaps more advantageous. In Figs. III-B-1 to III-B-4 such feature patterns are shown. The utterance and the speakers are the same as in the first part of the study.

Fig. III-B-1 shows sonagram and feature pattern of the test sentence spoken by the hearing subject H3. Test utterances can almost be considered as a normalized feature pattern except for the pause between the two parts of the test sentence. Figs. III-B-2 to III-B-4 show sonagrams and feature patterns of the test sentence spoken by the deaf subjects D1, D2, and D3. These sentences were discussed in the previous part.

A comparison of the length of the segments or the features for the different speakers is not easy because of deviations in the number of segments and features. An alternative method is to study phoneme durations as shown in Fig. III-B-5. Of course a determination of phoneme boundaries is not unambiguous and to avoid large errors in some instances adjacent phonemes have been taken together in groups. Generally as in Fig. III-B-5 it is apparent how much lower the rate of speaking of the deaf subjects is compared with that of the hearing subjects.
Fig. III-B-1. Sonagram and feature pattern of the test sentence "solen skiner men det är kalt" spoken by the hearing subject H3.
Fig. III-B-2. Sonagram and feature pattern of the test sentence "solen skiner men det är kallt" spoken by the deaf subject D1.
D1

Fig. III-B-2. Sonagram and feature pattern of the test sentence "solen skiner men det är kallt" spoken by the deaf subject D1.
Fig. III-B-3. Sonagram and feature pattern of the test sentence "solen skiner men det är kallt" spoken by the deaf subject D2.
Fig. III-B-4. Sonagram and feature pattern of the test sentence "solen skiner men det är kallt" spoken by the deaf subject D3.
Fig. III-B-5. Phoneme durations in the test sentence "solen skiner men det är kalit" measured at the three hearing subjects H1, H2, H3, and at the three deaf subjects D1, D2, and D3.