Effect of Word Familiarity On Speech Discrimination Scores

A Dissertation
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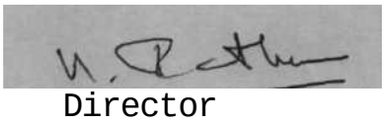
To

Amma and Acha

to whom I owe what I am today

C E R T I F I C A T E

This is to certify that the dissertation entitled "EFFECT OF WORD FAMILIARITY ON SPEECH DISCRIMINATION SCORES" is the bonafide work in part fulfilment for the degree of Master of Science(Speech and Hearing), of the student with Register No.



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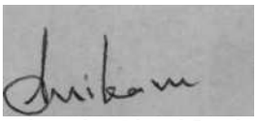
This is to certify that the dissertation entitled " EFFECT OF WORD FAMILIARITY ON SPEECH DISCRIMINATION SCORES " has been done under my supervision and guidance.



Dr.(Miss) Shailaja Nikam
Guide

D E C L A R A T I O N

This dissertation is the result of my own work done under the guidance of Dr. (Miss) Shailaja Nikam, Professor and Head, Department of Audiology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any University for any other Diploma or Degree.

MYSORE.

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C O N T E N T S

C H A P T E R I

I N T R O D U C T I O N

One of the basic requirements of any organism, is the need to communicate. "It is the process of imparting to one-another, ideas, thoughts, feelings or opinions by means of signs, signals and symbols expressed consciously or unconsciously" (Travis, 1971). Down the corridors of time, speech has been the most commonly used mode of communication.

A breakdown in speech communication can take place at three levels:

1) at the transmitter level, i.e., the speaker,
2) during transmission, i.e., any interference of speech during its transmission, and
3) at the receiver level, i.e., the listener.

A defective speech discrimination is one of the factors leading to a communication breakdown. This could result from an interference at any or all of the three levels of communication breakdown mentioned earlier. Factors leading to a speech discrimination problem can also be grossly classified into those that are intrinsic and those that are extrinsic to the individual.

Intrinsic factors that lead to disturbance in speech discrimination include pathologies of the auditory system which could be at the level of the cochlea, auditory nerve, or higher in the central auditory system. Further, psychological processes such as memory, fatigue, attention and intelligence can also bring about a deterioration in the speech discrimination scores.

Extrinsic factors that lead to a disturbance in speech discrimination include variations due to:

1) the input signal,
2) the transmission system,
3) the listener, and
4) the tester.

Research has shown that various aspects of the input signal can affect speech discrimination. They are:

a) The type of speech material i.e., whether it is nonsense syllables (Lehiste and Peterson, 1959y Carhart, 1965), monosyllables (Miller, Merse and Lichten, 1951; Boothroyd, 1968), Polysyllabic words or continuous discourse (Speaks and Jerger, 1965; Giolas, 1966 a? Berger, 1969).

b) The phonetic balance of the test lists (Haskins, 1949; Lehiste and Peterson, 1959; Tillman and Carhart, 1966)

c) Whether it is a half list or a full list (Elpern, 1961; Tobias, 1964; Martin, 1975).

d) whether the same list is repeated while determining articulation function (Lagenbeck, 1965; Tillman and carhart, 1966). If different lists are used, the comparability of each of the lists (Hood and Poole, 1977).

e) Use of a carrier phrase, as well as the content of the carrier phrase (Pederson, 1970; Gladstone and siegenthaler, 1971; Lynn and Brotman, 1981).

f) whether stimuli are presented through live voice or through recorded mode (Carhart, 1965; Goetzinger, 1978).

g) Presence of a background noise (Carhart and Tillman, 1970; Keith and Tabis, 1970; Northern and Hattler, 1970).

Variations introduced during transmission include:

a) Presentation level of the stimuli (Tillman et al, 1963; Boothroyd, 1968; Giodas, 1975).

b) Distortion introduced by the instrument and

c) ambient level of the test room.

The linguistic background of the listener (Sapon and Carrol, 1957; Singh, 1966; Bagli, 1972; and Miyawaki et al, 1975) and above all his familiarity with the test words (Black, 1952; Hirsh et al, 1952? Rosenweig and Postman, 1951; Owens, 1961? Schwartz and Goldman, 1974) are known to affect speech discrimination scores. It is very essential that the test words should be within the vocabulary of the population being tested. Savin (1963) especially noted that more commonly used words are often substituted for the less commonly used stimulus word.

Besides the above points, the tester himself/herself is likely to be an important variable, intrinsic factors which are present in the listener can also be found in the tester. Also, the kind of instructions he gives the listener prior to the speech discrimination test, whether it is written or oral responses that he wishes to elicit, and the criterion he uses while scoring the words have high chances of affecting the test results.

It is essential that the above factors be controlled while testing, unless it is necessary to introduce some of them while testing some specific cases. For

instance, background noise may be introduced while determining rollpver effect in sensory-neural cases. Time compression, time expansion, or filtered speech stimuli may be called for while testing cases with central auditory disorders.

NEED FOR THE PRESENT STUDY:

It is desirable to obtain the degree to which discrimination has been affected in an individual, with a pathology, for the purpose of diagnosis as well as rehabilitation. To do so, it is essential that we have standardized tests of speech discrimination. The test conditions should be optimum, and all individuals should be subjected to a similar set up.

The Nu Auditory test No.6 (Tillman and carhart, 1966) is one such speech discrimination test that has been used extensively in the west (Beasley, Schwimmer and Rintelmann, 1972? Beasley, Forman and Rintelmann, 1972; Rintelmann and Schumaier, 1974; Sanderson-Leepa and Rintelmann, 1976; orchik and Roddy, 198O). in India, it has been standardized by Malini (1981) and used by Sood (1981).

Malini (1981) found the mean and median scores obtained at any sensation level, for all four lists of the N U Auditory test No.6, to be consistently

lower than those obtained by Rintelmann, Schumaier and Jetty (1974). In addition, the variability in her scores were also higher. One factor that could have resulted in this discrepancy in scores, is the subjects' familiarity with the test words. Despite the fact that Tillman and Carhart (1966) had tested the words for familiarity and found a sizeable proportion of them to be very common by the American population, the same cannot be expected of an Indian population, words that are familiar to the American population may not be found equally familiar by the Indian population, for the Americans are native speakers of the language, where as the Indians are non-native speakers of English.

Most often it is oral responses of the listener that is evaluated and not written responses, in such case, the tester's familiarity with the test words is likely to influence his scoring ability as much as it is likely to influence a listener's discrimination.

1) What effect does the familiarity of the test words have on the speech discrimination scores?

2) Does training in scoring of the responses affect the speech discrimination scores?

3) Is there any significant difference between trained and untrained testers, with respect to the familiarity of the test words?

C H A P T E R II

REVIEW OF LITERATURE

Various factors can affect the speech discrimination scores in a normal hearing population. They can be listed into the following broad categories:

I. Variations due to the input signal.
II. Variations due to the transmission system.
III. the listener and the listening condition as a variable.
IV. the tester as a variable.

I. variations due to the input signal

a) Type of the speech material used:

The material used in speech discrimination tests ranges from nonsense syllables to sentences.

Nonsense syllables have been found to be rather abstract and cause considerable confusion to the subjects (Carhart, 1965). One such test is the one constructed by Mayadevi (1974). The test consisted of 20 CV syllables, the vowel being constant i.e., /a/. As these isolated phonemes do not carry any meaning, they do not possess the property of intelligibility (Lehiste and Peterson, 1959). Such a

test serves the purpose of a recognition test rather than one of discrimination and is analyzed in the subcortical parts of the auditory pathway (Zakrzowski et al, 1975).

"One advantage of nonsense syllables is that they facilitate the measurements in cases where the intelligibility score is high" (pedersen, 1970). For instance the discrimination test at the "Technical University" developed a method where the nonsense syllables were presented as the fourth "word" in a sentence chosen from spoken Danish (Pedersen, 1970). Thus they took into account the transition phenomenon between the sounds preceding and following the nonsense syllable, which had not been taken into consideration in Mayadevi's test.

Nonredundancy is a desirable factor while testing discrimination. Presence of redundant material will make available to the patient, clues which may obscure his discriminating disability to a considerable degree. Monosyllables provide this desirable factor, since they are sufficiently unpredictable (Carhart, 1965). In addition they serve as an easy task for the listener because of contextual cues (Miller, Heise and Lichten, 1951). By using monosyllable words it is possible to construct word lits that are highly familiar, as well

as phonetically balanced. Moreover, they can be easily manipulated to represent colloquial speech (Giolas, 1975). They enable rapid determination of discrimination scores and/or articulation function (Boothroyd, 1968). Tobias (1964) stated that ". . . . . monosyllabic words are useful in that they are a specific form of speech stimuli rather than because they are a good representation of everyday conversational speech". Some of the commonly used monosyllabic word lists are the PAL PB-50 word lists (Egan, 1944), CID W-22 (Hirsh et al, 1952), the Nu Auditory test No.4 and No.6 (Tillman et al, 1963; Tillman and Carhart, 1966) and the PBK (Haskins, 1949).

Polysyllabic words have been found to yield higher intelligibility than monosyllabic ones, under the same conditions. This is due to thefact that they afford more cues for discrimination than do monosyllabic words.

There are yet others who are of the opinion that sentences or even some form of quantifiable continuous discourses give forth results that are more accurate (Berger, 1969; Giolas, 1966 a; Harris, Haines and Myers, 1960; Speaks and Jerger, 1965). Sentences present a more natural listening task than do single words (Hirsh et al, 1952). They make use of the

crucial parameters used in understanding connected speech. Some of the sentence tests include the CID sentence lists (silverman and Hirsh, 1955), its modified version by Harris et al (1960), the multiple choice series developed by Berger (1969) and synthetic sentences constructed by Speaks and Jerger (1965). Despite the advocacy of the use of some of these sentences in clinics (Speaks, Jerger and Trammel, 1970 a, 1970 b; Jerger, 1973), they have not been incorporated in routine audiological assessment.

b) Phonetic Balance:

A test that is phonetically balanced should contain the elements of that particular language, in approximately the same proportion as they occur in that language. Some of the phonetically balanced tests are those constructed by Haskins (1949); Lehiste and Peterson (1959); Tillman, Carhart and Wilber (1963); and Tillman and Carhart (1966).

It is essential that each list of a discrimination test should not exclude those sounds that occur more frequently in that language. If this were done, an accurate determination of the discrimination ability.of the listener would not be obtained.

The test constructed by Mayadevi (1974) consisted of CV syllables that occur in most Indian languages. Though the test may have been phonetically balanced in some of the Indian languages, it may not have been so in others.

c) Full list Vs Half list:

There has been considerable controversy as to whether, utilizing a half list is likely to affect the speech discrimination scores. The main point of argument has been as to whether saving time is a more important factor or maintaining the phonetic balanced list is more vital.

It is agreed that little is gained by utilizing 100 items, if it yields no more information than do fifty item tests (Carhart, 1965).

Further, Elpern (1961) pointed out that a 25 word list was as effective as a 50 item list, based on his analysis of w-22. Campanelli (1962) obtained similar results on the PB-50 lists. Employing only 25 words was considered to save time. However, with regard to the w-22 test, four tenth of the words were too easy and thus failed to differenciate among scores, except very rarely. Tobias (1964) opined that phonetic balance

was not an essential factor in a "useful diagnostic test". Thus a half list was considered as informative as a full list.

Grubb (1963) contradicted the findings of Elpern (1961); Campanelli (1962) and Tobias (1964) by stating that the two half lists may not be equally difficult or equally easy. Also, the list would no longer be phonetically balanced. The findings of Black (1952), served to substantiate the above statement.

Considering Martin's (1975) view point, the full list takes no more than five minutes to administer, which is not a considerably long duration. Thus, the argument, that a half list saves time, is untenable.

d) <u>Necessity for having several lists:</u>

The need for several lists arises when one is determining the articulation function of an individual. It is of paramount importance that the same list should not be used more than once on an individual, for his memory may play a factor and improve his scores on successive presentation of the list (Langenbeck, 1965; Tillman et al, 1963; Tillman and Carhart, 1966).

It is even more vital that each list be comparable with the other. That is, the items in each list should

be identical with respect to difficulty (Hood, Poole, 1977). If two lists do not meet this criterion, then the scores obtained by each of them will not be comparable.

Hirsh et al (1952) reported no statistical information about the difference in scores of the four lists of the CID W-22.

Lehiste and Peterson (1959), in their auditory test, constructed ten lists of 50 words each, in all of which, the phonemic balance was rigidly maintained. The phonemic distribution was proportional to the phonemic structure of CNC words occuring with a minimum frequency of one per million according to the Thorndike and Lorge's frequency count (1944). However, Elkins (1970) questioned the interlist difference with reference to the number of familiar words each contained. Peterson and Lehiste (1957) considered the overall familiarity of their 500 words, but did not take into account the interlist difference.

While developing the Nu Auditory test No.4, Tillman et al (1963) also conformed rigorously to the phonemic balance that had been suggested by Lehiste and Peterson (1959).

Using the Form A of the Nu Auditory test No.6, Rintelmann and his associates (1974) found all four lists to be equivalent. Rintelmann, Schumaier and Burchfield (1974) also found the four forms of the same test to yield similar results, using the Form A of Nu Auditory Test No.6, Rintelman and Schumaier (1974) found list IV to be easier, while lists I, II and III were equivalent in normal hearing, young sensori-neural loss cases, and cases with presbycusis. This differs from the findings of Rintelmann, Schumaier and Burchfield (1974) who found lists I, II and III to be equivalent. However, no statistically significant difference between the lists, was obtained in either of the above two studies.

Malini (1981) also established an interlist difference using form A of Nu Auditory Test No.6. However, the differences in the this study were found to be statistically significant at low sensation levels and not so at higher sensation levels. At low presentation levels, she found list IV to be easier, and list I to be the most difficult. Ranking the lists with respect to difficulty, i.e., most difficult to least difficult, the following order was obtained - list IV, list III, list II and list I.

e) Effect of the carrier phrase:

Egan (1944) and carhart (1952) utilized carrier phrases in speech audiometry with the intention of alerting the listener for the test word, and allowing the announcer to monitor his voice. The exact content of the carrier phrase was not given much consideration. Studies conducted at a later stage indicated that the operation of a preceding phoneme on a succeeding one, did influence the intelligibility of speech (Pederson, 1970; Gladstone and Siegenthaler, 1971). with a change in the carrier phrase, a variation in the discrimination scores has been noted by Kruel et al (1969), employing the Modified Rhyme test.

Gladstone and Siegenthaler (1971), using the CID W-22 test, found a difference of score of 7% as a function of carrier phrase, i.e., using different carrier phrases. An improvement of 16% was found in intelligibility when the more enhancing carrier phrase was compared with scores of the same words with no carrier phrase. They extrapolated that the intelligibility of the carrier phrase "You will say....." enhanced the scores, as the long vowel /ei/ at the end, in contrast to other endings, helped in augmenting the intelligibility. Gelfand (1975) obtained similar results, when comparing words in isolation with those

spoken with the carrier phrase "Say the word . . . . . ".

Lynn and Brotman (1981) have stated that the carrier phrase enhances intelligibility of the test words, when a prevocalic consonant (CV) is embedded in a phrase such as "You will say CV". The consonant here, is considered an intervocalic consonant ($V_1C\ V_2$), with the nucleus of the word "say" being V_1, and the nucleus of the test word being V_2. In addition, the findings of ostreicher and sharf, 1976; Sharf and Beiter, 1974, Sharf and Hemeyer, 1972, and Sharf and Ostreicher, 1972 have demonstrated that VC formant transitions provide more consonantal place of articulation information than do CV transitions; This finding substantiated the extrapolation of Gladstone and Siegenthaler (1971).

Kuehu and Moll (1972) have speculated that the carrier phrase contains acoustic cues for some manner of articulation distinction for intial consonants and also for the tongue advancement cues for syllabic nuclei of the test words. Lynn and Brotman (1981) have also postulated that the phrase "You will say . . . . . " contains perceptual cues that enhance identification of place of articulation of the initial consonant of the test word.

However, contrary to the above findings, Martin et al (1962) have found that carrier phrases are non-essential and only serve to confuse individuals who had severe discrimination problems. Father, Martin and Forbis (1978), found that the discrimination scares decline when a carrier phrase is used. Nixon (1961) found carrier phrases to have no effect on the intelligibility of words.

Considering the findings of these different investigators, it seems justified to maintain using a single carrier phrase through all discrimination testing.

f) Live Voice vs Recorded Speech material:

This has been a point of argument since the advent of speech audiometry. Each method has its merits and demerits, with regard to live voice, the results obtained by different speakers cannot always be considered as equivalent (Carhart, 1965; preusse, 1968). Each speaker's intonation, pronunciation, accent and mother-tongue, is likely to be a variable. Also, the results obtained, using the same speaker from one time to another may be a variable. In live voice presentation, there is a strong tendency for the speaker to try and articulate more clearly when the patient does not understand clearly (Langenbeck, 1965).

The main advantage of live voice testing is its flexibility. "For example, the use of monitored live voice testing with very young children and with many aged persons often provides information quickly, which otherwise might require a considerable period of conditioning or else be unattainable" (Goetzinger, 1973).

The best method to eliminate the speaker being a variable, is by making use of a single speaker's recorded speech. This makes comparison among results of different examiners possible (Carhart, 1965; Langen-beck, 1965). The unique characteristics of the talker is a constant variable in each recorded test. There is every possibility of there being as much difference between one recording and another as between two live-voice talkers (Carhart, 1965). Such a discrepancy has been demonstrated by the Rush Hughes recording of the PB-50 and the w-22. The former was compiled by Davis and others (1948) and the latter by Hirsh et al (1952). The scores were found to improve rapidly with increase in the presentation level in the W-22 list, and were near the speech reception threshold. The Rush-Hughes version was more exacting - a more gradual improvement in discrimination as the presentation level was increased. Only at extremely high levels, were the scores of W-22.

Baettie and Edgerton and Suihovec (1977) found that the Auditec of St. Louis cassette recordings of the Nu Auditory test No.6, and CID W-22 speech discrimination tests, yielded a similar articulation function, the slope being about 4.4% per dB. Each gave a speech discrimination score of approximately 95% at 32 dB SL.

All words should have the same intensity no matter whether it is recorded or presented live. In the latter condition, an AC voltmeter can be used to monitor the speech (Langenbeck, 1965).

g) The speaker as a variable:

This factor has been dealt with, to a certain extent, while discussing recorded vs live material presentation.

Kreul et al (1969), employing one of the lists of the Modified Rhyme Test, which was developed by House et al (1963, 1965), found that the test difficulty did not change significantly with reutterances of the same materials by a given speaker over two recording sessions. However, they did change significantly with the change in talkers.

Variables such as vocal parameters (Treisman, 1964) and regional dialects are factors that could

be contributing to the speaker variability. So also bis cultural, educational background, and the presence of any speech defect. Hecker (1974) determined the consonant-vowel ratio of the recordings of two male speakers of the 300 monosyllabic words of the Modified Rhyme Test, utilizing an interactive computer system. The consonant vowel ratio was computed by measuring the energy in the appropriate consonant and vowel segments. The speaker with a higher consonant vowel ratio was found to be more intelligible.

Preusse (1968) putforth a new point of view, by suggesting that a small number of speakers as two or three, do not provide an accurate evaluation in all cases. This is due to the fact that "extraordinary differences" among speakers have been found (Preusse, 1968). Due to the limited number of lists available in a single test, a large number of speakers, speaking each list, will not be possible. As a solution, he suggested to rotate a large number of speakers within each test list so that each list provides a sample of all the speakers employed.

h) Presence of background noise:

Another factor that can bring about a deviation of the expected scores in normal hearing individuals.

is the introduction of a competing stimuli along with the speech material (Carhart and Tillman, 1970; Keith and Tabis, 1970; Northern and Hattler, 1970; Rupp and Phillips, 1969). It has also been demonstrated that different background noises have different effects on speech intelligibility for normal hearing adults (Williams and Hecker, 1968). The semantic content of the competing message has a differential effect on speech discrimination, depending on the type of material being used (Garstecki and Mulac, 1974). Increading the level of noise decreases the intelligibility for a given level of speech, but it is to some extent possible to compensate for this effect by increasing the speech level (Lochner and Burger, 1961).

Dirks and Bower (1969) have given evidence that the noise background had no influence on synthetic sentence discrimination when the speaker of the sentence material and competing message arethe same. However, Garslecki and Mulac (1974) illustrated that synthetic sentence discrimination in forward competing message mode was a rather difficult task for both normal hearing individuals and those with mild to moderate sensory-neural hearing loss.

While determining the effect of pure tones on speech

intelligibility, Pearson (1977) found that in the presence of air-craft-type noise in which combinations of tones and noise are held at a constant A - level, intelligibility was either unaffected or increased by addition of tones in the 2 - 4 KHz range.

The reverberation time of the room in which the speech material was taped can also influence the speech discrimination scores.

II. VARIATIONS DUE TO TRANSMISSION

Effect of presentation level:

Discrimination scores established at low sensation levels yield poor scores, with a rise in the presentation level, the scores also increase steadily. At a particular point, an increase in the intensity does not bring about an improvement in the discrimination scores (Carhart, 1965; Boothroyd, 1968; Giodas, 1975). This particular point has been referred to as PB max when phonetically balanced words are employed.

With regard to W-22, maximum intelligibility was reached at 60 dB SPL. Above this intensity level, no appreciable improvement in score was noted. However, below 60 dB SPL, the slope of the curve was steep, indicating the dependency of discrimination scores on

intensity (as reported by Giodas, 1975).

While determining the articulation function from -4 dB SL to +40 dB SL, for the N u Auditory Test No.4, Tillman et al (1963), found it to be linear, which underwent saturation at higher signal intensities. "Almost perfect discrimination" was obtained at +24 dB SL.

Tillman and Carhart (1966) found the four lists of Nu Auditory test No.6 gave forth essentially a similar articulation function as did the Nu Auditory Test No.4. An asymptole was reached at 32 dB SL. Variability in scores was found to be greater at lower SLs, and it reduced progressively and dramatically once saturation level was reached (Tillman et al, 1963; Carhart, 1965; Rintelmann et al, 1974; Malini, 1981).

Much as it is desirable to obtain an articulation function, it is not always practical to do so in routine testing.(Boothroyd, 1968). Thus it has been suggested that for routine testing purposes, discrimination be obtained at one particular level. Davis (1948) has recommended that, while administering the PAL PB-5O word list, 110 dB SPL be used for cases with hearing loss of 55 dB or less, and at 120 dB SPL for hearing losses greater than 60 dB unless the latter causes discomfort, Carhart (1951 - 1952) suggested administering

the discrimination test at the upper limit of the comfortable level.

Making use of just one intensity level, one cannot be sure that he is determining the maximum discrimination score of the individual, unless he has got a score of 100% at that level. If the scores are lower, there is no way of knowing whether it presents the person's highest performance (Carhart, 1965).

III. THE LISTENER AS A VARIABLE

a) Effect of linguistic background of the listener:

Sapon and Carroll (1957), Singh (1966), Boothroyd (1968), Barr (1969) have shown that the discrimination scores of nonnative speakers of the language in which they were tested, were lower, than when they were tested in their native language.

Abranson and Lisker (1968), studying the discrimination of two language groups (Thai and English) which varied in phonetic category, found that the discriminability was essentially determined by specific language expressions rather than the phonetic categories.

Miyawaki et al (1975) while studying the ability of Japanese and American subjects to distinguish between

the phonemes /r/ and /l/ found that the language of the listeners played a role in discriminating, when the stimuli were in the "speech mode". No such difference was established when the subjects were presented with non-speech stimuli. Bagli (1972) noted that dialectical differences also played an important role in speech perception.

Sood (1981) found his results to be affected as he used a foreign speaker while studying the perception of time-compressed CNC monosyllables by non-native speakers of English. He did not observe the expected rise in performance with an increase in sensation level.

Experiments by Stevens et al (1969) and Terbeck and Harshman (1971) contradicted the above finding. Stevens et al (1969) using vowels, determined that linguistic experience had no effect on the discrimination of synthetic vowels. The experiment was carried out on Swedish and American listeners, in whom the vowels were phonemically distinct for one group and not for the other.

Boothroyd (1968) and Sinha (1981) have suggested that in order to overcome the influence of a nonnative language, the test should be designed such that the

word lists are appropriate to the language skills of various population. But this is not a feasible idea, especially in a country like India, where there are over 1500 dialects (Times of India Directory and Year book, 1979).

b) Instructions and other variables that may affect the listener's response:

Markides (1979) found that by instructing the listener to repeat every single phoneme identified, enhanced the discrimination scores. Asking the listener to repeat only what he identified to be meaningful, depressed the scores. Asking the listener to respond to every stimulus he heard, whether it be a part of a word, or a word which made no sense, is especially essential when scoring is done phonemically.

Other factors that are likely to affect the test scores are the listener's previous knowledge of the test, his intelligence, emotional state, attention or lack of it, fatigue, short term memory, eagerness, confusion and uncertainity, reaction time, self-conscious, ness, drowsiness, etc (Markides, 1979). Also, environmental factors such as the humidity, temperature and airation of the test room can affect the physiological state of the subjects.

c) Familiarity of the word lists as a variable:

When the familiarity of the test words is not maintained as a constant, conflicting results can arise. The review of literature discloses that word familiarity affects both recognition as well as discrimination scores (Black, 1952; Hirsh et al, 1952; Howest, 1957; Rosenweig and Postman, 1957; Postman and Rosenweig, 1957; Owens, 1961; Peterson and Lehiste, 1962; Schultz, 1964; Campbell, 1965; Boothroyd, 1968; Epstein, 1968; Boothroyd, 1970; Elkins, 1970; and Schwartz and Goldman, 1974). It is essential that the word list be in accordance with the vocabulary of the population.

Basically two main methods have been used to determine the familiarity of words

i) studies making use of a frequency count,
ii) asking individuals to rate words based on their familiarity,

i) Studies making use of a frequency count:

Recognition of words does not depend solely on the presence or absence of the word in the listener's vocabulary, but also depends on the probability of occurance of the word (Peterson and Lehiste, 1962; Boothroyd, 1970).

Research on visual and auditory perception have used an operational definition of word familiarity i.e., "a word was more or less familiar according to its frequency of usage in a language".

Some of the frequency counts that are available are Lorge Magazine count (1944). in this count, Thorndike and Lorge (1944) tabulated over 4500000 words from five widely circulating magazines from 1928 to 1938. They denoted word frequency by the number of occurances of a word in the count, other available word counts are those of Dewery (1950) and Lorge-Thorndike (1952).

Black (1952) utilizing Thorndike's word list, determined that words with higher familiarity were identified with greater accuracy, even among generally common words. He explained this on the basis of expectancy or set. Further, Black (1952) substantiated his findings based on the observation of Miller, Heise and Lichten (1951), by stating that familiar words, in a sense, 'limit' one's vocabulary. This limited vocabulary enables the individual to make lesser errors, thereby augmenting recognition.

Rosenweig and Postman (1957) found that in both English and French, the frequency of usage of a word

was the most important determiner while establishing the threshold of recognition.

Postman and Rosenweig (1957) determined the threshold of visual recognition and found it to be inversely related to the word frequency. They also brought to light that transfer with reference to training across sensory modality was possible. However, when the same sense modality was involved in training and testing, recognition improved more, than when there was a change in modality. Transfer effect was more noticeable from visual training to auditory recognition than on visual discrimination.

It has been reported that the CID W-22 list (Hirsh et al, 1952) yielded results that were better than those of PB-50 developed at Harvard psycho-acoustic lab (1944). Owens (1961) attributed this discrepancy in scores to be due to the greater familiarity of the w-22 word list. He verified this, using the Lorge count (1952). Owens (1961) also noticed a variation in familiarity from list to list, in both the above tests. This intra list variation was more marked in the PB-5O list. Thus scores obtained in one list cannot be readily compared with that of another. Furthermore, Campbell (1965) found the CID W-22 words to be "inappropriate and nonhomogenous" in word difficulty.

Confusion has arisen due to the contradictory findings with reference to the interaction of word length, familiarity and intelligibility. Longer words are known to enhance intelligibility, and so also words having a higher Thorndike rating. Black (1952) opined that the above two factors operate in auditory recognition, independant of the phonetic content. Finally, he concluded, that in order for a word to be intelligible, it should first be familiar and then, also have two syllables.

The validity of using a frequency count that is primarily based on written material, has been questioned, since the tests are auditory and not visual. However, various investigations have made it evident that using the above mentioned word frequency count, has no adverse effect on the results of the studies that made use of them.

a) Howes (1957) reported that there was a high correlation (0.75) between the Lorge-Thorndike frequency count and words used orally by college students, in addition, he also stated that any error that is present while predicting intelligibility of college students from word frequency was due to the inadequacey of the Lorge Magazine count (1944).

b) Postman and Rosenzweig (1957) gave evidence that visual training brought about an improvement in auditory recognition.

c) Also Rosenzweig (1957) showed that there was a close correspondance in written and spoken count in french.

The drawback of the studies by Rosenzweig and Postman (1957) and Postman and Rosenzweig (1957), was that they made use of population average and neglected individual differences. Thus only a rough estimate of individual usage was got. They, themselves were aware that the validity of their conclusions depended on the adequacy of the norms which were used to estimate the relative frequency of usage.

The intelligibility of a word does not depend solely on the frequency of its occurence. Pollack, Rubenstein and Decker (1959) had suggested that the frequency of occurance of the word with which it may be confused may also play an important role in the intelligibility of a word. Futher, Savin (1963), while determining the threshold of recognition, observed that not all uncommon words lead to higher thresholds - only those that lead to confusion with more common words, do so. He also noted that most subjects gate the same

incorrect response, which was usually a word that was used more commonly than the stimulus word.

Extrapolating from the findings of Savin (1963), it can be said that while establishing discrimination scores, even if the word is not so familiar, it will be identified correctly, in so far that there are no words which are more common with which they may be confused.

Oyer and Doudna (1960), while evaluating the frequency of occurenoe of incorrect responses, found them to occur in the highly familiar category (i.e., frequency of occurence of 100 or more per million). These responses were independant of the stimulus familiarity. Schultz (1964) also obtained similar results coupled with the findings that the familiar stimuli were more likely to be misidentified.

ii) <u>Rating of familiarity:</u>

Hirsh et al (1952) stressed the importance of selecting familiar words while constructing the CID W-22 list. This was done in order to minimize the effect of differences in educational background of the listeners,

To construct the test list, five individuals were asked to rate the entire psycho-Acoustic Laboratory vocabulary on a three point scale. They were asked to

rate half the words of each PAL PB-50 list as one (most familiar), 25% of the words as two (fairly familiar) and approximately 25% as three (very familiar). They found good agreement between the ratings, of the 1000 words, 120 were selected, of which 112 were rated as one, seven as two and only one as three. The remaining eighty words were selected from no specific source. Finally, the entire W-22 word lists were checked with the Thorndike list (1932) as well as the Dewey list (1950). Comparison with the Thorndike list revealed that all except one appeared on the Thorndike list. 190 words were among the 2000 most common English words, and 171 were among the 1000 most common words. Three words were relatively unfamiliar. Comparison with the Dewey list (195O) indicated that only 128 of the 200 test words appeared there, all of which were among the first 2O0O most common words on the Thorndike list.

By asking the five individuals to rate a specific percentage of words as being most familiar, fairly familiar and very familiar, while rating the PAL PB-50 words, would have acted as a bias. Moreover, Hirsh et al (1952) did not specify exactly as to what they meant by the three ratings. Thus each individual may have had different criterion while rating the words.

They do not consider words that may have been unfamiliar to the individuals. Also, the comparison with Dewey's list was not really essential, since it did not contribute any further information than what was already known.

IV. THE TESTER AS A VARIABLE

Not much attention has been paid to the role of the tester in a speech discrimination test. The linguistic background of the tester, his familiarity with the test words, his hearing acuity, his attention, fatigue and criterion for scoring the responses are significant variables.

In addition, whether it is verbal responses or written responses that he has to score may be a factor. Merrell and Aktinson (1965), while comparing written and oral responses for CID W-22, found a marked discrepancy between the two - i.e., upto 20%. The judges had a tendency to accept incorrect responses as correct, when listening to the oral responses. This they explained on the possibility that "slight aberrant vocal responses were translated as accurate" by the judges. Tweedie (1969) also found similar results.

Markides (1978), after much experimentation found that the method employed in scoring also influenced the

test scores. The two methods employed in scoring the PB words were, the number of whole words, or the number of phonemes correctly repeated, phonemic scoring was found to yield higher scores of as much as 10%.

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C H A P T E R III

M E T H O D O L O G Y

The present study aimed at determining the effect, familiarity of the test words has on the discrimination of test words of listeners. It also aimed at finding how familiar, trained and untrained testers found the same test worda.

Subjects;-

Two groups of subjects were studied:-

a) Listeners, b) Testers.

a) Twenty young adults (age range 18 years to 27 years, mean being (22 years) served as the listeners. Ten of them were males and ten were females.

b) Twenty trained testers (age range 2O to 26 years, mean being 22 years) and twenty untrained testers (age range of 19 to 26 years, mean being 22 years) scored the responses of the listeners. The trained group consisted of subjects who had more than two years of speech and hearing training.

Criterion for selection of subjects:-

1) All sixty subjects had to have English as the medium of instruction for atleast five years.

2) They were required to pass the English test "A test of English Ability".

3) Their age had to range between 18 years to 28 years.

4) Their hearing had to be normal, ie. an air-conduction threshold of less than or equal to 25 dBHL in the frequency range 250HZ to 8KHz, in both ears (ref.ANSl, 1969), and an air-bone gap of less than l0dB HL at any given frequency.

5) They should have had no history of any auditory disorder.

Apart from the above factors, the listeners had kannada as their mother tongue. Among the testers (both trained and untrained) half of them had indo-Aryan languages as their mother tongue, and the other half had indo-Dravidian languages as their mother tongue.

Material:-

a) For selection of subjects.

b) For determining the discrimination scores.

a) For selection of subjects:- The test "A test of English Ability" constructed at the Central institute of English and Foreign Languages, Hyderabad, India (1980) was administered. The subjects had to score fifty or more in order to be selected for the study.

b) For determining the discrimination scores:- To determine the intensity level at which the discrimination test had to be administered, the speech reception threshold had to be

first obtained. The CID W - 1, List A (Hirsh et al 1952) (appendix No. II) was used to obtain the SRT scores.

The four lists of CNC mono-syllable words of the NU Auditory test No. 6, Form A (Tillman and Carhart, 1966), were used to determine the speech discrimination (appendix No: III).

Recording procedure:-

The CID W - 1 and NU Auditory test No. 6 were taped in an anechoic chamber, using a tape recorded (G rundig-TK 74 5) with a tape speedi of 71/2 i.p.s.

The speaker was a young Indian male, whose English was considered to represent Indian English. He was given adequate training to monitor his voice such that the VU meter needle on the tape recorder, peaked to a constant point while he said the test words.

The carrier phrase "you will say-—R was said prior to each spondee and mono-syllable. The intensity level of the carrier phrase was maintained such that the VU meter peaked constantly at a particular point and the test stimuli was allowed to follow in a natural manner. Between each spondee a gap of five seconds was given; and between each successive CNC mono-syllable word, a silent interval of eight seconds was maintained.

A l000Hz Calibration tone, recorded from a beat frequency oscillator (B and K 1022), was introduced before each list. This was done in order to be maintain the intensity of the input signal from the tape recorder while obtaining the speech speech reception threshold, as well as the speech discrimination.

Instrumentation:-

A spool tape was played on the tape recorder (Uher SG 631), the output of which was fed to the tape input of the clinical audiometer (Madsen OB7O). The output of the audiometer was given to ear-phones (TDH - 39) housed in ear cushions (MX - 41/AR). Calibration of the audiometer was done regularly (ANSI, 1969). The frequency characteristics of the ear phones were also obtained (appendix V).

Test Environment:-

The tests were administered in a sound treated rooms. A two room situation was used. The noise levels in the test room was measured using a sound level meter (B and K 2209) with an octave filter set (Band K 1613) and a condensor microphone (B and K 4165). The noise levels were within the permissible limits.

Test Procedure:-

The pure tone, airconduction and bone-conduction thresholds were obtained for the frequencies 250 Hz to

8 KHz and 250 Hz to 4 KHz respectively, for all sixty subjects. The modified Hughson-Westlake procedure was utilized (Carhart and Jerger, 1959).

For all the listeners, the speech reception threshold of the test ear, which was chosen randomly, was obtained - using the CID w - 1 spondee test. The procedure used was that employed by Rintelmann and his associates (1974). The subjects were first familiarized with the test, by reading out the list in an alphabetical order, in a face to face situation. The instruction given were "You will hear the words that I read to you over the ear-phone, but in a different order. Before each word you will hear the phrase 'you will say----- '. Repeat the word that follows the phrase. You may guess the words if you are not sure of them. Do you have any questions?"

The SRT was determined by first presenting two spondees at 30 dB HL. If the spondees were correctly repeated, the intensity was reduced in l0dB steps. Two spondees were presented at each level. This procedure was continued untill the subject failed to repeat both the spondees. The intensity was then increased by 8 dB and there-after attenuated in 2 dB steps, with two spondees presented at each level. The descent continued till the subject missed five out of six words. The lowest level at which the subject repeated both words correctly minus

1 dB for those words repeated correctly from then on, was taken as the SRT.

Following this, the speech discrimination was obtained for the listeners. The four CMC word lists of NU Auditory Test No.6, Form A, was used to establish the speech discrimination.

Response sheets were supplied to the listeners and the following instructions were given to they, "You will hear four lists of words over the ear-phone. Each list, which contains fifty words, will be heard at a different intensity. Before each word you will hear the phrase 'you will say---—- '. Write down the word that follows the phrase on the sheet given to you, against the appropriate serial number. Simultaneously say the word out aloud. Do you have any questions?"

At this stage, the testers were introduced into the testing set up. Each listener had two testers score his responses. The two testers were either both trained, both untrained or one trained and one untrained. The testers were seated behind the listener at a distance of about three feet. Each of the testers was given response sheets and then given the following instructions, "You will hear the listener give oral responses to the stimuli he hears over the ear-phones. You are required to write

down these responses against the appropriate serial number on your response sheet. Do not ask the listener to repeat his responses, and do not discuss the responses with each other. Do you have any questions?"

Each listener heard each of the four lists of the NU Auditory Test No.6 at any of the following sensation levels, 8dB HL, 16dB HL, 24dB HL, 32dB HL, and 40dB HL. The test level combination was randomized such that no intensity was repeated for any one listener. The test ear was chosen randomly.

While presenting the spondees as well as the CHC mono-syllables, the tape recorder gain was adjusted so that the VU meter on the audiometer peaked at '0' on presentation of the lOOOHz tone.

Scoring:-

The responses were scored manually as being right or wrong. A 2% score was assigned for each correct response. The percentage of scores at each sensation level was determined.

Testing for familiarity of the test words (NU Auditory Test No. 6):-

All the words from the four lists were arranged alphabetically. Thirty CNC mono-syllable words that were not present in the four lists were included. Thus there

were 230 words in all. This was done in order to prevent the listeners and the testers being over familiar with the test items prior or after the speech discrimination was determined.

The words were read out to the subjects in a quiet room, and they were asked to rate the words on a four point scale based on familiarity: ie. highly familiar, familiar, just familiar and un-familiar. Highly familiar indicated those words the individual knew the meaning of, and used it in communication. Familiar were those words they knew the meaning of, when given in a context and used some times. Just familiar indicated those words the subject had come across but were not sure of the meaning. Un-familiar represented those words they were not at all familiar with. Besides the above instructions the subjects were also told that if they did not follow a particular word, it would be spelt out to them.

Both the listener and the tester were required to rate this familiarity check list. The testers were given the test prior to the administration of the speech discrimination test. A gap of atleast a week was given between the two tests to allow the effect of the familiarization of the test words to wear off. The listeners were administered the familiarity rating test after the speech discrimination test.

The data thus obtained was subjected to statistical analysis.

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C H A P T E R -IV

R E S U L T S

The obtained data was analyzed to determine:

a) the effect of word familiarity on the discrimination scores- of the listeners.

b) the effect of familiarity on the discrimination scores at different intensity levels, for the listeners.

c) Whether the trained testers were significantly different from the untrained testers with respect to their familiarity of the test words.

Chi square test was utilized to analyze the former. To compute the latter two parts, analysis of variance for unequal observations per cell, as described by Winer (1971) was used.

Analysis of variance indicated that both the listeners and the testers found a majority of the words "highly familiar". On an average, the sixty subjects found 187 words to be "highly familiar", 6 words= "familiar", 4 words "just familiar" and 3 to be "unfamiliar."

Further the following analysis were carried out:

a) Effect of word familiarity on the discrimination scores of listeners:- Chi square analysis revealed that there was significant difference between the correctly discriminated and wrongly discriminated test words with respect to

familiarity at the 0.01 level of significance. This indicated that words that are "highly familiar" to an individual, have greater probability of being correctly discriminated than those that are not so familiar. The contingency coefficient was found to be O.22 which was statistically significant.

b) Effect of familiarity of test words on discrimination scores at different intensity levels, for the listeners:

Analysis of variance indicated that the listener's familiarity with the test words had no influence on their discrimination scores, when the words were presented at different sensation levels, viz. 8dB SL, 16 dB SL, 24 dB SB, 32dB SL and 40dB SL, even at the 0.05 level of significance. This shows that familiarity of the test words played a similar effect an the individual's ability to discriminate the same words, regardless of whether they were presented at a difficult listening level, ie. low sensation level, or at an easy listening level, ie high sensation level (Table.1). However there was a steady increase in the ratio between correctly discriminated words and their familiarity (called the discriminability - familiarity ratio or D/F ratio), with an increase in the sensation level, though not a statistically significant one.

Table-I

Findings of the Two-way Analysis of variance for the D/F ratio at different intensities

Source of variation	Sum of squares	Degrees of freedom	Mean Scores
A. D/F ratio	-16.05	1	- 16.05
B. Intensity	1.2	4	0.3
A.B interaction of D/F ratio and intensity	16.5	4	0.38
Within cell	4.3	107	0.04

* significant at the 0.01 level of significance.

c) Inter list difference in familiarity:-

The means of the familiarity rating for each list was determined. Lists III and IV were found to have the greatest number of "highly familiar" words ie 48 each, followed by list I and list II having 47 and 45 highly familiar words respectively.

d) Difference between trained and untrained testers with respect to familiarity of the test words:

Two way analysis of variance revealed that there was no significant difference between trained and untrained testers with respect to their familiarity with the test words even at the 0.05 level of significants. (Table II)

Table II. Findings of the two way analysis of variance showing the difference in word familiarity between trained and untrained testers.

Sources of variation	Sums of squares	Degrees of freedom	Mean scores
A. Between groups. trained vs untrained	0	1	-
B. Difference in familiarity		3	*12.24
A.B Interactior	0.73	3	0.24
Within cell	20.65	626	O.032

* Significant at the 0.01 level of significance.

e) <u>Words that were not found highly familiar:</u>

The following words include those that were not found "highly familiar" by a majority of subjects (ie. 55% and more): ie. dab, dime, keg, haze, lore, nag shack and yearn.

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CHAPTER – V

DISCUSSI0N

The results obtained in the present study have been discussed in terms of the effect of familiarity of the teat words on the discrimination of the scores and also in terms of the familiarity difference of trained and untrained testers of the same test words.

The effect of word familiarity on the discrimination SCORES OF listeners:-

The statistical analysis revealed that an individual's familiarity with a test word, played a significant role in his ability to discriminate it. These findings are in accordance with those of Black, (1952), Owens, (1961), Schultz, (1964). This indicates that words that are highly familiar have a greater probability of being discriminated correctly.

Lajon (1968) stated that subjects look for meaning in the stimuli they recieve. This aids them to correctly discriminate the words. Thus unfamiliar words, not containing the necessary meaningful context, have a greater chance of not being correctly identified.

Though not statistically significant, the responses refealed that some words, despite being rated as highly familiar, were wrongly discriminated. This could be

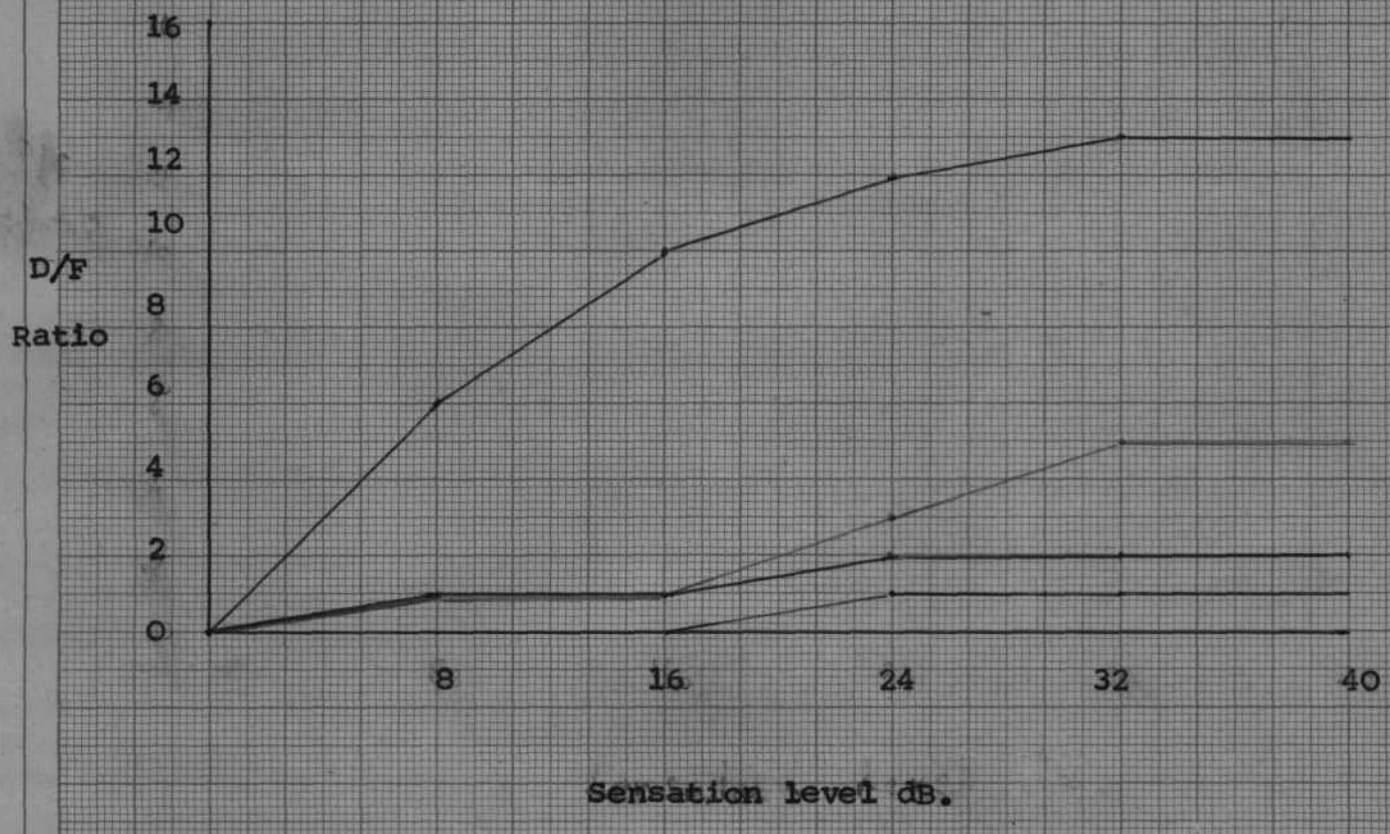
explained baaed on Savin's (1963) and Schultz (1964) observation that only words that lead to confusion with more common words get wrongly identified. They noted that the error words were invariably more common ones than the stimuli. Thus, despite the stimulus word having been rated as highly familiar, of the two, (the stimulus word and error word) the error word could have been a more frequently used one, and hence more familiar than the stimulus word.

Effect of familiarity of words on discrimination scores different sensation levels:-

With increasing sensation level, the discriminability - familiarity ratio (D/F ratio) showed no statistical significance. However, there did exist a gradual increase in the D/F ratio with increase in sensation level (figure - 1). This increase was more evident for 'highly familiar' and 'familiar' words and no for the 'just familiar' and 'unfamiliar words'. This shows that sensation level did interact to some extent with the 'highly familiar' and 'familiar' words, though not to a significant extent. Nevertheless, the increase in sensation level did not enable the individuals to discriminate 'just familiar'and 'unfamiliar' words more accurately as it did for 'highly familiar' and 'familiar' words. Thus,

EFFECT OF SENSATION LEVEL ON THE D/F RATIO

Figure - 1



even under an easy listening condition, ie. at a higher sensation level, the listeners wrongly identified the'just familiar' and 'unfamiliar' words.

Difference in testers (trained Vs untrained) with respect TO familiarity:-

No significant difference existed between trained and untrained testers with respect to their familiarity with the test words. Elizabeth (1983) using a similar methodology, as was used in the present study, found no difference between trained and untrained testers; in their ability to score the oral responses of the NU Auditory test No.6. possibly no difference existed between the scoring ability of the two groups, since they did not differ in their familiarity of the teat words.

It was established that both trained and the untrained testers were not "highly familiar" with all the test words. It can be extrapolated from the findings of the listeners^ that the testers familiarity with the test words can affect their discrimination ability, and thus affect their scoring when oral responses are being scored. Thus to avoid the testers familiarity of the test words affecting the scores, it would be advisable to obtain written responses from the listeners.

CHAPTER -VI

SUMMARY AND CONCLUSION

The purpose of the present study was to examine, the effect familiarity of test words (NU Auditory test No.6) had on the speech discrimination scores of listeners and also to investigate how familiar the trained and untrained testers found the same word lists.

The test was undertaken in order to determine why Indian subjects tested by Malini (1981) and Sood (1981) consistently obtained lower speech discrimination scores than the native listener tested by Rintelmann et al (1974) using the same speech discrimination test, NU Auditory Test No.6.

Two groups of subjects were tested a) twenty listeners, and b) forty testers, of whom, twenty were trained testers and twenty were untrained testers.

All the subjects were required to have an adequate knowledge of English which was determined using a English test, have normal hearing, and be within the age range 18 years to 28 years.

Each listener was administered NU Auditory Test No.6. Each listener heard all four lists each being presented at any one of the five sensation levels. The lists and

levels were randomized such that no list or intensity level was repeated for a single individual.Both oral and written responses were obtained from all the listeners. Two testers scored the oral responses; of each of the listeners;by writing down what they heard.

All sixty subjects were also required to rate the same test words on a four point scale based on how familiar they found them.

The data collected was subjected to statistical analysis: The analysis indicated that:-

a) There existed a relation between a listener's familiarity of the test words and his ability to discriminate them. Words that were highly familiar were correctly discriminated more frequently than those which were less familiar. This was statistically significant at the 0.0l level of significance.

b) The listener's familiarity with the test words had no influence on their discrimination scores, when the words were presented at different intensity levels.

c) Mean familiarity rating of the test words indicated that list III and IV had the greatest number of highly familiar words(48). List I and list II had 47 and 45 words respectively.

d) There was no significant difference between trained and untrained testers with respect to their familiarity with the test words.

Implications of the present study:-

IL) Words that are not highly familiar to the majority of the individuals who were tested, should be excluded from the word tests, as they influence their speech discrimination scores despite the fact that they have normal hearing.

2.) The tester's familiarity with the test words is further likely to influence the discrimination scores, as they also found some of the words not highly familiar, in such case it is advi6able to obtain written responses rather than oral responses from the listeners.

Suggestions for further research:-

1) Determine whether the error responses to a test stimuli is more familiar than the test word as such.

2) Is there any difference between written and oral response scoring. If such a difference does exist it would indicate that either the pronounciation of the listener or the perception of the tester influences the test scores.

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3/3/3/3/3/3/3/3/3/3/3

APPENDIX I

A TEST OF ENGLISH ABILITY

(CIEFL DB 2B 1980)

SECTION A

(I) Write suitable articles in the blanks in the following sentence

(1) This is_____worst thing that could have happened.

(2) Mr. Shankar is_____honest man.

(II) write suitable prepositions in the blanks in the following sentences

1. He was born_____the summer_____1969.
2. She fell unconscious_____hearing the shocking news.

(III) Write suitable pronouns in the blanks in the following sentences

1. The children have gone for a holiday with_____parents.
2. Is this cycle_____? I've seen you using it.

(IV) Write suitable articles, prepositions or pronouns in the blanks in the following sentences

1. The Children are scaredof him because_____shouts at

2. The doctor has advised_____to live_____fruits along, as he found that she had_____very bad liver.
3. There are_____number of good films in Hyderabad now. I want to see them all. To do that, I must see then at_____rate of one a day. Even then, I am afraid I may miss some_____them.

(V) Insert suitable articles, prepositions or pronouns wherever necessary in the following sentences

Example: Mt. Everest is the highest peak in the world.

1. As there is lot of money in bank thieves are attracted by it.

2. I asked the teacher to explain me the new topic in science.
3. The Principal wants you to inform as soon as you arrive.
4. Talking about the accident, she said she had seen with own eye.
5. If you are in need of anything ask it.

SECTION B

(I) insert the right form of the verb given in brackets into each of the following sentences

1. He_____(go) there yesterday.
2. She_____(go) to school by bus everyday.
3. I must_____(meet) the Principal tomorrow.
4. He_____(have) bis tea when I_____(telephone) him yesterday.
5. He_____(live) here since 1934.

(II) Put a ( ) mark against all the sentences which are grammatically correct and an (X) mark against those not grammatically correct.

1. Last year I walk to school everyday. /_____/
2. Last year I have walked to school everyday. /_____/
3. Last year I walked to school everyday. /_____/
4. Last year I was walk to school everyday. /_____/
5. Hari did not came to class. /_____/

6. Hari has not come to class.

7. Hari has not came to class.

8. Hari does not come to class.

9. Kamal was been swimming since sunrise. /_____/

10. Kamal swimming since sunrise. /_____/

11. Kamal swims since sunrise. /_____/

12. Kamal has been swimming since sunrise. /_____/

(III) Make questions whose answers will be the following statements. Use the words given in the brackets to begin the questions.

1. The students like Science fiction, (what)

2. Hari has broken my glasses. (Whose)

3. The Children go to school by bus. (How)

SECTION C

(I) Read each sentence and decide if there is any error in any underlined part. Write the letter of the wrong part in the box. If there is no error write the D. (NE stands for 'NO ERROR')

1. An object (A) normally becomes (B) hot when place itin thesun.(NE) (C) /___/ D

2. Ranjit and his sister (A) are studying (B) in same school. (NE) (C) /____ / D

3. Balu and brother (A) came to my (B) house last night. (NE) (C) /___/ D

4. She does not know anyone who works in that office(NE) / /
   A B C D

5. Why did you gave him my book? (NE) / /
   A B C D

6. I did not been able to pay my fees yet.NE / /
   A B C D

7. It was difficult for me to hearing the speaker. (NE) / /
   A B C D

8* The police complain that cyclists seldom observe traffic
   A B C
   rules. (NE)
   D

9. Mother asked to my friends why they were leaving so
   A B
   soon. (NE)
   C D

10. I still do not understand that how a steam engine works.
    A B D
    (NE) /_____/
    D

11. You will losezyour purse unless you are not careful.
    A B C
    (NE)
    D

12. We searched every where but could not anywhere find
    A B C
    the watch. (NE) /_____/
    D

13. A friend of her told me that she has passed. (NE) / /
    A B C D

14. The principal himself must sign both the copies
    A B
    of the application. (NE) /___/
    C D

15. I was sure he would join this college although he did not do so. (NE) / /
A B C D

SECTION D

(1) Seclect words from the list given to fill in the blanks in the sentences:

List of words:

is	what	who	although
are	when	whom	because
was	where	whose	However
were	which	that	therefore
am	while	so that	but

1. He left the place early he could reach home before sunrise.
2. I thought he would join the college _____ he did not do so.
3. When I telephoned him yesterday he told me _____ he _____ returning only next week.
4. _____ are the candidates _____ are to be interviewed today?
5. He does not have the needed qualifications. _____ he has been given a temporary appointment.
6. _____ the rains came late, farmers are hopeful of a good crop.

(II) Rewrite the following sentences correcting the mistakes in them:

1. He used to laughing at others.

2. How you open this gate?

_____

3. He has left the college in 1978.

_____

4. Can you tell how does it work?

_____

5. Having booking the ticket much in advance, we enjoyed a comfortable journey.

_____

_____

6. The man whom I met him yesterday is the new warden.

SECTION E

Read each passage and the statements that follow it.

Decide whether each statement is true or false, according to the passage, and put a /____/ or a /x/ in the box.

(I) Rani asked Raju if he wished to own a scooter. He said he did not mind spending seven thousand rupees on buying one. But he could not spend two hundred rupee a month just for maintaining it.

1. Rani wants to sell a scooter for Rs. 7000/- /___/

2. Raju cannot imagine spending so much money on a scooter. /___/

3. Raju can afford to pay Rs.7000/- for a scooter. /__/

4. Raju thinks that maintaining a scooter is expensive. /__/

(II) "No!" said Julie's father. "It's not right to keep a dog in a flat in the middle of a big town. Wait for a few weeks. The we will have our own house with a garden."

5. Julie had asked her father to get a pet dog. /____/

6. Julie's father does not like pet dogs. /____/

7. Julie's family were about to move to a new house.

(III) When my aunt was young there was no electricity or running water in the house. She used to walk half a mile everyday to fetch water from the village well.

8. My aunt walks half a mile everyday. / /

9. She does not go to the village well now. / /

10. She usually fetches water from the well. . /____/

(IV) We lived in Hyderabad many years ago. we were there for four years. Then my family moved to Madras. We haven't been to Hyderabad since then.

11. We are now living in Madras. /____/

12. We used to live in Hyderabad. /____/

13. We visited Madras from Hyderabad four years ago. /

14. We lived in Madras for four years before returning to Hyderabad. /____/

15. We haven't visited Hyderabad for many years now. /____/

SECTION F

(I) Read the passage carefully and answer the questions that follow:

The frail man wearing a jibba and dark glasses, and carrying a walking stick, was a familiar figure all over India. One day, people returning home from offices in Madras were surprised to find him walking along the road to the central Railway station just like an ordinary man. There were surprised looks and excited inquiries, people asked one another, "Why is he walking in this crowd? It could be dangerous". The man they were talking about

was Chakravarthi Rajagopalachari, the Chief Minister of Madras State. When Rajaji, as he was popularly and affectionately known, was asked why he was going to the station on foot, he had a simple answer. He had actually come by car. But the traffic jam near the station had forced the car to stop. He had to reach the station in time, so he had got out of the car and was walking, in any case, he did not see any reason why he should not walk a few steps even though he was the Chief Minister of the state*

1. At what time of day did people see Rajaji walking on the road?

   (a) early in the morning (c) at about l0.OO a.m.

   (b) late at night (d) at about 5.00 p.m. /____/

2. What information suuports your answer to question 1?

   a) He was carrying a walking stick.
   b) He was wearing dark glasses.
   c) The road near the station was corwded.
   d) People were returning home from offices. /____/

3. There were surprised looks and excited enquiries because

   a) It was dangerous for a minister to walk in a crowd.
   b) Rajaji's train might have been delayed.
   c) the Chief Minister was walking along the road.
   d) the crowd had forced the Chief Minister's car to stop but he was facing the situation bravely. /____/

4. Rajaji's reason for walking to the station was that

   a) he believed in simple Gandhian principles.
   b) he thought walking would be more effective in the traffic jam.
   c) his popularity depended on being close to the common man,
   d) the crowded was hostile and he would be safer in the station. /____/

5. "In any case, he did not see any reason why he should not walk . . . . . ". This statement indicates that Rajaji felt that ministers should

   a) always walk and set an example.
   b) be prepared to walk whenever it seemed necessary.
   c) walk on the steps of buildings, not on the roads.
   d) help prevent traffic jams by not using big official cars. ,

6. Find the word nearest in meaning to the word in capitals which occurs in the passage.

FRAIL: a) fierce b) weak c) important d) simple.

INQUIRIES; a) rumours b) slogans c) questions
d) notices /_____/

ACTUALLY: a) really b) usually c) earlier
d) accidentally. /____/

APPENDIX II

CID W-l

1. Grey hound
2. School boy
3. Ink well
4. White wash
5. pan cake
6. mouse trap
7. Ear drum
8. head light
9. birthday
10. duck pond
11. side walk
12. hot dog
13. padlock
14. mushroom
15. hardware
16. workshop
17. Horse shoe
18. arm chair
19. base ball
20. Stairway
21. Cowboy
22. Iceberg
23. North west
24. Rail road
25. Play ground
26. airplane
27. wood work
28. oat meal
29. tooth brush
30. Fare well
31. grandson
32. drawbridge
33. door mat
34. hot house
35. daybreak
36. sun set

//*/*/*/*/*/*/*/*/*

APPENDIX III

N.U. Auditory Test No.6

	List I	List II	List III	List IV
1.	Land	pick	base	pass
2.	boat	room	mess	doll
3.	pool	nice	cause	back
4.	nag	said	mop	red
5.	limb	fail	good	wqsh
6.	shout	south	luck	sour
7.	sub	white	walk	bone
8.	vine	keep	youth	get
9.	dime	dead	pain	wheat
10.	goose	loaf	date	thumb
11.	whip	dab	pearl	sad
12.	tough	numb	search	yearn
13.	puff	juice	ditch	wife
14.	keen	chief	talk	such
15.	death	merge	sing	neat
16.	sell	wag	germ	peg
17.	take	rain	life	mob
18.	fall	witch	team	gas
19.	raise	soap	lid	check
20.	third	young	pole	join
21.	gap	ton	road	lease
22.	bat	key	shall	long
23.	met	calm	late	chain
24.	jar	tool	cheek	bill
25.	door	pike	beg	hole

Appendix III Continued..

	List I	List II	List III	List IV
26.	love	mill	gun	lean
27.	sure	hush	jug	tape
28.	knock	shack	sheep	tire
29.	choice	read	five	dip
30.	hash	rot	rush	rose
31.	lot	hate	rat	came
32.	raid	live	void	fit
33.	hurl	book	wire	make
34.	moon	voice	half	vote
35.	page	gaze	note	judge
36.	yes	pad	when	food
37.	reach	thought	name	ripe
38.	kind	bought	thin	have
39.	home	turn	tell	rough
40.	rag	chair	bar	kick
41.	which or witch	lose	mouse	lose
42.	week	bite	hire	near
43.	size	haze	cab	perch
44.	mode	match	hit	shirt
45.	bean	learn	chat	bath
46.	tip	shawl	phone	time
47.	chalk	deep	soup	hall
48.	jail	gin	dodge	mood
49.	burn	goal	size	dog
50.	kite	far	cool	should

APPENDIX IV

'CALIBRATION PROCEDURE :

Pure tone Calibration:-

Both frequency and intensity calibration was done for the pure tones generated by the clinical audiometer (Madsen OB 70).

1) intensity Calibration:

Intensity calibration for air conducted tones were carried out with the output of the audiometer set at 70dBHL (ANSI, 1969), through the ear-phones (TDH 39 with Mx-41/AR ear cushions) the acoustic output of audiometer was given to a condencer microphone (B and K 4144) which was fitted into an artificial ear (B and K 4152). The signal was then fed to a sound level meter (B and K 22O9) through a pre-amplifier (Band K 2616). The SLM was fitted with a half inch to one inch adapter (B and K, DB 0962). At each of the test frequencies, ie. 250 Hz to 8 KHz, the output SPL value was noted. A discrepancy of more than 2.5 dB between the observed SPL value and the expected value (ANSI Stds, 1969), was corrected by means of internal calibration, by adjusting the presets in the audiometer.

Intensity calibration for the bone vibrator (X120 - Denmark) was done, for the frequencies 250 Hz to 4 KHz. The output of the audiometer was set at 40 dB Hl (ANSI, 1969).

From the bone vibrator (X- 120 - Denmark) the acoustic signal was fed to the artificial mastoid (B and K 4930). This output was than fed via a pre-amplifier (BandK 2616) to the SLM (B and K 2209). A difference of more than + 2.5dB between the observed SPL value and the expected value, (ANSI standards, 1969), was internally calibrated. Thus the output of the audiometer was maintained within 2.5dB of the standards (ANSI, 1969).

ii) Frequency Calibration:

A time / counter (Radart 203) was utilized to calibrate the frequency of the puretones. The electrical output of the audiometer was fed to the counter which gave a digital display of the generated frequency. The difference between the dial reading on the audiometer and the digital display of a given frequency, did not exceed + 3% of each other.

iii) Calibration of Tape input:

To check the calibration of the tape input, the following two measurements were done- a) using puretones and b) using speech noise.

Four puretones, 500HZ, 1KHz, 2KHz and 4KHz, were taped on a magnetic tape recorder (Uher SS 631) from a clinical audiometer (Beltone 200C), by internal taping.

The output of the four frequencies were maintained constant by adjusting the VU meter on the tape recorder to zero. The frequencies of the audiometer (Beltone 200 C) had been checked earlier and found to be satisfactory.

The tape-recorder output was then given through the tape input of the clinical audiometer (Madsen OB7O). The tape input was set to 70 dBHL and the intensity levels of the frequencies 500HZ, lKHz, 2KHz and 4KHz tones were found to be within + 3dB with reference to the lKHz tone. All the measurement was done using a set up, identical to the intensity calibration of the puretones using earphones.

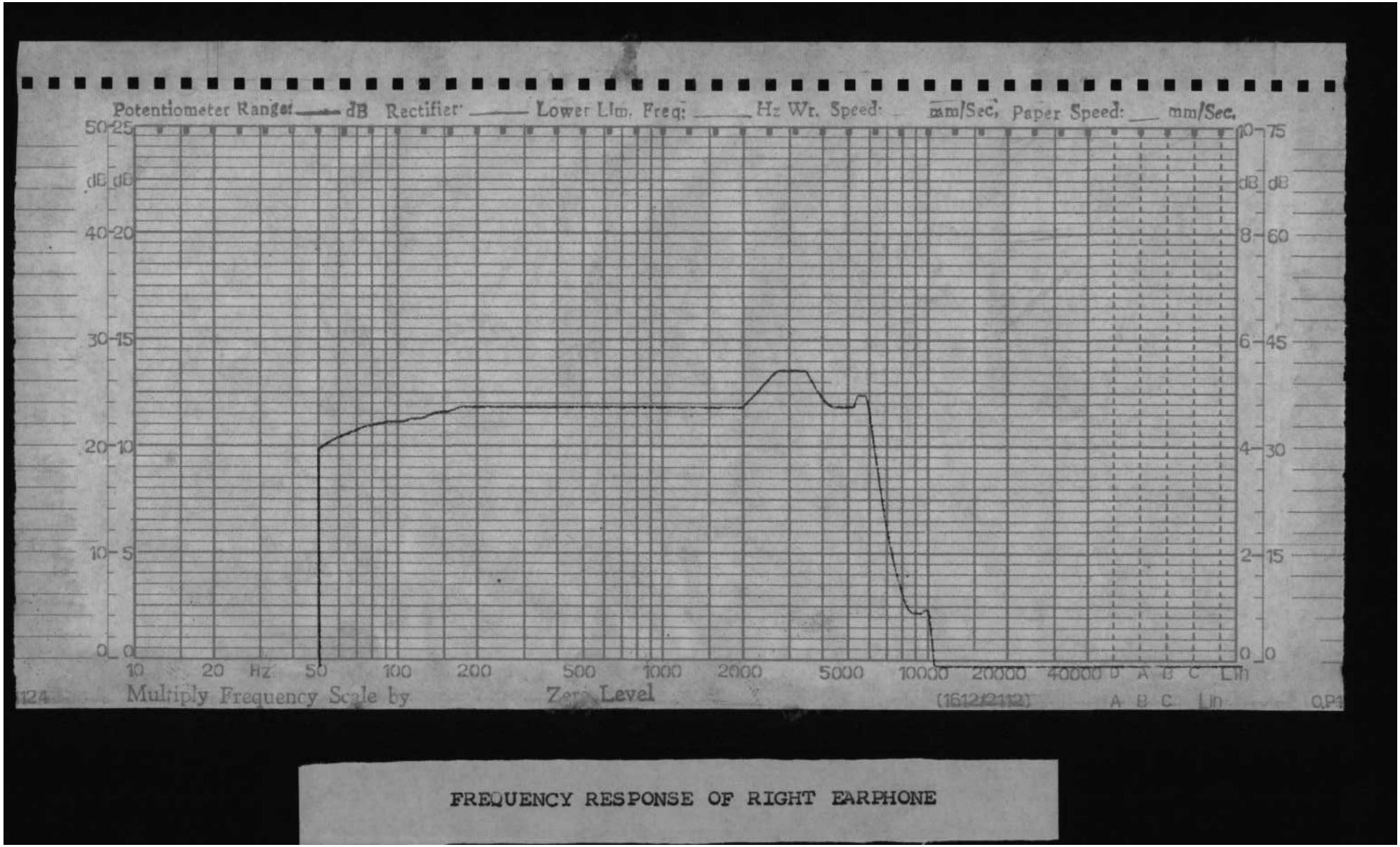
iv. The tape output of the audiometer was checked using a speech spectrum noise which was taped on a magnetic tape using a tape recorder (Uher SG 631). Direct taping was done from the audiometer Beltone 200C.

There after the tape was fed to the clinical audiometer (Madsen 0B70), with the intensity dial set at 70 dBHL. The output was taken out through ear-phones (TDH 39, with MX - 41/AR ear cushions), using a setup similar to that used while determining the intensity calibration of air-conducted puretones, the intensity of the speech noise was found which was in agreement with the ANSI (1969) specifications.

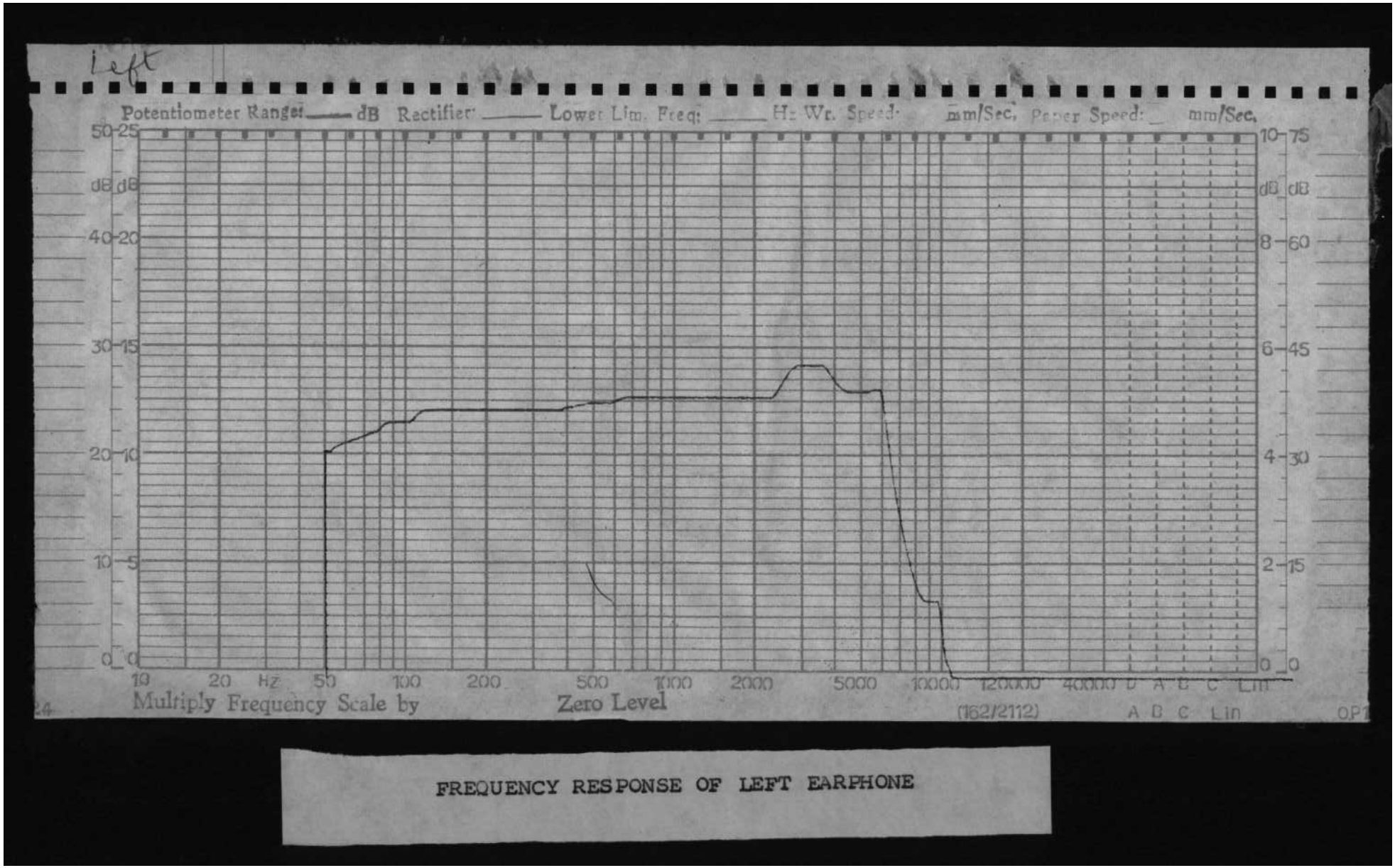
v. Earphone Frequency Response Characteristics:

A beat frequency oscillator (B and K 1022) and a level recorder (B and K 2305) were utilized to establish the frequency response characteristics of the earphones. Frequency calibration had been previously carried out for the BFO using a timer / counter (Rodart 203). The electrical output of the BFO were fed to the earphones (TDH 39, with MX- 41/AR ear cushions) that were used during the study. The earphone output was picked up by a microphone (B and K 4144) which was connected to a pre-amplifier (B and K 2616). Further, this output was fed to a level recorder (B and K 2305). Thus a graphic recording of the frequency response of the earphones was established on recording paper, (appendix V).

A P P E N D I X



FREQUENCY RESPONSE OF RIGHT EARPHONE



FREQUENCY RESPONSE OF LEFT EARPHONE

APPENDIX VI

The Noise levels in the test room were as follows;

Octave Frequencies in Hz	Level in dB SPL
125	30
250	21
500	12
1000	12
2000	10
4000	10
8000	10
C-Scale	33

//*/*/*/*/*/*/*/*/*