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HEARING IMPAIRMENT IN ELEMENTARY SCHOOL
CHILDREN AND ITS RELATION TO ACADEMIC
ACHIEVEMENT AND PERSONALITY TRAITS

By

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A Thesis

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ABSTRACT

Hearing is one of our most important senses. Each year more attention is focused upon improved ways of preventing and restoring hearing losses. In the United States hearing conservation programs are becoming as much a part of school health examinations as measurements of height and weight and visual acuity. Results from careful periodic testing of young school age children frequently reveal previously undetected hearing losses of sufficient magnitude as to interfere with school achievement and create social and emotional difficulties. We do not have any references to similar studies in the Middle East. The only study of this kind was carried out by Dr. Diran O. Mikaelian (1966-67) and the writer was his Research Assistant. Around 5000 students from different national and religious groups, both male and female, ages 5-15 were tested.

One purpose of this study was to see whether it confirmed other findings and ^{to} try to determine the significance of the relation of hearing impairment to academic achievement and personality traits in the elementary school children of Beirut. We can only take the findings of the other countries as suggestive.

The results obtained from our research indicated that impaired hearing interfered with the academic achievement of these children and that with increasing impairment of hearing the academic achievement became even poorer. Students with unilateral hearing loss similarly showed poor academic achievement. Personality test results did not show any appreciable difference between normal hearing students and the impaired group; A non verbal intelligence test administered to a group of students with maximal hearing loss revealed a normal distribution.

As our findings indicate, it would be highly recommended to institute hearing conservation programs in the elementary schools of Lebanon.

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CHAPTER I

INTRODUCTION

A. Purpose of Study

Hearing is one of our most important senses. Naturally any interference with its functioning will produce difficulties in communication and in adjusting to the environment. Each year attention is focused increasingly upon improved ways of preventing and restoring hearing losses. In recent years in the United States, the public schools have been assuming an increased responsibility for discovering cases of hearing impairment in school children. Hearing conservation programs are becoming as much a part of school health examinations as measurements of height and weight and tests of visual acuity¹. The preschool child with a severe loss of hearing is frequently identified by his parents and others; the child who has incurred lesser hearing loss may not be identified until such time as he receives a careful audiometric test. If this identification is delayed one might expect to

¹Hayes A. Newby, Audiology: Principles and Practice (New York: Appleton-Century-Crofts, Inc., 1958), p. 189.

find some concomitant problems. Ideally, every pupil should be tested every year; however, the usual practice is to conduct routine tests of each child every third year.²

The purposes of a school hearing conservation program are to reduce to the absolute minimum the number of children with impaired hearing and to provide for the special educational needs of these children. The discovery and treatment of conditions producing hearing loss in the primary grades will have the result of reducing the number of hearing losses in the higher elementary grades and in high school. Knowledge concerning the status of a child's hearing consequently becomes a very important part of the differential diagnosis of his hearing disability, his social and emotional problems, and his behavioral disorder. Obviously, the chief goal is to detect minor hearing losses in school children and prevent them from reaching such proportions that they may interfere with achievement, adjustment, and behavior. This constitutes the basic reason for conducting periodic testing in the schools.³

²Ibid., p. 190.

³Ronald K. Sommers, Hearing Services for School Children: The Audiometric Screening Program, Maico Audiological Library Series (U.S.A: Maico Hearing Instruments, 1968), Vol. IV, Report Six.

We do not have any references to similar studies in the Middle East. The only study of this kind was carried out in Lebanon by Dr. Diran O. Mikaelian (1966-67). The writer was his research assistant and one in charge of hearing tests at the Audiology clinic of the American University Hospital. Group screening tests were administered in 18 private and public elementary schools of Beirut. Around 5000 students from different national and religious groups, both male and female, ages 5-15, were tested. The data for this research have been collected using questionnaires as the principal research instrument. A questionnaire was filled out for each student tested. The following information has been collected: class, age, sex, religion, nationality, socio-economic status, and academic achievement. Those students with impaired hearing, serious enough to interfere with their usual class activities, were considered suitable candidates to undergo tests for personality trait evaluation. A smaller group of students who had unilateral total hearing loss was tested along similar lines. Intelligence tests were administered to students with the maximum amount of bilateral hearing loss. This was a pilot study as the number of these cases did not exceed more than 6 or 7 students.

The purpose of this study is to see whether

our research confirms other findings and to try to determine the significance of the relation of hearing impairment to academic achievement and personality traits in the elementary school children of Beirut. We can only take the findings of the other countries as suggestive. However if our findings show a positive relationship then it would be highly recommended that hearing conservation programs be applied in the elementary schools of Beirut and possibly Lebanon.

B. Nature of the Problem

The problem of the hard of hearing child is one of serious social significance. The community should feel concern since the financial and social effects of retardation in school are considerable for children whose handicaps have been neglected or unrecognized. School authorities, who view with alarm the financial outlay necessary for a really constructive program for the hard of hearing child, should be informed that the saving from avoiding unnecessary repetition of grades offsets a large part of the cost of the program. In addition, one must take into consideration the various forms of antisocial behavior which characterizes the child who becomes bored with school work in which it

is so difficult for him to participate.⁴ "The financial aspects of the problem, however, must not obscure the solemn moral obligation of a democratic community to provide for each child the opportunity to develop according to his maximum potentialities. This is the fundamental principle of a system of democratic education, and the community that shirks responsibility for an adequate program for the physically handicapped child stands guilty of its violation."⁵

Many a child has been labeled mentally retarded because of his apparent ability to hear and his inability to understand much of what he hears. Children imitate the speech they hear. If the speech they hear is incomplete, their speech will also be incomplete and often unintelligible. Besides this, the knowledge that the normal child ordinarily acquires through hearing is denied the child with deficient hearing. In the school room the teacher is often not aware that the learning or behavior difficulty of a hard of hearing child is due to his impaired hearing and not to a lack of mental ability or to some fault in his methods of

⁴Hallowell Davis and S. Richard Silverman, Hearing and Deafness (New York: Holt, Rinehart and Winston, Inc., 1966), pp. 454-55.

⁵Ibid., p. 455.

teaching. Failure to diagnose correctly the basic cause of the child's difficulties frequently leads to fruitless remedial measures that are time consuming for both the child and his classmates.

In the narrower confines of a family circle, too, the hard of hearing child presents a problem that requires wholesome and sympathetic understanding. Apparent inattention to the spoken word is often interpreted as sheer naughtiness. The misdirected punishment often results in tensions within the family which would be avoided if the parents were only aware of their child's handicap. Furthermore repetition of grades in school delays the day when the child can become a self-supporting individual. In many families this prolonged dependence is a serious problem.⁶

1. Psychological Aspects:

"A hearing impairment almost always produces some maladjustment in the individual. Sometimes, the psychological difficulties arising from the hearing loss are a greater problem for the hard of hearing person than the communicative disorder. Psychological difficulties are not always proportional to the severity of the loss, but they are usually related to the

⁶ Ibid.

time of onset of the hearing impairment."⁷ The importance of age in the learning process cannot be over-emphasized as it is the key to the understanding of the problem of impaired hearing and hence to its successful management.

The ability to recognize and interpret sounds is learned to a very large extent during the first year of life which has therefore been called the period of "readiness to listen" (Fry and Whetnall, 1954). After the age of three years, the facility for learning to recognize new sounds, and, therefore, speech, diminishes, so that by the age of five it is difficult to teach a child through his hearing if there has been no previous training and by the age of seven it is said to be almost impossible. The period about the age of twelve to eighteen months has been called the period of "readiness to speak." (Stinchfield and Young, 1938). Failure to develop any skill at the right age in the growth pattern leads to difficulties which cannot easily be overcome. Of the various skills the child must learn, hearing and speaking are the most difficult and at the same time the most necessary. The difficulties of these skills are so great that hearing and speech development will

⁷Newby, loc.cit., p. 218.

suffer unless great care is taken to prevent deprivation of the essential factors.⁸

Those who are born with impaired hearing or who lose their hearing early in life do not have as severe adjustment problems as those who suffer hearing loss after having had normal hearing well into adult life. Apparently it is psychologically more difficult to lose one's hearing after having experienced a number of years of normal hearing than it is to be without hearing for all of one's life. In other words, the congenitally deaf person does not realize what he is missing and so it is easier for him to adjust to his situation.⁹

Ramsdell¹⁰ refers to three levels of hearing, the loss of any one of which would cause some psychological difficulty to the adult who has previously enjoyed normal hearing. The three levels are: the symbolic level, the warning or signal level, and the primitive level. The symbolic level refers to the function of the hearing mechanism in the process of oral communication. Not being able to talk easily with

⁸Edith Whetnall and D.B. Fry, The Deaf Child (Great Britain: The Whitefriars Press Ltd., 1964), p. 11.

⁹Newby, loc.cit.

¹⁰Ibid., pp. 218-23.

people leads to a tendency to withdraw from more and more social contacts. Withdrawal in turn leads to feelings of depression, because the individual is cut off from his normal social life. The warning or signal level of hearing refers to the function of the hearing mechanism in making us aware of dangers in the environment. For example, we hear the scream of a siren and are immediately alerted to look out for an emergency vehicle. Thus loss of hearing on the warning level causes an individual to be more hesitant in his actions and increases his feelings of insecurity. In turn, increased feeling of insecurity tend to add to the feeling of depression. In many respects according to Ramsdell, loss of hearing on the primitive level creates more serious psychological problems than loss of hearing on the other two levels. The person with normal hearing is always situated in an environment of sound. If we are suddenly deprived of the background of noises around us, we are aware of a feeling of discomfort and become ill at ease. It is awareness on the unconscious level of the environment of sounds surrounding us which is referred to as the primitive level of hearing.

Results from careful periodic testing of young school age children frequently reveal previously undetected hearing losses of sufficient magnitude to interfere with school achievement, create social and emo-

tional difficulties, and contribute to discipline problems. Goetzinger, Harrison, and Baer¹¹ (1964) recently, confirmed the fact that even minor degrees of hearing loss in school children can have injurious effects upon school achievement and children's behavior in school. Children with mild or moderate degrees of hearing loss frequently are apt to be retained in grade as low achievers and may tend to be described by teachers and others as "inattentive" "dissatisfied" "querulous" "dull" and even "mentally retarded". Further, it has been consistently demonstrated that classroom teachers cannot identify the fact that hearing is defective in such children (Warwick, 1928; Curry, 1950). These findings lend even further support to the view that some program of periodic hearing testing, should be conducted for school children.¹²

There are other reasons why the child may become maladjusted because of a hearing loss. Difficulty in communication leads to trouble with school work and misunderstandings with family and friends. Thus the

¹¹C.P., Goetzinger, C. Harrison and C.J. Baer, Small Perceptive Hearing Loss: Its Effect in School-Age Children (Alexander Graham Bell Association for the Deaf, N.W., Washington, D.C., 1964), reprint No. 809.

¹²Sommers, loc.cit.

hearing loss heightens tensions within the child. As a result, the hard-of-hearing child is seldom perfectly adjusted. Usually he reacts to his frustrations either by withdrawing from situations that are difficult for him or by becoming overly aggressive in behavior. The parents of a hearing-handicapped child face the difficult task of assisting their child to find an adequate personal adjustment to his disability.¹³

Knapp¹⁴ reports that during World War II five hundred and ten patients from an Army Hearing Rehabilitation Service at the Deshon General Hospital, were studied psychiatrically, and classified according to the relationship of their hearing loss to their psychiatric disability. Some cases showed no demonstrable interrelationship. Some patients, who tended to have more severe and more chronic loss, reacted neurotically to the constricting effects of deafness, appearing to defend themselves by overcompensated outgoing activity, denial of hearing loss, withdrawal from society, displacement of anxiety, or exploitation of hearing loss. The incidence of such cases was 5.5 per cent of total admissions during the six months. Other cases went

¹³Newby, loc.cit., p. 223.

¹⁴Barbara A. Dominick, Psychological and Psychiatric Aspects of Speech and Hearing (Charles C. Thomas, Illinois, 1960), pp. 437-38.

further and in part welcomed their disability and had a mixture of struggle against loss and measurable psychogenic increase in it. Such individuals comprised 2.8 per cent of admissions during the six months. A final group had primarily psychogenic deafness, their incidence was 5.7 per cent in the six months. They seemed to have deep desires for isolation and silence; and frequently they had invested hearing with powerful emotion.

2. Review of Literature:

Hearing conservation programs are not new in schools of the United States and some countries of Europe. Some states and city school systems in the United States have provided hearing testing services for the past three decades. In India similar studies have been carried out very recently, (1961 and 1962).

It is relevant to cite the figures of other countries for the incidence of hearing loss in school children. The extent of the problem in the United States can be recognized from the reports of many school studies. Most of these show that between 2.8 and 4.0 percent of school children have "significant hearing losses." In Chicago 2.8 per cent of pupils tested in 98 public schools had a hearing loss of at least 30 decibel (db) in two or more frequencies in the speech

range. In Philadelphia 4 per cent of school children had hearing losses. These and other reports emphasize further that well over 80 per cent of the hearing losses in these children are curable with adequate medical attention. In children below the age of 6 the high incidence of mild or even moderate hearing loss is not fully realized, because such losses in preschool children often go unrecognized. In 54 per cent of the cases found by the Chicago audiological screening clinics to have a moderate loss or severe loss of 35 decibel (db) or more for the speech frequencies, even the children's own parents had no suspicion of any hearing difficulty.

Kodman and Sperrazzo (1959) found that five per cent of public school children in the U.S.A. had impaired hearing. Proctor (1963) states that experience with children in the county schools of Maryland has shown that on initiating a hearing conservation program, from seven to ten per cent of the children were found to have impaired hearing. However, after two to three years of such a program, only about two to four per cent were below normal.

The Scottish Educational Department (1950) reported hearing-loss incidence ranging between five and eight per cent for school children. For England, according to Godber (1963), the incidence of severe deafness in the whole population of school-age children,

is thought to be at present in the region of one per 2000 children (0.05%). Watson has described a screening program for children aged five and thirteen years in a county borough in England. The preliminary figures indicated that in the group of five-year-olds about 11% of those screened have significant losses. In the group of thirteen-year-olds, about 3.5% of those screened seemed to have significant losses.

Livingstone (1964) has mentioned that in the United Kingdom 0.2% of the children have hearing losses severe enough to require them to have special training. A report of the Audiometric Survey Unit of the Glasgow School Health Service (Dunn, 1963) showed approximately 6.6% of children in that city had Grade I hearing defects, though it is not clear from the publication exactly what Grade I loss means.

A Danish study (Fabritius, 1964) reported the results of a survey continuing over a nine-year period on the incidence of hearing loss in children in North Trondelag. The incidence of hearing loss in these children varied from 1.7% to 5.3% during this period with an average of 3.4%. The incidence of chronic otitis media as a cause of hearing loss varied between three and four per cent.

Misre et al. (1961) have surveyed hearing loss

in 1390 school children in India in the city of Lucknow. Their report shows a prevalence of hearing loss in 34% of the children, the majority of these being conductive in nature. According to the Ministry of Education of the Government of India, there are approximately 89,602,000 school children in that country. Figures from the Ministry of Education indicate there are 223,000 deaf children in the nation (1964). Study of the figures obtained by Y.P. Kapur (1962) shows that the prevalence of hearing loss in the 857 children examined varied from 16.3 to 18.6%. If the incidence of hearing loss indicated by this study prevailed for all school children of India then 14,580,000 children between the ages five and twelve years would have hearing losses requiring medical attention. This is the observation of Y.P. Kapur. A significant fact that emerges from his study is the relatively high prevalence of conductive hearing loss among school children, 90 and 97%. This form fortunately can be treated and hearing loss can be reversed in a large number of cases.

3. Research in the Middle East:

The only study of this kind in the Middle East was administered by Dr. Mikaelian, (1966-67) as was mentioned earlier. Group screening tests of hearing were carried out in 18 private and public elementary

schools in Beirut. Five thousand and twenty students from different national and religious groups, both male and female, ages 5-15 were tested. Any one failing in any frequency in both ears or any two frequencies in one ear was individually tested and had a complete ear, nose and throat examination by the otologist. A questionnaire was circulated to the principals of schools concerning the class, age, sex, religion, nationality and enquiring about socio-economic status and academic achievement. This information was obtained for every student tested and the questionnaires^{were} filled out by the principals of each school. Students with impaired hearing, serious enough to interfere with their usual class activities were considered suitable candidates to undergo tests for personality trait evaluation. A smaller group of students who have unilateral total hearing loss was tested along similar lines. Intelligence tests were administered to students with the maximum amount of bilateral hearing loss.

A Beltone II C A.S.A. calibrated group screening audiometer was used for screening the hearing. The Johnston group screening procedure was followed. Ten students were tested at a time. Students failing the screening tests had individual hearing tests with both air and bone conduction. They had a complete otological examination by the doctor and etiology of hearing loss

was determined. The information obtained through the questionnaires was registered as follows:

Students with normal hearing have been grouped according to their classes, divided into age groups and classified for their sex, nationality, religion, academic achievement and socio-economic status.

Students with impaired hearing have been grouped according to their schools and have also been classified for their age, sex, class, nationality, religion, academic achievement and socio-economic status, frequency loss and average frequency loss and comments.

Data have been tabulated as follows:

1. Incidence of hearing loss in elementary school children.
2. Hearing loss and academic achievement.
3. Hearing loss and socio-economic status.
4. The incidence and amount of hearing loss as related to age.
5. Hearing loss and personality traits.
6. Hearing loss and intelligence (pilot study).

CHAPTER II

METHOD AND MEASUREMENT TECHNIQUES

A. Method of Testing

1. General Remarks Concerning Screening Tests for Hearing:

Screening is a mass survey technique which seeks to identify those persons whose hearing is outside of normal limits and requires further evaluation. In screening it is necessary to obtain the answer to one question: Does this person hear the tone when it is presented at a pre-determined deci-bel (db) level? If he does hear it, he may be presumed to have hearing within "normal" limits. If he does not, then he should be referred for a complete audiometric evaluation. Considerable work has been done to develop techniques and measuring instruments which permit such an assessment. Although there are several variations within these categories, the tests and instruments fall into two general groups: Individual pure-tone sweep-check screening devices, and group screening, (manual or automatic).¹

Both group and individual methods of testing

¹Aram Glorig, Audiometry: Principles and Practices (The Williams & Wilkins Company, Baltimore, 1965), p. 170.

are employed in school hearing surveys. A difference of opinion prevails among audiologists and school administrators as to whether the group or individual form of test is superior. The primary advantage of the group test, of course, is that many more pupils can be tested in a hearing survey by a single audiometrist. The disadvantage of the group test is that it may sacrifice accuracy of testing in order to cover a wider population. The advantage of an individual test is that it is the most accurate means known for assessing the hearing of each individual in a school population. The disadvantage of the individual test is that it is more time consuming than the group test.²

The common group tests recommended for us today are: the Massachusetts test, the pulse-tone group tests (Regar-Newby or Glorig), and the Johnston group pure-tone screening test. The Massachusetts test requires a pure-tone audiometer with multiple earphones which are matched in their frequency response at the three test frequencies of 500, 4000, and 6000 cycles per second (cps). In testing, a sequence of tonal bursts is given with six "yes" or "no" options at each frequency. Those being tested circle "yes" or "no" on

²Newby, loc.cit., p. 192.

a special form depending upon whether or not they heard a tone at the time they were to listen. The forms are scored by counting the "no" responses, and if the number of "no" responses at any frequency differs by more than two from the number presented, it constitutes a failure.

Investigators have found that the Massachusetts test provides accurate screening from grade 3 up. In Pulse-Tone group tests a set number of pulses, or spurts of tone, are presented automatically. Those being tested indicate by writing on a test blank the number of pulses heard each time they see the signal to listen. Two excellent procedures of this type have been developed by Regar and Newby and by Glorig. Each employs an automatic audiometer and the test is so identified. Both of these tests are acceptable for grade 3 and above.

2. Method Employed in the Present Research:

The test which was employed in this research project was the Johnston group pure-tone screening test. A Beltone 11C audiometer with air-conduction earphones, calibrated to meet the screening criteria of the American Standards Association of 1951, was used. This test eliminates the need for a written response, making it practical for the lower grades. The audiometer is

modified to accomodate 10 earphones, and the sweep technique is used. The test is performed at frequencies of 500, 1000, 2000, and 4000 at a sensation level of 15 decibel (db) at each frequency. The subjects are seated in a semi-circle around a table and are instructed to keep their eyes closed. They are told to raise their hands when they hear a tone. They are warned, however, that not all of them will hear the tone because a few of the ear phones will be disconnected each time, so they are to ignore others being tested. By checking the raised hands against the earphones carrying the signal, the tester can tell immediately who fails to hear the tone. Those students who failed to respond to two or more frequencies in one ear, or to any one frequency in both ears, were tested individually. Pupils, failing in the individual threshold (threshold is the level at which a normal hearing ear senses a given frequency) test, were referred to the otolaryngologist for a complete ear, nose and throat examination and the etiology of the hearing loss was determined. The findings of the examining otolaryngologist were recorded on the pupils' health record. These findings and recommendations were transmitted by the school to the pupils' parents. The parents were urged to take their child to their own family physician

for the fulfillment of the recommendations that the examining otolaryngologist had made.

It was often a problem to find a satisfactory room in the various schools in which to give the group screening hearingtest. Although it is not necessary to have a sound-treated room in which to test, it is important that the surrounding noise in and around the room be kept to a minimum. If there is much activity in the halls, or if recess is in progress, the noise condition in the testing room may become intolerable. All principals cooperated with us by selecting a room for the testing which was the least noisy. Since most schools do not have rooms to spare, finding a suitable place for conducting hearing tests was a major undertaking. Quite often the office of the principal was used as the least noisy area of the school.

B. Questionnaires

The data for the research has been collected by questionnaires. A questionnaire was filled out for each of the 5020 students tested and the following information collected: class, age, sex, religion, nationality, socio-economic status and academic achievement. The questionnaires were filled out by the principals of the schools after receiving instructions about

how to do it. They evaluated the academic achievement of the students as "good", "fair" or "poor" according to the following criteria: general impressions of the teachers who taught them, the grades of the present year, and, the rank of the student in his class during the past year.

The classification of the socio-economic status of the students, (also on a "good", "fair", "poor" scale) was made by the secretaries of the schools. Their evaluations depended on the information collected from the following people: the social worker of the school, the superintendent, and the general impression of the principal who came in contact with the parents.

C. Personality Test

It was suggested that the Eysenck Personality Inventory be administered to the group of impaired hearing students who had moderate to maximum hearing loss bilaterally and complete hearing loss unilaterally. A group of students, with normal hearing, similar in age but randomly chosen, around four times the size of the impaired group, completed the same inventory and served as a control group.

The Junior Eysenck Personality Inventory was devised in English by Sybil B.G. Eysenck. It was designed to measure the two major personality variables of neuroticism or emotionality, and extroversion-introversion in children. The scale is a later development of the Maudsley Personality Inventory (Eysenck 1959), and the Eysenck Personality Inventory (Eysenck and Eysenck 1964) for adults, and like the latter the Junior E.P.I. also contains a "lie scale" for the detection of faking. On the basis of factor analysis, 60 suitable items were chosen for the final inventory of which 24 measured E, 24 N and 12 constituted the L scale.

To be able to use the Junior Eysenck Personality Inventory for the group of students being tested, it had to be translated into both Arabic and Armenian. University graduates, majors in languages, were asked to do the translations which were checked by university professors.

Both normal and impaired hearing students were seated together in a group to take the test. Each student was given the test which consisted of 60 questions to be answered by either a "yes" or a "no". In each school a teacher was appointed to help us administer the test.

The scoring and the tabulation of results was done according to the instructions of the manual.

D. Intelligence Tests

The Raven Progressive Matrices, Sets A, A_B, B intelligence test were administered to those students who had a maximum amount of bilateral hearing loss. This was a pilot study since the number of these students was very small (7).

The Raven Progressive Matrices is a non-verbal intelligence test. It was given to the students individually. The scoring of results was carried out according to the instructions of the manual.

The results of a group of elementary students, who were given the same intelligence test but who were not screened for hearing, were considered a control group.

CHAPTER III

STATEMENT OF RESULTS

TABLE 1
TOTAL TESTED

Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
116	5M 57	17	21	19	10	26	21
	F 59	30	20	9	18	19	22
710	6M393	215	101	77	62	161	170
	F317	184	74	59	65	82	170
794	7M391	172	164	55	56	187	148
	F403	183	184	36	76	136	191
771	8M399	136	163	100	51	204	144
	F372	118	178	76	49	108	215
709	9M357	126	135	96	48	162	146
	F352	114	179	59	43	119	190
724	10M387	132	149	106	59	147	181
	F337	106	171	60	43	108	186
550	11M299	84	125	90	33	134	132
	F251	91	105	55	51	82	118
450	12M263	62	99	102	32	129	102
	F187	57	90	40	29	80	78

TABLE 1 (Cont'd)

Total	Age	Academic Achievement			Socio-Economic Status			
		G	F	P	G	F	P	
150	13M	70	13	32	25	9	34	27
	F	80	20	17	43	7	38	35
42	14M	20	3	12	5	1	12	6
	F	22	2	13	7	1	7	14
4	15M							
	F	4		2	2		2	2
5020			1865	2060	1095	743	1977	2300
M	2636	960	1001	675	361	1196	1079	
F	2384	905	1059	420	382	781	1221	
T		37.15%	41.03%	21.81%	14.80%	39.38%	45.81%	
M		19.12%	19.94%	13.45%	7.19%	23.82%	21.49%	
F		18.03%	21.09%	8.36%	7.61%	15.56%	24.32%	

TABLE 2
IMPAIRED HEARING

Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
4	5M 2		2			1	1
	F 2	1	1		1	1	
36	6M19	5	9	5		2	17
	F17	8	7	2	2	3	12
50	7M24	9	13	2	5	6	13
	F26	6	15	5	3	11	12
34	8M17	4	3	10		7	10
	F17	7	6	4	2	6	9
36	9M18	6	9	3	1	6	11
	F18	7	6	5		7	11
31	10M11	2	3	5		6	5
	F20	4	10	6	4	6	10
26	11M14	2	4	8	1	3	10
	F12	2	8	2	1	4	7
30	12M19	3	6	10	3	6	10
	F11	3	7	1	3	4	4
8	13M 4	1	2	1		2	2
	F 4		1	3		3	1

TABLE 2 (Cont'd)

Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
1	14M						
	F 1		1				1
256		70	113	73	26	84	146
M	128	32	51	45	10	39	79
F	128	38	62	28	16	45	67
T		27.34%	44.14%	28.51%	10.15%	32.81%	57.03%
M		12.50%	19.92%	17.57%	3.91%	15.23%	30.85%
F		14.84%	25.02%	10.94%	6.24%	17.58%	26.80%

TABLE 3A
ACADEMIC ACHIEVEMENT
TOTAL TESTED IN %

Total	Age	G	F	P
116	5 M 57	14.65	18.10	16.37
	F 59	<u>25.86</u>	<u>17.24</u>	<u>7.75</u>
		40.51	35.34	24.12
710	6 M398	30.28	14.22	10.84
	F317	<u>25.91</u>	<u>10.42</u>	<u>8.30</u>
		56.19	24.64	19.14
794	7 M391	21.66	20.65	6.92
	F403	<u>23.04</u>	<u>23.17</u>	<u>4.53</u>
		44.70	43.82	11.45
771	8 M399	17.63	21.14	12.97
	F372	<u>15.30</u>	<u>23.08</u>	<u>9.85</u>
		32.93	44.22	22.82
709	9 M357	17.77	19.04	13.54
	F352	<u>16.07</u>	<u>25.24</u>	<u>8.32</u>
		33.84	44.28	21.86
724	10 M387	18.23	20.58	14.64
	F337	<u>14.64</u>	<u>23.08</u>	<u>8.28</u>
		32.87	43.66	22.92

TABLE 3A (Cont'd)

Total	Age	G	F	P
550	11 M 299	15.27	22.72	16.36
	F 251	<u>16.54</u>	<u>19.09</u>	<u>10.00</u>
		31.81	41.81	26.36
450	12 M 263	13.77	22.00	22.66
	F 187	<u>12.66</u>	<u>20.00</u>	<u>8.88</u>
		26.43	42.00	31.54
150	13 M 70	8.66	21.33	16.66
	F 80	<u>13.33</u>	<u>28.66</u>	<u>11.33</u>
		21.99	49.99	27.99
42	14 M 20	7.14	28.57	11.90
	F 22	<u>4.76</u>	<u>30.95</u>	<u>16.66</u>
		11.90	59.52	28.56
4	15 M			
	F 4		50.00	50.00
5020				

TABLE 3B
ACADEMIC ACHIEVEMENT
IMPAIRED HEARING IN %

Total	Age	G	F	P	X2 Level of Sig- nificance
4	5 M 2		50		
	F 2	<u>25</u>	<u>25</u>		
		25	75		
36	6 M19	13.88	25.00	13.88	
	F17	<u>22.22</u>	<u>19.44</u>	<u>5.55</u>	
		36.10	44.44	19.43	.02
50	7 M24	18.00	26.00	4.00	
	F26	<u>12.00</u>	<u>30.00</u>	<u>10.00</u>	
		30.00	56.00	14.00	.15
34	8 M17	11.76	8.82	29.41	
	F17	<u>20.58</u>	<u>17.64</u>	<u>11.76</u>	
		32.34	26.46	41.17	.01
36	9 M18	16.66	25.00	8.33	
	F18	<u>19.44</u>	<u>16.66</u>	<u>13.88</u>	
		36.10	41.66	22.21	.75
31	10 M11	6.45	9.67	19.35	
	F20	<u>12.90</u>	<u>32.25</u>	<u>19.35</u>	
		19.35	41.92	38.70	.05

TABLE 3B (Cont'd)

Total	Age	G	F	P	X2 Level of Sig- nificance
26	11 M14	7.69	15.38	30.76	
	F12	<u>7.69</u>	<u>30.76</u>	<u>7.69</u>	
		15.38	46.14	38.45	.15
30	12 M19	10.00	20.00	33.33	
	F11	<u>10.00</u>	<u>23.33</u>	<u>3.33</u>	
		20.00	43.33	36.66	.75
8	13 M 4	12.50	25.00	12.50	
	F 4	<u>12.50</u>	<u>12.50</u>	<u>37.50</u>	
		12.50	37.50	50.00	
1	14 M				
	F 1				
256					

TABLE 3C

DEGREE OF HEARING LOSS AND ACADEMIC ACHIEVEMENT

Hearing Loss	Academic Achievement			Total
	Good	Fair	Poor	
Less than 25 db loss (bilateral)	43 27.7%	76 49.0%	36 23.3%	155
Between 25-35 db loss (bilateral)	20 34.5%	18 31.0%	20 34.5%	58
More than 35 db loss (bilateral)	4 17.4%	8 34.8%	11 47.8%	23
Unilateral severe hearing loss (more than 70 db)	3 15.0%	11 55.0%	6 30.0%	20
Total impaired group	70	113	73	256
Total tested group	1865	2060	1095	5020
Chi square test for significance	Significant at a better than .01 level of significance			

TABLE 3C₁
SEVERE HEARING IMPAIRMENT - BILATERAL
(STUDENTS WHO PASSED PERSONALITY TEST)

Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
2	6 M						
	F 2	1	1		1		1
6	7 M 3		3			1	2
	F 3		1	2		1	2
5	8 M 1	1				1	
	F 4	1		3		2	2
4	9 M 2			2			2
	F 2	1		1			2
3	11 M 1		1				1
	F 2			2		1	1
2	12 M 2		1	1			2
1	13 M 1		1				1
	F						
23		4	8	11	1	6	16
		17.4%	34.8%	47.8%	4.35%	26.08%	69.56%

TABLE 3C₂
 TOTAL HEARING LOSS - UNILATERAL
 (STUDENTS WHO PASSED PERSONALITY TEST)

Total	Age	G	F	P	G	F	P
2	9 M 1		1			1	
	F 1		1				1
3	10 M 2		1	1		1	1
	F 1	1			1		
1	11 M 1			1			1
	F						
2	12 M 2			2			2
8		1	3	4	1	2	5
		12.5%	37.5%	50%	12.5%	25%	62.5%

TABLE 3C₃

MAXIMUM AMOUNT IMPAIRMENT - BILATERAL

(45%, 40%, 75%, 45%, 40%, 35%, 35%)

(STUDENTS WHO PASSED INTELLIGENCE TEST)

Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
1	6 M						
	F 1		1			1	
1	7 M						
	F 1			1			1
1	8 M 1		1				1
	F						
1	9 M						
	F 1		1				1
2	11 M 1			1			1
	F 1			1			1
1	12 M 1			1			1
	F						
7		0	3	4	0	1	6
		0%	42.8%	57.2%	0%	14.28%	85.72%

TABLE 4A
EYSENCK JUNIOR PERSONALITY INVENTORY

Extraversion Norms									
Ages	Final Norms			Normals			Impaired		
	n	m	S.D.	n	m	S.D.	n	m	S.D.
<u>Girls:</u>									
7	345	15.46	3.25	7	11.43	2.58	2	12.50	.72
8	433	16.08	3.27	12	12.75	1.92	3	11.33	1.54
9	519	16.45	3.56	12	14.50	2.50	4	12.50	3.88
10	569	16.80	3.17	10	13.70	2.40	3	16.66	1.54
11	690	17.31	3.57	4	13.75	2.22	1	15.00	
12	551	17.35	3.51	8	13.75	2.38	2	15.00	
13	608	17.41	3.94	5	15.60	.55	1	15.00	
14	603	17.47	3.71						
15	321	16.71	4.45						
16	220	16.46	4.72						
<u>Boys:</u>									
7	342	15.83	3.34	-			-		
8	433	16.66	3.12	12	13.67	3.34	3	13.66	1.54
9	520	17.05	3.41	5	12.40	2.70	1	14.00	
10	565	17.79	3.33	9	14.00	2.50	3	14.33	3.51
11	688	17.69	3.47	8	13.37	1.92	2	13.50	3.54
12	557	17.58	3.49	8	13.50	1.60	2	9.50	2.13
13	557	18.16	3.84	13	13.24	3.49	4	11.00	2.83
14	550	17.83	3.79	4	12.75	1.71	1	10.00	
15	319	17.22	4.45						
16	147	17.40	4.62						

TABLE 4B
EYSENCK JUNIOR PERSONALITY INVENTORY

Neuroticism Norms									
Ages	Final Norms			Normals			Impaired		
	n	m	S.D.	n	m	S.D.	n	m	S.D.
<u>Girls:</u>									
7	345	11.06	4.90	7	11.57	3.55	2	10.50	2.13
8	433	11.43	4.78	12	14.50	2.15	3	14.33	3.51
9	519	12.27	4.80	12	13.83	3.43	4	12.75	5.74
10	569	12.19	5.03	10	14.00	4.00	3	12.66	3.51
11	690	11.83	5.33	4	16.00	5.48	1	17.00	
12	551	12.48	5.19	8	14.50	4.14	2	20.00	1.42
13	608	12.90	5.19	5	16.00	4.31	1	15.00	
14	603	13.92	4.81						
15	321	13.71	4.58						
16	220	13.75	5.10						
<u>Boys:</u>									
7	342	10.28	4.92	-			-		
8	433	11.52	4.84	12	13.16	3.16	3	14.66	2.52
9	520	11.38	4.65	5	16.40	2.61	1	11.00	
10	565	11.22	4.99	9	15.11	4.60	3	15.00	2.65
11	688	11.09	5.11	8	13.75	4.98	2	13.50	.72
12	557	11.01	5.06	8	10.25	3.58	2	12.50	3.54
13	557	10.73	5.02	13	15.84	2.88	4	14.75	4.99
14	550	10.84	4.82	4	11.25	.5	1	14.00	
15	319	10.41	4.99						
16	147	9.15	4.69						

TABLE 4C
EYSENCK JUNIOR PERSONALITY INVENTORY

Lie Scale Norms									
Ages	Final Norms			Normals			Impaired		
	n	m	S.D.	n	m	S.D.	n	m	S.D.
<u>Girls:</u>									
7	88	9.08	1.93	7	8.71	2.05	2	7.50	2.13
8	148	7.75	2.33	12	7.33	1.92	3	7.00	1.00
9	143	7.30	2.59	12	8.00	2.48	4	8.25	2.06
10	149	5.62	2.72	10	9.50	1.42	3	10.00	
11	211	5.49	2.64	4	7.50	2.12	1	10.00	
12	198	4.44	2.85	8	8.00	1.77	2	8.50	.72
13	186	3.48	2.45	5	9.80	1.79	1	8.00	
14	212	3.10	2.26						
15	63	2.77	2.49						
16	73	2.12	1.95						
<u>Boys:</u>									
7	108	8.08	2.39	-			-		
8	138	6.66	2.66	12	7.75	1.50	3	7.66	.58
9	135	5.78	2.66	5	8.60	2.61	1	10.00	
10	141	4.85	2.66	9	8.88	1.62	3	8.66	2.08
11	178	4.79	2.61	8	8.12	1.73	2	8.50	.72
12	163	4.14	2.75	8	8.37	2.14	2	5.50	.72
13	175	3.05	2.18	13	7.00	1.83	4	6.25	2.75
14	155	3.03	2.33	4	8.00	.82	1	6.00	
15	50	2.16	2.51						
16	63	2.57	2.19						

TABLE 5A
RAVEN PROGRESSIVE MATRICES
INTELLIGENCE TEST

Impaired Hearing									
	Age	Academic Achievement			Socio-Econ. Achievement			Grade *	Hearing Loss %
		G	F	P	G	F	P		
Arpi (R) Hagopian	6	1			1			II	35%
Azadouhi Ohanian	7			1			1	V	35%
Abd Mesri	8	1					1	III	45%
Aida Sabri	9	1					1	III	45%
Laila (R) Ghedudeh	11			1			1	III	75%
Husein Mekke	11			1			1	IV	40%
Hasan Shuwa	12			1			1	III	40%
	<u>7</u>								

- * I or "intellectually superior",
 II "definitely above the average in intellectual capacity",
 III "intellectually average",
 IV "definitely below average in intellectual capacity",
 V "intellectually defective".

TABLE 5B
 RAVEN PROGRESSIVE MATRICES
 INTELLIGENCE TEST

Control Group (Non Tested School)						
Total	Age	Grade I	Grade II	Grade III	Grade IV	Grade V
9	6	2		5	2	
12	7	2	2	6	1	1
5	8	2	2		1	
5	9		1	2	1	1
5	10			2	3	
36		6	5	15	8	2
7			1	4	1	1

TABLE 5B
RAVEN PROGRESSIVE MATRICES
INTELLIGENCE TEST

Control Group (Non Tested School)						
Total	Age	Grade I	Grade II	Grade III	Grade IV	Grade V
9	6	2		5	2	
12	7	2	2	6	1	1
5	8	2	2		1	
5	9		1	2	1	1
5	10			2	3	
36		6	5	15	8	2
7			1	4	1	1

TABLE 6
AGE INCIDENCE OF HEARING LOSS

Age Impaired	% of Impaired	% of Total	Total Tested	% of Total
5 M 2	.78	.04	M 57	1.13
F 2	<u>.78</u>	<u>.04</u>	F 59	<u>1.17</u>
	<u>1.56</u>	<u>.08</u>		<u>2.30</u>
6 M 19	7.42	.38	M393	7.82
F 17	<u>6.64</u>	<u>.34</u>	F317	<u>6.31</u>
	<u>14.06</u>	<u>.72</u>		<u>14.13</u>
7 M 24	9.41	.48	M391	7.78
F 26	<u>10.16</u>	<u>.52</u>	F403	<u>8.07</u>
	<u>19.57</u>	<u>1.00</u>		<u>15.80</u>
8 M 17	6.64	.34	M399	7.94
F 17	<u>6.64</u>	<u>.34</u>	F372	<u>7.41</u>
	<u>13.28</u>	<u>.68</u>		<u>15.35</u>
9 M 18	7.03	.36	M357	7.11
F 18	<u>7.03</u>	<u>.36</u>	F352	<u>7.01</u>
	<u>14.06</u>	<u>1.72</u>		<u>14.12</u>
10 M 11	4.30	.22	M387	7.70
F 20	<u>7.81</u>	<u>.40</u>	F337	<u>6.71</u>
	<u>12.11</u>	<u>.62</u>		<u>14.41</u>

TABLE 6 (Cont'd)

Age	Impaired	% of Impaired	% of Total	Total Tested	% of Total
11	M 14	5.47	.28	M299	5.95
	F 12	<u>4.69</u>	<u>.24</u>	F251	<u>5.00</u>
		<u>10.16</u>	<u>.52</u>		<u>10.95</u>
12	M 19	7.42	.38	M263	5.23
	F 11	<u>4.30</u>	<u>.22</u>	F187	<u>3.72</u>
		<u>11.72</u>	<u>.60</u>		<u>8.92</u>
13	M 4	1.56	.98	M 70	1.39
	F 4	<u>1.56</u>	<u>.08</u>	F 80	<u>1.59</u>
		<u>3.12</u>	<u>.16</u>		<u>2.98</u>
14	M			M 20	..40
	F 1	.39	.02	F 22	<u>..43</u>
					<u>.83</u>
15				F 4	.07
	256	100%	5.12%	5020	100%

TABLE 7
 ETIOLOGY OF HEARING LOSS IN THE 256
 IMPAIRED GROUP

	Right	Left	Bilateral
Congenital Atresia of ear canal	1		
Wax in Canal	15	18	12
Scarred Drum	24	15	39
Thick and Congested Drum	4	10	9
Perforated drum-dry	7	5	1
Serous otitis media-acute	4	1	7
Serous otitis media-chronic	5	1	11
Chronic otitis Media with perforation and discharge	5	7	3
Retracted drum	4	5	7
Perceptive loss	8	8	1
Normal ear drums with hearing loss	10	9	

TABLE 8
CHARTS OF INDIVIDUAL SCHOOLS (BOTH TOTAL
TESTED & IMPAIRED 1-18)

1- Tarik-El-Jadid Boy's 3rd School							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
23	6	9	6	8	3	14	6
39	7	11	14	14	2	29	8
45	8	17	12	10	5	26	8
37	9	14	12	11	6	21	10
51	10	19	17	15	4	33	14
27	11	7	12	8	1	20	6
32	12	17	6	9	3	20	9
<hr/>							
254							

TABLE 8 (Cont'd)

1- Tarik-El-Jadid Boy's 3rd School							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
2	6		1	1			2
1	7			1			1
3	8		1	2			3
3	9		1	2			3
1	10			1			1
5	11		2	3			5
5	12		1	4			5
20							

TABLE 8 (Cont'd)

2- Tarik-El-Jadid Boy's 2nd School							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
42	6	18	7	17		32	16
28	7	9	12	7		19	9
44	8	17	15	12		35	9
31	9	13	9	9		27	4
40	10	13	12	15		33	7
34	11	9	10	15	3	17	14
29	12	7	12	10	1	19	9
248							

TABLE 8 (Cont'd)

2- Tarik-El-Jadid Boy's 2nd School							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
2	6		1	1			2
4	7	1	3			1	3
5	8	4	1			5	
4	9		3	1		3	1
3	10		2	1		3	
2	11			2		1	1
1	12			1			1
1	13		1				1

TABLE 8 (Cont'd)

3- Tarik-El-Jadid Girl's 2nd School							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
24	6	13	7	4	3	8	13
22	7	15	4	3	1	13	8
27	8	8	7	12	3	10	14
19	9	5	8	6		13	6
8	10	3	4	1	1	4	3
3	12	3				3	
6	13	3	3			6	

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TABLE 8 (Cont'd)

3- Tarik-El-Jadid Girl's 2nd School							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
2	6	1		1			2
1	8			1		1	
3	10	2	1		1		2
1	11		1				2
2	12	1	1			2	
<hr/>							
9							

TABLE 8 (Cont'd)

4- Tarik-El-Jadid Girl's School							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
27	6			27			27
45	7		45				45
81	8		66	15		8	73
89	9	4	82	3	3	9	77
73	10	6	64	3	3	11	59
27	11	6	16	5	2	5	20
27	12	5	19	3	4	10	13
5	13	1	2	2	1	1	3
2	14		1	1		1	1

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TABLE 8 (Cont'd)

4- Tarik-El-Jadid Girl's School							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
3	7			3			3
2	8		2				2
6	9	1	3	2		1	5
4	10		2	2		1	3
3	11		3				3
1	12	1					1
1	6		1				1

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TABLE 8 (Cont'd)

5- Al-Arz School							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
31	5M15	2	5	8		6	9
	F16	7	3	6		2	14
62	6M27	9	8	10		3	24
	F35	25	9	1		14	21
31	7M11	4	6	1		5	6
	F20	7	9	4		8	12
30	8M16	8	4	4		6	10
	F14	5	8	1		7	7
21	9M8		4	4		3	5
	F13	8	5			4	9
14	10M5	1	3	1	1	1	3
	F9	8	1			7	2
31	11M11	3	8			7	4
	F20	9	10	1	2	10	8
16	12M7	2	4	1		3	4
	F9	6	3			4	5
1	13M1		1			1	
3	14M2		2			1	1
	F1	1				1	

TABLE 8 (Cont'd)

5- Al-Arz School							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
2	6M2			2			2
	F						
1	7M						1
	F1		1				
1	10M						
	F1			1			1
<hr/>							
4							

TABLE 8 (Cont'd)

6- St. Elie Btini							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
7	5M4	3	1			4	
	F3	3			1	2	
66	6M44	16	15	13	8	30	6
	F22	5	12	5	4	16	2
66	7M50	15	24	11	3	33	14
	F16	4	9	3	2	9	5
58	8M34	14	18	2	3	26	5
	F24	6	12	6	3	9	12
41	9M27	14	6	7	1	19	7
	F14	10	3	1	2	5	7
58	10M42	18	15	9	4	27	11
	F16	9	5	2	4	7	5
40	11M27	6	15	6	1	19	7
	F13	7	5	1	2	6	5
23	12M19	7	7	5	1	9	9
	F 4	1	1	2	1	2	1
2	13M1		1				1
	F1	1				1	

TABLE 8 (Cont'd)

6- St. Elie Btini							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
2	5M1		1			1	
	F1		1		1		
1	6M					1	
	F1		1				
2	7M1		1		1		
	F1			1	1		
1	8M1			1		1	
1	9F1			1			1
1	11M1			1		1	
1	12M1					1	
<hr/>							
9							

TABLE 8 (Cont'd)

7- Arabiyet El-Hadisa						
Total Tested						
Total	Age	Academic Achievement			Socio-Economic Status	
		G	F	P	G	F
4	5M3	2	1			3
	F1	1				1
173	6M92	80	12			92
	F81	73	8			81
109	7M63	50	13			63
	F46	40	6			46
76	8M43	37	6			43
	F33	27	6		1	32
79	9M43	24	9			43
	F36	26	10			36
104	10M55	37	18			55
	F49	32	17			49
77	11M42	31	9			42
	F35	24	6			35
48	12M26	9	17			26
	F22	7	3			22
<hr/>						
670						

TABLE 8 (Cont'd)

7- Arabiyet El-Hadisa							
Impaired							
Total	Age	Academic Achievement			Socio-Economic		Status
		G	F	P	G	F	
12	6M5	3	2				5
	F7	3	4				7
9	7M7	4	3				7
	F2	1	1				2
3	8M						
	F3	3					3
7	9M3	3					3
	F4	2	2				4
5	10M2	1	1				2
	F3	1	2				3
3	11M2	2					2
	F1	1					1
3	12M2		2				2
	F1		1				1
<hr/>							
42							

TABLE 8 (Cont'd)

8- Ecole Pepinier							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
23	6M13	8	3	2	1	11	1
	F10	5	2	3	1	9	
27	7M12	5	6	1	5	6	1
	F15	6	8	1	2	11	2
17	8M14	5	9		4	10	
	F 3	1	1	1		3	
5	9M 4	1	2	1	1	1	2
	F 1	1			1		
5	10M2	1		1	2		
	F 3	2	1		1	2	
1	11F		1			1	

TABLE 8 (Cont'd)

8- Ecole Pepinier							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
1	6M						
	F1		1			1	
1	7M						
	F1		1			1	
1	9M						
	F1	1			1		
3							

TABLE 8 (Cont'd)

9- Ecole St. Joseph Maronite							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
1	5F1	1				1	
30	6M20	13	3	4	4	13	3
	F10	8	2		5	5	
31	7M15	8	3	4	3	11	1
	F16	10	5	1	5	11	
33	8M13	8	5		3	7	3
	F20	11	7	2	7	12	1
27	9M13	2	10	1	1	10	2
	F14	6	2	6	1	12	1
29	10M8	4	1	3	1	5	2
	F21	8	12	1	1	16	3
15	11M5	1	3	1		4	1
	F10	5	2	3	2	7	1
3	12M2	1	1			2	
	F1	1				1	
3	14M2	1	1			2	
	F1		1				1

TABLE 8 (Cont'd)

9- Ecole St. Joseph Maronite							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
1	5M1						
	F1	1			1		
5	6M4	2	2			2	2
	F1		1				1
7	7M2	2			2		
	F5	3	2		2	2	1
2	8M						
	F2	1		1	1		1
2	9M1		1			1	
	F1			1		1	
3	10M						
	F3		2	1		2	1
1	13M1			1		1	
<hr/>							
21							

TABLE 8 (Cont'd)

10- Evangelical Hayashen							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
14	6M10	6	4		3	6	1
	F 4	1	3			2	2
7	7M 1		1			1	
	F 6	2	4		1	3	2
17	8M10	4	4	2	2	6	2
	F 7	4	3		3	1	3
10	9M 7		4	3		5	2
	F 3	1	2		2		1
5	10M2	1	1				2
	F3		3			1	2
7	11M2		1	1		2	
	F5	1	4		1	1	3
9	12M5	1	3	1		5	
	F4	2	1	1	1	2	1

TABLE 8 (Cont'd)

10- Evangelical Hayashen							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
1	6M1		1				1
	F						
1							

TABLE 8 (Cont'd)

11- Nazarian								
Total Tested								
Total	Age		Academic Achievement			Socio-Economic Status		
			G	F	P	G	F	P
15	5	M5	2	3		4	1	
		F10	10			8	2	
72	6	M34	29	5		29	5	
		F38	33	3	2	34	4	
111	7	M59	31	13	15	24	31	4
		F52	32	14	6	40	10	2
84	8	M49	21	23	5	18	26	5
		F35	19	12	4	19	16	
57	9	M34	13	15	6	15	15	4
		F23	7	12	4	15	8	
57	10	M28	4	9	15	10	17	1
		F29	3	11	15	15	13	1
44	11	M18	2	8	8	8	10	
		F26	5	13	8	25	1	
25	12	M12	3	7	2	10	2	
		F13	4	7	2	13		

TABLE 8 (Cont'd)

11- Nazarian							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
2	6 M						
	F2	2			2		
4	10 M						
	F4	1	2	1	1	2	1
1	11 M						
	F1		1		1		
2	12 M1	1			1		
	F1		1		1		
<hr/>							
9							

TABLE 8 (Cont'd)

12- Nshan Palanjan Djemaran							
Total Tested							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
13	5 M 6		6		1	5	
	F 7		7		2	4	1
46	6 M25	2	21	2	6	12	7
	F21	1	20		8	6	7
49	7 M20	3	13	4	3	11	6
	F29	10	14	5	9	11	9
30	8 M15	3	11	7	2	14	3
	F15	2	7	2	4	5	2
49	9 M21	4	11	8	6	7	10
	F28	5	15	6	8	12	6
33	10 M19	1	9	9	9	7	3
	F14	2	9	3	2	6	6
34	11 M17	1	8	8	8	5	4
	F17	4	7	6	5	8	4
38	12 M18	3	8	7	4	8	6
	F20	3	10	7	2	9	9
21	13 M10	1	3	6	1	5	4
	F11	2	4	5	4	5	2
9	14 M 4		3	3	1		3
	F 5		2	1	1		3

TABLE 8 (Cont'd)

12- Nshan Palanjian Djemaran							
Impaired							
Total	Age	Academic Achievement			Socio-Economic Status		
		G	F	P	G	F	P
1	6 M 1		1			1	
3	7 M 2	1	1		1	1	
	F 1		1			1	
1	9 M 1		1		1		
	F						
2	11 M						
	F 2		2		1	1	
1	12 M 1		1			1	
	F						
8							

TABLE 8 (Cont'd)

13- Tekeyan								
Total Tested								
Total	Age		Academic Achievement			Socio-Economic Status		
			G	F	P	G	F	P
19	5	M13	4	4	5	4	6	3
		F 6	3	2	1	3	1	2
64	6	M42	18	16	7	4	22	16
		F22	12	7	3	3	9	10
82	7	M28	11	10	7	2	9	17
		F54	17	25	12	2	22	30
69	8	M32	9	16	7		10	22
		F37	9	12	16		14	23
76	9	M42	11	21	10		17	25
		F34	19	10	5		16	18
76	10	M40	10	18	12	1	17	21
		F36	12	17	7		13	23
64	11	M40	11	17	12		17	23
		F24	3	15	6		11	13
75	12	M39	10	16	13	1	20	18
		F36	11	19	6		17	19
55	13	M25	5	12	8		9	16
		F30	10	16	4		8	22
11	14	M 4		4			2	2
		F 7	1	4	2		2	5

TABLE 8 (Cont'd)

13- Tekeyan							
Impaired							
Total	Age		Academic Achievement			Socio-Economic Status	
			G	F	P	G	F
1	5	M 1		1			1
		F					
7	7	M 1		1		1	
		F 6	1	5		4	2
8	8	M 6	3	1	1	2	3
		F 2	2		1	1	2
7	9	M 4	1	3	1	1	3
		F 3	2	1		3	
3	10	M 2			2	1	1
		F 1	1				1
5	11	M 3		1	2		3
		F 2		1	1	1	1
10	12	M 6	1		5	4	2
		F 4	1	2	1	2	2
4	13	M 2		2		1	1
		F 2			2	1	1
1	14	M					
		F 1		1			1

TABLE 8 (Cont'd)

14- Armenian Evangelical College							
Total Tested							
Total	Age		Academic Achievement			Socio-Economic Status	
			G	F	P	E	F
10	6	M 4	2	2		2	2
		F 6	2	3	1	3	3
41	7	M23	10	10	3	13	10
		F18	10	8		10	8
31	8	M22	10	10	2	10	12
		F 9	4	5		4	5
41	9	M27	14	10	3	14	13
		F14	10	4		10	4
39	10	M25	12	10	3	10	15
		F14	8	4	2	7	7
32	11	M12	5	5	2	6	6
		F20	9	9	2	10	10
38	12	M27	10	10	7	10	17
		F11	5	5	1	5	6
22	13	M13	5	6	2	6	7
		F 9	3	6			9
8	14	M 5	2	3			5
		F 3		3			3
2	15	M					
		F 2		2			2

TABLE 8 (Cont'd)

14- Armenian Evangelical College						
Impaired						
Total	Age	Academic Achievement			Socio-Economic Status	
		G	F	P	G	F
3	7 M 3	1	2		2	1
	F					
1	10 M 1	1				1
	F					
2	12 M 2		2		2	
	F					
<hr/>						
6						
<hr/>						

TABLE 8 (Cont'd)

15- Aksor Kassarjian								
Total Tested								
Total	Age		Academic Achievement			Socio-Economic Status		
			G	F	P	G	F	P
26	5	M11	4	1	6	1	4	6
		F15	5	8	2	4	7	4
34	6	M17	7	8	2	2	11	4
		F17	6	10	1	4	6	7
57	7	M30	12	10	8		15	15
		F27	4	12	11	2	14	11
55	8	M25	2	10	13	1	10	14
		F30	8	11	10	2	13	15
61	9	M29	4	9	16		13	16
		F32	13	9	10		19	13
46	10	M20	2	10	8		9	11
		F26	5	10	6	3	7	15
47	11	M21	5	6	10	2	12	7
		F26	7	8	9	1	12	13
18	12	M10	1	1	8		5	5
		F 8	3	1	4	1	2	5
7	13	M 3		2	1		3	
		F 4		3	1		3	1
3	14	M 2			2		1	1
		F 1		1				1

TABLE 8 (Cont'd)

15- Aksor Kassarjian							
Impaired							
Total	Age	Academic Achievement			Socio-Economic		Status
		G	F	P	G	F	P
3	6 M						
	F 3	2	1			1	2
3	7 M						
	F 3		2	1		1	2
2	8 M						
	F 2	1	1		1	1	
3	9 M 2	2					2
	F 1			1			1
2	10 M 1						
	F 1	1		1	1		1
2	11 M			1			1
	F			1			1
<hr/>							
15							

TABLE 8 (Cont'd)

16- Torkomian								
Total Tested								
Total	Age		Academic Achievement			Socio-Economic		Status
			G	F	P	G	F	P
8	7	M 5	2	2	1		5	
		F 3	1	2		1	1	1
20	8	M 9	5	4		2	4	3
		F 11	7	3	1	1	6	4
16	9	M 8	3	3	2	2	2	4
		F 8	1	5	2		5	3
25	10	M 16	7	8	1	3	7	6
		F 9	4	4	1	2	6	1
19	11	M 14		8	6	2	4	8
		F 5	1	2			1	4
6	12	M						
		F 6	1	3	2		3	3
8	13	M 6	2	1	2		4	2
		F 2		1	1	1		1
1	15	M						
		F 1			1			1

TABLE 8 (Cont'd)

16- Torkomian							
Impaired							
Total	Age	Academic Achievement			Socio-Economic		Status
		G	F	P	G	F	P
1	7 M	1		1		1	
	F						
2	8 M						
	F	2	1	1		1	1
3							

TABLE 8 (Cont'd)

17 -Aramiam								
Total Tested								
Total	Age		Academic Achievement			Socio-Economic		Status
			G	F	P	G	F	P
23	7	M 6	1	5		1	2	3
		F17	3	12	2	1	10	6
28	8	M18	2	12	4		9	9
		F10	2	7		3		4
30	9	M17	6	6	5	2	6	9
		F13	6	6	1		9	4
19	10	M11	1	10		1	7	3
		F 8		5	2	2	4	2
17	11	M 9	2	3	4	2	3	4
		F 8	1	4	3	1	3	4
32	12	M17		6	11	1	12	4
		F15	2	9	4	5	4	6
2	13	M 2		2		2		
		F						
1	14	M						
		F 1			1		1	

TABLE 8 (Cont'd)

17- Aramian							
Impaired							
Total	Age	Academic Achievement			Socio-Economic		Status
		G	F	P	G	F	P
1	8 M 1		1				1
	F						
1	9 M						
	F 1			1		1	
1	10 M 1		1				1
	F						
2	12 M						
	F 2		2		1	1	
1	13 M						
	F 1		1		1		
<hr/>							
6							
<hr/>							

TABLE 8 (Cont'd)

18- Apkarian							
Total Tested							
Total	Age		Academic Achievement			Socio-Economic Status	
			G	F	P	G	F
18	7	M 1			1		1
		F17	7	7	3	5	12
26	8	M 9	3	4	6	1	3
		F17	5	8	4		5
20	9	M 9	3	4	2		3
		F11	2	6	3	1	3
42	10	M23	1	8	14		6
		F19	4	4	11	1	4
34	11	M21	1	11	9		8
		F13	6	3	4		7
28	12	M20		9	10	1	7
		F 8	3	5			5
21	13	M 9		4	5		5
		F12		8	4	1	5
2	14	M 1			1		1
		F 1		1			
1	15	M					
		F 1			1		

TABLE 8 (Cont'd)

18- Apkarian							
Impaired							
Total	Age	Academic Achievement			Socio-Economic		Status
		G	F	P	G	F	
1	6 M	1		1			1
	F						
5	7 M	1		1		1	
	F 4	1	2	1		1	3
4	8 M	1					1
	F 3		2	1		2	1
1	11 M						
	F 1	1				1	
1	13 M						
	F 1			1		1	
12							

CHAPTER IV

INTERPRETATION OF RESULTS

A. Incidence of Hearing Loss and Comparison With Related Research

According to figures obtained from the Education Department of the American University of Beirut there are 83,227 elementary school children in Beirut (1966-67). The number of students screened for hearing in the present research is 6.03% of the school population of the city. The duration of the screening was from December 1966 to May 1967. These students came from eighteen private and public schools located in various districts of the city. Schools were visited after previously set appointments and a few trips were taken to each school to cover the screening of all students in the age group. A Beltone 11 C screening audiometer was utilized each time and the otolaryngologist was present during the processing. The principals of the respective schools were very cooperative and pleased with the medical attention the children received.

Table 6 gives the incidence of hearing loss in respective age groups. It will be seen that it is

highest between the ages of 6 to 9. This is in agreement with the otolaryngologists' experience with children. They report that the prevalence of tonsil and adenoid problems that effect the ear, and consequently the hearing, is highest during this period of a child's life.

Table 7 gives the etiology of hearing loss in 256 impaired students. It will be seen very clearly that the majority of these cases (85%) are middle ear problems, a type that can be treated and prevented. Therefore, a hearing conservation program at an early age will have a constructive result of finding these cases and treating them, consequently reducing the number of hearing losses in the higher elementary grades and in high school.

An analysis of the figures obtained from this research indicates that the prevalence of hearing loss in the 5020 school children screened is 5.12%. This is not very different from results obtained in other countries for the incidence of hearing loss in school children. A short survey of results as appearing in the literature during recent years are given below.

Holmgen (1952) reported impairment of hearing in 3.2 per cent of 26,000 school children in Stockholm. Also in Sweden, Flodgren (1955) found impairment of

hearing in 5.4 per cent of 14,709 school children in the province of "Ostergotland". Similarly, Rohrt (1955) found hearing impairment in 4.5 per cent of 2,622 school children in the province of Vanersborg. Hoeksema and Huizing (1956) found hearing impairment in 5.2 per cent of 4,252 school children in Groningen.

Kodman and Sperrazzo (1959), cited earlier, found that 5 per cent of public school children in the U.S.A. have impaired hearing. The Scottish Education Department (1950) reported hearing loss incidence ranged between 5 and 8 per cent for school children.

Y.P. Kapur (1963) found that the prevalence of hearing loss among 857 school children in three schools in the Vellore area (South India) varied from 16.3 to 18.6 per cent. This is higher than figures from other countries mentioned above.

B. Academic Achievement Results - Total
Tested and Impaired

The information collected from the questionnaires filled out for each student tested is tabulated in Table 1. Students were divided into age groups and checked for academic achievement and socio-economic status.

Table 2 shows the classification of the students with impaired hearing. They are also divided into age groups and checked for academic achievement and socio-

economic status.

Figures obtained from these tables show that the academic achievement and the socio-economic status of the impaired group is considerably poorer compared with that of the total tested group.

Tables 3A and 3B show the academic achievement (in percentages) at different age levels, both of the total tested and the impaired groups. The significance of the statistical evaluation of the results was tested by the chi square. The levels of significance ranged from .02 - .01 levels, which are statistically significant.

It will be seen that at the age levels 6, 7, 8, 10, 11, respectively the academic achievement results of the impaired group show very clearly a poorer result and this has been found to be statistically significant, except for the age group 9 and 12.

The impaired hearing students in the present research were classified according to the severity of their hearing loss. This was determined by averaging the hearing threshold levels for pure tone 500, 1000, 2000 cycles per second which are called speech frequencies. The hearing loss was categorized as follows:

1. Students with less than 25 db loss (bilateral).
2. Students with 25-35 db loss (bilateral).

3. Students with more than 35 db loss (bilateral).
4. Students with unilateral severe hearing loss (more than 70 db).

The incidence or the percentage of students having poor academic achievement appeared to increase with increasing impairment of hearing. Table 3C shows this relationship. The results obtained from the academic achievement of the impaired group in comparison with the results of the academic achievement of the total tested group were found to be significant when tested by the chi square method. The level of significance was better than .01 level of significance (see Table 3C).

It will be seen from Table 3C that the group with the poorest academic achievement were those students who had a bilateral hearing impairment of more than 35 db (23 in number). From this same group 7 students who passed the intelligence test (see discussion on impaired hearing and intelligence test) revealed even poorer academic achievement (Table 3C₃). Students with total unilateral hearing loss, 20 in number, showed a low figure in academic achievement too; (Table 3C). "Such children will naturally have difficulties in school, particularly if they have their seats at the

back of the classroom with the healthy ear towards the wall. It is important to make parents and teachers realize that such children have only one ear on which to rely. It should be seen to that they are given a seat in the classroom from which they can hear the teacher better."¹

From the results obtained in the present research it will be seen that students with impaired hearing are poorer in their academic achievement than those with normal hearing. The more severe the hearing loss the poorer is the academic achievement. In other words, the academic achievement decreases with severity of hearing loss. Children with total unilateral hearing loss can not make use of their good ears when not given the right seat in class and consequently are poor in academic achievement.

All this is in close agreement with statements made by Goetzinger, Harrison and Baer (1964) who recently confirmed the fact that even minor degrees of hearing loss in school children can have detrimental effects upon school achievement. Ronald K. Sommers in the same article adds that, "the observations of professional personnel who have interacted with such children tend

¹H. Fr. Fabritius, Mass Examination for Detection of Hearing Loss in School Children in a Northern Province of Norway, Acta Otolaryngologica, Supp. 140, 1958, p. 128.

to support these findings."²

"Since academic achievement depends on language skill, it is not difficult to realize that hard of hearing children, in general, lag in educational achievement and that deaf children are seriously retarded."³

C. Personality Trait Results
Control Group & Impaired

The Junior Eysenck Personality Inventory was administered to a group of students with maximum hearing loss bilaterally and total hearing loss unilaterally. There were a total of 31 students, 23 with bilateral hearing loss and 8 with unilateral total hearing loss. (The total group of unilateral hearing loss was 20, however only 8 students were available to pass the personality test. Their academic achievement is seen on Table 3C₂). Around four times this number of students with normal ears, similar in age but chosen randomly, were considered as a control group.

²Ronald K. Sommers, Hearing Services for School Children: The Audiometric Screening Program, Maico Audiological Library Series, Vol. VI, Report Six, (U.S.A., 1968).

³Charlotte B. Avery, The Education of Children with Impaired Hearing in Education of Exceptional Children & Youth, William M. Cruickshank & G. Orville Johnson (eds.) (Englewood Cliffs: N.J. Prentice Hall Inc., 1967) p. 352.

Table 4A gives the scores for extraversion. It will be seen that there is a marked increase in extraversion for British norm boys but a rather less marked one for British norm girls. As for our normal hearing groups, there is an increase in extraversion for girls but almost no change for boys. On the other hand there is a marked increase in extraversion for our impaired girls and a marked decrease for boys.

Table 4B gives the scores for neuroticism. Here there is increase with age for British girls but no change for boys; there is a clear increase with age for our normal hearing girls but a decrease for boys. In the impaired groups there is an increase in girls but no change for boys.

Table 4C gives the scores for the lie scale. It will be seen that there is a consistent decrease in lying with age for both British norm boys and girls. However there is no change for either our normal hearing groups nor impaired ones both for boys and girls.

From the results of the British norm groups "it appears that boys are more extraverted than girls, a finding not unexpected in view of the previous observation with adult samples that men are more extraverted than women."⁴ The results of the groups we have

⁴Sybil B.G. Eysenck, Manual of the Junior Eysenck Personality Inventory, (University of London Press Ltd., London, 1965), pp. 6-7.

both normals and impaired, show that our girls are more extraverted than boys.

As to neuroticism scores of British norm groups, "It thus appears to be a fact that girls become more unstable with increasing age, whereas boys appear to remain at very much the same level."⁵ This agrees fairly well with the results of our groups both normal and impaired.

The British lie scale scores "show clearly the shift from high lying in the younger children to very low lying in the older boys and girls,"⁶ but our group of students, both normal and impaired, boys and girls shows no change.

D. Intelligence Test Results Pilot Study

The Raven Progressive Matrices, a non-verbal intelligence test, was administered to a group of students with the highest percent of bilateral hearing loss. These were 7 in number (Table 3C₃). A group of normal hearing students, 36 in number, from a non-screened school were considered as a control group.

⁵Ibid, pp. 6-7.

⁶Ibid, pp. 6-7.

The results which are tabulated in Table 5A and 5B show some interesting points.

The scores of the 7 impaired students show a normal distribution, 4 students being average, one above average, one below average and one showing an "intellectually defective" result.

It is interesting to mention here that a 6 year old girl with an above average intelligence score, and the 11 year old girl with an average intelligence score and with 75% hearing loss, (the highest in the impaired group), are both repeaters thus are very good students in their classes, as was reported by their class teachers.

Table 5B shows the scores of the control group. The results of this group fall in a normal curve, too. Thus it is very similar to the impaired group.

From the intelligence test result collected, we may say that impaired hearing does not necessarily affect the intelligence of a child but definitely affects the academic achievement. However, repetition of subject matter makes a child with impaired hearing a "good" achiever the next year.

"It is difficult for the child with severe hearing impairment to live up to the potential of his intellectual capacity, although he may be qualitatively not

inferior in intelligence."⁷

"Concerning intelligence, the studies have revealed that although hearing impairment has some effect on intellectual development and functioning, it is not a generalized effect."⁸

The Eysenck Personality Inventory (pages 23-24) and the Raven Progressive Matrices (page 25), a non verbal intelligence test, were used in the present study with the understanding that both of these tests have not been standardized yet for our cultural patterns. Therefore, extreme caution should be used in drawing relationships between these and the incidence of impaired hearing loss until such time as these tests have been validated on Arabic-speaking children.

⁷Human Communication: The Public Health Aspects of Hearing, Language, And Speech Disorders, NINDB Monograph No. 7, Bethesda, Md. (U.S.A., 1968), p. 9.

⁸Avery, loc.cit.

CHAPTER V

SUMMARY AND SUGGESTIONS

A. Outline of Research Conducted and Results

Screening elementary school children for detection of hearing loss was carried out in 18 Beirut elementary schools during the period of December 1966 to May 1967. The number of Beirut elementary school children is 83,227. Five thousand twenty children ages between 5-15 were tested. Two hundred fifty six students were found to have impaired hearing, an incidence of 5.12%. These children had a complete ear, nose and throat examination by the otolaryngologist. Most of these children had a middle ear type of disease amenable to treatment and for prevention. The hearing loss of the 256 impaired ranged between 30% - 75% for the speech frequencies.

Academic achievement, personality traits and intelligence in relation to impaired hearing were determined. The results suggested that impaired hearing interfered with the academic achievement of these children. The results indicated, too, that students with total unilateral hearing loss were poor achievers.

Personality test results did not show any appreciable difference between normal hearing students and the impaired group.

A non verbal intelligence test administered to a very small group of students with maximum hearing loss showed a normal distribution. The poor academic achievement in these children may be attributed to their impaired hearing.

B. Suggestions

The findings of our research support the view that hearing conservation programs be applied in the elementary schools of Beirut. As was mentioned earlier, the basic reason for conducting periodic testing in the schools is to detect minor hearing losses in school children and prevent their reaching such proportions that they may interfere with achievement, adjustment and behavior. It is imperative that hearing deficiencies be discovered at a very early age so that, with proper treatment, each child can develop to the fullest within the limits of his intellectual potential.

Hearing conservation programs are not new in schools of the United States and some countries in Europe.

In the hearing conservation programs of some

school communities in the United States, screen testing of hearing is carried out every year on every child. This of course, is ideal. In other communities screen testing is done only for elementary school children in alternate grades, for example, in the kindergarten, second, fourth and sixth grades. A compromise between these two plans which would be less likely to delay the discovery of a hearing deficient child is as follows: screen test yearly all children in the kindergarten, first, second, fourth, sixth, eighth, tenth and twelfth grades; test any child referred by his teacher and any child newly enrolled in the school. Since younger children are more susceptible to infections and diseases which affect hearing than are older children, screen tests of hearing are most valuable for youngsters in the lower grades. "A delay of over a year in discovering the early beginning of a hearing loss may result in great physical, educational and emotional harm to a child."¹

It is useless to discover cases of hearing loss unless something is done to improve the situation for

¹John K. Duffy, Hearing Problems of School Age Children, Maico Audiological Library Series, (U.S.A., 1962), Report V.

the children who have hearing problems. Therefore the medical and educational follow-up aspects of the hearing-conservation program are extremely important. The effectiveness of a school hearing-conservation program is directly related to the thoroughness with which the follow-up program is conducted.

The educational needs of the impaired hearing child are different from those of the deaf child. The impaired hearing child can learn to talk and to understand speech and to learn language by more nearly natural means and relying primarily on his sense of hearing. Furthermore, if his difficulties are recognized and if he is given proper assistance his needs may well be met in the classroom itself.

We should stress here that although the welfare of the hearing impaired child should be entrusted to specially trained personnel, all remedial measures should be carried out within the framework of a regular school and health system. Such children should be educated with normal hearing children wherever this is practical. It is psychologically and educationally desirable that the child should not be prevented from associating with children who hear normally. True, he must be segregated for speech reading lessons and auditory training, but these activities should be con-

sidered part of his school program. When a child is convinced that he is a normal boy or girl with a particular need that has been recognized, he has hurdled the chief obstacle to his eventual adjustment.

In summary the management of hearing impaired children requires:

1. Public information about hearing impairment.
2. Case-finding through appropriate screening programs in clinics for babies and in schools.
3. Complete medical diagnosis of hearing difficulties.
4. Appropriate medical and surgical treatment.
5. Thorough assessment of hearing after all indicated medical and surgical procedures have been completed, with particular attention to educational needs.
6. Special educational measures that include auditory training, speech, reading, speech correction and conservation of speech, vocational planning, and psychological guidance.

The importance of hearing in every day communication and school achievement should be conveyed to all school principals. It should be explained to teachers that the child with the worried expression on his face as he intently watches the teacher speak to him may be one of the many children with impaired hearing. So may the child with any of the following characteristics:

- 1) He who fails to pay attention when casually spoken to.
- 2) He who gives the wrong answers to simple questions.
- 3) He who hears better when watching the speaker's face.
- 4) He who is functioning below his potential ability in school.
- 5) He who often asks the speaker to repeat words or sentences.
- 6) He who has frequent earaches and running ears or frequent colds.
- 7) He who has frequent upper respiratory infections such as sinusitis or tonsillitis.
- 8) He who has become a behavior problem at school and at home.
- 9) He who fails to articulate correctly certain speech sounds or omits certain consonant sounds.

10) He who often fails to discriminate between words with similar vowels but different consonants.

11) He who is withdrawn and does not mingle readily with classmates and neighbors.

Therefore, the presence of auditory impairment when suspected by the symptoms mentioned above should lead school authorities to take early steps to remedy the disorder. It is advisable that screening audiometers be made available to the school health authorities for periodic checks on hearing.

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