THE DEVELOPMENT AND STANDARDIZATION OF SPEECH TEST MATERIAL IN ENGLISH FOR INDIANS

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Introduction

Speech audiometry is an important element in the battery of audiometric tests. Speech tests need to be standardized on the population to be tested. Speech tests in Indian languages are at present being made up. However, as an interim measure the standardized tests in English are used with English-knowing Indians. However pilot studies (Nikam, 1968) have indicated that the available tests may not be wholly suitable to Indian population because many words in the test are unfamiliar to us and this can affect performance. Here an attempt is to be made to modify the existing speech tests, to suit our conditions. The proposed study is "the development and standardization of speech tests in English for Indian population".

The purpose of this study is (1) to show that with some modifications for familiarity and standardization to suit our conditions, English speech audiometric test materials can be used to test the hearing of Indian population; (2) to help further research on these lines; and (3) to compare the results of these tests, with those of speech audiometry tests already available.

Review of Literature

Adults: Studies of speech audiometry have been made by several including Fletcher (1929), Egan et al (1942) and Hirsh et al (1952).

In India speech audiometric studies are made by Abrol (1971) and Kapur (1971).

Preparations of spondee and phonetically balanced word lists in Hindi was done by Abrol (1971). Two lists of 50 words out of 800 words which were prepared based upon the frequency counts for all consonants as given by Ghatage (1964) and their familiarities. No word was common to both the lists. Two lists of 38 spondee words each were also prepared from amongst the words of common usage.

In order to test the working, 30 normal persons, who had SRTs ranging generally from 10 to 30 dB, were administered words with the carrier phrase 'say the word'at 10 dB higher than the word itself. Different lists were used for each ear. The persons were required to repeat the words as soon as they heard them. A time of 2 seconds was allowed for them to speak.

At 10 dB above SRT, slightly more than half of 30 people repeated more than 90% of the words.

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At 30 dB above SRT all the persons could give 100% score. Considering all these,' optimum for Hindi PB words were tentatively fixed 30 dB above SRT which is 10 dB less than that recommended for English PB words.

'Development of Hearing and Speech test materials based on Indian Languages' (Malayalam and Tamil) was done by Kapur (1971). Speech audiometry in the Malayalam language was developed as follows : Disyllabic words which were very common were used in developing speech materials for both SRT and pB word lists as very few monosyllabic words were available, 200 disyllabic words were found to be most familiar.

Six subjects with normal otological findings and with normal pure-tone audiograms were taken for the study and were given the 200 disyllabic words. The responses were written down. Each listener listened to the tape recordings of the familiar disyllabic words at +4 dB, +2 dB, 0 dB, —2 dB, -4 dB, and — 6 dB relative to their average pure tone thresholds. The order in which the lists were given at different levels each listened varied according to random Latin Square design.

In the analysis of data, an easy word was defined as missed once or never by all six listeners. The words that five of the six listeners missed were considered as a difficult word. Words falling in both of these extreme categories were eliminated. This resulted in a list of 35 familiar spondee words.

In the preparation of PB word lists, two-hundred familiar word list was administered to six subjects and those words which were not missed more than three times by each subject were divided into three lists of 30 words each. The articulation percentages for these six subjects were determined at each intensity through a range of 50 dB in steps of 5 dB steps. Articulation curves show that the maximum score of 97 was obtained at 45 dB.

In preparing a list to obtain articulation score 78 words out of 85 monosyllabic words were used for testing six normal subjects. The test was given at the following dB levels 0, 4, 14, 24, 34, 44, 54, 64, 74, 84 re-audiometric zero. Articulation curves showed that the maximum score of 97 was obtained at 45 dB.

The development and standardization of speech test material in Kannada for Indians is being worked at All India Institute of Speech and Hearing, Mysore as part of the VRA Research Project.

Research was done on 'Adaptation of speech test material in English to Indian conditions' by Miss S. Nikam (1968). The words from w-22 and the children's spondee list were combined avoiding repetitions. As a result 80 words were obtained and administered for 72 undergraduates in Mysore to rate them as very familiar, familiar and not familiar. Out of 80 words, 45 words were rated as very familiar by 70% of the subjects. These words would be used with those patients with a minimum of high school education. Further research was not done.

Children : Studies on speech audiometry with children have been made by Keaster (1947), Sieganthaler (1954), Stark (1968) and others. "The development of speech test materials ranged from use of modified monosyllabic and spondee-word lists to tests of non-verbal responses". In this study monosyllabic and spondee word lists will be used to obtain discrimination scores and speech reception thresholds.

METHOD

Sample used in testing for average speech reception threshold and speech discrimination

Adults: 60 adults with normal intelligence and hearing will be chosen whose education ranges from PUC and above. Their ages will be between 16 and 25 years. The ratio of male to female subjects would be 1 : 1. All the subjects shall know English.

Children : 60 children with normal intelligence and hearing will be chosen whose ages range from 7 to 15 years. Ratio of boys to girls would be 1 : 1.

The population comprises of persons in Mysore city-

Equipment

A calibrated speech audiometer Madsen OB 70 will be used with a two room facility (acoustically treated rooms)

Differential Diagnostic Audiometer (Madsen Model OB 70) and 'Uher' tape recorder will be used for the study. The audiometer will be calibrated using Bruel and Kjoer equipment. Speech audiometer will be calibrated using 1000 Hz noise (supplied with the Madsen OB 70 apdiometer). The attenuator of the audiometer will be set at 60 dB HL and the volume control of the tape recorder will be adjusted until the V.U. meter of the speech audiometer reads 'zero'. The output of the earphones separately will be increased using artificial ear and Bruel & Kjoer equipment. The measured output will be compared with the I S.O. value of 1000 cps tone (66.5 dB SPL).

The difference in the values will be taken into account while reporting the results.

A talk-back system will be made use of to hear the subjects' responses as the testing will be done in a two-room (acoustically-treated) situation.

Technique of testing

Speech reception threshold—adults

The 84 spondee words from Auditory test No. 9 and 14 will be subjected to familiarity test. The familiarity test will be given to 200 college going graduate and post-graduate students whose ages range from 16 to 25 years. Scores will be given to these words, on the basis of their being familiar, not so familiar and not

familiar. Then weighted scores will be obtained and all such words which have obtained scores greater than an arbitrarily selected scores are considered as familiar. These familiar spondee words will be arranged into two lists randomly, thus equilising the level of difficulty of the spondee in any given word list.

These two spondee word, lists will be presented to various subjects at 0, 5, 10, 15, 20, 25, 30. 35, 40 and 45 dB levels. Each of the given 2 lists will be presented to a listener only once at a given intensity. The order of presentation of these lists also will be determined randomly. The responses of the case will be noted down. This procedure will be repeated on the entire sample. Articulation curves will be plotted in each case and the intensity level at which 50 per cent correct response is given will be found. The reason for selection of 0 to 45 dB presentation levels at 5 dB intervals is that a normal hearing person would reach the assymptodes of response within these intensity levels.

Speech reception threshold—children

Children's spondee word list of 57 words will be subjected to familiarity test. The familiarity test will be given to 200 school going children whose ages range from 7 to 15 years. Details of the administration and scoring of the familiarity test will be same as in the case of adults. These words will form a list of 25 words. The levels of administration of this list will be 0, 5, 10, 15, 20, 25, 30, 35, 40 and 45 dB. Articulation curves will be drawn and finally SR.T : i.e. the level at which 50 per cent of spondee words are repeated correctly will be obtained.

Instructions to the subject: These are common to both adults and children They are as follows :

"You will hear a list of words through your earphones. These will consist of two-syllable words such as baseball, armchair etc., with the accent on both syllables. First, I will make the words loud enough for you to hear them easily, then the loudness will gradually get weaker. You must repeat into the microphone any word just as you hear it. If you are not sure, guess. The words will finally become so weak that no one could hear all, so do not worry if toward the end of the test you cannot repeat some words. Do you have any questions ?"

Speech discrimination - adults

The 200 PAL PB words and 200 C1D Auditory test w-22 wiir be subjected to familiarity test on 200 adults whose ages range from 16 to 25 years. Details of administration and scoring of the familiarity test will be same as above. Of the total number of words 200 words will be found to be familiar. Then these words will form 2 lists of 25 words each which will be phonetically balanced. Each list will be presented to a subject only once and at only one intensity level. The intensity levels will be 0, 5, 15, 25, 35, 45, 65 and 75 dB 0.0002 dynes/cm^2. Articulation curves will be plotted with each of the subjects responses. The average dB level at which there is a 100 per cent correct response will be noted.

Speech discrimination—children

The original PAL PB word lists for children, containing 200 words, will be administered for familiarity to children of ages 7 to 15 years. The familiar words in the 2 lists will be phonetically balanced. Each list will be presented to a subject only once and at only one intensity level. The intensity levels will be 0, 5, 15, 25, 35, 45, 55, 66, 75 and 85 dB ref: 0.0002 dynes/cm^2. Articulation scores will be plotted with each of the subjects' responses. The average dB level at which there is a 100 per cent correct response will be noted.

Instructions to the subject

Instructions are common to both children and adults. They are as follows :

"You are going to hear a list of 25 one syllable words with which everybody is familiar. You are to repeat each word into the microphone as best as you can. If you are not sure, guess".

Conclusion

The analysis would give average speech reception thresholds and discrimination scores for adults and children. These results would be used as norms while carrying out speech audiometric tests.

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