THE TONE IN NOISE TEST IN NORMALS

Register No.8708

AN INDEPENDENT PROJECT IN PART FULFILLMENT OF FIRST YEAR M.SC. IN SPEECH AND HEARING SUBMITTED TO THE UNIVERSITY OF MYSORE.

ALL INDIA INSTITUTE OF SPEECH AND HEARING: MYSORE -570 006

MAY 1988

To,

MY DEAREST VARADBAPPA

He remains to me a vivid, living personality, with a keen intellect and a fine sense of humour, whose devotion to his family, his friends and his profession makes him memorable to all those who knew him....

CERTIFICTE

This is to certify that the Independent Project entitled: "The Tone-In-Noise test in Normals" is the bonafide work in pact fulfillment of I year M.Sc., in Speech and Hearing, of the Student with the Register No. 8708.

Dr.N.Rathna
Director,
All India Institute of
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Mysore - 570 006.

CERTIFICATE

This is to certify that the Independent Project entitled: "The Tone-In-Noise Test in Normals" was done under my guidance and supervision.

Dr.M.N.Vyasamurthy
GUIDE

DECLARATION

This Independent Project ia the result of my own work undertaken under the guidance of Dr.M.N.Vyasamurthy, Department of Audiology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at atny University for any other Diploma or Degree.

Mysore

May 1998 Register No.8708

ACKNOWLEDGEMENT

My gratefulness to my guide Dr.M.R.VYasamurthy, Department of Audiology, All India Institute of Speech and Hearing, Mysore.

I am grateful to Dr.N.Rathna, Director, AIISH, Mysore for providing me an opportunity to carry out this study.

I extend my thanks to Dr.s.Nikam, Professor and Head of the Department of Audiology.

My sincere thanks to Dr.Ching Pang, Honolulu and Mrs. Roopa.

Thanks to Satya, Soumi and Nagpurnima for their timely help.

Special thanks to Kavitha and Deepakraj - friends in need and friends indeed.

Hearty gratefulness to my parents and my brother - they are everything to me,
and

Special thanks to a very special person, who fills me with confidence everytime i see her. Who gives me a reason to live everytime i meet her ... wonder if She knows it.

Thanks to Ms.Rajalakshmi R Gopal for typing this manuscript.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

"Functional hearing loss" or "Pseudohypacusis" refers to any hearing loss which has no organic basis. It designates auditory dysfunction for which no plausible anatomical or chemical basis can be found. The term includes auditory disorders ranging from conscious purposeful malingering to unconsious apparently purposeless disorder called psychogenic deafness (Glorig, 1965).

The causes of non-organic hearing impairment are not known, although, plausible contributing factors occasionally can be identified. Generally, two explanations are advanced to justify a malingerers actions. First*, he may be attempting to shut off all or a portion of his hearing environment because, what he hears imposes a psychological threat.Second,the patient gains something directly by feigning a hearing loss. The motivations for functional hearing loss may range ever a continuum from wholly conscious to wholly unconscious. In many a functional hearing loss may be superimposed on a true organic deficit, in which case the functional component is called as a 'functional overlay'.

It is known that, patients with functional hearing loss employ a figurative yardstick of loudness and, their response to an auditory stimulation is in relation to this loudness yardstick employed. Therefore, they fail to respond to any sound which is fainter than their self-imposed loudness yardstick. The solution for detecting a functional hearing loss would be to disturb the patients loudness yardstick so that, he has no reliable means of determining the loudness of the stimulus. The sensitivity of a test for pseudohypacusis therefore, depends on its efficiency in breaking this loudness yardstick (Glorig, 1965).

A wide range of tests and methods are available for the identification of pseudohypacuais. One such test is the "TONE-IN-NOISE" test (Pang-Ching, 1970), which uses ipsilateral masking as a device to disturb the figurative loudness yardstick used by the patient. Being a simple puretone test,it can be used in regular clinical practice as a screening test for functional hearing loss. The difference between thresholds for puretones in quiet and thresholds in noise is the measure taken in tone-in-noise test. Introduction of noise may cause elevations in auditory thresholds which suggest nonorganic hearing disorder. The present study deals with the establishment of norms for the TIN test. The amount of threshold shift that can be expected using the test on normal hearing subjects, is found. The results obtained are compared with the threshold shift found when the subjects are asked to feign a hearing loss. This indicates the clinical validity of the test to identify patients with functional hearing loss.

Null Hypothesis: There will be no significant difference in the threshold shifts found in a group of normals and those who feign a hearing loss.

Sub-Hypothesis: There will be no atatiatically significant difference in the threshold shifts found in -

a) a group of normals and a group of subjects who simulate a hearing loss at 500Hz in the right ear.

b) a group of normals and those who feign a hearing loss at 1000Hz in the right ear.

c) a group of normals and thoae who feign a loss at 2000Hz in the right ear.

d) a group of normals and those who feign a loss at 500HZ in the left ear.

a) a group of normals and those who feign a loss at 1000Hz in the left ear.

f) a group of normals and those who feign a loss at 2000Hz in the left ear.

9) in the right ear and left ear for normals at 500Hz.

h) ia the right ear and left ear for normals at l000Hz.

i) in the right ear and left ear for noemale at 2000Hz.

j) in the right ear and left ear for the group who feign a loss at 500Hz.

h) in the right ear and left ear for the group who feign a loss at l000Hz.

l) in the right ear and left ear for those who feign a loss at 2000Hz.

CHAPTER II

REVIEW OF LITERATURE

Over the years, a number of terms have been used to describe a hearing loss which cannot be explained on the basis of the pathology in the auditory system. These include: functional hearing loss, non-organic hearing loss, psychic deafness, psychogenic deafness, auditory malingering, pseudohypacusis, etc. Functional hearing loss may be related to monetary gains. and/or to a desire to avoid specific situations, etc. In some, a functional hearing loss may be superimposed on a true organic deficit in which case it is referred to as a 'functional overlay'.

The prevalence of functional hearing lota is estimated as less than 3% in the general population, about 7% in children between six to seventeen years of age and between about 10 to 50% in persons tested for compensation purposes or in military related audiology services (Feldman, 1967).

An area of concern to clinical Audiologiata is the problem of functional hearing loss in an industrial setting, some countries have legislations which recommend compensations for those who have incurred hearing loss in the course of their employment. This will probably be accompanied by a substantial increase in cases of functional hearing loss, since, the incidence of functionality tends to be high among persons whose hearing loss is evaluated for compensation purposes.

An audiologist must take extra care that he is not stating evidence of a 60dB loss when it actually is 10dB.It ia important for an audiologist to ascertain to the best of his ability what the patient can and cannot hear and indicate on this basis of his background, the condition under which the data were obtained (Martin,1978).

Clinically, pseudohyacusis can be detected in both nontest and test situations. The following behaviour patterns indicate a functional hearing loss in NON-TEST situations. They include:

a) Frequently, the source of referral will suggest the possibility of pseudohypacusis (Martin, 1978).

b) The case history is also of value, particularly in compensation cases.

a) The exaggerated behaviour of the patient by itself is a clue at times. The patient may claim an:

1) Over reliance on lip Reading.

2) May ask for inappropriate repetition of words.

3) May constantly readjust the hearing aid

4) Vague description of his/her hearing disability or discomfort.

5) Voluntary unasked for supplementary infomation which are often contradictory statements of the hearing difficulty. Behavioral observations show that thay make exaggerated maneuvers to watch every movement of the speaker's lips.

Certain other indications are obtained in the TEST situation:

1. The patient is frequently inconsistent in his test responses. A certain amount of variability is expected of any individual; however, when the magnitude of this variability exceeds 10dB for any threshold measurement, one must consider the possibility of malingering.
2. Extremely slow and deliberate responses may be indicative of a nonorganic problem, since patients with organic losses, respond relatively quickly to the signal, particularly at levels above threshold.
3. It has been reported that a saucer shaped audiogram is typical of nonorganicity.
4. Poor test-retest reliability.
5. Thresholds are greater than logically predictable through observation of the clients response to oral communication.

6. Inappropriate lateralization of puretones in unilateral hearing loss is a sign of functional loss.
7. PTA-SRT discrepancies seen in functional loss, who appareatly base their responses on a loudness criterion and will repeat spondee words at levels substantially lower than he voluntarily responded to tonal stimuli (Carhart,1952).
8. May repeat half of a spondee during SRT measurements.
9. Rhyming responses may be given during discrimination testing.
10. BC thresholds may be significantly poorer than AC thresholds.

A variety of tests have been used in the diagnosis of functional hearing loss. They are

I.Puretone,tests:

(a) automatic Audiometry (Jerger, 1960; Hopkinson,1965; Carhart,1964;Ventry, 1971).

(b) Puretone tests with ipsilateral masking (Martin,1946; Pang-Ching,1970);

(c) Ascending and descending approach to puretone threshold measurement (Harris, 1958);

(d) Puretone Stenger Test (Martin, 1978);

(e) Modifications of stenger tests:

1) Speech Stenger test
2) Shifting voice test
3) Rapid Random loudneas judgement
4) Fusion inferred threshold.

II. Acoustic Impedanca Measurements (Alberti, 1970; Lamb, 1967).

III. a) Electrodermal Audiometry (Chaiklin and Ventry,1963),

b) Electrocochleography and evoked response audiometry (Martin, 1978).

c) Delayed auditory feedback (Ruhm and Cooper, 1964).

IV. a) Speech Stenger test (Johnson, et al. 1956; Watson, 1962; cited by Martin, 1978).

b) Doerfler-Stewart test (Doerfler and Epstein, 1956; cited by Martin, 1978).

c) Shifting voice test (Johnson et al, 1956; Carhart, 1960; cited by Martin, 1978).

d) Lombard test (Chaiklin and Ventry, 1963).

e) Story test (Chaiklin and Ventry, 1963).

f) DAF (Lee,1950; cited by Martin, 1978).

g) Yea-No test (Miller, 1970).

h) Falconers lip-reading test (Falconer, 1966).

The TONE-IN-NOISE test: The Tone-in-Noise test (TIN test) is a modification of the Doerfler-stewart test (Doerfler and Stewart, 1946). The D-S test is difficult to administer to individuals with poor speech discrimination. As a screening device, it is too difficult and complex to administer (Vantry, et al. 1965).

This modification was proposed by Pang Ching (1970). It is a simplified monoanral puretone approach. The test examines the patient's ability to respond to puretones in the presence of a masking noise. The difference between thresholds in quiet and thresholds in noise across three frequencies (.5KHz, 1KHz, 2KHz) is the only measure taken. The TIN examines thresholds with the noise presented at a single, fixed sensation level. The use of ipsilateral masking in the test is based on a study by Hawkins and Stevens (1950), who noted that white noise below 20-30dB SPL produced negligible masking effects on the absolute poretone threshold. This means, the threshold for puretones in noise levels upto 30d8 SPL is the same as it is in the quiet. Above this level of masking, the relation between masking and noise intensity becomes linear i.e, there is an incremental equivalence in dB's of masking and of masking noise intensity (Pang Ching, 1970).

A basic premise underlying threshold investigation is that the person with a functional loss employs some kind of a loudness criterion of the sound stimulus as his reference for admitting or denying it's presence which he actually hears all the time. By simultaneous presentation of noise with the signal, theoretically, this reference can be disrupted. Maintaining consistent suprathreshold responses to auditory signals in the presence of noise in the same ear is difficult. Introduction of noise to the test ear confuses the patient with a functional hearing loss, causing him to lose his loudness yardstick. Introduction of noise either by air conduction or bone conduction may cause elevations in auditory thresholds which suggest, nonorganic hearing disorder because of their incosistencies with predicted findings on patients withtrue hypacusis (Glorig, 1965).

A case feigning a hearing loss responds to all sounds which are fainter than his self-imposed threshold. As long as he is in a relatively uniform sound environment, his yardstick will remain stable. For this reason, consistent responses are got in a test situation even though the loss is not an organic one. Tests which take place in a stable environment give the patient an opportunity to guage the preferred stimuli against his unconscious yardstick.

Two groups of subjects were studied by Pang Ching (1970) in his original TIN test. Group-I consisted of ten normal subjects who were asked to simulate a hearing loss. In addition, their true thresholds were also measured. Group-II had ten patients with hearing loss.

Procedure: (Pang Ching, 1970):

a) Obtain the AC threshold using the ascending method of Jerger and Carhart (1965). This is labelled T_1

b) Increase the intensity of the tone by 5dB. This is $T_1 5$.

c) Introduce noise 10dB above the $T_2 5$ level into the test ear. The noise is introduced at the criterion level suddenly, never gradually.

d) After noiae is introduced, the tone is interrupted and a threshold for the tone in noise is obtained. This is $T_2 N$. It is important that the tone be interrupted and $T_2 N$ obtained, regardless of whether there is a cessation or continuation of the response, when noise is first introduced. In determining $T_2 N$, tonal presen— tatioa begins at $T_1 5$ level. The results were expressed in terms of THRESHOLD SHIFTS between threshold in quiet (T_1) and threshold in noise ($T_2 N$). Pang Chiag's (1970) study revealed that, for Group-I, i.e., those who simulated a heating loss, T_2N's were substantially higher than the corresponding T_1's. Most of them had 10dB shifts or more. Their true thresholds in noise as expected were very similar to T_1. Out of the ten subjects in Group-II, three were correctly diagnosed as having a functional hearing loss (they had threshold shifts of 15 to 40dB). The organic group had T_1's which were slightly better at every frequency than the mean T_2N's.

In the light of this data, it would appear that T_2N's that exceeded T_1's by more than 5dB are indicative of nonorganic hearing loss.

The present study will be carried out on a group of twentyeight normal subjects and norms for the threshold shift observed will be established. To test for the validity of the study, the test will be conducted on the group who will be simulating a hearing loss. when presented as a part of the routine puretone audiometry, the TIN test will alert the clinicians to the possibility of a nonorganic hearing loss.

CHAPTER III

METHODOLOGY

This study was aimed at establishing norms for the TIN test.

Subjects: The study population composed of a group of twentyeight normal hearing subjects (Mean-age:21 years 3 months), who had their thresholds within 15dBHL across all frequencies from 250 to 8000Hz at Octave intervals. They had no history of any ENT problems. This group of normals was labelled GI. In GI, half of the subjects were tested in the right ear and the other half in the left ear. To test and validate the results of the test on GI, the same subjects were asked to feign a hearing loss and the test was conducted under this simulated condition. This group was labelled G-II.

Instrument: The audiometer GSI-10, calibrated to ANSI-1969 specifications was used for testing. Earphones were of supra-aural types (TDH-39). The noise levels were calibrated in effective levels (EL's) as instructed in the instrument manual

Testing environment: Tests were carried out in a sound treated two room condition. The ambient noise levels in the room were within permissible limits.

Stimuli: Puretones at 500Hz, 1000Hz and 2000Hz were used. Narrow band noise was used for masking.

Instructions: The subjects were asked to respond (raise their finger) only to tones (puretones and pulsetones). They were also instructed to respond to even the faintest tone they hear. They were not aware of the noise which would be presented aa a part of the test. G-II subjects were asked to simulate hearing loss. Since the malingerer may employ any of the several loudness criteria of the stimulus as his reference, G-II subjects were not provided with any clue as to the loudness levels they might use.

Procedure: The same procedure as described by Pang Ching (1970) was utilized.Following steps were included:

a) The subjects air conduction threshold was obtained at 500Hz using the ascending method. This was labelled T_1.

b) Intensity of the tone was increased by 5dB. This was labelled $T_1$5.

c) Narrow band noise was introduced suddenly at 15dBSL, i.e, 10dB above $T_1$5.

d) After the noise was introduced, the tone was interrupted and a threshold in noise was got. This was labelled T_2

e) The threshold shift i.e, the difference in, thresdhold obtained in quiet (T_1) and the threshold obtained in noise (T_2) was noted.

f) The same steps were carried out at 1000Hz and 2000Hz also.

This was done for both groups.

CHAPTER IV

RESULTS AND DISCUSSION

The data was subjects to a statistical analysis and the results were tabulated. The following were found out:

a) Mean and standard deviation of the threshold shifts for G—I at 500Hz in the right ear and left ear.

b) Mean and standard deviation of the threshold shifts for G-I at 1000Hz in the right and left ear.

c) Mean and standard deviation of the threshold shifts for G-I at 2000Hz in the right and left ear.

d) Mean and standard deviation of the threshold shifts for G-II at 500Hz in the right and left ear.

e) Mean and standard deviation of the threshold shifts for G-II at 1000Hz in the right and left ear. ^

f) Mean and standard deviation of the threshold shifts for G-II at 2000Hz in the right and left ear.

g) Whether there was a statistically significant difference for the mean threshold shifts between:

1) G-I and G-II at 500Hz in the right ear (See table-I)
2) G-I and G-II at l000Hz in the right ear (See table-II)
3) G-I and G-II at 2000Hz in the right ear (See table-III)
4) G-I and G-II at 500Hz in the left ear (See table-IV)

5) G-I and G-II at l000Hz in the left ear (See table-V)

6) G-I and G-II at 2000Hz in the left ear (See Table-VI)

7) Right and left ear for G-I at 500Hz (Table-VII)

8) Right and left ear for G-II at 500Hz(See table-VIII)

9) Right and left ear for G-I at l000Hz (See table-IX)

10) Right and left ear for G-II at 1000Hz(See table-X)

11) Right and left ear for G-I at 2000Hz (See table-XI)

12) Right and left ear for G-II at 2000Hz (See table-XII).

The latter (g) was found out using the 't' test for significance.

The Tables-I-XII are given below.

Discussion:

The mean threshold shifts for G-I and G-II showed a statiatically significant difference at .05 and .01 levels of significance for all the three frequencies (500, 1000, 2000Hz). This was true for both the right ear and left ear. The mean threshold shifts between the right ear and left ear showed no significant difference at .05 and .01 levels of significance for all the three frequencies (500, 1000, 2000Hz). This was true for both the G-I and G-II.

Table-I:Threshold shifts (T_2-T_1) of G-I and G-II at 500HZ in the right ear.

subjects	Group-I T_2-T_1	Group-II T_2 - T_1
1	15	40
2	15	30
3	10	35
4	15	25
5	10	30
6	10	30
7	15	30
8	20	20
9	15	25
10	15	40
11	10	45
12	20	35
13	10	40
14	15	25
	Mean 13.92	Mean 32.14
	SD 3.36	SD 6.99

't' test showed a statistically significant difference between the means of G-I and G-II at .05 and .01 levels of significance.

Table-II: Threshold shift of G-I and G-II at l000Hz in the right ear.

Subjects		Group-I $T_2 - T_1$		Group-II $T_2 - T_1$
1		15		35
2		15		25
3		10		30
4		15		30
5		10		20
6		15		30
7		20		25
8		10		30
9		20		30
10		20		35
11		10		40
12		20		40
13		10		35
14		20		25
	Mean	15	Mean	30.71
	SD	4.23	SD	5.62

'f test showed a statistically significant difference between the means of G-I and G-II at .05 and .01 levels of significance.

Table-III: Threshold shifts of G-I and G-II at 2000Hz in the light ear.

Subjects		Group-I $T_2 - T_1$		Group-II $T_2 - T_1$
1		15		30
2		15		35
3		5		25
4		25		25
5		15		20
6		15		30
7		15		25
8		15		25
9		15		30
10		10		40
11		15		40
12		15		25
13		15		45
14		15		35
	Mean	14.64	Mean	30.71
	SD	3.99	SD	7.04

't' test showed a statistically significant difference between the means of G-I and G-II at 005 and .01 significance levels.

Table-IV: Threshold shifts of G-I and G-II at 500Hz in the Left ear.

Subjects	Group-I $T_2 - T_1$	Group-II $T_2 - T_1$
1	15	35
2	10	35
3	15	40
4	10	40
5	10	30
6	15	25
7	15	35
8	15	30
9	10	35
10	15	35
11	10	35
12	10	35
13	15	30
14	15	25
	Mean 12.86	Mean 33.22
	SD 5.25	SD 4.47

't' Test showed a significant difference between the means of G-I and G-II at .05 and .01 significance levels.

Table-V: Threshold shifts of G-I and G-II at 1000Hz in the left ear.

Subjects	Group-I $T_2 - T_1$	Group-II $T_2 - T_1$
1	15	25
2	10	30
3	10	40
4	10	45
5	10	25
6	15	25
7	10	30
8	10	35
9	20	35
10	20	30
11	10	30
12	15	30
13	15	30
14	15	30
	Mean 13.21	Mean 30.71
	SD 3.58	SD 4.16

't' Test showed a statistically significant difference between the means of G-I and G-II at .05 and .01 levels of significance.

Table-VI: Threshold shifts of G-I and G-II at 2000HZ in the left ear.

Subjects		Group-I $T_2 - T_1$		Group-II $T_2 - T_1$
1		20		30
2		15		35
3		15		30
4		15		35
5		10		20
6		15		25
7		15		35
8		10		35
9		15		30
10		20		25
11		15		45
12		15		35
13		15		30
14		10		25
	Mean	14.64	Mean	31.07
	SD	2.96	SD	6.03

't' Test showed a statistically significant difference between the means of G-I and G-II at 0.05 and .01 levels of significance.

Table-VII: Threshold shifts end their difference at 500Hz between the right ear and left ear of the G-I.

Subjects		Right ear $T_2 - T_1$		Left ear $T_2 - T_1$
1		15		15
2		15		10
3		10		15
4		15		10
5		10		10
6		10		15
7		15		15
8		20		10
9		15		15
10		15		10
11		10		10
12		20		11
13		10		15
14		15		15
	Mean	13.92	Mean	12.86
	SD	3.36	SD	5.25

't' Teat showed no statistically significant difference between the two means at .05 and .01 levels of significance.

Table-VIII: Threshold shifts and their differences at 500Hz between the right and left ear of G-II.

Subjects		Right ear $T_2 - T_1$		Left ear $T_2 - T_1$
1		40		35
2		30		35
3		35		40
4		25		40
5		30		30
6		30		25
7		20		35
8		30		30
9		25		35
10		40		35
11		45		35
12		35		35
13		40		20
14		25		25
	Mean	32.14	Mean	33.21
	SD	6.99	SD	4.47

't' test showed no significant between the two means at .05 and .01 levels of significance.

Table-IX: Mean threshold shifts and their difference at 1000Hz between the right ear and left ear of G-I.

Subjects		Right ear $T_2 - T_1$		Left ear $T_2 - T_1$
1		15		15
2		15		10
3		10		10
4		15		10
5		10		10
6		15		15
7		20		10
8		10		10
9		20		20
10		20		20
11		10		10
12		20		15
13		10		15
14		20		15
	Mean	15	Mean	13.21
	SD	4.23	SD	3.58

't' Test showed no significant difference between the two means at .05 and .01 levels of significance.

Table-X: Threshold shifts and their differences at 1000Hz between the right and left of G-II.

Subjects		Right ear $T_2 - T_1$		Left ear $T_2 - T_1$
1		35		25
2		25		30
3		30		40
4		30		35
5		20		25
6		30		25
7		25		30
8		30		35
9		30		35
10		35		30
11		40		30
12		40		30
13		35		30
14		25		30
	Mean	30.71	Mean	30.71
	SD	5.62	SD	4.16

't' Test showed no significant difference between the two means at .05 and .01 levels of significance.

Table-XI: Threshold shift and their difference at 2000Hz between the right and left ear of G-I.

Subjects	Right ear $T_2 - T_1$	Left ear $T_2 - T_1$
1	15	20
2	15	20
3	5	15
4	25	10
5	15	35
6	15	25
7	15	35
8	15	35
9	15	30
10	10	25
11	15	45
12	15	35
13	15	30
14	15	25
	Mean 14.64	Mean 14.64
	SD 3.99	SD 2.97

't' Test showed no significant difference between the two means at .05 and .01 levels of significance.

Subjects	Right ear $T_2 - T_1$	Left ear $T_2 - T_1$
1	30	30
2	35	35
3	25	30
4	25	35
5	20	20
6	30	25
7	25	35
8	25	35
9	30	30
10	40	25
11	40	45
12	25	35
13	45	30
14	35	25
	Mean 30.71	Mean 31.07
	SD 7.04	SD 6.03

't' Test showed no significant difference between the two means at .05 and .01 levels of significance.

The mean threshold shifts for group-I at 500Hz for the right ear and left ear were 13.92dB (SD=3.36) and 12.86dB (SD=5.25) respectively; at l000Hz it was 15dB(SD=4.23) and 13.2dB (SD=3.58) respectively; at 2000HZ it was 14.64dB (SD=3.99) and 14.64dB(SD=2.96) respectively, i.e., the mean threshold shifts ranged from 12.96dB to 15dB respectively for G-I. There was no significant difference between the mean threshold shifts for G-I at 500, 1000 and 2000Hz in the right and left ears.

G-II showed a mean threshold shift Which ranged from 30.71 to 33.22dB in both the ears across the three frequencies tested. The mean threshold shift for G-II at 500HZ in the right and left ears were 32.14 (SD-6.99) and 33.22 (SD=4.47) respectively; for G-II at l000Hz in the right and left ears were 30.71 (SD=4.16) and 30.71dB (SD = 5.62) respectively; at 2000HZ it was 30.71 (SD = 7.04) and 31.07 (SD=6.O3) respectively for the right and left ears. There was no significant difference between the mean threshold shifts for G-II at 500, 1000 and 2000HZ in the right and left ears.

There was a significant difference between the mean threshold shifts of G-I and G-II for the three frequencies in both the right ear and the left ear at .05 and .01 levels of significance. At 500Hz, the difference between the mean threshold shifts of G-I and G-II was 18.22dB and 20.36dB in the right ear and left ear respectively; at l000Hz, the difference between the mean threshold shifts of G-I and G-II was 17.5dB and 15.71dB in the right ear and left ear respectively; at 2000Hz, the difference between the mean threshold shifts of G-I and G-II was 16.07dB and 16.43dB in the right and left ear respectively; this shows that there is an average of 17.38dB HL difference of mean threshold shift between G-I and G-II in both the ears; i.e, G-II shows an average of 17.38dB HL greater threshold shift than the G-I.

The average mean threshold shift for G-I in the right ear across the three frequencies was 14.52 dB and in the left ear it was 13.57dB. The average mean threshold shift for G-II in the right ear across the three frequencies was 31.18dB and in the left ear it waa 31.66dB.

Pang Ching, 1970 reports of 0 dB or less than 5dB HL threshold shift for normals, 10 to 15dB HL of threshold shift for normals who simulate a hearing loss and more than 15 to about 35dB HL threshold shift for malingerers (true). The present study revealed a shift of about 14.04dB HL for normals end a shift of about 31.42dB HL for normals who simulate a hearing loss i.e, there is a difference of almost 15dB HL in the values reported by Pang Ching, 1970 and the present study in both the groups. It is important to note that the difference between the mean threshold shifts for G-I and G-II, i.e, the normals and normals who simulated a hearing loss, was significant at both levels of significance (.05 and .01) at all the three frequencies; Also, no ear differences were present for both the groups.

Thus the null hypothesis was refuted. There was a significant shift found in a group of normals and those who feign a loss. Sub-hypothesia (a)+ (b), (c), (d), (e), (f) were refuted whereas, (g), (h), (i), (j), (k) and (1) were supported, i.e, no ear differences in threshold shifts were significant in both the groups.

CHAPTER v

SUMMARY AND CONCLUSION

An attempt was made to collect norms for the TONE-IN-NOISE TEST (Pang Ching, 1970) and to assets itS utility in the identification of functional hearing loss.

It was seen that, normals show a threshold shift of about 14.04dB HL whereas normals Who simulate a hearing loss show a greater threshold shift (about 31.42dB HL). This means to say, whan the TIN test was conducted on normals, it showed a lesser degree of threshold shift (at all three frequencies tested) than when it was conducted on normals who feigned a hearing loss. It can be said that, a threshold shift of more than 15dB HL would be conclusive of malingering as indicated by the present data. Normals would Show a threshold shift of only 15dB HL or less when they were tested using the TIN teat.

These values can be utilized to differentiate pseudohypacusis from normal hearing. The findings show that the TIN test clearly differentiates between the simulated hearing loss and normals (Difference of about 15dB HL or more in the threshold shifts). In simulated hearing loss, thresholds in noise is much higher compared to the thresholds in quiet. Changes exceeding 30dB HL are common.

The TIN test demands very leas from the subjects sad is simple, independent of any language skills. It appears from the data and results, as a useful screening device for identifying nonorganic hearing losses. The TIM test can be administered at a single frequency in each ear, since a positive finding on the TIN is unlikely to be found at isolated frequencies. Since its & mono— aural teat, definitive index of auditory function in each ear can be readily obtained.

A substantial saving in time and effort would ensue if the clinician was alerted to the existence of a pseudohypacusis early in the testing session.

Recommendations: Validity of the teat should be established by conducting this test on true malingerers.

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