EFFECT OF TALKER DIFFERENCE *ON* WORD DISCRIMINATION SCORES

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Human voice according to Wolf (1874) (cited in O'Neil and Oyer) "is the most perfect conceivable measure of hearing". Speech materials have become an indispensable tool in clinical evaluation.

The prime purpose of speech audiometry is to measure the difficulty associated with auditory dysfunction, through other measures like speech reception threshold and threshold of detectability, tolerance and discomfort level can also be go;

Different kinds of materials have been used - nonsense syllables (Mayadevi, 1974), monosyllables (Egan, 1948 ; Hirsh et al. 1952) Tillman et al 1963) and sentence tests (Silverman and Hirsh 1955, Jerger, speaks and Trammel, 1968). However research by Knight and Littler (1953) and Hirsh et al (1952) has shown that difficulty in speech discrimination associated with auditory dysfunction is most easily detectable with monosyllables.

Several monosyllable word lists-CID W_22 (Hirsh et al 195 2), CNC monosyllable word lists by (Lehiste and Peterson) and NU auditory test No. 6 (Tillman and Carhart 1966) are available. The NU Auditory test No. 6 has. been used in India by other researchers and its clinical utility has been demonstrated and has been used in the present study-

Several variables are found to effect the word discrimination scores of these the effect of talker difference has been seen to a significant variable (Palmer, 1955, Brandy, 1966, Kruel et al, Penrod, 1980). This could be because variablesrelated to speech production are very many, complicated and difficult to control unlike the relatively uncomplicated pure tone (Brandy 1966).

Recording the speech material has been recommended to reduce the number of variables affecting the discrimination scores. However as Carbart, 1965 pointed out that there may be as much difference between one recording and another between two live talker, the recordings of the some speech material have to be compared and standardized before it can be used with clinical population.

The aim of the present study were to see (1) if any significant difference existed between the two talker on the scores obtained for the NU auditory test No. 6;

(2) the effect of level of signal presentation on the scores obtained ;

(3) the equivalancy of the four lists of the No. 6.

METHODOLOGY

Speakers:- Two adult speakers ; one male and one female with no vocal pathology were used as speakers- Both were fluent speaker of English language and their English could be considered as representative of Indian English.

Subjects : Forty, young adults - Twenty male and twenty female served as subjects. To be included in the test they had to satisfy the following criteria.

1. Should have had Kannada as their another tongue.
2. Should have hearing thresholds within normal limits between 250 Hz t© 8000 Hz (ANSI, 1969).
3. Should obtain "Score of atleast 50% on the test of English ability" constructed at Central Institute of Indian and Foreign Languages, Hyderabad.
4. Should give a negative history of ear infection or head injury.

Recording : The speech materials (the CNC monosyllables of the NU auditory test No. 6, and the CID W-I spondee lists) were tapes in an anechoics Chamber with a tape recorder Grundig TK-475 with a Stereo microphone **GD** SM 331 at a speed of *1* ips.

Both the monosyllables and the spondes were taped with the carrier phase "you will say....." at the beginning of each word and an inter stimulus interval of 8 sec. and 5 sec. respectivley to collect responses. The recordings were found to be within I 2 dB of a 1000 Hz caliberation tone.

Instrumentation : A caliberated (ANSI, 1961) two channel Audiometer (Madsen OB 70) and a stereo tape recorder UHER Logic SG 631 were used in the study. All measurements were done in a sound treated two room situation.

Procedure: The pure tone thresholds of both ears were obtained for the subjects. And the ear with the better thresholds was choosen as the test ear and was done for that ear.

The speech discriminate test lists were then presented to the test ear at five different SLS (ref. SRT) 8 dB SL, 16 dB SL, 24 dB SL, 32 dB SL, and 40 dB SL. The list and levels were randomly chosen such that list or level was repeated for any one subject. The subjects were instructed to write what they heard on the response sheets given. Scoring was done on write or wrong basis. A credit of 2% was given for each word and the total percentage was computed for each list.

RESULTS AND CONCLUSION:

The data was analysed and mean and standard deviations were computed for both the talkers. Articulation function in % per dB for the two talker are tabulated below :

	List I	II	III	IV
Male	4.75	0.375	2.56	3.25
Female	2. 86	3.75	1.81	2.13

The mean scores of the lists at each level was computed for both male and female talker Fig. (1).

A three way analysis was done and results indicated a significant ratios for the effect of level at 0.01 level of significant and for the effect of talker at 0.05 level of significance. The test lists were not significant and so were all the interaction scores were not significant.

The results of the present study were compared with a similar study by Malini (1981). The average scores of the four lists of Malini study across the levels are represented along with those obtained in the present study. The difference in the scores obtained in the present study especially at the lower level could be attributable to the possible combined effect of the difference in the recording procedure, the selection of subjects instrumentation and talker difference.

The recording for Malini's (1981) study was done in a recording room, and the another tongue was not considered as a criteria for selection of subjects. These along with the fact that a different talker was used for the study could have contributed to the difference.

Talker difference was significant at 0- 05 level of significance. This difference could be because of the difference in linguistic background of the two speaker and because of the difference in male-female talker intelligibility,

Though the talker level interaction scores were not significant, diverging curves of the Fig. (1) shows that the performance for the female talker was better with increasing sensation levels.

A plateau was not reached for the female talker, which indicated that possibly with further increase in sensation level, the scores could improve. However, the male talker should very little increase with increasing sensation level for the three highest SL used in this study.

The fact that the eurves are diverging suggests that there could possibly be a difference in talker intelligibility, which increases with increasing sensation evels.

SUMMARY AND CONCLUSION :

The present study indicates that talker difference should be considered a significant factor contributing to the difference in speech discrimination scores. If speech discrimination score is defined as the point of maximum speech intelligibility for a particular message being used (Giolas, 1975) then 40 dB SL (ref. SRT), cannot be used for test presentation level with the recorded materia of the female talker used in this study, as no asymptote was seen.

The study also implies that further research is necessary till No.6 can be used in the clinic for the Indian population.

REFERENCES

BRANDY, W- T., "Reliability of Voice tests of Speech discrimination". *J. Speech Hear. Res., 9, 461-469 (1966).*

GARHART, R., "Problems in measurement of speech discrimination". *Arch.l Otolaryngol, 82, 253-260 (1965).*

EGAN, P. J., "Articulation testing methods". *Laryngoscope 58, 955-991 (1948).*

GIOLAS, T. G., "Speech Audiometry" in *Auditory Assessment cf the Difficult-to-test* Fulton, R. T. and Lloyd. L L- (Eds), Baltimore : The Williams and Wilkins(1975).

HIRSH, TJ,, Davis, H., Silverman, S.R., Reynolds, E.G., Eldert, E and Bensor, R.'W.,, "Development of materials for speech audiometry" *J.Speech Hear. Dis., 17,321-327 (1952).*

JERGER, J., Speaks, C, and Trammell, J.L., "A new approach to speech audiometry". J. *Speech Hear. Dis., 33, 318-329 (1968).*

KNIGHT, J. J. and Littler, T.S., "The technique of speech audiometry and a simple speech audiometer with masking generator for clinicai use". J. *Laryngol, 67, 248-265 (1953).*

KRUEL, J.E., Bell, D.W., and Nixon, J., "Factors affecting speech discrimination test difficulty". J. *Speech Hear. Dis., 12, 281-287 (1969).*

MALINI, M.S., "Standardization of the N U. Auditory test No. 6 on an English speaking Indian population" Unpubl. Master's Dissertation, Univ. of Mysore (1981).

MAYADEVI "The development and standardization of a speech discrimination test for Indians". Unpubl. Master's Dissertation. Univ. of Mysore (1974).

O'NEIL, J.J. and Oyer, H.T., "Applied Audiometry". Dodd, Head, and Co. INC, (1966) Chapter 5.

PALMER, J.M., "The effect of speaker difference on the intelligibility of phonetically balanced word lists". J. *Speech Hear. Dis., 20, 192-195 (1955).*

PENROD, P. J., "Talker effects on word discrimination scores of adults with SN hearing impairment". J. *Speech Hear, Dis., 44, 349-343 (1979).*

TILLMAN, T.W., and Carhart, R., "An expanded test for speech discrimination utilizing CNC monosyllabic words (North Western University Auditory test No. 6). Technical report, SAMTR-66-55, USAF School of Aerospace Medicine, Aerospace Medical Division (AFSC), Brooks Air Force Base, Texas (1966).

TILLMAN, T.W, Carhart, R. and Wilber, L. A., "A test for speech discrimination composed of CNC monosyllabic words (North Western University Auditory Test No. 4) Technical report, SAM-TDR-62-135, USAF School of Aerospace Medicine, Aerospace Medical Division (AFSC) Brooks Airforce Base, Texas (1963).