# CONTRIBUTORY FACTORS IN THE INTEGRATION OF THE **HEARING-IMPAIRED** IN SCHOOLS

THESIS

Submitted to the University of Mysore in 1994.

**To**

Dr. (Mrs.) ShamimaDevaraj and Dr. A.A. Devaraj,

my parents.

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# CERTIFICATE

This is to certify that the theses entitled **CONTRIBUTORY FACTORS IN THE INTEGRATION OF THE HEARING-IMPAIRED IN SCHOOLS** submitted by Asha Yathiraj, for the degree of Ph.D. in the University of Mysore, Mysore, was carried out at the AH India Institute of Speech and Hearing, Mysore under my guidance.

Place: Mysore

Date: 9-12-94

Dr. S. Nikam
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## DECLARATION

I declare that this thesis entitled **CONTRIBUTORY FACTORS IN THE INTEGRATION OF THE HEARING-IMPAIRED IN SCHOOLS,** which is submitted herewith for the award of the degree of Ph.D. from the University of Mysore, Mysore, is the result of the work carried out by me at the All India Institute of Speech and Hearing, Mysore, under the guidance of Dr. S. Nikam, Director All India Institute of Speech and Hearing, Mysore. I further declare that the results of this work have not been previously submitted for any degree.

Place: Mysore.

Date: 9-12-94

Asha Yathiraj.

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# INTRODUCTION

The earliest recorded evidence of a deaf individual receiving education was in the early Christian era by Pliny (AD 23-79). He described how a young deaf boy received painting lessons to develop his artistic talents. Prior to this, the deaf were thought to be incapable of any constructive work, let alone being capable of receiving education. Since then there has been considerable change in the educational trend for the hearing-impaired (Flint, 1979).

The education of the hearing-impaired children can take place in various settings. These may be: a) special schools for the hearing-impaired which can be residential or day schools, b) special classes for the hearing-impaired located within a regular school and c) regular schools into which the hearing-impaired are integrated. The former two educational set-ups would result in the hearing-impaired child being segregated while the latter would allow them a chance to grow in the mainstream.

## Special Schools/Classes:

The hearing-impaired may be placed in special schools established specifically for them or along with other handicapped children such as the mentally retarded. These schools may have teachers who have special training in handling the hearing-impaired children, specially designed classrooms, and devices that may help the children communicate better. These special schools may either be residential schools or day schools. The hearing-impaired children in these schools are segregated for academic and nonacademic purposes. Hence their interaction with the normal hearing population is limited.

The hearing-impaired may also be enrolled in special classes. These are classes that are located in regular schools. As in the special schools, the special classes may have teachers trained to manage the hearing-impaired, classrooms designed to enhance communication and special devices. The children in the special classes would be segregated from the normal hearing children for the academic programs, but they have the opportunity to mingle with the normal hearing children during co-curricular activities.

Each of the above educational settings have their own merits and demerits. They are discussed below:

**Merits of special schools/classes:**

The advantage of educating the hearing-impaired children in special schools or classes, are: 1) The children get special attention from teachers who are specially trained to deal with them. 2) Since the school/class would have several hearing-impaired children it is easier for them to justify the use of special equipment/devices for them. 3) The children would have lesser amount of strain in life since they do not have to compete with the normal hearing cohorts. 4) The organizers of the special schools/classes would find it easier to plan for the hearing-impaired as they do not have to do so for the normal hearing population also at the same time (Babbidge et al., 1965).

## Demerits of special schools/classes:

Though segregated schools have their advantages, they also have their disadvantages. 1) Segregation would mean that the hearing-impaired children would have minimal interaction with the normal hearing population during school hours. In residential schools this restricted interaction is seen even outside school hours. 2) Hearing-impaired children in residential schools have minimal contact with their parents and normal hearing siblings. 3) A further disadvantage of residential schools is that the parent participation in their education is minimized. 4) Though these children may be taught through an aural mode during the school hours, several of them tend to use signs once they are not under direct supervision of the teacher. 5) Also these hearing-impaired children would tend to mingle among themselves and not have much of an opportunity to do so with the normal hearing population. Hence, these children would have a greater problem in adjusting to the general population once they emerge out of their exclusive environment. 6) The same is true for the normal hearing population which would not have had the opportunity to learn to interact with the hearing-impaired population (Babbidge et al., 1965).

## Integration:

The educational goals of the hearing-impaired may also be achieved in schools meant for the normal hearing children. These schools generally do not have specially designed classrooms or specially trained teachers. If the teacher does have training, it is more an exception rather than a rule. In this set-up, the hearing-impaired children are with the normal hearing children for both academic and co-curricular activities. "Mainstreaming (or integration) is not the wholesale elimination of special education self-contained classes—Rather it is the educational arrangement of placing handicapped students in regular classes with their non- handicapped peers to the maximum extent appropriate" (Turnbull and Schulz, 1979, pp. 52).

Integrating the hearing-impaired children for educational purposes has been made possible with the adoption of the oral-aural approach. The use of the aural sensory modality to train the hearing-impaired gained popularity with the introduction of high gain hearing aids and devices such as the FM system, the infrared hearing aids and the digital hearing aids (Berger, 1975; Strong, Kretschmer and Kretschmer, 1978). These modern devices help the hearing- impaired individual make better use of their residual hearing by providing them with adequate amplification and a good signal-to-noise ratio. In addition, the support offered to the child by the professional, the parents and teachers has contributed to making integration a possibility.

## Merits of integration:

Mainstreaming of the hearing-impaired offers several favorable points over segregation. They are discussed below:

First, it presents the hearing-impaired child with a model for personal/social/communicative behavior (Brackett and Henninges, 1976). His attempts at oral communication would get positive reinforcement, thus increasing the verbal output. Comprehension of oral communication increases and the use of gestures as the primary mode of communication decreases. On the whole, the hearing-impaired child learns to be more independent and ceases to rely entirely on others to convey his wants and intentions (Northcott, 1976).

Second, it is conceivable that those hearing-impaired who have been integrated in their early childhood years, would find it easier, in adulthood, to be integrated with their normal hearing peers in vocational placements and in their personal lives. Dale (1967) opined that making adjustments would be easier for a child if he has to start making it right from his childhood rather than start the adjustment after leaving the school for the deaf.

Thirdly, in special schools, there is a risk of the teacher's expectations for the hearing-impaired child running too low (Dale, 1967). This may occur as the majority of children may perform below the average level when compared to the normal hearing children in regular schools. With the teacher's expectations being low, the hearing-impaired children may not achieve their full potential. In an integrated school the teacher interacts with normal hearing children and this is likely to have a more normalizing effect on his/her expectations of the hearing-impaired children.

Fourth, it can be deduced that mainstreaming would have a beneficial effect on the parents also because their hearing-impaired child has found a place in the regular school, providing him with opportunities that his normal hearing peers enjoy.

Fifth, society at large stands to gain. As mentioned above, the mainstreaming of hearing-impaired at the school level will lead to their being successfully integrated into a normal life later on also. Hence, they can contribute to society more effectively than individuals who have not been integrated early in life.

Several factors have been identified as contributory to successful integration of the hearing-impaired. They may be classified under four broad categories:

1) Factors concerning the hearing-impaired child: Lowe (1972b) noted that certain factors determined the success of a hearing-impaired child being integrated. These included the age of onset of hearing loss, the age at which schooling was started, the child's language level and lip-reading ability. Perier (1972) and Rister (1975) thought the degree of hearing toss could also play a role, though it is not the sole determining factor of his progress in school. In addition, factors such as the type of hearing loss, the child's use of an appropriate hearing aid, the number of languages he is required to learn, the presence of other physical or psychological problems the special training he receives, and his IQ may also contribute to a child's success.

2) Factors concerning the child's family: In this category are included such factors as the amount of attention the family devotes to the child (Rister, 1975) and their socioeconomic status (Lowe, 1972b). In addition, the number of languages spoken at home, the mode of communication i.e., gestures or speech and any other physical or

psychological problems the members of the family may have are likely to contribute to the child's success in school.

3) Factors concerning the school teacher: The school teacher can contribute to a large extent towards the progress the child makes. The contact the teacher has with the parents and the special educator (Pollack and Ernst, 1973), her overall attitude towards having a hearing-impaired child in her classroom (Northcott, 1972) and any special training she has had in handling a hearing-impaired child are likely to determine the integrative progress of the child.

4) Factors concerning the environment: These factors range from the classroom acoustics (Ross, 1978b; Nabelek and Mason, 1981; Finitzo-Hieber, 1981), adequate illumination in the class (Erber, 1974, 1979), strength of the class (Thirumalai, 1979) and the ratio of hearing-impaired to normal children in the classroom (Mecham and Van Dyke, 1971).

Need for the studv:

Several reasons justify the present study. They are:

1) Presently, the trend in India is towards bridging the gap between the handicapped and normal individuals in various spheres. Both the Central and State Governments have taken steps to facilitate the integration of the handicapped into the community. The National Council of Educational Research Training (NCERT) since 1983, has undertaken training programs for the resource teachers and teachers of the regular schools (Rath, 1983), thus helping m the educational

integration of the handicapped, including the hearing-impaired. With this increasing importance being given to integration, it is to be expected that larger number of hearing-impaired children are likely to be mainstreamed than ever before. Prior to integrating the hearing-impaired children, it is essential that they meet a set of criteria so that their encounter with the school curriculum and environment is met with success. It is of paramount importance that these criteria be established at the earliest.

2) Though numerous studies on integration have been conducted in other countries (Horowitz and Rees, 1962; Vaughn, 1968; Rudy and Nace, 1973; Downs, 1974; Rister, 1975; Brackett and Henninges, 1976; Kennedy et al., 1976; Lane, 1976; McClure, 1977; Pflaster, 1980, 1981), they cannot be directly generalized to an Indian set-up. The several factors that negates generalization from studies carried out in other countries are:

a) Parent participation which is a contributing factor for the successful education of hearing-impaired children (Dale, 1967; Auble, 1972; Fallis, 1975; Rister, 1975) is minimal due to the high degree of illiteracy prevalent in the Indian population (Manorama Year Book, 1983).

b) Lowe (1972b) has pointed out that a hearing-impaired child is bound to have difficulty learning even one language, let alone additional ones. Quite often in India, the child may have to leam more than one language when the mother tongue and medium of instruction at school are at variance with each other.

c) Supportive help from professionals is essential in order for an integration program to succeed (Ester, 1974; Yater, 1977). In India there is a dearth in the professional help that is available. In comparison, the number of hearing-impaired children requiring attention is considerably more, which is 0.65 millions (Programme in action, 1992 -National policy on education, 1986).

d) In developed countries, technological advancements have led to the use of highly sophisticated hearing aids such as the FM transmitters and other audio and/or audio- visual aids (Lowe, 1972; Ester, 1974; Boothroyd, 1975). Most of these are not available to the hearing-impaired and the others associated with them in India. Such a lacuna brings down sharply the adequate reception of information which is largely conveyed orally in a classroom.

e) The regular school teacher is generally overworked due to the large number of students in the class. Integrating a hearing-impaired child into such a class will give her little opportunity to devote extra time to the child. The reduction of their workload by lessening the class strength, is arranged in other countries (Auble, 1972). This is usually not considered in India, where admitting a hearing-impaired child in a regular school is still met with resistance from the teachers and administrators alike. It is more likely that the hearing-impaired child is left to fend for himself/herself after admission.

f) In other countries the hearing-impaired children are partially integrated or fully integrated depending on their capabilities (Motto and Wawrzaszek, 1963; Yater, 1977). In India, pacing of integration from full segregation, to partial segregation, to partial integration and to full integration is not available in most schools.

g) The educational system used in western countries differs from that in India. This includes the procedures used to evaluate the academic proficiency of the children. In India, no standard academic achievement tests are available for evaluating normal and hearing-impaired children. Developing standard tests in India is difficult since it has to be done in the several languages spoken in the country.

h) The social and cultural aspects of life in India are unique. Hence the social factors that are likely to affect successful integration in India need not necessarily be the same as those found in other countries. There is therefore a need to study these factors.

3) With the implementation of "Project Integrated Education for Disabled" in India (Programme of action, 1992 - National policy on education, 1986), many regular schools now admit hearing-impaired children. However, there seems to be no formal criteria used to admit them. They form a heterogeneous group with respect to the degree of hearing loss, speech and language development, speechreading abilities, intelligence, socioeconomic status of the parents, cognitive abilities and psycho-social development. Nevertheless, quite a few have competed favorably with their normal hearing peers. Several have passed in distinction and even gained admission to professional courses. However, some of the hearing-impaired children placed in regular schools have not been successful in completing the course or have shown poor performance. What factors contribute to the success in some and whether it is the absence of these factors alone that contributes to failure in others is not known. Determining the contributing factors that help or retard the successful integration will be

helpful in bringing about improvement in those hearing-impaired children who are not performing so well.

5) Clause 4.3.1 of the Programme of Action 1992 - National policy on education, 1986, by the Government of India, states that "For achieving equalization of educational opportunities, children with disability should have access to quality education comparable to other children—. (The targets is to have) universal enrollment by the end of the ninth five year plan (i.e. 2000 A.D.)— (and) a reduction of drop out rates on par with other children". Guidelines to select candidates for integration in an Indian set-up, becomes imperative, if this clause of the Programme in action is to be effectively implemented. The results of this study may be used by professionals dealing with the hearing-impaired.

6) Studying the social adjustments that the parents, teachers, peers and the hearing-impaired child will have to make, will have implications for other handicaps also. Thus, professionals handling children having handicaps other than a hearing loss, may also use some of the information from this study as a guideline to integration.

7) The results of this study will also have pedagogical implications. This is especially true with reference to the environmental factors that help the hearing-impaired perform better in an integrated class. It has been noted in literature that hearing-impaired children require well lit classrooms and high signal-to-noise ratio to perform adequately.

The present study was designed to evaluate the effect of several variables on the successful integration of the hearing-impaired children.

The success of integration was measured using the academic performance of the children in class. The influence of the following variables on the academic success was evaluated:

a) Auditory response
b) Linguistic ability: comprehension, expression
c) Mode of communication
d) Speech intelligibility
e) speechreading ability
f) Visual acuity
g) Cognition
h) Intelligence
i) Intervention
j) Therapy
k) Psycho-social aspects
l) Parent-teacher interaction and parent-specialist interaction
m) Peer interaction
n) Attitudes of the parents and the teachers
o) Teacher training
p) Parent-teacher meeting
q) Hearing aid check
r) Parent's education
s) Number of languages used with the children
t) Age of the child
u) Class and class strength

To date no such study has been done in India. Hence it can be seen that there is an urgent need to study the factors that contribute to the successful integration of the hearing- impaired children in India.

The findings of the study will serve as a guideline for selecting the appropriate educational placement of hearing-impaired children.

# REVIEW

The integration of hearing-impaired individuals into the normal society has attained considerable prominence in the past two decades, This is evident from the literature available in this area. Over the years, the literature on the integration of the hearing-impaired has progressively been increasing. This rapid acceleration in the available literature on mainstreaming was noticed in 1973 by Bitter and Meals, Their review on the topic revealed that the up-trend was more pronounced during the immediate five years preceding the publication of their study. To date, there is no let-up in the interest evoked by this trend in the education of the hearing-impaired, that is mainstreaming.

From the very beginning, a plethora of factors have been identified which determine the success or failure of a program for integration. However, there exists a considerable amount of controversy among investigators regarding the significance of these factors. Possibly, this is due to the unsystematic method that a great majority of authors use to base their opinions. The number of systematic studies are relatively few. in 1973, Bitter and Mears, reported an extensive review of literature on the integration of the hearing-impaired. Of the 412 articles reviewed by them, only fifteen were research reports.

The factors identified in the literature, which affect the integration of a hearing-impaired child, may be classified as follows:

1. Factors concerning the child,
2. Factors concerning the family,
3. Factors concerning the therapist and/or the special educator,
4. Factors concerning the school teacher, and
5. Factors concerning the environment.

## I. FACTORS CONCERNING THE CHILD:

Several factors concerning the hearing-impaired child that are of direct relevance to the academic achievement and the social adjustment of the child are included here.

### a) Age of onset of hearing loss:

The age of onset of hearing loss has been found to be one of the important factors determining the speech and language development of a hearing-impaired child. Several studies have been conducted in this area.

It is a well established fact that audition is the primary modality through which speech and language develop in a child. Hence it is but natural that a defect in hearing should hinder this development in a child. The onset of a hearing loss prelingually has a greater detrimental effect on the speech and language development of a child than a loss that occurs postlingually (Brill, 1975).

Since speech is the primary mode of communication in an integrated set-up, it becomes important that a child develops it adequately. Thus the time of onset of a hearing loss is considered to be one of the components that determine the success of integration. (McCartney, 1984).

Northcott's (1970) viewpoint regarding this aspect was that the age of onset of a hearing loss was not the primary factor that determined a child's academic success or his language ability. A study by Lane (1976) concurs with this view point. She studied 731 orally educated deaf adults who were students for at least two years at the Central Institute for the Deaf between the years 1914-1969. Applications filled out by the parents gave the information regarding the age of onset of deafness. She found that in her subjects, the factor of onset of hearing loss did not retard their oral language acquisition. 82% of her orally educated subjects had developed their hearing loss prior to the acquisition of speech. 47.6% of the total population studied, graduated from high school, a fact indicative of their academic success. However, her report on their oral success should be held with some reservation since it was based on subjective evidence. It was based on reports given by the subjects themselves. She used no standard measure to evaluate their oral success and also made no mention of the percentage of subjects who had developed oral success.

Fry (1978) also opined that though an early onset of hearing loss **does present an obstacle to speech and language development, it was** not necessarily one that could not be overridden.

These findings show that the onset of hearing toss prior to developing language may not be a hindrance to the educational progress of these children. This progress can be made a reality by timely identification of hearing loss and initiating appropriate intervention strategies.

**b) Early identification and intervention:**

Early detection and early intervention are prerequisites for a hearing-impaired child to develop speech and language (Pollack, 1964 , Lowe, 1972 b; Fry, 1978; Victor, 1981). The earlier this is done, the better are the chances of the hearing-impaired child acquiring speech and language (Lowe, 1972 b; Davis and Hardick, 1981; Rubin, 1981).

Ling, Ling and Pflaster (1977) identified eight conditions to be considered while implementing a program for integration. The aspects of early identification and early integration were two of the eight conditions thought essential.

Rubin (1981) noted that there was a paucity of neonatal hearing screening programs in the United States. Thus many a hearing-impaired child remained unidentified.

The hearing-impaired child has little to gain if early diagnosis is not immediately followed up with early intervention (Downs, 1978). Early intervention includes the use of adequate amplification (Pollack, 1964; 1975; Niemann, 1972; Sanders, 1976; Knauf, 1978) and systematic Intensive training (Doehring, Bonnycastle and Ling, 1978).

The importance of early detection and training is depicted in a study by Doehring, Bonnycastle and Ling (1978). They studied the rapid reading skills in relation to language and naming skills in ten profoundly and eleven severely hearing- impaired children. These children had been integrated in regular classrooms. They found the children with profound hearing loss to be normal or above normal in most of the reading skills. However the children with severe hearing loss scored about one year below their age level. Their poorer performance was attributed to a delay in detection and training. Training was started for the profound hearing loss group at an average age of 1.9 years, whereas it was started at 4.09 years for the severe hearing loss group.

Thus early identification and intervention is a key factor in the scholastic success of a hearing-impaired child.

**c) Oral skill:**

Oral skills are stated to be essential to enable the hearing-impaired child to cope in a regular school (Frick, 1973; Ross, 1978 a; Pflaster, 1980; McCartney, 1984). The linguistic performance of the child should not be very deviant from that of his fellow students (Brill, 1975; Nix, 1977; Maxon and Brackett, 1981). The necessity for having good oral skills in a mainstreamed child is probably based on the fact that in a regular school the basic mode of communication is through speech.

The importance of having intelligible speech by a hearing-impaired child in an integrated school was studied by Hoversten and Fomby (1981). Ten itinerant teachers at the South-West school for the hearing-impaired were asked to assign weightage to the items in Nix's (1977 b) checklist. The teachers dealt with children in whom the hearing loss ranged from a mild degree to a profound degree. One of the items that all ten teachers rated as being of 'considerable importance' or of great importance' was the parameter "Student has sufficient speech intelligibility to be understood by regular classroom teacher'.

Not only should the hearing-impaired child have good speech production abilities, but also good speech reception abilities (McCartney, 1984). Unless the child has sufficient auditory abilities, he would find himself in an impossible situation in a class where he has to process speech presented at a rapid pace (Maxon and Brackett, 1981).

Boothroyd (1972) pointed out that though the speech reception capabilities of a child did correlate quite well with their residual hearing, there was a possibility of children with similar audiometric patterns displaying different speech reception abilities. Hence, based on pure tone audiometry results alone, one should not decide on the speech reception ability of a child.

Communication skills was found to be one of the three main criteria used to select a prospective candidate for integration in residential schools, day schools and day classes. Craig, Salem, and Craig (1976) established this finding through questionnaires sent to residential schools, day schools and day classes.

Oral skills as a prerequisite for mainstreaming was also recommended by Ling, Ling and Pflaster (1977). They considered the following information necessary in order to determine acceptability of a hearing-impaired child for mainstreaming: (a) measures on motor speech skills; (b) measures on speech reception capabilities; and (c) measures on spoken language capabilities.

Brackett and Henninges (1976) found that the language skills of hearing-impaired children also determined how well they were accepted socially by their normal hearing peers. They studied thirteen hearing-impaired nursery children, whose age ranged from three years six months to five years three months. The degree of their hearing loss varied from mild to profound. All the children had worn binaural hearing aids for a duration of three months to forty-nine months. An equal number of normal hearing children, matched for age, formed the control group. An observational technique was utilized to obtain data on each child's communicative behavior. Two observers who were familiar with the children observed them in two different settings for ten minute duration each. With practice, an inter-rater reliability of 96% was obtained. One of the two settings used for observation was a structured language setting and the other was a free play setting. The observations made were categorized under the following headings: kind of communicative interaction, i.e. whether the interaction was initiated by the subject or was it in the nature of a response to initiation by someone else; communicative partner, i.e. was the communication with a normal hearing individual, a hearing-impaired individual or with an adult; and mode of communicative interaction, i.e.. judging each communicative act as verbal, vocal or gestural. The results indicated that those hearing-impaired children with superior language skills mingled more with their normal hearing peers than did those with inferior language skills. Brackett and Henninges (1976) failed to rule out whether any psychological conditions other than the verbal skills of the child interfered with the findings of their study.

The above studies confirmed that good verbal skills, which included reception and production, were essential to integrate a hearing-impaired child. However, there are experts who disagree with this view point. It is their stand that though good verbal skills contribute to successful integration, they are not absolutely essential (Motto and Wawrzaszek, 1963; Simon, 1967; Hoemann and Briga, 1981). The viewpoint of these experts are presented below:

According to Behrens (1972), the method of communication as the key to integration is given far too much importance by the hearing community. It prevents them from viewing the hearing-impaired person as an individual who, of necessity has to employ various modes of communication.

Hoemann and Briga (1981) concurred with Behrens (1972) and considered it to be a misconception that pure oral education is essential for mainstreaming, Bunch's (1987) Integration Rating Guide[1] indirectly substantiated this contention. The rating guide evaluates six areas. Each area was given a weighting depending on the frequency of mention in the literature. Language was given the maximum weighting (75 out of a total of 215) followed by communication ability (40 out of 215). Academic achievement, intelligence, social abilities and parental support were also given due importance. Thus children with poor oral skills but with high scores on the other areas still stood a chance of succeeding in the integrated program.

Libbey and Pronovost (1980) investigated the communication practices of 557 mainstreamed hearing-impaired adolescents. The subjects answered a questionnaire which determined their communication practice with their parents, teachers, friends and employers. The mode of communication varied depending on who they interacted with. Receptive communication was predominantly through listening (78% to 52%) and lip reading (81% to 66%) . The other methods also used for receptive communication were writing (25% to 9%) , someone interpreting (24% to 5%) and signs and finger-spelling (61% to 2%). Expressive communication was mainly through speaking (96% to 74%). The other modes of expression were through writing (25% to 11%), some one interpreting (16% to 4%) and signing and finger-spelling (63% to 2%). Signing and finger-spelling were used for reception and expression mainly while communicating with their deaf friends. Though most of the hearing-impaired adolescents did use listening, lip reading and speaking for communication, one-fourth to one-third of them reported that some of their biggest problems were communicating with hearing people and being embarrassed about my speech'. No mention was made of whether those subjects who made use of the oral-aural method succeeded better in the integration set-up than those who did not. Also, the subjects had undergone varying degrees of mainstreaming, a majority being partially mainstreamed.

A major way through which hearing-impaired children could improve their oral skills is through integration (Pollack and Ernst, 1973; Yater, 1977). This would result from the greater exposure to oral language the child would have in an integrated set-up. It is a well established fact that the speech and language ability of the hearing-impaired improves significantly with increased stimulation. The following study substantiated how interaction with normal hearing individuals increased the verbal output in mainstreamed hearing-impaired children. Raimondo and Maxwell (1987) studied the communication modes used by twenty hearing- impaired children, their teachers and their peers in a mainstreamed junior and senior high school. The typical hearing-impaired child that they observed has a pure-tone average of 68.4 dB; had been mainstreamed for 7.4 years; studied in the ninth grade and attended 3.3 regular academic classes with normal hearing children. The typical child also had a reading grade level of 6.5 and exhibited good speech intelligibility and speech reading ability. They made no mention of the range for any of the above mentioned aspects and the age of the subjects. Also the criteria used to establish speech intelligibility and speech reading ability was not mentioned.

Raimondo & Maxwell (1987) observed each hearing-impaired child for two hours in two academic class situations. The observers recorded on coding sheets which specifically defined the communication modes used by the hearing-impaired child, the teacher and the peer in a group as well as in a one-to-one situation. The communication modes that they were expected to observe were 'speech only[1], 'sign language only[1], 'finger-spelling only[1], 'simultaneous communication' 'writing', 'interpreter', and 'pantomime gesture'. The observers also wrote anecdotes of each of their observations. Inter-observer agreement was 89.2%. The observation was that speech was the mode of communication used most often by all three groups studied. In a one-to-one situation, while communicating with the hearing-impaired subjects, teachers and normal hearing children used speech 78% and 68.3% of the time respectively. The hearing-impaired subjects in turn utilized speech 71.9% and 70.2% of the time while communicating with their teacher and normal hearing peers respectively. Pantomime/Gestures were also used by all the groups, though considerably less. Similarly, in the group situation, speech was the predominant mode of communication, with pantomime gestures being used occasionally. Six of the hearing-impaired subjects had other hearing-impaired children in their mainstreamed classes. The amount of speech used while communicating with their hearing-impaired classmates in a one-to-one situation was just 32.3% and the amount of pantomime/gesture and sign language used was 34.1% and 22.6% respectively. In group situations, the hearing-impaired did not communicate with each other at all.

Saur and Stinson (1986), reviewed studies conducted on students integrated from the National Technical Institute for the Deaf into various programs conducted by the Rochester Institute of Technology. The articles reviewed by them revealed that speech intelligibility was not related to academic achievement and the degree level in which the subjects studied. However, communication skills through reading and writing were directly related to student achievement. This indicated, that rather than verbal expression, communication via the reading and writing mode were better indicators of the academic achievement of integrated students.

Geers (1990) reported the findings of a study carried out at the Central Institute for the Deaf, which focused on the functioning of hearing-impaired children in the mainstream. The subjects, who were aged sixteen or seventeen years, were classified into four groups based on the number of years for which they had been integrated. Group 1 had been integrated from the time they were in kindergarten or in first grade, group 2 during elementary school, group 3 at junior high and group 4 had been placed in the mainstream at age sixteen or were still enrolled in all day special education. As part of the study the speech intelligibility of the four groups were evaluated. The findings of the study indicated that the children in group 3 had significantly poorer speech intelligibility compared to those in groups 1 and 2. However, speech intelligibility of the children in group 4 who had been integrated for the least number of years, did not differ significantly from groups 1 and 2. Similarly, children who had been mainstreamed in junior high and high school, exhibited oral proficiency that did not differ from those who had been mainstreamed early in life. The findings of this study contradicts the notion that the earlier a child is integrated, the better is their speech intelligibility and oral proficiency.

The above studies indicated that there is considerable disagreement regarding the need for a hearing-impaired child to have good oral skills before being integrated into a normal school.

**d) Degree of hearing** loss:

The degree of hearing loss in a child has direct relevance to his capacity to learn (Northcott, 1972; Goetzinger and Proud, 1975). Several experts consider those who have mild or moderate hearing loss to make better candidates for integration than those with severe to profound hearing loss (Motto and Wawrzaszek, 1963; Rudy and Nace, 1973; Downs, 1974; Northern and Downs, 1974 ; Rupp et al., 1977; Ross, 1976b). A solution to this was suggested by Perier (1972). He recommended that those who had hearing loss that were not so severe could be integrated with supportive help as soon as the hearing aid was fitted. Those with a more severe but not profound loss, could be integrated after a duration of about one to two yeas during which period they would have to attend a special school. Very few of those with a profound hearing loss could be integrated into a regular school at a primary level.

Rudy and Nace (1973) developed a test titled "Transitional Instrument" to enable educators to select appropriate school placement for hearing-impaired children. One of the four aspects that was included in the test was the hearing level of the child. Greater the degree of loss, poorer was the child's score. This indicated that Rudy and Nace (1973) did consider the degree of hearing loss an important variable that determined the success of a hearing-impaired child in an integrated set-up.

Boothroyd (1984) noted that, when taught in a purely aural-oral mode, the degree of hearing loss of the child played a significant role. With an increase in loss, the speech perception of the individual became poorer. He studied 120 (sixty-one boys and fifty-nine girls) hearing-impaired students of Clarke School for the Deaf whose age ranged from 11-18 years (median age of fifteen years). The three frequency average of the subjects ranged from 55 dB HL to 123 dB HL. It was found that the degree of hearing loss required for the perception of various features, varied from feature to feature. The levels of hearing loss at which scores on the speech perception tests fell to 50% were 75 dB HL for consonant place; 85 dB HL for initial consonant voicing; 90 dB HL for initial consonant continuance; 10 dB HL for vowel place (front-back); 105 dB HL for talker sex; 115 dB HL for syllabic pattern and in excess of 115 dB HL for vowel height. This indicated that the degree of hearing loss of a child in an integrated class would play a significant role in his speech perception.

The trend in using the hearing level as one of the criterion for integrating hearing-impaired children is gradually loosing support. Experts believe that all hearing-impaired children, regardless of their degree of hearing loss can be integrated, including those with profound hearing loss. The study by Pflaster (1980) throws light on this aspect. She conducted a study on 182 hearing-impaired children ranging in age from 6.6 to 19.8 years. They had bilateral hearing loss of more than 30 dB HL (range being 30-110 dB in the better ear, mean being 71 dB)> However, a majority of the subjects had severe to profound hearing loss. They were found to have normal intelligence. All the subjects were already integrated in programs for almost the entire day. Pflaster (1980) selected 251 independent variables, one of them being the hearing level. The dependent variable was scores on reading comprehension tests, which she considered as an indication of a child's academic achievement. She found no significant correlation between the hearing level and the academic performance of a child. Based on this finding she concluded that the success of a child in an integrated class did not solely depend on the degrees of hearing loss.

Saur & Stinson (1986) reviewed studies carried out on post-secondary, hearing-impaired students who were integrated. They found that none of the articles reviewed by them were able to "link degree of hearing loss to academic achievement either in terms of CGPA (Comparative Guidance and Placement Program) or in grade earned in a specific course".

Maxon and Brackett (1981) in a study of 165 hearing-impaired children noted that there were children who inspite of being given maximum cues through the auditory as well as the visual modality, railed to perceive speech adequately. However, they suggested that such children could fit into an integrated program, provided they had supportive help.

Geers (1990) as part of her study evaluated the hearing abilities of groups of children who had been integrated for varying number of years. Those in group-1 had been integrated for the longest duration and those in group-4 for the shortest. It was found that group-1 had significantly more hearing (average of 98 dB) than group-3 (average of 103 dB). Similar findings were also noted for the aided speech perception tests. The findings of this study indicated, that children with more residual hearing and better speech perception skills, were integrated earlier in life. However, children with poorer auditor skills were generally integrated at a later stage in education. Thus, despite having poorer auditory abilities, these children were still considered as candidates for integration. Despite their poor auditory skills, the children integrated in junior high, demonstrated good academic performance, which was evaluated based on their reading skills.

Other experts who recommended the integration of children with profound hearing loss were Dale (1967); Northcott (1970); Fallis (1975); and Birch, (1976); Conway (1979); Libbey and Pronovost (1980) and Saur, Coggiola, Long and Simonson (1986). Healey (1976) and Hoversten and Fomby (1981) suggested that the degree of hearing loss should not be the only criterion for selecting candidates for integration.

The studies reviewed above show that in general, the magnitude of hearing loss does not have a positive correlation in the academic achievement. Thus, even those hearing-impaired children with considerably less residual hearing can be integrated in a regular school.

Along with the auditory stimuli that all children receive, they would require visual cues also. These visual cues are of great importance to those children with poor auditory speech reception abilities.

**e) Speechreading:**

As early as 1943, Ewing and Ewing established in their study, the positive effect speechreading had on the reception of speech. Ninety-two listeners (age range seventeen years to seventy-two years), with postlingually acquired hearing loss were studied. Eighty-seven of them had attended classes in lip reading. The average number of lessons attended by them was nineteen. The sentence reception ability of the ninety-two listeners was obtained under four different conditions. Their scores in each of the four different conditions were as follows: Unaided hearing with no speechreading, 21%, unaided hearing with speechreading, 64% aided hearing with speechreading, 64% aided hearing with speechreading, 90%.

The superior performance of individuals under the combined audio-visual condition has also been noted by others such as Hulton (1959) and Erber (1972b). Erber (1972b) studied the consonant recognition ability of three groups of children: normal hearing, severely hearing-impaired and profoundly deaf. Each group consisted of five children (age range nine - fifteen years). The two groups of hearing-impaired children were matched with respect to number of years of experience with hearing aids and to the number of years they had attended an oral school for the deaf, They were studied under three different conditions i.e. auditory, visual and combined audio-visual modes. All three groups were found to function similarly in the visual mode. In the auditory mode, the normal hearing group performed nearly perfectly, but not the other two groups. The group with profound loss scored lower than the severely hearing-impaired group. In the combined mode, the normal hearing and severely hearing-impaired groups performed almost perfectly, but the profoundly deaf subjects did not score very much higher than they did in the purely visual modality. This indicated the limited usefulness of amplification for the profoundly deaf. Amplification would provide them only with gross temporal and intensity cues, and lip reading would have to be the primary modality through which they can receive speech (Erber, 1972a).

The above studies throw light on the fact that utilizing a purely oral-aural approach for teaching, especially with those who have a higher degree of hearing loss, would leave the hearing-impaired children at an extreme disadvantage. Also, for those hearing-impaired children with a lower degree of hearing loss, auditory stimulation alone would not be of much help in adverse listening conditions, such as in a noisy area (Finitzo-Hieber & Tillman, 1978). The auditory information would have to be supplemented with speechreading (Erber, 1972 a,b).

A study on the communication practices of 557 mainstreamed hearing-impaired adolescents by Libbey and Pronovost (1980) indicated that 87% could lip-read at least some of what was spoken to them. Of them 18.3% could lip-read "all", 41.8% "most" and 27.1% "some" of others speech. This information was elicited through a questionnaire that was answered by the hearing-impaired subjects.

Pflaster (1976, 1980, 1981) also found that speechreading and linguistic competence were the best predictors of successful integration for hearing-impaired students over ten years of age.

Other authors have also noted that one of the required conditions in mainstreaming a hearing-impaired child is good speechreading ability (Northcott, 1972; Lowe, 1972 b; Perier, 1972; Healey, 1976; Bitter and Mears, 1973; Ling, Ling and Pflaster, 1977, Frick, 1973; and Mothner, 1980).

Stinson & Ng (1983) however, found no significant correlation between speechreading and lecture comprehension. They evaluated the relation of hearing-impaired students' recall of lecture material to measures of communication skills. Their findings revealed that subjects who had higher reading and writing scores tended to recall more of the material than those who did not. Other communication skills such as speechreading with sound, speechreading without sound, manual communication reception and simultaneous communication reception did not correlate significantly with the students' recall of lectures. Thus it can be construed that lecture comprehension is more dependent on reading and writing skills rather than speechreading, as per this study.

A majority of the studies reported in the literature, consider speechreading as a condition that would enhance the possibility of hearing-impaired children succeeding in integrated schools. Greater success of the hearing-impaired child can be anticipated if supplementary help is also made available to him.

### f) Training or Therapy received prior to integration:

Prior to integrating a hearing-impaired child into a regular primary school, he should have received intensive training to enable him to function at a language level appropriate for his age. The duration and type of such training he received would affect or facilitate his communication and learning abilities (McConnell and Horton, 1970).

It is stressed by some experts that this training is best achieved in a pre school for the deaf (Harris, 1971; Narayanaswamy, 1985). The belief is that the training received in the preschool for the deaf would help the child develop good oral communication abilities. Harris (1971) strongly opposed integration at the pre school level, saying that it "— eliminated the possibility of any child reaching his potential and enjoying quality of life as an individual" (pp. 9).

Pollack and Ernst (1973), however believed that integrated education right from the pre school level was more effective. They suggested that in addition to classroom training, the child should also attend a speech and hearing clinic. Supporting this view, Fallis (1975) recommended that all hearing-impaired children who could benefit from integration should be given this opportunity in their early years. However, how early in years it should be was not specified.

Ross (1978 a) also advocated integration at the preschool level. His contention was that the verbal behavior of the child would indicate as to whether the hearing-impaired child should continue in the mainstream or not. Based on the finding of Brackett and Henninges (1976) (stated earlier), Ross proposed that those with greater verbal skills would mingle more readily with the hearing children. No systematic study was conducted to prove that children with poorer verbal abilities at an younger age, fail to improve in these skills subsequently. Thus it is misleading to utilize the early verbal skills of a child as a criterion to integrate him.

Craig, Salem and Craig (1976) obtained information regarding the proportion of integrated preschoolers, when compared to other age groups. This information was obtained through questionnaires that were mailed to residential schools, day schools and day classes. The questionnaires were designed to obtain details regarding the integration programs offered by those three different special schools. Analysis of the questionnaire revealed that preschoolers (0-2 years and 3-6 years age groups) were the least frequent participants in an integration program. Of the total 7518 integrated hearing- impaired children, only thirty-nine were pre-schoolers (0.52%)> Of these, thirty-six were integrated from day classes and the remaining from day schools. Residential schools were found not to conduct any integration program for preschoolers. These findings indicate that more attention should be given to integrating pre-schoolers.

Other experts differ regarding the kind of education that the preschool hearing-impaired children should receive. Some suggest segregation initially and gradual integration subsequently. Porter (1975) described the integration program at the Oralingua school for the Hearing-impaired in Whittier, California. The hearing-impaired children had to go through three different stages of preschool before they were integrated into their neighbourhood elementary school. In the first stage the children were instructed in a self containing classroom where their social, emotional and verbal communication needs were dealt with. They then progressed into the second stage where they interacted with other preschool normal hearing children and were taught by a regular elementary school teacher as well as a teacher for the hearing-impaired. This stage was designed to instill feeling of confidence and success into the children. The teacher helped them communicate meaningfully with the hearing peers. The ratio of normal hearing to hearing-impaired children was almost equal at this stage. At the third stage, each class had only one hearing-impaired child. The child was integrated socially as well as academically, thus enabling the child to develop independence.

At the Keister elementary School in Harrisonburg, Virginia, the preschool was initially started as a segregated class. However, due to the advantages to be gained, the necessity to integrate the hearing-impaired children was felt. This need was fulfilled through a reverse integration program. Three hearing children were admitted in the pre-school class along with the five hearing-impaired children. The advantage of the program was that the hearing-impaired children were exposed to normal speech and language and thus helped them developed the same (Layman, 1974).

Quite often students of special schools are integrated at a later stage when they are considered competent to cope in a regular school. Their initial training is obtained at the special school after which the child may be integrated either at the primary school level or at the secondary school level (Yater, 1972).

Early home training has also been stated to account for the hearing-impaired child developing more speech and language and a more mature personality. (Lowe, 1972b, Ling, Ling and Pflaster, 1977). Ling, Ling ana Pflaster (19??) suggested a home training program for hearing-impaired children under the age of four years. The program dealt with educating the parents rather than the children. The rationale was that the guidance that the parents received from the specialists, would enable them to help their children better.

### g) Level of integration:

The degree to which a hearing-impaired child can be integrated into a regular school can differ. This depends on the amount of support that he requires (Lowe, 1972 b, Yater, 1977; McCartney, 1984; Northcott, 1970; Testut and Baldwin, 1977). Lowe (1972 a) classified the various types of integration programs into nine different categories. Each category varied in terms of the extent to which the hearing-impaired child was involved with the normal hearing population. The classification was as follows:

Full integration:

Level 1: Hearing-impaired children in regular classes without supportive help.

Level 2: Hearing-impaired children in regular classes with transitory or permanent supplementary instructional services like auditory training, speechreading training, speech therapy etc.,

Level 3: Hearing-impaired children in regular classes with supplementary instruction and a few hours of remedial instruction.

Partial integration:

Level 4: Hearing-impaired children in special classes attached to an ordinary school. They require part-time special education and attend some classes with normal hearing children.

Level 5: Hearing-impaired children in special classes attached to an ordinary school attending only subjects like arts, needle work or gymnastics with the normal hearing children.

Partial segregation:

Level 6: Hearing-impaired children in special day schools. They spend their spare time with the normal hearing when return home everyday.

Level 7: Hearing-impaired children in special residential schools. They return home only once a week or less often and spend only their holidays with the normal hearing population.

Full segregation:

Level 8: Hearing-impaired children in special programs for multiply handicapped children (not including mental retardation). They require full time special education and their opportunities to interact with ordinary children are reduced.

Level 9: Hearing-impaired children in special programs for the mentally retarded. They require full time special care in a sheltered workshop.

Yater (1977) also classified integration into various levels: full or complete integration; partial integration; non-academic partial integration; informal integration and ; reverse integration. The former four were described in Lowe's (1972 a) classification. The latter, reverse integration, comprised of admitting normal hearing children into the special dass, for academic or nonacademic subjects. This form of integration, however, is relatively uncommon. Dean and Nettles (1987) studied the effect of reverse integration on normal hearing children at the Houston School for Deaf Children. The parents of the normal hearing children were asked to rate a questionnaire on a five point scale. Their response indicated that they were pleased with the program. A majority of them agreed that the emotional and academic need of the their children were met. A positive change in the attitude towards the hearing-impaired was noted. Only one child was found to adopt the hearing-impaired children's gestural communication rather than encourage the hearing-impaired children to use speech. This, could be overcome by having more than one normal hearing child in a class. Thus reverse integration could be beneficial for both normal hearing and hearing-impaired children.

Though Lowe (1972 a) and Yater (1977) described various types of integration programs, they did not indicate the basis for placing a particular child in a given type of program.

Maxon and Brackett (1981) also described several levels of mainstreaming. They suggested that the child should be continuously evaluated to decide his placement. They listed several aspects that should be evaluated. Based on these evaluations it should be decided whether the child is receiving adequate attention to meet his individual needs. However, no specific criteria were given to select placement at any of the levels of integration.

Motto and Wawrzaszek (1963) after reviewing various research studies on integration of the hearing handicapped, felt the need to pace the integration of the hearing-impaired. They were against abrupt integration. They found that this factor was not considered in the studies that they had reviewed. Porter (1975), described pacing of integration at a preschool level, at the Oralingua School for the hearing-impaired in Whittier, California. The children progressed from instruction in a completely segregated environment, to two different levels of partial integration and finally to a fully integrated environment.

Testut and Baldwin (1977) also suggested that a hearing-impaired child should be allowed to progress by increasing the amount of mainstreaming at various stages. Each child should undergo a comprehensive assessment, which would require the participation of several professionals and the parents. The appropriateness of the program chosen for each child should be evaluated at periodic intervals. They did not exemplify as to what areas should be assessed in each child.

Partial integration has gained considerable popularity over the past few decades. Several schools for the deaf, partially integrate their children for either academic or nonacademic subjects or integrate them socially.

A partial integration program in New Zealand was described by Dale (1967). For approximately half the day, the hearing-impaired children had their classes along with the normal hearing children.

During this period, two teachers, one a teacher of the deaf and the other a regular school teacher, worked simultaneously with the children. Each teacher, worked mainly with their group of children. The topic dealt with at this time were reading, printing, music, rhythmic word, art, physical education, natural study and class visits. Topics such as speech, language, new sessions and story were taken in a small room separately. Being a day school, the children returned to their respective homes after class hours. Dale (1967) observed the following advantages of such a program: It was more economical than running a residential school; there was a normalizing effect on the deaf children socially as well as with their use of oral language; there was a normalizing effect on the teachers of the deaf since their goals for the hearing- impaired children would be the same as that for the normal hearing children (Teachers of the deaf generally have lower aspiration levels); teaching language to the hard-of-hearing was easier; it was easier for the hearing-impaired children to adjust to the hearing world at a younger age, and ; the normal hearing children learned to accept them more readily at a younger age. The inference drawn by Dale (1967) on the partial integration program should be held with some reservation since he made no systematic study of his observation.

Craig and Salem (1975) conducted a three staged study on partial integration programs of residential schools. Initially a survey of the residential school that conducted integration programs was done. Of the seventy-five schools surveyed, thirty-nine schools reported having eighty-five integration programs. Each school offered the programs at more than one grade. In general, more integration programs took place at higher grades than at the lower grades. Also, residential schools with fewer enrollments, integrated greater number of children. This reflects that when the size of the class is smaller, each child receives greater attention and thus performs well enough to be integrated.

In the second stage of the study, the residential school administrator and the public school administrator were sent questionnaires to answer. When asked to evaluate their programs, as many as twenty-nine (i.e. 74.4%) of the residential school administrators rated them as being excellent or good (twelve being excellent and seventeen being "good"). Among the public school administrator, 90.6% rated their programs as being excellent or good. Fourteen of these school (48.3%) based their evaluation either on report cards or on other in house type evaluation. No definition of the terms used in the rating scale was given. Hence it cannot be ascertained that the criteria used by one administrator to rate his programs matched with that of another. What could have been considered as "excellent" by one individual could have been rated differently by another. Inter-judge correlation for each integration program would have thrown light as to whether each program was rated similarly or not by the residential school administrator and the public school administrator. No such correlation was established however. Thus, there was a possibility the same program could have been rated differently by the two groups of administrators.

Craig, Salem and Craig (1976) mailed questionnaires to residential schools, day schools and day classes listed in the 1975 Directory of programs and services. The questionnaires aimed at eliciting information regarding the integration programs conducted by the schools. The responses indicated that 3.38% of children from sixty-three residential school, 27.74% from fifty-five days schools and 53.06% from 322 day classes were integrated. The number of partial integration programs were more than the number of full mainstreaming programs. In the partial integration program 170 of them had resource room facilities, 239 had specialized instruction offered in the school or class. In the total integration programs, 111 had some support services and only twenty-six were completely independent.

The criteria for selection of students for participation in the various integration programs were diverse. The most frequently used criteria were communication skills, academic skills, and social development. Other alternatives used were: good vocational skills, student drive, self confidence, student's request, parents request; classroom space available and age. Some schools made no special selection.

Kennedy (1980), a teacher of hearing-impaired students in junior and high school, based on her observations recommended that hearing-impaired children could be mainstreamed in all classes except social studies. She opined that, "Because mainstreaming in social studies classes does not generate an atmosphere in which hearing-impaired students learn cognitive skills, they should be taught the subject by teachers trained to teach the hearing-impaired."

The review of literature reveals that there are several types of integration programs available. However no conclusive suggestion can be made regarding the placement or a hearing-impaired child in any of the types. This is probably because there are several variables that influence the success of a child in each of these set-ups.

The general suggestion is that a program that is least restrictive to the child's progress should be selected. This would depend on the child's specific needs. Bunch (1987) developed an "Integration rating guide" (IRG) with the purpose of assisting"......teachers and others in estimating the probability of success in integration as well as the teacher support necessary to achieve that estimated degree of success" (pp. 37).

A pilot study, using the IRG on sixteen hearing-impaired students (ten males and six females) was conducted. Their ages ranged from seven years to fourteen years and hearing loss ranged from mild to profound with the majority in the severe to profound ranges. Half the number of students were completely integrated, while the other half were placed in classes for the hearing-impaired with varying degrees of integration. The investigator met the teachers early in the school year and gave them several tests from which they could select the ones that they considered appropriate for their children. The researcher also interviewed each teacher to obtain teacher estimates of performance. Each IRG was completed using the teacher estimates and their standardized and non-standardized test results.

At the end of the year, the program supervisor was interviewed, to obtain information regarding the degree of integration, prediction of probable success, and quantum of specialist teacher support. This was translated into integration success (i.e. high, acceptable, slender, and nil) and integration support ratings (i.e. four degrees of integration). This information was correlated with the success of integration and integration ratings from the IRG. The correlation between the two was found to be high for the decision regarding integration (14 of 16). It was not so high for decision regarding the amount of support required by each child from a teacher of the hearing-impaired. A follow-up interview with the project supervisor during the end of the first term the next year revealed, that they had to change over to the prediction of the IRG. Thus the IRG could be used to judge not only the success of a child in an integration program, but also to decide about the amount of support help required by the child.

**h) Intelligence:**

It has been well established that the intelligence of any child plays a key role in his academic achievement (Binet, 1922; Binet and Simon, 1905: Sukhia et al., 1974). Average or above average intelligence is one of the importance factors in the admission of a child into a regular school. This is true for a hearing-impaired child also.

Rudy and Nace (1973) in the construction of the test 'A Transitional Instrument' displayed the importance given to intelligence, by teachers, when mainstreaming a hearing- impaired child. The Transitional Instrument' was constructed with the intention of being able to predict the success of a hearing-impaired child in a regular school. Intelligence was one of the four aspects included in the test. To determine the validity of their predictive test, Rudy and Nace (1973) conducted a two staged study during the third year of their integration program. In the first stage, ten teachers from the regular school who taught hearing-impaired children *.....were asked to list observable criteria which they felt were important factors in any student becoming a successful learners' (pp. 131). Based on the factors listed by them, a rating scale was developed. Prior to the second stage of the study, the reliability of the rating scale was established. Five of the teachers were asked to rate students independently twice at an interval of one month between the first and second rating session. Statistical analysis revealed that there was a good correlation between the first and second rating for every teacher. Based on this finding, the authors considered the rating scale to be a suitable measure to test the validity of the Transitional Instrument[1]. This formed the second stage of the study. A correlation was found between the teachers rating and the scores on the transitional instrument.

This study indicated that intelligence and three other aspects were good predictors of the success of a hearing-impaired child in a regular class. The lowest IQ that was included in the Transitional Instrument' was 80. Rudy and Nace (1973) probably considered it impossible to integrate a hearing-impaired child whose IQ was less than 80. No mention, however, was made as to whether this IQ referred to the verbal IQ, the performance IQ or a combination of the two.

The necessity to evaluate the intelligence of a hearing-impaired child who is to be integrated, has been felt essential by several other experts also (Downs, 1974; Nix, 1977; Yater, 1977; Hoversten and Fomby, 1981; Bunch, 1987).

Yater (1977) considered it necessary to measure the verbal IQ and the performance IQ of the hearing-impaired children since there was a high probability of the two scores being different. Due to their speech and language deficiency, their verbal IQ could be lower than that of their performance IQ. To overcome the difficulties the hearing-impaired had in their oral-aural skills, the use of performance tests were recommended to evaluate their IQ (Levine, 1963).

As part of a study, Geers (1990) compared the verbal and performance IQs of groups of subjects who had been integrated for varying number of years. The Wechsler Adult Intelligence Scale was utilized to evaluate them. It was expected that children who had been integrated for a greater number of years would have significantly higher verbal IQ. However, no significant difference was noted for either the verbal or the performance IQ for those who had been integrated for longer years. All the subjects were found to have normal IQ.

In general there is an agreement that the children should have normal intelligence to have a higher probability of succeeding in the regular class. There is no contradiction regarding this matter.

i) **Social adjustment:**

Social integration is as important as academic integration. Aiming for pedagogic success alone does not lead to total integration. The social adjustment of the hearing-impaired child in the regular school should also be given due importance (Motto and Wawrzaszek, 1963; Vaughn, 1968; and Craig, Salem and Craig, 1976; McCartney, 1984; Manning, 1987; Saur, Layne & Hurley, 1981).

To be socially integrated, the hearing-impaired child should have a social maturity that is appropriate to his peer group. He should have the capacity to fit into an already existing social group (Nix, 1977; Perier, 1972; Maxon and Brackett, 1981: Leckie, 1973). Rudy and Nace (1973) concurred that social adjustment was one of the factors that was crucial for the success of a hearing-impaired child in the regular school. The social adjustment score was one of the four dimensions that they utilized to derive the cumulative transitional quotient for their titled Transitional Instrument'. This quotient determined the success or failure of hearing-impaired child in the regular school.

Montague (1956), an expert who conducted the Correspondence Course at John Tracy Clinic for several years, collected information through the parents, regarding the social adjustment of the hearing-impaired with the normal hearing children. The younger hearing-impaired children at the pre-school level, could adjust well with the normal hearing children of their age or of a little higher age. This was not so as the child grew older. The teenagers found it more difficult to adjust that the younger children. But the parents reported that they did not consider this problem as being of much significance, considering the other advantages the hearing-impaired children stood to gain on account of their association with the hearing population.

A longitudinal and cross-sectional study on the social acceptance of hearing-impaired children as conducted by Kennedy, Northcott, McCauley and Williams (1976). They studied hearing-impaired children who were integrated at Minneapolis. The longitudinal study was conducted over a period of three years. Each year, the hearing-impaired children and the normal hearing children in the same class were administered three sociometric tests; the Moreno Peer nomination scale; a forced choice social acceptance scale; and a social empathy scale. In the first year, fifteen grade I and grade II children, whose hearing loss ranged form mild to profound degrees, were studied. They were found to be highly accepted socially. In the next two consecutive years, eleven, severe to profoundly hearing-impaired children were studied. In the second year, there was no significant difference between the social status, social acceptance and social empathy scores between the hearing-impaired children and normal hearing children. But during the final year of the study, the hearing-impaired children were significantly less accepted socially, than their normal hearing classmates. This revealed that there need not be any consistency over the years, regarding the social acceptance of a hearing-impaired child in a regular school. A child who is socially well adjusted initially need not necessarily have to continue to be so right through his student life.

McCauley, Bruininks and Kennedy (1976) examined the social interaction of fourteen hearing-impaired students who were integrated into public school for the whole day, except for twenty minutes of speech therapy and one hour of supplementary tutoring. Their pure tone average thresholds ranged from 48 dB to 110 dB, and were enrolled in grade one through four in twelve elementary schools. Observations of positive and negative initiations and responses, the interaction partner (i.e. teacher, normal and hearing or hearing-impaired peer), and the mode of interaction (verbal, gestural, physical contact) were noted. The results indicated that hearing-impaired children directed significantly more interaction to the teachers than to the peers. This interaction was mainly in the form of responses to the teacher who initiated the interactions. The normal hearing children interacted with a significantly greater number of peers than did the hearing-impaired group. The mode of communication used by the hearing-impaired children and the normal hearing children was similar. This study indicated that the normal hearing children had more positive social behavior than did the hearing-impaired children.

Conway (1979) observed hearing-impaired students in their mainstream classes and noted that adjustment of the students would be easier if they had other deaf students in the school if not in the same classroom.. This would add to their security. However Antia (1982) did not find social interaction of hearing-impaired children with their peers to increase when they were placed amidst other hearing-impaired children. Their interaction with the teachers did increase though.

Antia (1982) investigated the social interaction of partially integrated hearing-impaired children with their normal hearing and hearing-impaired peers in both integrated classrooms and resource rooms. Thirty-two hearing-impaired children, with pure tone average thresholds ranging from 25 to 108 dB, were observed along with eighty-four normal hearing children. The observations that were recorded included physical proximity, interaction partner (teacher, normal-hearing or hearing-impaired peer), mode of communication (oral, simultaneous, and nonverbal) and unusual positive or negative behavior. Though normal hearing and hearing-impaired children did have the opportunity to interact as they were in close physical proximity, the hearing-impaired children interacted significantly less frequently with their normal hearing peers as compared with interaction with their teacher. Peer interaction did not increase in the resource room, although interaction with teachers increased from 8% to 26%.

Similar findings were noted in a study by Brown and Foster (1991). They studied the social integration of deaf students in a college campus. It was found that the deaf students were successfully placed on campus with hearing students for educational purposes. However, social integration was minimal.

Soderhan and Whiren (1985) studied a four year old boy with genetically induced moderate to severe hearing loss. The subject attended a pre-primary class for the hearing-impaired four mornings a week, and was integrated into a early childhood centre four afternoons a week. They observed the following: subject's initiation of interaction with peers and/or adults and vice-versa, the conflict resulting from this interaction, and the amount of conflict resolved by adults and/or children. The investigators found that positive interaction did not occur unless it was purposefully encouraged. Interaction was high between adults and the subject and low between the subjects and the peer. The interaction pattern changed only then the adults involved with the child were instructed to encourage subject peer activity. However, this interaction diminished once the adults stopped monitoring the subject-peer activity. Thus merely integrating a hearing-impaired child will not result in socialization. Efforts must be put forth to make a success of the placement.

Raimondo and Maxwell (1987) in their study of twenty mainstreamed hearing-impaired children, found them to use speech only for communication in class. The children did not utilize it for social interaction before and after class as did the normal hearing students. Supportive help is called for in order to socially integrate those children who are not well adjusted. The supportive help is also required to see to that the child is socially integrated throughout his student career. The necessity for the staff involved to be sensitive to the emotional needs of each child is impetus (Fallis, 1975).

The school and the home environment should be such that it enables the hearing-impaired child to be in par with his peers on a social level. Thus was the opinion of Simon (1967), a congenially deaf individual. Social adjustment would create a greater number of situations for communication and thereby help in improving the hearing-impaired child's speech and language. It would also lead to successful vocational adjustment later in life.

Though mature social behavior is a positive factor to be considered in any integration program, lack of it need not necessarily prevent a hearing-impaired child from being integrated. Association with the normal hearing population would give the hearing-impaired child greater opportunities to develop better social habits than lack of such an association (Yater, 1977; James and James, 1980).

j) **Use of appropriate amplification:**

Irrespective of whether a hearing-impaired child attends a school for the deaf or a regular school, provision of adequate assistance through amplification is mandatory, if oral language is to be acquired by him.

Libbey and Pronovost (1980) found that of their 557 mainstreamed subjects 84.5% reported that they used their hearing aids at least some of the time, while 55.8% reported they used it "all of the time". Only 6.1% reported that they did not perform any better with a hearing aid and hence did not use one.

Individual hearing aids, prescribed by qualified audiologists should be worn by the hearing-impaired child throughout the day. This, along with the proper maintenance of the hearing aid to ensure that it is working at its optimum level, would enhance the auditory skills of the child. This in turn would pave the way to the mainstreaming process of the child (Yater, 1977; Northcott, 1972; Nix, 1976; Hoversten and Fomby, 1981; Fry, 1978; Fallis, 1975; Mothner, 1980; Victor, 1981; Maxon and Brackett, 1981).

To overcome the problems of ambient noises also being amplified and masking out speech signals, the use of FM hearing aids have been advocated in integrated schools (Davis and Hardick, 1981; Levitt, 1985; Brackett & Maxon, 1986; Flexer, Wray & Ireland, 1989). Libbey & Pronovost (1980) in their study of integrated, hearing-impaired adolescents, found that 30.9% of their subjects desired to make use of FM hearing aids. However only 6.5% of the subjects received training via FM systems. Hoversten and Fomby (1981) suggested the use of FM hearing aids in conjunction with the child's personal hearing aid. Although a very valid suggestion, the implementation of the used of FM hearing aids in developing countries is a distant reality, considering the cost involved.

Prescription of binaural hearing aids for the integrated child is ideal (Fry, 1978). The advantages of binaural hearing aids over a monaural one has been brought to light by many experts (Markides, 1977; Matkin, 1977; Carhart, 1958; Luterman, 1970; and Olsen and Carhart, 1967). Its advantages, in the presence of noise would undoubtedly improve the listening condition for the hearing-impaired children in the regular class (Maxon and Brackett, 1981). Financial constrains may however make it impossible to fit binaural hearing aids on hearing-impaired children who could benefit from it.

## II. FACTORS CONCERNING THE FAMILY:

The parents and family of any child have a vital role to play in his/her upbringing. Much depends on them as to how the child develops. Invariably the child's behavior and attitude is a reflection of that of his parents and family. Hence, it is to be expected that any encouragement given by the family would lead to positive effect on the child. Encouragement and guidance given to the child regarding his education should result in greater probability of his success. UNESCO experts agreed that the guidance the family gave was of primary importance in the psychological development of a child in an education set up (Srivastava, 1982). The effect the family can have on the hearing-impaired child can be categorized into several aspects.

### a) Parent participation in the education of the hearing-impaired child:

The active involvement of the parents' in the education of a mainstreamed hearing-impaired child would be of immense help in bringing about positive results in an integration program (Fisher and Schneider, 1986). Educational guidance given by them could help bridge the gap between the progress of hearing-impaired child and a normal hearing child. This extra help would enable the child to cope more effectively with the difficulties he may have in the reception of auditory messages in school.

Ling, Ling and Pflaster (1977) were of the view that in the early years (0-4 years) the parents were the main educators of their hearing-impaired child. They, along with the rest of the family were the main providers of speech and language stimulation. The quantity and quality of such stimulation has much implication regarding the later progress of a child in terms of the amount of speech and language he developed.

Ezold and Boss (1978) developed a four-stage plan to facilitate successful mainstreaming for thirteen profoundly hearing-impaired students aged 10-12 years. The plan required the involvement of the parents, students and teachers. Initially, the student with the help of the parents read the new lessons at home. Next, the lessons were taught by the special school teachers. In the third stage, the regular classroom lessons were taught by the class teacher and the final stage involved post teaching, if found necessary. Thus the parents were the first tutors of the hearing-impaired child.

Bunch (1987) also considered parental support to the mainstreamed child necessary. He considered this aspect to be one among the six areas that should be explored to determine the probability of success in integration. As per his "Integration Rating Guide" parental support received 25 points out of a total of 215. This indicated that though important, it was not a major factor in determining the success of a mainstreamed child. Concurring with Bunch (1987), Yater (1977) expressed that though the active participation of the family in the education of the mainstreamed hearing-impaired child was highly desirable, it was not absolutely necessary.

Blanchard (1984), a teacher of the hearing-impaired and himself a hearing-impaired individual, cautioned that parents should not demand too much from children who are average or below average.

Excess pressure on the children could yield diminishing returns. It was essential that parents recognize the potential of each child.

The controversy regarding the degree of parent participation leading to beneficial consequence cannot be solved. No systematic study has been carried out to indicate the degree to which parental involvement is required for successful integration of a child. Literature in this area is mainly based on the experience of the individual authors. Hence, it is not possible to deduce whether it is a major contributing factor, a minor necessary factor or a factor of little consequence.

The family would have to provide help to the child not only during the early years of his life, but right through his educational career. To provide appropriate help to the child, the parents require constant guidance from specialists and teachers (Dale, 1967; Northcott, 1972; Pollack and Ernst, 1973; Nober, 1975; Ling, Ling and Pflaster, 1977; Yater, 1977; and Maxon and Brackett, 1981).

**b) Supportive help given to the parents:**

Parents require supportive help from professionals to deal most effectively with their child (Manning, 1987). Ling, Ling, and Pflaster (1977), based on a review of literature, enlisted various aspects regarding which parents would require guidance. These included, counselling the parents to accept their child's problems and its consequences; acquisition and maintenance of appropriate hearing aids; help regarding ways and means of utilizing activities of daily living to develop speech and language in the child; and help in the total integrated development of the hearing-impaired child. They also believed that the parents should be involved in the education process and in deciding upon the short-term goals for themselves and their child. Similar suggestions were made by Manning (1987).

The guidance given by the parents to the hearing-impaired child should be coordinated with the education provided to the children in the school. To make this possible, it was required that the parents keep in touch with the school teacher (Nober, 1977). Dale (1967) suggested that it would be beneficial for the parents of the hearing-impaired child to attend both the general parent-teacher-association meetings as well as special meetings held exclusively for them. This would provide guidance to the parents regarding the general education and also the special problems of the child. A number of parents of the hearing-impaired are unaware of the educational problems that are likely to arise as a consequence of their child's hearing loss (Brill, 1975).

During the discussion with the teacher, the parents could collect information regarding the lessons that would be covered in the class the following day. An orientation to the topics by the parents, prior to class, would make it easier for the child to follow the teacher in class. Victor (1981) recommended following such a procedure in India. He opined that the formal education procedures followed in the regular schools in India, would make it possible for the parents to review the lessons in advance. This procedure would enable parents to follow the school schedule. The parents would have to be highly dedicated as well as literate to carry out such a program.

Besides helping the parents review classroom lessons at home, constant parent-teacher interaction is required to ensure that they become aware of the problems their child might have at school soon after they are detected by the teacher. This would enable them to deal with the problem at the earliest (Pollack and Ernst, 1973).

Manning (1987) suggested that parents of hearing impaired children should also maintain contact with parents of children having similar problems. Sharing their concerns would reduce their frustrations.

Thus, to act most efficiently, parents require help from the professional, the school teacher and from other parents who have children with similar problems. With the help they gather, they can enhance the success of their child in an integration program.

**c) Parental attitudes:**

The attitude taken by the parent has a significant bearing on the performance of the hearing-impaired child who is integrated (McCartney, 1984). Hoversten and Fomby (1981) found that itinerant teachers rated the parental acceptance of a child's disability as being of considerable importance' or of great importance.

Pflaster (1980) considered the "parental attitude" to be a "minor extrinsic factor" that should be considered while integrating a hearing-impaired child. In her study she found the parents to have a positive attitude which she described as being "warm and nurturant". She also noted that a positive attitude of the parents with regard to their accepting the child's need to use a hearing aid to be a factor that significantly contributed to academic success. This aspect was once again termed as a "minor extrinsic factor".

In addition to the parent's acceptance of the child's problem, it is necessary for them to have the desire and motivation to mainstream their child (Perier, 1972; Nix, 1977). Yater (1977) considered it essential that parents be given the right to make the final decision regarding the education of their child. The educational placement chosen, based on the evaluation of the child by the specialist, should be discussed with the parents who need to be convinced that the placement chosen for their child is indeed the most appropriate one. This is true because, any uncertainty on the part of the parents, about the chosen program, is likely to have a bearing on the child's progress.

The legislative mandates in the U.S.A., gives parents or guardians, in conjunction with the educators, the authority to determine the most suitable form of education for their hearing-impaired child (Vlahos, 1977). The parents would require an advisory committee to help them make the right decision. Giving parents this authority has not had the desired results according to Hoemann and Briga (1981). They found that many a parent took if for granted that the law gave them the right to integrate their child irrespective of his/her capabilities.

The attitude of the parents of the normal hearing peers at school has also been cited as a contributory factor in the successful integration of a hearing-impaired child. Pollack and Ernst (1973) reported instances, though few, where the parents of the normal-hearing children objected having a hearing-impaired child in the same class as their child. This attitude of the parents may in turn cause a hostile attitude in their child and thus a rejection of the hearing-impaired child in the scholastic set-up. Pollack and Ernst (1973) suggested that the prejudice of the parents could be overcome with counselling. They also mentioned that on most occasions, the parents supported the integration of the hearing-impaired child with their normal hearing children.

**d) Literacy level and socio-economic status of the family:**

To be active participants in the educational growth of a hearing-impaired child, it would be certainly advantageous if the parents were literate. To follow-up at home the lessons taught at school, at least one of the family member should have knowledge of reading and writing. No mention of this aspect has been made in the literature on integrated education of the hearing-impaired.

The percentage of literate individuals in India, is considerably low. As per the 1981 census carried out in India, only 46.74% of the males and 24.88% of the females were literate (Manorama Year Book, 1989). Hence, it is essential that this aspect receive its due attention in the integration programs in India.

The socio-economic status of the father has been noted to be related to the educational level of the hearing-impaired. Welsh and Schroedel (1982) found in their study that the father's socio-economic status was one of the best predictors of a student's degree level attainment. Such findings have also been noted for the normal-hearing population.

## III. FACTORS CONCERNING THE THERAPIST AND/OR THE SPECIAL EDUCATOR:

Prior to placing a hearing-impaired child in a regular class, he should undergo training with professionals who are specialized in dealing with such children (National Education Association, 1975). The necessity for such training has been felt essential in order to bring the hearing-impaired child in par with the rest of his hearing peers. Based on the progress made by the child, the specialist should decide his possible placement for further education. The specialists plays a crucial role here. It is vital that she deals with the child in a manner that is most congenial to promoting learning. The task of bringing the hearing-impaired child to function at a level that would enable him to be integrated, would mainly be that of the specialist.

At a later stage, prior to placing the child in a regular classroom, it would be the task of the specialist to make a judgment as to whether or not the child is a potential candidate for mainstreaming. She may draw the conclusions based on tests that she might administer (Bunch, 1987; Yater, 1977) or based on her observations (Yater, 1977).

Yater (1977) described such an approach in his integration program. The special class teacher was required to complete a single page report about a child who had been considered for integration. This information was routed through the supervisor of the classroom program and the supervisor of the hearing clinic program respectively. After discussions with the classroom teachers and observations of the Child in the Classroom, the two supervisors selected the candidate for integration. They could eliminate some children from or include other children into the list prepared by the class teacher. The children thus selected were administered intelligence tests, audiological tests and achievement tests. Further decision about their placement was made based on the test results. Finally, the placement decision was discussed with the parents and if they were agreeable, the child was placed in the regular school. Following such a systematic procedure to determine the correct placement of a hearing- impaired child for his educational placement, is certainly commendable. Good cooperation among the specialists of the team would be a prerequisite to make such a procedure effective.

Those hearing-impaired children who are integrated right from the beginning of their educational career, and have not attended any special school, might have problems acquiring speech and language. It was recommended that they receive speech and hearing therapy from a specialist, to bridge the gap between the hearing-impaired and the normal hearing children (Pollack and Ernst, 1973; Layman, 1974; Yater, 1977).

Dale (1967) suggested speech therapy also for those hearing-impaired children who were integrated at the secondary school level. He recommended that they attend therapy for one or two periods a week. This has been supported by Conway( 1979).

Ezold and Boss (1978) advocated active participation of the teacher of the deaf in the education of mainstreamed hearing-impaired children. The teacher of the deaf was required to pre-teach lessons as well as revise past lessons before the regular classroom lessons. If considered necessary, post-teaching of lessons were also conducted oy tne teacher or tne dear.

Active participation of the specialists is also necessary when it come to the choice of school while integrating the hearing-impaired child. Selection of an appropriate school and classroom has to be made by the specialist.

Careful selection of the class teacher who would be competent and sensitive to the needs of the hearing-impaired child is essential (Yater, 1977; Manning, 1987). The specialists should choose teachers who are motivated to having a hearing-impaired child in their classroom. Maxon and Brackett (1981) reported that no pressure should be exerted on the class teacher, forcing her to admit a hearing-impaired child in her class. This, they felt would result in a drastic reduction in the success of the mainstreaming program.

Hoversten and Fomby's (1981) study on ten itinerant teachers at the Southwest School for the hearing-impaired, let to similar findings as Maxon and Brackett (1981). They too noted that it was important for the class teacher to want to have the hearing-impaired child in the class.

Discussing with the school staff the need for an integration program, prior to admitting the hearing-impaired child, has been considered necessary by Fallis (1975). In addition to an introductory briefing to the school staff, continual help and support from the specialist should be made available. School staff receiving constant support from the specialist has been stressed by several experts (Dale, 1967; Bown, 1971; Bitter and Mears, 1973; Ester, 1974; Craig and Salem, 1975; Ling, Ling and Pflaster, 1977; Yater, 1977; Hoemann and Briga, 1981; Maxon and Brackett, 1981).

Fallis (1975) described a multi-district integration program for the hearing-impaired. In order that the program should succeed, the need for an experienced, dedicated supervisor was felt to be of prime importance. This supervisor would have to provide support to each hearing-impaired child which would include being sensitive to the emotional need of the child. Yater (1977) concurred with Fallis (1975) and suggested that the hearing-impaired child should receive consistent speech therapy from the specialist. The regular class teacher cannot be expected to provide this help since they are not adequately trained to do so. Hoemann and Briga (1981) further emphasized the need for supportive help for the hearing-impaired child in the regular school by stating that".....thoughtless placement with no support services and no provisions for their communication needs is just as restrictive an environment as could conceivably be imagined".

The necessity for support services in mainstreamed programs for hearing-impaired adolescents was also evident from a study carried out by Libbey and Pronovost (1980). Based on the responses from 557 adolescents, enrolled in various integration programmes, it was noted that the hearing- impaired subjects desired to have supportive help for various aspects. The supportive service that the maximum number of students desired and received was for "learning to speak better". They also desired and received help for better listening, lip-reading, signing and finger spelling, and having interpreters available to assist them. The support services that the students desired but were not receiving adequately was for learning to use the telephone, TTY and having an FM hearing aid system.

The number and kind of specialists who are required to help a hearing-impaired child in an integrated class, have yet to be established. An attempt to determine this was done by Bitter and Mears (1973). As a part of their project 'NEED' they conducted a survey of forty-two states, to determine the ratio of supportive personnel to hearing-impaired students. The supportive personnel included various specialists such as speech therapists, school psychologists, social workers, tutors (salaried), tutors (volunteer), integration specialists, certified teachers of the hearing-impaired and others. They determined that the number of specialists working with the socially, partially and fully integrated deaf children was relatively low when compared to the students in non-integrated programs. The need to train more support personnel was suggested by them. No mention was made regarding the optimum number of support personnel who could be required in a successful integration program.

Though Yater (1977) did advocate the need for supportive help from a specialist, he opined that the non-availability of this help did not contraindicate the mainstreaming of a hearing-impaired child. His observation was not based on any systematic study. No other author has made such a observation which could substantiate Yater's view. Hence his observation should be viewed sceptically.

Thus, the role the specialists play in the integration of the hearing-impaired in regular schools is of considerable importance. The supportive participation of the specialist throughout the educational career of the hearing-impaired child is essential to enhance the success of an integration program.

## IV. FACTORS CONCERNING THE SCHOOL TEACHER:

As in the case of any child attending a school, the school teachers play a crucial role in the education of the hearing-impaired child. "What they (the teacher) know, what they do, how they treat their pupils, how rich an experience they provide, how they organize opportunities for learning, and how they cooperate with the family members all determine the kind of education that prevails in their classroom", stated Streng, Kretschmer and Kretschmer (1978, pp. 100).

### Teacher-specialist communication:

Teachers are generally trained to handle normal hearing children. This training enables them to provide a climate that is optimal only for those children with no hearing loss. However, they are not adequately prepared to handle the specific problems that confront a hearing-impaired child in a regular school (Yater, 1977).

As a means of overcoming this difficulty, training the regular class teacher to deal with the hearing-impaired children has been suggested (Dale, 1967, Northcott, 1970, Kristensen, 1972; Leckie, 1973; Craig and Salem, 1975; Fallis, 1975; Yater, 1977; Greco, Mathias, Peterka, Sheldon, Strazewski, and Theoharis, 1983). This would enable the class teacher to furnish appropriate assistance to the hearing-impaired children. The need for the teacher to be intensively trained by specialists for the duration of one year, has been recommended by Kristensen (1972)

Leckie (1973), Brich (1976) and Manning (1987), noted that though teachers of regular schools might desire to integrate hearing-impaired children in their classes, they might hesitate to do so since they lack special training. Training the regular school teacher will not only improve the quality of an integration program, but may also result in an increase in the number of children who will be integrated.

Craig and Salem (1975), conducted a survey to gather information as to whether existing integration programs did have any preparatory sessions for the regular school staff. An analysis of the responses from the twenty-two schools that they received, indicated that all of them had some form of orientation program. The quality and quantity of the orientation program varied from school to school. The teachers from the regular school either visited the schools for the deaf or had short meetings between the faculties of the two schools (i.e. school for the deaf and the regular school) or had some combination of the above two procedures. No information as to the usefulness of these programs were, was mentioned. Craig, Salem and Craig (1976) again reported similar findings on an analysis of questionnaires from residential schools, day schools and day classes that initiated integration programs.

Rittenhouse (1987) obtained information on the attitudes of twenty-seven regular school teachers who dealt with mainstreamed hearing-impaired children. The teachers were required to answer two questionnaires. 33% responded positively for having received in-service training on mainstreaming while 56% responded negatively and 11% gave no response. However, 67% felt that they were prepared to deal with mainstreamed children and only 22% did not feel so. Regarding whether adequate information was available to serve as a basis for individualized education programs, only 22% responded affirmatively, 56% negatively and 22% did not respond.

In the program described by Yater (1977), the principal and the teacher concerned were invited to attend a one-day intensive seminar held by specialists prior to the integration of the hearing-impaired child. They were given the opportunity to observe classes for the hearing-impaired and seek clarifications. Discussions were also held with other staff members of the regular school, both professional and non-professional to ensure their understanding and help in the integration of the hearing-impaired child. The topics discussed included information about hearing loss, hearing aids, speechreading, classroom adaptation etc. An orientation such as this should help make it easier for their regular school staff to make adjustments to integrate a hearing-impaired child into curricula and extracurricular activities. It would also result in an atmosphere that would be more congenial for learning by the hearing-impaired child. Dale (1967) had also suggested a similar procedure to be carried out.

As an incentive for teachers to undergo a diploma course on teaching the disabled children, the Government of India bears their training charges. Each of them also receives a sum of Rupees two hundred per month from the Department of Education, and Youth Service Department (Sahu, 1983).

Measures are being taken in India, to train key persons in the integration of the disabled. The National Council of Education Research and Training (NCERT) since May, 1983 has been conducting six months training courses. The first three months are utilized in giving an orientation on four different disabilities, i.e. visual, speech and hearing, neurological and orthopedic disorders. During the next three months, the trainees select one of the disabilities on which they are given more intensive training. These individuals later serve as resource teachers.

A perusal of the literature has brought to light that the role of the specialist does not end with the initial discussion with the personnel of the regular school. The need for them to be continuously in contact with the hearing-impaired child and his teacher during his entire attendance in the regular school has been given great importance by several experts (Dale, 1967; Mecham and Van Dyke, 1971; Auble, 1972; Northcott, 1972; Frick, 1973; Leckie, 1973; Pollack and Ernst, 1973; Fallis, 1975; Nober, 1975; Hedgecock, 1974; Ling, Ling and Pflaster, 1977; Yater, 1977; Conway 1979, Testut and Baldwin, 1977 ; Maxon and Brackett, 1981, Conway, 1980). This continual inflow of help would enable detection of any problem that might crop-up in the integrated class. Early detection coupled with immediate rectification of the problem would be of immense help in the smooth running of an integration program. Leckie (1973) considered it beneficial for the teachers to have more regular consultation with the specialist or integration officer than just one initial session.

To provide this assistance to the classroom teacher, frequent meetings with the specialist would be advisable. Craig and Salem (1975), as a part of their study, which has been described earlier, determined the frequency of meeting between the specialist and the class teacher in various integration programs. Their study elicited the following information: nine schools reported daily meetings; seven schools, weekly meetings; four schools, semi-weekly ; one school, bi-weeKty; srx scnoois oy appointment ana two scnoots at otner time intervals. No attempt was made to analyze as to which of the above frequencies of meetings were optimum for successful integration. Such an analysis would have enabled the authors to suggest an optimum frequency of meeting between the specialist and class teacher, for such a program to be successful.

Martin et al. (1988) carried out a study on 187 in-service teachers enrolled in graduate communication courses. An eighty-four item questionnaire regarding knowledge of hearing disorders and attitude towards mainstreaming of hearing-impaired children, was administered to the teachers. The results indicated that although the teachers had a positive attitude towards mainstreaming, the majority of them preferred to teach hearing-impaired children only if substantial support personnel and in-service training were available. Most of the teachers did not think that they had the ability to teach the mainstreamed hearing-impaired children and had a limited knowledge of hearing disorders. This was probably because most of them had no professional training in this area.

Printed guidelines which can be made available to the regular school teacher are a useful means of helping them handle the hearing-impaired children in their class. Guidelines prepared by Pollack and Ernst (1973) covered aspects such as the working of the hearing aid which could be learnt from the parents or clinicians, preparing the peers to accept and deal with the hearing-impaired children, and various hints regarding modification of their existing teaching procedure to accommodate the hearing-impaired children.

Parents can also provide help to the school teacher. Manning (1987) noted that parents of successfully integrated children tried: "(a) to help teachers understand the family's and students long range goals; (b) to listen carefully to the teachers' concerns along the way; and (c) to provide encouragement and information to the school staff' (pp. 124).

Thus, the review of literature reveals that guidance to the school staff, before integrating hearing-impaired children, and at regular intervals, are factors to be given due importance in any integration program.

## V. FACTORS CONCERNING THE ENVIRONMENT:

The physical environment into which a hearing-impaired child is integrated is found to have considerable influence on his/her speech perception (Sanders, 1965; Erber, 1974; Nabelek and Pickett. 1974a,b; Ross, 1978 b; Erber, 1979; Bess artl McConnell, 1981; Houtgast, 1981; Nabelek and Mason, 1981). Poor speech perception would in turn affect his/her success in school.

In the literature, the physical conditions that influence speech perception or the success in integration have been discussed in terms of the classroom acoustics; illumination of the classroom; the seating arrangement of the hearing- impaired children; the strength of the class and the ratio of the hearing-impaired children to normal hearing children.

**a) Classroom Acoustics:**

The noise level as well as the reverberation time have been noted to influence speech perception of the normal hearing and the hearing-impaired individuals.

Noise, its effects on speech perception and permissible noise levels:

It is a well established fact that in the presence of noise both normal hearing and hearing-impaired individuals have difficulty in understanding speech. This difficulty is more pronounced for those with hearing impairment (Ross et al., 1965; Olsen and Tillman, 1968; Olsen, Noffsinger, and Kurdziel, 1975; Ross, 1978 b). This aspect has been mainly investigated in adults.

The effect of noise on speech discrimination in children has been studied by Finitzo-Hieber and Tillman (1978). Their findings indicated that as the signal-to-noise (S/N) ratio decreased, there was a reduction in the discrimination for monosyllabic words. In the 0.0 reverberation time condition, the discrimination scores decreased from 95% in the quiet condition to 60% in the 0 S/N ratio condition for the normal hearing subjects. However, for the hearing-impaired group, with their hearing aids on, the scores decreased from 83% in the quiet condition to 39% in the 0 S/N ratio condition. These results indicated that in the presence of noise the scores dropped by 35% for the normal hearing children, and by 44% for the hearing-impaired children. Thus, it is evident from these findings that the presence of noise has a more deleterious effect on the speech perception of the hearing-impaired.

Gengel (1971) found that students having a moderate to severe sensorineural hearing loss required a S/N ratio of at least +10 dB and preferably -20 dB to function effectively in a classroom. Thus, according to Gengel (1971) the noise level in a classroom should be not more than 40 dB on the C scale or 30 dB A, presuming that the average speech level at a distance of 3 feet to 15 feet would be 60 dB SPL.

Fourcin et al., (1980), also recommended noise levels of a similar magnitude. They categorized classrooms into two types: Type-1 where non-academic subjects were taught; and Type-2 where children spent a major portion of their time and had to make use of their auditory abilities to learn. It was suggested that the noise levels in Type-1 classrooms should be 45 dB (A) or less, and 35 dB (A) or less in Type-2 classrooms (Fourcin et al., 1980).

Several studies done over a period of more than fifteen years indicate that the noise levels in classrooms exceeded the levels that would permit good speech perception. Sanders (1965) measured the noise levels in 47 classrooms from 15 different schools. The mean noise level in the occupied classrooms was highest in kindergarten classes (i.e. 69 dB B), followed by high schools (62 dB B), elementary classes (59 dB B) and units of the partially deaf (52 dB B). Sanders (1965) found the average S/N ratio in the high schools to be +5 dB and +1 dB in lower grades similar findings have been reported by other studies (Watson, 1964; Ross and Giolas; 1971; Blair, 1977).

Maxon and Brackett (1981) have found that the noise levels in classrooms ranged from 40 dB to 85 dB although it was generally around 60 dB SPL. They described the lower limit of the range as being lower "quite favorable" and the upper limit as being "intolerable". They concur with Gengel (1971) who suggested that the hearing-impaired children required a signal-to-noise ratio of +20 dB in order to perceive speech effectively.

Sinclair et al. (1980) assessed the noise levels in nineteen classrooms for the hearing-impaired that had partial sound treatment. These classrooms were located in five regular elementary schools and one junior high school. The average noise levels in these classes when unoccupied were 41 dB, 50 dB and 58 dB on the A, B, and C weighting scales respectively. When occupied, the noise levels increased by 15 dB, 10 dB and 5 dB on the A, B and C weighting networks. Thus, even in partially sound-treated rooms, the noise levels exceeded the permissible limits.

In addition to the noise levels in a classroom the reverberation time is also to be reckoned with. This is known to affect the reception of speech in normal as well as hearing-impaired individuals.

## Reverberation:

Bess and McConnell (1981) defined reverberation as "the persistence of sound within an enclosed space when sound waves reflect off hard surfaces". Reverberation time is defined as the time taken from the moment a sound source has stopped until it is reduced by 60 dB from its original intensity (Finitzo-Hieber, 1981).

Studies on normal hearing individuals have demonstrated that reverberation can result in difficulty in understanding speech. (Moncur and Dirks, 1967; Finitzo-Hieber and Tillman, 1978). This difficulty is considerably greater in the hearing-impaired individuals.

Borrild (1978) reported of a study conducted by Ingelslev in 1949, which showed that in a room the size of a medium auditorium, normal hearing listeners experienced a steady decrease in speech discrimination with an increase in reverberation time, especially after 2 seconds. These findings were obtained in a room the size of a medium auditorium.

Gelfand and Silman (1979) developed a confusion matrix of speech sounds discriminated in a non-reverberant and a reverberant (0.8 seconds) condition. They studied normal hearing individuals in a small room. Their findings revealed that reverberation affected phoneme recognition in a manner similar to that of the speech masking noise.

Finitzo-Hieber and Tillman (1978) found that by increasing the reverberation time from 0 to 1.2 seconds in a quiet situation, speech discrimination in normal decreased from 95% to 77%. They found that the same increase in reverberation time resulted in greater disparity for the hearing-impaired subjects. For the hearing-impaired children the discrimination scores dropped from 83% in the 0 second reverberation time condition to 45% in the 1.2 second reverberation time condition. They also found that when the reverberation time condition was increased from 0 to 0.4 seconds, there was hardly any difference in discrimination scores for the normal hearing group (i.e. 2% decrease in scores). However, for the hearing-impaired subjects, this increase in reverberation time resulted in a drop in discrimination score by 9%. This indicated that excess reverberation results in greater degradation in speech understanding for the hearing-impaired listeners than for normal hearing listeners.

The combined effect of noise and reverberation:

The degradation in speech understanding is considerably more when excess noise as well as reverberation are present simultaneously. Finitzo-Hieber and Tillman (1978) found that in a condition that was quiet and having a reverberation time of 0.0 second, the normal hearing and the hearing-impaired (with hearing aids on) subjects got discrimination scores of 95% and 83% respectively. In an adverse listening condition which had signal-to-noise ratio of 0 dB and a reverberation time of 1.2 seconds, the discrimination scores for the normal hearing and hearing-impaired children dropped to 30% and 11% respectively.

The findings of Nabelek and Pickett (1974 a, b) concur with those of Finitzo-Hieber and Tillman (1978). They studied word recognition performance in both normal and hearing-impaired subjects under quiet conditions and under different conditions of signal-to-noise ratios. Both monoaural and binaural listening conditions were examined. At the -5 signal-to-noise ratio condition, the normal hearing subjects displayed a breakdown in understanding in both the monaural and the binaural condition as the reverberation time was increased from 0.3 seconds to 0.6 seconds. The hearing- impaired subjects exhibited a greater breakdown in speech discrimination for the same condition.

Both the normal hearing and the hearing-impaired subjects performed better in the binaural than in the monaural mode.

Other investigators have also got similar results (Moncur and Dirks, 1967; Gelfand and Hochberg, 1976). These studies highlight that in poor acoustic conditions, individuals with fairly good speech discrimination perform far below the level that they are otherwise capable of.

Several authors have given suggestions for the improvement of the acoustic conditions in classrooms. The suggestions put forth by them helps eliminate noise emanating from outside the school building, within the school building and within the classroom (Knudsen and Harris, 1950; John and Thomas, 1957; Davis, 1965; Niemoeller, 1968; Crum and Matkin, 1976; Olsen, 1977; and Finitzo-Hieber, 1981).

Levitt (1985) has noted that no classroom was entirely free from background noise or unwanted reverberation. He suggested that in order to overcome this problem, hearing aids that eliminate acoustic feedback, and reduce the effects of background noise and room reverberation, should be developed.

The use of FM hearing aids in an integrated set-up has been advocated by several experts, to help improve the signal-to- noise ratio at the ear of the hearing-impaired subjects (Brackett and Maxon, 1986; Levitt, 1985; Flexer, Wray and Ireland, 1989).

Speechreading is yet another suggestion that has been put forth to compensate for the difficulties a hearing-impaired child is faced within a classroom with a poor signal-to-noise ratio. Frick (1973) and

Northcott, (1972) recommended lip- reading in order to supplement the auditory cues that a child received.

**b) Illumination of the Classroom:**

Children with profound hearing loss are observed to depend primarily on visual cues for speech perception (Van Uden 1960; Erber, 1972 a, b). One of the factors that contributes to better speechreading scores is the illumination in a classroom.

Studies have demonstrated that illumination in a room can decrease or increase speechreading test scores. Several authors have recommended that the illumination in the classroom should be such that the lighting should fall on the face of the teacher and out of the pupils eyes (Northcott, 1972; Perier, 1972; Frick, 1973; Erber, 1979)>. O'Neil and Oyer (1961) and Berger (1972) suggested that the teacher should face the windows while speaking. In the event that natural light is not available or is reduced, artificial lights must be used (Erber, 1979).

Overhead lighting that are generally used in classrooms are undesirable, as they produce shadows over the mouth thereby visually obscuring the production of post-dental consonants (Jeffers and Barley, 1971; and Erber, 1974). Erber (1971 c) was of the opinion that the fluorescent lamps should be fitted such that they produced direct illumination at the level of the speakers mouth. Further, the same investigator (Erber, 1974) felt that the angle of incidence of the light should be Oo to 45o to the speaker's mouth as the speechreading scores of profoundly deaf children was best in this condition. The mean lip-reading scores were lowered when overhead lighting was used.

Based on his earlier studies, Erber (1979) recommended that fluorescent fixtures should be fitted on the back wall and periphery of the classroom.

The brightness of the light on the teacher's face has also been found to improve speechreading scores. Erber (1974) found that as the brightness was diminished from 30 to 0.03 footlamberts, the profoundly deaf subjects exhibited only moderate decrement in the mean lip-reading performance (12.8%). Thus, Erber construed that as long as the source of light provided similar oral and facial illumination, speechreading scores were affected only minimally. However, when the facial luminance was decreased from 0.03 to 0.01 footlambert, the speechreading scores dropped sharply by as much as 21.4%. This occurred because only gross shapes and shadows of the speaker's head and mouth were visible in the latter lighting condition.

It has been noted that if the background lighting is too bright, speech readers have difficulty in lip reading due to the glare in their eyes (Berger, 1972). Erber (1974), however, noted that it was not the poor brightness of the background alone that makes lip-reading difficult. Rather, it was the contrast between the background and the facial luminance that was important. He studied the speechreading ability of profoundly deaf children. When the background brightness was 300 footlamberts and luminance on the speakers face was 30 and 3 footlamberts. A large mean difference (40.9%) between the scores of the two conditions was obtained, thus indicating that in the presence of a brightly illuminated background, speechreading can be carried out as long as the face of the speaker is also well lit.

The angle at which the light fell on the face of the speaker has a direct impact on the distance from which an individual can speech read. Erber (1971) demonstrated that performance on a word-recognition task of profoundly deaf children improved steadily from about 11% correct at 100 feet to about 75% correct at 5 feet. These findings were in contradiction to those of other experimenters such as Mulligan (1954, cited in O'Neil and Oyer, 1961) and Neely (1956) who found that varying the distance from the speaker did not make a significant difference in the ease or difficulty of speechreading. Erber (1971) attributed his findings to the difference in illumination conditions used in his study. The earlier studies made use of overhead lamps for illumination which put the speaker's oral cavity in shadow, whereas he made use of direct illumination at the level of the mouth the speaker. The direct illumination provided additional information on lip-reading. Thus, he suggested that under conditions of direct oral illumination, a minimal separation between a teacher and a deaf child would result in the most effective visual communication.

The lighting conditions in an integrated classroom, was one of the items included in the "parent checklist for placement of a hearing-impaired child in a mainstreamed classroom" developed by Goldberg, Niehl and Metropoulos (1989). This checklist was developed for parents of the hearing-impaired to enable them to select the most appropriate placement for their child in a mainstreamed classroom setting.

The lighting conditions in the integrated classrooms has not been given much importance by most experts dealing with the area of integration. The review of literature establishes that a majority of authors have not taken into consideration the illumination in the classroom, when enumerating out conditions that could contribute to better integration of hearing-impaired children.

**c) Seating placement of the hearing-impaired child:**

The choice of appropriate seating of the hearing-impaired, integrated child, has mainly been discussed with reference to placement that would enable him to obtain maximum visual and acoustic information during class hours. The placement of the hearing-impaired child has also been discussed with a view to maximize the social integration of the child.

Experts vary in their opinion regarding what they consider the most ideal seating placement of the hearing impaired child in the integrated set-up. Pollack and Ernst (1973) recommended placing the child next to the teacher so that he could get clues by looking into the teacher's book, or get hints from the teacher regarding the topic under discussion.

Most often the preferred seating position for the child is in the front row of the class. This is to enable him to receive maximum visual and auditory information from the teacher (Perier, 1972; Northcott, 1972; Maxon and Brackett, 1981).

However, Maxon and Brackett (1981) have remarked that frontal placement, though usually advisable may not be the ideal choice if it happens to be the noisy area in the class. Also, if the teacher moves around in the class, whiie teaching, she will not be very visible to the children seated in the first row. The child will also not be able to watch other children, when they talk. Hence, preferential seating of the child no longer means seating the child in the first row only.

Northcott (1972) and Maxon and Brackett (1981) Healey (1976), Kindred (1976); Hoversten and Fomby (1981) recommended that the hearing-impaired child should be given the freedom to move about in the class to an area where he can get the maximum visual cues.

Dale (1967) suggested that the seating of the child should be chosen such that it enhances social integration. In order to facilitate this, he recommended that each hearing-impaired child should have two normal hearing children on either side. He was against the idea of grouping hearing-impaired children together in a regular school. He did not consider this as real integration.

Raimondo and Maxwell (1987) opposed placing the hearing-impaired child in the front row, as he considered it to hinder social interaction. This occurred because the child would be "under the eye" of the teacher.

Vernon and Prickett (1976) and Flexer, Wray and Ireland (1989) have expressed that preferential seating alone is not enough. Flexer, Wray and Ireland (1989) recommended adopting three main strategies for success in a mainstream set-up. These included auditory training to improve discrimination of spoken language; teaching mainly via the auditory mode in schools; and pre and post tutoring.

Though opinions differ, the majority of the authors agree that the preferred seating for the hearing impaired children should be such that it enables the child to get maximum information. The main aim was to enhance visual information, rather than auditory information.

### d) Strength of the class:

The need to reduce the strength of the class, and have lesser number of children in the class, has been considered to be yet another pre-requisite in an integrated class (Justman, 1957; Van Wyk, 1960; Healey, 1976; Maxon and Brackett, 1981; Victor, 1981; Brill, 1975).

One of the seven conditions that the "National Education Association" of America (1975) considered as a prerequisite for a mainstreaming program was the modification in the class size (cited in Hoversten and Fomby, 1981).

This aspect has been considered essential in order to lighten the work load of the class teacher. This would enable the teacher to pay more individualized attention to the hearing- impaired child. It would give her time to cross question the child at frequent intervals and thus be more aware of his performance (Auble, 1972; Brill, 1975; Maxon and Brackett, 1981).

Maxon and Brackett (1981) also noted that by reducing the strength of the class, the noise level and the amount of visual distraction would decrease. The ill effects of these adverse conditions have been well documented in the literature (Finitzo-Hieber and Tillman, 1978; Ross et al. 1965; Olsen, Noffsinger and Kurdziel, 1975; Ross, 1978). They recommended that a class should have less than twenty children in order for the environment to be conducive to integrating hearing-impaired children.

Several other experts (Dale, 1967; Victor, 1981; Brill, 1975) concurred that the class size should be small. Dale (1967) recommended that the class should not have more than 30 normal hearing children. Victor (1981) noted that in India many classes have-as many as 40-60 pupils. In an integrated class, he suggested that this number should be reduced to 25-30.

Brill (1975), however, suggested that ideally the class should have just six to eight pupils. Such a small class would allow constant eye contact between each pupil and the teacher.

Thus, it is generally agreed that to achieve the goal of a mainstreamed program, the strength of the class should be reduced. This would enable the hearing-impaired child get individual attention. Ratio of the hearing-impaired to the normal hearing children in the class.

It is generally agreed that only a limited number of hearing-impaired children should be admitted to each integrated class, the intention being to prevent them from forming a segregated group (Pollack and Ernst, 1973) which in turn, would reduce the social integration of these children (Hoversten and Fomby, 1981).

Dale (1967) recommended that in a class of thirty normal hearing children, six to eight hearing impaired children could be integrated. Thus, the ratio of hearing-impaired to normal hearing children would approximately be 1:4 to 5, as per Dates {.196Z} suggestion.

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Pollack and Ernst (1973) were of the view that a single hearing impaired child in a regular class would be most ideal. However, they suggested that this number could be increased to a ratio of 1:4 or 5, thus concurring with Dale (1967). They reasoned that too many hearing impaired children in an integrated program would lead them to form their own nonverbal group.

Having fewer hearing-impaired children per integration program would also reduce the work load on the class teacher. This would enable her to spend more time and pay more attention to the needs of the hearing impaired group.

From the review of literature it can be noted that several factors have been enumerated to contribute to successful integration of the hearing-impaired children. There however, does not exists a consensus among the experts as to the importance of these variables in integrating the hearing- impaired children.

From the first hand knowledge of the investigator, several children who have been identified as having hearing loss are admitted into regular schools. No systematic study seems to be done regarding the criteria that is to be used at the time of their admission. Following their admission, it is not known if any efforts are made to augment those conditions or attitudes that contribute to their academic success. It is also not known whether a child who performs below the average level at school, does so solely on account of not having normal hearing. The training programs that are available for the teachers in integrated schools, would have a greater impact if guidelines were available to select tne hearfng-imparred candidates. *To* date no systematic study has been carried out in India to evaluate the factors that contribute to successful integration of the hearing-impaired. Hence, there is a need to study this aspect in India.

# METHODOLOGY

## SUBJECTS:

The subjects, a total of 160, belonged to four groups: hearing-impaired children, their parents, their teachers and normal hearing children.

a) The forty hearing-impaired children were integrated in regular schools in Mysore city. They had an average age of 12.58 years and an age range of 7 years to 21 years. There were 15 females and 25 males. The children were drawn from twenty different schools, ranging from first standard to eleventh standard. The distribution is given in Table-A.

b) Either the mother or the father of the hearing-impaired children were interviewed. In some cases it was the father and in some it was the mother who was interviewed (seven fathers and thirty-three mothers). In all, there were 40 parents.

**Table-A:** Class-wise distribution of the hearing-impaired children

| Class (Standard) | Number of subjects |
|---|---|
| 1st | 3 |
| 2nd | 6 |
| 3rd | 4 |
| 4th | 10 |
| 5th | 4 |
| 6th | 2 |
| 7th | 2 |
| 8th | 3 |
| 9th | 2 |
| 10th | 2 |
| 11th | 2 |

The educational background of the parents who were interviewed is given in Table-B.

**Table-B:** Educational background of parents who were interviewed

| Educational background | Number of subjects |
|---|---|
| No education | 6 |
| Primary education | 1 |
| Middle school education | 5 |
| High school education | 20 |
| Pre-University education | 2 |
| Graduate | 3 |
| Post graduate | 2 |
| Professional | 1 |

c) The forty class teachers (six males and thirty-four females) of the hearing-impaired children were from twenty different schools.

d) The forty normal hearing children were matched with the forty hearing-impaired children in terms of age, sex and medium of instruction in school.

## PROCEDURE:

The study was carried out in four stages. Stage-I commenced from eliciting information from the parents of the hearing-impaired children who had been integrated in regular schools.

Stage-I I consisted of getting information from the class teachers of the same hearing-impaired children. Information regarding the academic achievement of the children was also obtained from the teachers at this stage. No formal academic achievement test was used due to the non-availability of a standard test for Kannada and English speaking Indian children.

In Stage-Ill the integrated hearing-impaired subjects were assessed for the following:

a) Audiological status,
b) Language competency,
c) Speechreading ability,
d) Speech intelligibility,
e) Intelligence and
f) Cognitive ability.

Stage-IV involved collecting information on the following areas from a control group:

a) Language competency.
b) Speechreading ability, and
c) Cognitive ability.

A detailed description of the procedure at each of the stages is given below:

## Stages -1 & It:

In stages -I, the parents whose hearing-impaired children had been integrated in regular schools were asked to complete a questionnaire and in stage -II the teachers of the same children were asked to answer a different questionnaire developed for the purpose.

Two questionnaires were constructed for this purpose, one for the parents and another for the teachers.

### Construction of the Questionnaires:

Aim of constructing the questionnaire for the parents:

The questionnaire was constructed with the aim of obtaining information on the following: age of onset of hearing loss; age of intervention; languages spoken to the child; auditory response; speech intelligibility; parent-child communication; parent-teacher interaction; parent-specialist interaction; therapy; psycho-social aspects of the child and parental attitude.

Aim of constructing the questionnaire for the teachers:

The questionnaire for the class-teachers was constructed to obtain the following information: academic achievement of the child;

auditory behavior; usage of hearing aid; speechreading; linguistic ability; speech intelligibility; psycho-social aspects of the child; peer interaction; peer to hearing-impaired child communication; school/class environment; teacher-training; hearing-aid check by teachers; teacher-child communication; teacher-attitude, and parent-teacher meeting.

Selection of questions:

The questions chosen were based on the factors mentioned as being significant for successful integration in literature, on the experience of the investigator and the experience of other speech and hearing specialists.

The questionnaires, initially constructed in English, were evaluated by two speech and hearing professionals. The modifications suggested by them were incorporated into the questionnaires. The modifications included addition of new questions, deletion of what seemed repetitive questions and alteration of apparently ambiguous questions. The questionnaires thus modified were used in the field study.

Pilot study of questionnaire for parents:

A pilot study was carried out for field trial of the questionnaire meant for the parents. Five parents (three mothers and two fathers) who had hearing-impaired children integrated in regular schools were requested to respond to the questionnaire on a three point scale. Those questions that were considered ambiguous by them were modified. (These five parents were not included in the main study.) Further the parents expressed difficulty in responding on a three point scale. Hence the final questionnaire was modified to a Yes-No type. The final version of the questionnaire for the parents had forty-one main questions. Several of these questions had sub-questions.

Pilot study of questionnaire for teachers:

A pilot study was carried out on five teachers (two males and three females) from regular schools who had hearing-impaired children integrated in their respective classes. They were requested to answer the questionnaire and report if any of the questions were unclear. All five teachers reported that they had no difficulty answering the questions. Hence the questionnaire was adopted without incorporating any modifications. The questionnaire had seventy-six main questions and several sub-questions (appendix-A).

Translation of the questionnaires:

The final questionnaires were translated into Kannada, the regional language (appendix-A). This was done to facilitate the parents and teachers in responding to the questionnaires. Both the English and the Kannada versions of the questionnaires were available to the respondents. The accuracy of the translation was verified by two individuals who were fluent in both English and Kannada.

**Administration of the Questionnaire to the parents: (Stage-I)**

As a part of stage-I, the parents of hard-of- hearing children integrated in regular schools in Mysore city, were given the questionnaire. Those parents wno had at least middle school education were asked to answer the questionnaire and return it the following day. Those parents having primary school education or no education were interviewed with the questionnaire. The interview was carried out in Kannada for those parents who had completed primary school or had no education.

Scoring:

The responses of the questions were given a rating score. A more positive response yielded a higher rating and a more negative response was given a lesser rating. The questionnaire and scoring used is enclosed in appendix-A.

**Administration of the Questionnaire to the class teachers: (Stage-II )**

The class-teachers of all the forty integrated hearing-impaired children were given both the English and Kannada version of the questionnaire to answer and return. All the respondents complied.

Scoring:

As with the questionnaire for the parents the responses of each question was given a rating score. The more positive responses were rated with a higher score and a more negative response was given a lesser score. The ratings used to score the questionnaire is given in detail in appendix-B.

## Stage - 111:

Each hearing-impaired child was individually assessed on the following:

a) Auditory capability:

i) Pure tone thresholds
ii) Unaided sound-field warble tone threshold
iii) Unaided sound-field speech detection threshold (SDT)
iv) Unaided sound-field speech discrimination score (SDS)
v) Aided sound-field warble tone threshold
vi) Aided sound field speech detection threshold (SDT)
vii) Aided sound-field speech discrimination score (SDS)
viii) Aided sound-field uncomfortable level (UCL)

b) Linguistic abilities

i) expression
ii) comprehension

c) Speechreading ability

d) Speech intelligibility

e) Cognition

f) Intelligence

## a) AUDITORY CAPABILITY:

Test environment:

The auditory tests were carried out in a sound treated test and control room combination. The noise levels in the test room were measured using a sound level meter (B&K 2209) with an octave filter set (B&K 1613) and 1/2 inch free field microphone (B&K 4165). The noise levels were found to be within the permissible limits (ANSI 1969 standards). The measured noise levels are given in appendix-C.

Instrumentation:

A clinical audiometer (Madsen OB 822) with a head set fitted with TDH 39 earphones and noise excluding domes (ME 70); bone conduction vibrator (B-71) and a free field loudspeaker were used. The calibration of the audiometer was carried out regularly as per ANSI standards (1969). The calibration technique used is given in appendix-D.

### i) **Pure tone threshold measurement:**

Pure tone air-conduction thresholds for frequencies 250 Hz to 8000 Hz, and bone conduction thresholds for frequencies 250 Hz to 4000 Hz were obtained for each child. The following instructions in Kannada or English were given to them prior to the test: "You will hear some tones through the headphones. Each time you hear the tone, lift your finger. The tones will get softer and softer". Gestures were also used along with the verbal instruction. For the younger children play audiometric techniques were employed,

ii) **Unaided sound-field warble tone thresholds:**

Each hearing-impaired child was seated one meter away from the loudspeaker at 45 degree azimuth to establish their unaided sound field thresholds for warble tones. The loudspeaker was placed at a distance of one meter from the head of the subject as suggested by Morgan et ai. (1979). All the sound field testing was done with the subjects seated in the same position. The thresholds for the frequencies 250 Hz to 6000 Hz were tested. The children were given the following instruction: "You will hear some tones through the loudspeaker which will get softer and softer. Each time you hear the tone, lift your finger". Younger children were asked to drop a block each time they heard the tone. Gestures were also used to supplement the verbal instructions.

iii) **Unaided sound-field, speech detection thresholds:**

A live voice presentation was used to establish the unaided sound-field speech detection thresholds. The subjects were seated one meter away from the loud speaker, at 45 degree azimuth. The speech stimuli used were W-22 spondee list (Swarnalatha, 1972) for those children who studied in English medium schools, and Kannada paired words (Mayadevi, 1974) for those studying in Kannada medium schools. The children were given the following instructions "You will hear some words through the loud speaker, which will get softer and softer. Each time you hear the speech, lift your finger. " Younger children were made to drop a block instead of lifting their fingers. Along with the verbal instruction, gestures were utilized.

The investigator presented the stimuli such that the VU meter of the audiometer deflected to *O' for each presentation of the test stimuli.

**iv) Unaided speech discrimination:**

Ling's five sound test (1978) was used to establish the unaided speech discrimination ability of the subjects. A more detailed speech discrimination test was not used on account of the limited language level of some of the children. The children were instructed to write down and repeat aloud into the talk-back microphone, the test stimuli that they heard. The test stimuli was presented 40 dB above their unaided speech detection threshold or at lower levels for those children for whom audiometric limits did not permit presentation of stimuli at 40 dB SL. The order in which the stimuli were presented was randomized. The written responses were scored. The oral responses were scored for those children with poor writing abilities. The scores for each subject was converted to percentages.

**v) Aided sound-field warble tone thresholds:**

The subjects were seated one meter away from the loudspeaker at a 45 degree azimuth. They wore their prescribed hearing aids with a new cell (i.e. having a voltage of 1.5 volts). The hearing aid/s were placed in tne chiles pocKet or harness. Tne volume control was adjusted to the most comfortable level. The subjects were instructed not to manipulate the volume control setting, once it was set. The procedure used to establish the aided warble tone threshold was similar to that used to determine the unaided warble tone threshold.

vi) **Aided speech detection thresholds:**

The aided speech detection thresholds were established making use of a procedure similar to that used to obtain the unaided speech detection thresholds. The hearing aid setting was the same, as that in the aided warble tone test.

vii) **Aided speech discrimination:**

Aided speech discrimination scores were obtained using Ling's five sound test. The speech stimuli was presented at 52 dB HL (or 65 dB SPL). The above intensity was chosen since Dunn & White (1931) reported that the average speech intensity level was 65 dB SPL. (cited in Fletcher, 1953).

As in the unaided speech discrimination test, written and oral responses were obtained. The scoring was similar to the unaided testing.

viii) **Aided uncomfortable loudness level (UCL):**

Aided UCL for speech was established using W-22 spondee for those studying in English medium schools, and Kannada paired words (Swarnalatha, 1972) for those studying in Kannada medium schools. The subjects were instructed either orally and/or through gestures, to report whether the speech signal could be tolerated or not. The intensity level of the signal was increased until the subjects complained of discomfort, intolerance to the stimuli or till the maximum limits of the audiometer was reached.

The responses from all the auditory tests were recorded in the "Auditory Recording Sheet" (enclosed in appendix-E).

**b) LANGUAGE COMPETENCY:**

To assess the language competency of the subjects, both the expression and comprehension was tested for each child.

i) **Expression:**

Material:

The test materials consisted of twelve coloured pictures representing everyday activities (enclosed in appendix-F). Of the twelve pictures, two of them were practice items and ten were test items.

Test environment:

Testing was carried out in a quiet room, free from distraction. The subject was seated facing the investigator.

Instructions:

Oral instructions were given to each child. The subject was instructed to describe the pictures presented to him/her in complete sentences and in as many words as possible. One practice item was first described by the investigator and the subject was then asked to describe the other practice item. If the child performed the activity adequately, he/she was asked to describe the test items one at a time. If the subject could not describe the second practice item, the instructions were again repeated orally along with written instructions. After the subject described each picture, every child was asked as to what else he/she saw in the picture. This was done to elicit more speech from the subjects. The oral responses of each child was recorded on a tape recorder (Sony Stereo Cassette-corder TCS-350).

Scoring:

The recorded material was analyzed for the following aspects:

- mean length of utterance (in terms of words)
- number of sentences used, and
- number of complete sentences used.

### ii) Comprehension:

Comprehension was tested using the "Test for Auditory Comprehension of Language" (TACL) developed by Carrow (1973). The English version of the fifth edition consisting of 101 test items was used to test children who studied in English medium schools.

Translation:

The test was translated into Kannada to be used for those children studying in Kannada medium schools. The Kannada translation was checked by a linguist who was fluent in both English and Kannada. The Kannada translation had 100 items, as one of the English sentences could not be translated into Kannada (i.e. item No. 81). Appendix-G gives the English and Kannada Translation of TACL.

Test environment:

The test was administered in a quiet room, free from distraction. The subjects were seated in front of the tester at a distance of three feet.

Scoring:

Responses were scored as per the procedure suggested by Carrow (1973). The total (cumulative) scores got by each subject was tabulated.

**c) SPEECHREADING ABILITY:**

Test environment:

The test was carried out in a well lit, quiet room, free from distraction. The tester was seated at a distance of five feet and at the eye level of the subject.

Construction of the test stimuli:

Three lists each consisting of five simple commands and five words were developed. The tests were constructed in English and Kannada. The tests were matched in terms of:

a) Length of the commands or words.
b) Visibility of the words, and
c) Difficulty of the task.

List 1 was constructed such that the commands and words could be picturised. To demonstrate the command subsection to the subjects, two practice items were incorporated.

Three speech and hearing graduates who were fluent in both English and Kannada were asked to rate the equality of the three lists with regard to the length of the sentences and words; difficulty of the commands and the visibility of the words and sentences. The three tests were rated as being equal.

Pilot Study:

A pilot study was carried out on ten normal hearing children. Five of them were fluent in English and five of them in Kannada. The average age of the two groups were 5.2 years and 5.5 years respectively. The former group was tested with the English version of the test and the latter with the Kannada version.

The purpose of the pilot study was to check whether all the test stimuli were within the vocabulary of normal five year olds. In addition, the pilot study also aimed at establishing whether the subjects could carryout the commands given to them.

Initially, the sentence subsection in the three tests were evaluated and later the word subsection. All the test stimuli were presented in an audio-visual mode.

While evaluating the sentence subsection, the subjects were instructed to carry out all the commands given to them. The first practice item was demonstrated to the subjects (i.e. "Close your eyes"). The subjects were asked to enact the second practice item. If they were unable to do so, it was demonstrated to them. The order in which the lists were presented was randomized. While testing the commands in List 1, the pictures representing the commands were placed in front of the subjects. They were asked to carry out the command as well as point to the appropriate picture. *

While testing the word sub-section, the subjects were asked to repeat the words. In addition to repeating the words, the subjects were asked to point to pictures placed in front of them, while testing List-t.

All the subjects were able to carry out the tasks in all three lists with relative ease. Hence, no modifications were made in the speechreading tests. (Test items described in appendix-H).

Administration of the test:

The test was carried out individually, in a face-to-face situation. The sentence sub-section was initially presented followed by the word sub-section. Each subject was instructed to watch the face of the investigator and carryout the command that was mouthed or spoken aloud for the sentence sub-test. As in the pilot study, the first practice item was demonstrated to the subject and the subject was asked to carry out the second practice item. If the subject was unable to carryout the second practice item, it was demonstrated to him/her.

While testing the speechreading ability for words, the subject was instructed to repeat the words aloud. Those whose speech was unintelligible were asked to write down the words.

In both the sentence and the word sub-section, the test item was repeated if the subject did not give a correct response on the first attempt. Using the above procedure to administer the test, the speechreading ability of the subjects were evaluated under four different conditions. The conditions were evaluated in the following order:

a) Speechreading ability, without auditory cues, with context known,
b) Speechreading ability without auditory cues,
c) Speechreading ability with auditory cues and

d) Speechreading ability with auditory cues and when context was known.

**a) Speechreading ability, without auditory cues, with context known:**

List J was used to evaluate the speechreading ability of the subjects in this condition. The sentences were first evaluated, and then the words. Pictures giving clues to the commands were placed in front of the subject. He/She was told that the commands spoken would be related to the pictures in front of him. She/He was instructed to carry out the activity. Following this, the pictures representing the words in List f were placed in front of the child. She/He was told that the examiner would be naming the pictures, and that he/she should repeat and/or write down the word.

The commands and the words were mouthed by the examiner, with no exaggeration of articulatory movements. The hearing aid of the subject was also turned off to ensure that they got no auditory clues.

**b) Speechreading ability without auditory cues:**

Here, the tester mouthed the commands/words, with no exaggeration of the articulatory movements. The hearing aid of the subject was turned off. The subject was instructed to carry out the command and repeat the words. Half the subjects were tested with List 3 and the other half were tested with List 2.

**c) Speechreading ability with auditory cues:**

The tester presented the stimuli by speaking at a normal conversational level (around 65 dB SPL), with no exaggeration of articulatory movements. The subjects had their hearing aids on, with the volume control set to the most comfortable level. Half the children were presented List 3 and the other half on List 2. For no child was the list repeated.

**d) Speechreading ability with auditory cues and when the context was known:**

The test was carried out as in section (a). The hearing aids of the subjects were turned on, and the investigator spoke at a normal conversational level.

In addition to the above testing, the rating of the teacher regarding the child's ability to make use of visual cues while she taught was also utilized. This information was extracted from the "Class teacher's questionnaire".

Scoring:

The maximum scores that were obtainable on the command and word subsections were "six" and "five" respectively. Each item carried a score of one, except for item five in the sentences sub-section, which carried a score of two. A score of "oneTtwo" was assigned if the subject got an item correct in the first attempt. He/She got half the score if he/she got the item correct only after a repetition (appendix-H).

The class teacher's rating of the child's speechreading ability was scored as following: "usually" was given a score of three; "sometimes" a score of two and "never" a score of one.

**d) SPEECH INTELLIGIBILITY:**

Construction of the "Speech Intelligibility Scale":

To rate the intelligibility of the speech of the hearing-impaired children, a " Speech Intelligibility Scale" was constructed by the investigator. The items chosen were those that have been reported in literature to constitute good speech intelligibility. The scale consisted of **a** total of six items which had to be rated on a three point scale, i.e. usually, sometimes and never. Each of the rating points was defined, i.e. "usually" indicated that 75-100% of the time when the speech sample was heard it was intelligible. Likewise, "sometimes" and **"never" indicated that** the **speech** samples was intelligible 25-75% and 25% of the time, respectively.

Speech Sample:

Speech elicited from the hearing-impaired subjects while testing expressive language, which was recorded, was used to judge speech intelligibility.

Speech Intelligibility Rating:

Two speech and hearing graduates who were fluent in both Kannada and English served as judges. Each of them was initially familiarized with the "Speech Intelligibility Scale" recording sheet (enclosed in appendix-I). They were instructed to rate the intelligibility of each child's speech on the three point scale. The contents of the speech sample was not disclosed to the judges. The recorded speech of each child was played on a cassette player (National Stereo Cassette Recorder RX-F6). The judges first listened to the speech sample, after which they rated them. No discussion regarding the speech sample was allowed between the judges.

Scoring:

The ratings of the judges was given the following scores: "usually" was given a score of three, "sometimes" a score of two and "never" a score of one. The total score was calculated for each child. The maximum score obtainable was "eighteen". The scores given by the two judges were analyzed individually.

**e) TESTING FOR IQ;**

The intelligence of the hearing-impaired subjects was evaluated by qualified psychologists. Different intelligence tests, appropriate to the age of the subjects, were administered. The tests used were Seguin Form Board (Bharath Raj, 1971), Wechsler's Intelligence Scale for children (Wechsler, 1949), Bhatia's Battery short form (Bhatia, 1955), Developmental Screening Test (Bharath Raj, 1988), Columbia

Mental Maturity Scale (Bessie, Lucille, and Irving, 1959) and Raven's coloured Progressive Matrices (Raven, Court, and Raven, 1977). The number of subjects tested with each of the above mentioned tests is indicate in Table-C.

**Table-C:** Break-up of the subjects who were tested with different IQ tests.

| Tests administered | Number of Subjects |
|---|---|
| DST | 7 |
| CMMS | 4 |
| WISC | 17 |
| SFB | 11 |
| Bhatia's short form | 4 |
| RPM | 1 |

Four of the subjects were administered two IQ tests to counter check their IQ.

## f) COGNITION TESTING (SEQUENCING):

The ability of the hearing-impaired children to sequence pictures related to daily activities was evaluated.

### Construction of the test:

A test was constructed such that it had eight test items and one practice item. The concepts chosen, were those that most children were daily exposed to. Each item had three pictures representing a sequence of related activities.

Pilot Study:

Five normal hearing children (average age 5 years) studying in 1st standard were evaluated with the test. They were instructed that they would be given three pictures at a time, which they would have to place in the correct order. To make these instructions more explicit, the practice item was demonstrated and explained to them. The subjects were then asked to do the same with the test items.

It was found that two of the subjects required a repeat demonstration before being able to carry out the test accurately. It was also noted that three of the subjects had difficulty sequencing two of the test items. This difficulty was probably due to the ambiguity of the test items.

Based on the findings of the pilot study, the number of practice items was increased to two. The two items that were incorrectly sequenced, were dropped. The number of test items were thus reduced to five (Test items are included in appendix-J).

Administration of the test:

The hearing-impaired children were tested individually. Each child was instructed that he would be shown three pictures, which Should be placed in the correct sequence. These instructions were then demonstrated using the first practice item. The subjects were next asked to place the second practice Item in the correct order. If they were unable to do so, it was demonstrated by the investigator. The same was carried out for the test items without the help of the investigator. The three pictures for each of the practice and test items were placed in a random order in front of the child, before they carried out the task. If the subjects gave a wrong response, they were given a second chance to carry out the task.

Scores:

Each test item carried a maximum score of one. The subjects received a score of one only if they placed the test items in the correct order, in the first attempt. However, if they got the task correct only after a repeat, they were assigned a score of 0.5 for the item. The maximum score obtainable was five.

g) VISUAL ACUITY:

This test was conducted to check whether visual acuity correlated with the speechreading ability and/or the academic performance of the subjects.

Test material:

A Snellen chart having the letter "E" facing in different directions was used to evaluate visual acuity. The chart had five lines, with the first line having the largest sized letter "E" and fifth line having the smallest sized "E". A large sized letter "E" was also cut out on hard board, which was given to the subjects to indicate the direction of each of the tetter "E".

Test Administration:

The test was administered in a well lit room. The subjects were asked to stand at a distance of 10 feet away from the chart. The chart was placed at the eye level of the subjects. Making use of the letter "E" that was cut out on hard board, they were instructed to indicate the direction of the letters on the chart. They were first asked to close their right eye with their hand and read the chart with the left eye. The subjects had to read each line from the top to the bottom. The subjects were next asked to read the chart with their right eye, closing the left eye.

Scoring:

The line with the largest lettering carried a score of one and the line with the smallest lettering carried a score of five. The maximum scores a subject could obtain was five.

## Stage - IV:

Selection of normal hearing subjects:

Forty normal hearing children who were matched with the hearing-impaired subjects in terms of age, sex and medium of instruction were evaluated in this stage.

The subjects were initially screened to check whether they had normal hearing. A portable audiometer (Damplex AS 67) was used to screen the subjects. Only those subjects who obtained 20 dB HL air-condition thresholds in the frequencies 250 Hz to 8 KHz were selected.

Tests administered:

The control group was tested for the following:

a) Language competency
   i) Expression
   ii) Comprehension
b) Speechreading ability, and
c) Cognition

It was necessary to get comparative data on a normal hearing population as these tests did not have normative data on an Indian population.

Test Procedures:

The test procedures used to evaluate the normal hearing children were similar to that used with the hearing-impaired children. No hearing aids were used with these children though. The scores obtained were tabulated for analysis.

# RESULTS

The data collected on the hearing-impaired subjects and the normal hearing subjects was analyzed on a computer. The data was analyzed in three stages:

1. Initially the data obtained on the hearing-impaired subjects was analyzed. A correlation matrix was obtained between ten dependent variables and sixty-one independent variables. The significance of difference between means was calculated for some of the variables.

2. The variables evaluated in the correlation matrix were further subjected to a principal component analysis (Harris, 1975).

3. The significance of the difference between the means was calculated for nineteen variables for scores obtained on the normal hearing and hearing-impaired subjects using the Duncan's multiple range test. In addition, the effect of medium of instruction was also analyzed in this stage.

## ». RESULTS OF THE CORRELATION MATRIX:

A total of seventy-one variables that were obtained from the hearing- impaired subjects were analyzed in the first stage. Of the seventy-one variables, ten were concerning the academic achievement.

These formed the dependent variables and the remaining sixty-one were the independent variables. A correlation matrix was obtained between the dependent variables and the independent variables. The seventy-one variables were grouped under the following categories:-

a) Academic achievement
b) Auditory response
c) Linguistic ability: comprehension, expression
d) Mode of communication
e) Speech intelligibility
f) Speechreading ability
g) Visual acuity
h) Cognition
i) Intelligence
j) Intervention
k) Therapy
l) Psycho-social aspects
m) Parent-teacher interaction and parent-specialist interaction
n) Peer interaction
o) Attitudes of the parents and the teachers
p) Teacher training
q) Parent-teacher meeting
r) Hearing aid check
s) Parent's education
t) Number of languages used with the children
u) Age of the child
v) Class and class strength

**Academic achievement:**

Academic achievement was assessed by means of the scores the children obtained on the ten academic subsections. Based on the total academic performance, it was found that 45 % of the children (i.e. 18 children) performed below the average level, 27.5 % (i.e. 11 children) performed at the average level and 27.5 % (i.e. 11 children) performed the above average level. The correlation matrix indicated that the children's total academic performance correlated highly with their performance on individual academic sub-tests. Table-1 shows the correlation between each of the academic sub-tests with the total academic score . The correlation for all the variables was significant at the 0.01 level (Garrett and Woodworth, 1966).

The mean, standard deviation and coefficient of variation of the ratings of the academic sub-tests are in Table-2. The children got the highest mean scores (1.1) for their writing ability. The coefficient of variation (67.66) was also the least for the writing ability. The maximum scores was obtained for the writing ability followed by spelling ability, mathematics, first language, science, social studies and second language. Besides having the lowest mean score (0.50), second language also had the highest coefficient of variation (150.21%).

Since the subjects got the highest mean score and the ieast coefficient of variation for their writing ability, it was selected to observe how deviant their performance in the other academic subjects were from it. To evaluate this, the significance of difference between means for the writing ability and the other academic sub-tests were calculated (Table-3). As evident from Table-3, there was no significant difference between their writing ability and spelling ability even at the 0,1 level. A significant difference between means was got at 0.01 level for second language, social studies and science. The T value was the highest for the second language (t=5.08). The performance in the first language, the ability to carryout discussion and the overall performance of the children had a significant difference at the 0.02 level. The performance of the children in mathematics had a significant difference only at the 0.05 level.

TABLE 1

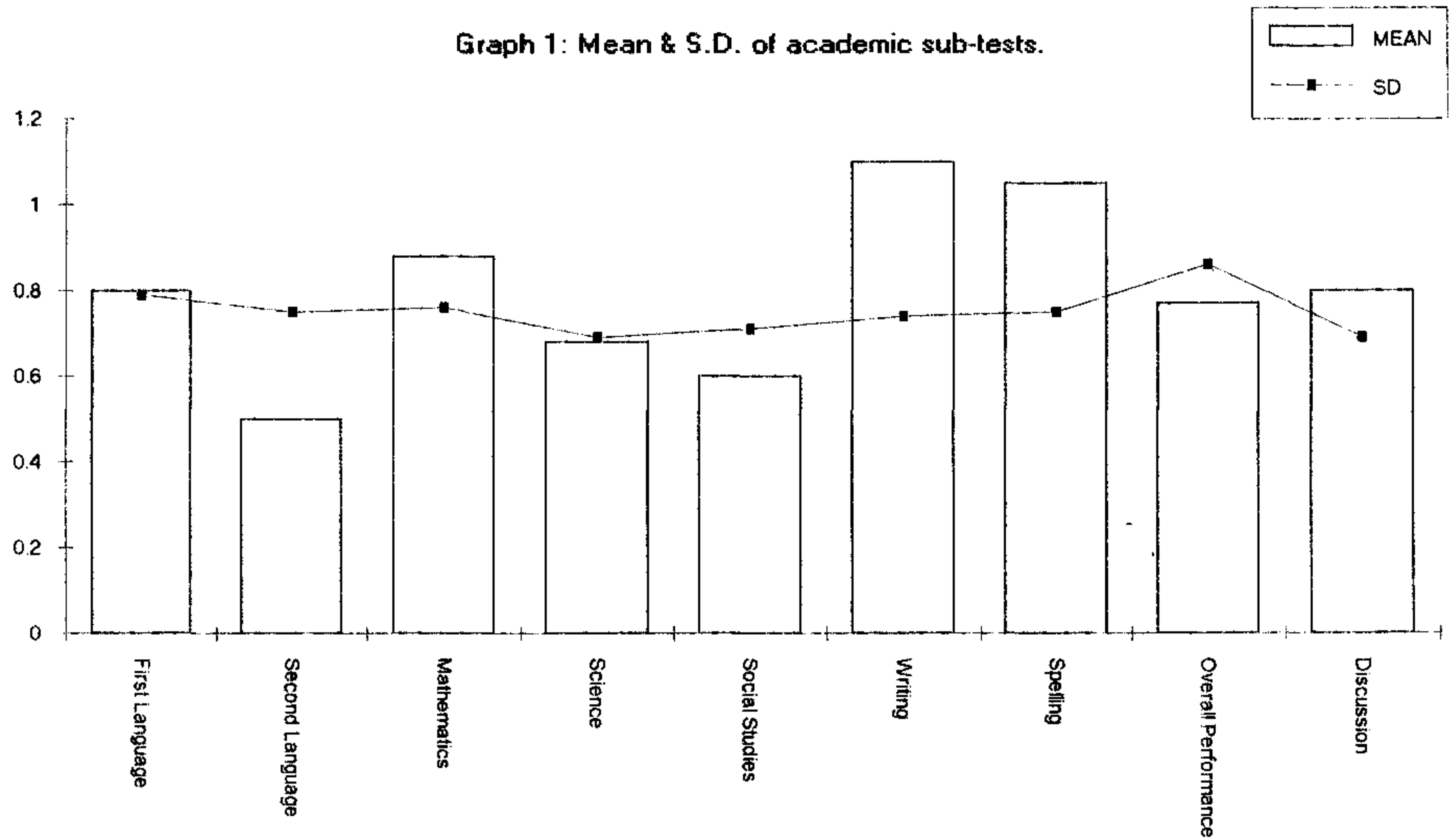
**Correlation of academic subjects with total academic scores.**

| Academic Subjects | Correlation coefficient (r) |
|---|---|
| Overall performance (teachers' judgement) | 0.95 |
| Writing ability | 0.88 |
| Science performance | 0.85 |
| Mathematical performance | 0.83 |
| Spelling ability | 0.81 |
| Social studies performance | 0.74 |
| Ability to take part in discussions | 0.67 |
| Second language performance | 0.66 |
| First language performance | 0.66 |

TABLE 2

**Maximum rated scores, mean, standard deviation and coefficient of variation of the academic sub-tests.**

| Academic Subjects | Maximum Rated Scores | MEAN | SD | CV% |
|---|---|---|---|---|
| First language | 2 | 0.80 | 0.79 | 98.87 |
| Second language | 2 | 0.50 | 0.75 | 150.21 |
| Mathematics | 2 | 0.88 | 0.76 | 86.56 |
| Science | 2 | 0.68 | 0.69 | 102.79 |
| Social studies | 2 | 0.60 | 0.71 | 118.15 |
| Writing | 2 | 1.1 | 0.74 | 67.66 |
| Spelling | 2 | 1.05 | 0.75 | 71.37 |
| Overall performance | 2 | 0.77 | 0.86 | 111.22 |
| Discussion | 2 | 0.80 | 0.69 | 85.86 |
| Total Performance | 100% | 41.90% | 31.19 | 74.45 |




Graph 1: Mean & S.D. of academic sub-tests.

TABLE 3

Significance of the difference between means for the writing ability and other academic sub-tests.

| Academic sub-tests | t | Level of significance |
|---|---|---|
| First language | 2.48 | 0.02 |
| Second language | 5.08 | 0.01 |
| Mathematics | 1.85 | 0.05 |
| Science | 3.72 | 0.01 |
| Social studies | 4.35 | 0.01 |
| Spelling | 0.42 | not significant at the 0.1 level. |
| Overall performance | 2.60 | 0.02 |
| Discussion | 2.65 | 0.02 |

**Variables that correlated with the academic achievements:**

The variables that correlated at the 0.01 and 0.05 level of significance, with the academic achievement of the children can be categorized as follows: Auditory ability, linguistic ability, speech Intelligibility, mode of communication, speechreading ability, intelligence, cognition, parent-specialist interaction, therapy, psycho-social aspect-teacher report; parent and teacher attitudes; hearing aid check by the teachers, hearing aid intervention and the class strength. Table-4 highlights the factors that had a significant coefficient of correlation with the various academic sub-tests. Details regarding the correlation of these factors with the sub-tests used to evaluate each broad category and with the academic sub-tests is given below.

**Auditory Response:**

The auditory capabilities of the subjects, that are reported are based on the findings of thirteen subsections.

To note whether pure tone thresholds of the subjects were related to their performance on other auditory tests, their correlation coefficient above were studied (Table-6). The following auditory sub-tests had a positive correlation significant at the 0.01 level with the pure tone thresholds: rated unaided warble tone average; rated aided warble tone average; absolute warble tone shift; rated unaided speech detection thresholds; rated aided speech detection thresholds; rated unaided speech discrimination scores; rated aided speech discrimination scores and aided auditory report by the parents. A negative correlation, significant at the 0.05 level was found between the rated pure tone threshold and the absolute speech discrimination score shift. However, no significant correlation was noted between the pure tone thresholds and the absolute speech detection threshold shift; aided auditory report given by the teacher; and the hearing aid use, as reported by the teacher (Table-6).

The tests administered to the children to judge their auditory abilities with and without their hearing aids were found to have a relatively low correlation with the academic sub-tests. The aided speech discrimination was the only auditory test that had a coefficient of correlation that was significant at the 0.01 level. This correlation was seen with the first language performance. Aided speech discrimination score was also found to correlate significantly with the spelling ability and overall performance of the children at the 0.05 level. The unaided speech discrimination also correlated with the same academic sub-tests at the 0.05 level. In addition it also correlated with the total academic performance at the same level (Table-4).

The average thresholds for pure tones under headphones correlated with the overall academic performance and the ability of the children to carry out discussions in class, at the 0.05 level. The aided warble tone thresholds, however correlated only with the overall academic performance of the children at the 0.05 level. These auditory tests had a coefficient of correlation that was not significant even at the 0.05 level with the children's performance in the second language, mathematics, science, social studies and writing ability (Table-4).

A few auditory tests did not correlate even at the 0.05 level with any of the academic sub-tests. These were unaided average warble tone threshold; average warble tone threshold shift (i.e. aided minus unaided warble tone thresholds); unaided speech detection threshold; aided speech detection threshold; speech detection threshold shift (i.e. aided minus unaided speech detection threshold shift); and speech discrimination shift (i.e. aided minus unaided speech discrimination score (Table-4).

From these findings, it can be seen that the auditory abilities of the children as measured by tests, do not play a major role in determining the academic success or failure of the children.

The report given by the parents regarding the aided auditory performance of the children also revealed a relatively low coefficient of correlation between the auditory responses of the children and academic tests. A significant positive correlation at the 0.05 level was found with their report and the writing ability, ability to carry-out discussions and the overall academic performance of the children (Table-4).

In contrast, the report given by the class teachers regarding the aided auditory response of the children had a comparatively higher correlation with most of the academic sub-tests. A significant coefficient of correlation was found with six of the academic sub-tests at the 0.01 level, and with two of the subjects at the 0.05 level. The difference in findings between the teachers report when compared to that of the parents and the auditory tests, indicated that the teachers were poor judges of the auditory ability of the children. This is further revealed in the findings shown in Table-6. The report given by the teachers did not correlate even at the 0.05 level with the pure tone threshold of the children, whereas the report given by the parents correlated at the 0.01 level of significance. This indicated that the parents are better judges of the auditory ability of the children than the class teachers.

The hearing aid use as reported by the class teachers correlated at the 0.01 level with seven of the academic sub-tests and at the 0.05 level with the remaining three academic sub-tests. The academic performance of the children in science, social studies and their ability to carry-out discussions were significant at the latter level (Table-4). The positive correlation indicates that those children who used their hearing aids regularly, performed academically better and those who used their hearing aids irregularly performed poorly academically. This finding contradicts the results of the tests used to evaluate aided performance.

Table-5 gives the rating scale used, the mean scores obtained by the subjects, the standard deviation and the coefficient of variation for the responses of the auditory tests administered to the subjects . It is evident from the mean scores that the mean warble tone thresholds improved by 26.95 dB , and their Speech Detection Thresholds improved by 24.01 dB (with the use of their hearing aids). The Speech Discrimination Scores improvement with the hearing aid use was minimal (2.5 %), indicating that the hearing aids did not help in speech discrimination. The parents[1] and the teachers' report that on the average the children made use of their auditory abilities about 50 % of the time. The children probably used their hearing more for awareness rather than for speech recognition.

**Table-4:**

**Factors that had a significant correlation with the various academic subjects.**

| Variables | Academic subjects | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 1st Lang. | 2nd Lang. | Maths | Science | Social Studies | Writing | Spelling | Overall Perf. | Discu-ssion | Total |
| **Rated hearing thresholds** | - | - | - | - | - | - | - | 0.31** | 0.30** | - |
| **Aided warble tone threshold (rated)** | - | - | - | - | - | - | - | 0.35** | - | - |
| **Unaided speech discrimination scores** | 0.38** | - | - | - | - | - | 0.37** | 0.35** | - | 0.32** |
| **Aided speech discrimination scores** | 0.41* | - | - | - | - | - | 0.32** | 0.36** | - | - |
| **Aided auditory performance** - Parent report | - | - | - | - | - | 0.32** | - | 0.32** | 0.33** | - |
| **Aided auditory performance** - Teacher report | 0.61* | - | 0.39* | 0.41* | - | 0.44* | 0.48* | 0.36** | 0.30** | 0.49* |
| **Hearing aid use - Teacher report** | 0.39* | 0.43* | 0.49* | 0.37** | 0.32** | 0.55* | 0.47* | 0.45* | 0.31** | 0.53* |
| **Comprehension(TACL)** | 0.36** | 0.31** | 0.32** | 0.36** | 0.40* | 0.48* | - | 0.47* | 0.45* | 0.51* |
| **Expression (MLU)** | 0.36** | - | 0.42* | 0.55* | 0.35** | 0.48* | 0.32** | 0.54* | 0.42* | 0.55* |
| **Number of sentences used** | 0.41* | - | 0.41* | 0.31** | 0.36** | 0.55* | 0.43* | 0.45* | 0.35** | 0.51* |
| **Expression - Parent report** | 0.43* | - | - | 0.37** | 0.30** | 0.37** | - | 0.39* | 0.39* | 0.43* |
| **Expression - Teacher report** | 0.52* | 0.38** | 0.50* | 0.58* | 0.55* | 0.58* | 0.52* | 0.61* | 0.50* | 0.66* |
| **Speech Intelligibility** - Parent report | - | - | - | 0.42* | 0.42* | 0.30** | 0.32** | 0.33** | - | 0.39* |
| **Speech Intelligibility** - Teacher report | 0.32** | 0.32** | - | 0.48* | 0.50* | 0.43* | 0.40* | 0.40* | 0.41* | 0.53* |
| **Speech Intelligibility** - Specialist I report | - | - | - | 0.33** | 0.30** | - | - | 0.33** | - | 0.33** |
| **Speech Intelligibility** - Specialist II report | 0.32** | - | - | 0.31** | - | 0.30** | - | 0.40* | - | 0.34** |
| **Child to teacher/peer communication** | 0.44* | 0.32** | 0.53* | 0.59* | 0.49* | 0.60* | 0.57* | 0.63* | 0.38** | 0.65* |
| **Parent to child communication** | 0.44* | - | 0.31** | 0.32** | 0.33** | 0.42* | - | 0.41* | - | 0.39* |
| **Child to parent communication** | 0.41* | - | - | 0.33** | 0.35** | 0.30** | - | 0.36** | - | 0.36** |
| **Peer to child communication** | 0.41* | - | 0.38** | 0.42* | 0.40* | 0.43* | 0.50* | 0.44* | 0.35** | 0.50* |
| **Speech reading - sentences** Condition I (SR+A+C) | 0.56* | 0.38** | 0.42* | 0.47* | 0.40* | 0.52* | 0.32** | 0.54* | - | 0.57* |
| **Speech reading - words** Condition I (SR+A+C) | 0.41* | - | 0.43* | 0.41* | 0.47* | 0.57* | 0.50* | 0.49* | 0.42* | 0.55* |
| **Speech reading - sentences** Condition II (SR+A) | 0.43* | 0.38** | 0.45* | 0.38** | 0.46* | 0.47* | 0.47* | 0.57* | 0.31** | 0.58* |
| **Speech reading - words** Condition II (SR+A) | 0.43* | - | 0.46* | 0.39* | 0.48* | 0.53* | 0.43* | 0.49* | - | 0.52* |
| **Speech reading - sentences** Condition III (SR) | 0.48* | 0.34** | 0.53* | 0.47* | 0.47* | 0.54* | 0.47* | 0.61* | 0.36** | 0.63* |
| **Speech reading - words** Condition III (SR) | 0.51* | - | 0.44* | 0.43* | 0.45* | 0.56* | - | 0.46* | 0.34** | 0.53* |
| **Speech reading - sentences** Condition IV (SR+C) | 057* | 0.41* | 0.53* | 0.44* | 0.42* | 0.50* | 0.39* | 0.54* | 0.45* | 0.60* |
| **Speech reading - words** Condition IV (SR+C) | - | - | - | 0.40* | 0.46* | 0.36** | 0.30** | 0.39* | 0.40* | 0.41* |
| **Speech reading - words+sentences** Condition I+II+III+IV | 0.55* | 0.42* | 0.56* | 0.55* | 0.57* | 0.63* | 0.48* | 0.65* | 0.45* | 0.70* |
| **Speech reading - words+sentences** Condition I+II+IV | 0.56* | 0.36** | 0.50* | 0.48* | 0.50* | 0.58* | 0.48* | 0.60* | 0.45* | 0.64* |
| **Speech reading - teacher rating** | 0.32** | 0.40* | 0.34** | - | - | - | - | - | - | 0.32** |

**Continued on next page**

**Table-4:**

**Continuation**

| Variables | Academic subjects | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 1st Lang. | 2nd Lang. | Maths | Science | Social Studies | Writing | Spelling | Overall Perf. | Discu-ssion | Total |
| Intelligence test scores | 0.36** | - | - | 0.33** | - | 0.56* | 0.36** | 0.41* | 0.41* | 0.44* |
| Cognition test scores | - | - | - | - | - | - | - | - | 0.33** | - |
| Parent-specialist interaction | - | - | 0.34** | - | - | 0.33** | - | 0.36** | - | 0.32** |
| Therapy | - | - | 0.37** | 0.38** | - | 0.33** | 0.31** | 0.33** | - | 0.36** |
| Psycho-social aspect - Teacher report | - | - | - | 0.33** | 0.31** | - | 0.35** | - | - | - |
| Parental attitude | - | - | - | 0.33** | - | - | - | - | - | - |
| Teacher attitude | - | 0.40* | - | 0.33** | - | 0.32** | - | - | - | 0.32** |
| Hearing aid check by teachers | - | - | - | 0.35** | - | - | - | - | - | - |
| Hearing aid, intervention | 0.42* | - | - | 0.30** | - | 0.43* | 0.42* | - | 0.30** | 0.36** |
| Class strength | - | - | - | - | - | - | -0.30** | - | - | -0.30** |
| No. of variables that correlated at the 0.01 level | 20 | 5 | 15 | 16 | 16 | 21 | 15 | 22 | 11 | 23 |
| No. of variables that correlated at the 0.05 level | 7 | 8 | 6 | 16 | 8 | 9 | 10 | 11 | 12 | 10 |

* Significant at the 0.01 level ** Significant at the 0.05 level

TABLE 5

Rating scale used, mean, SD and CV% of the auditory responses.

| AUDITORY TESTS | RATING SCALE USED | MEAN | SD | CV% |
|---|---|---|---|---|
| Rating of PTA under headphones | 10=normal hearing 0=no hearing | 0.80 | 0.79 | 98.87 |
| Rating of unaided average warble-tone threshold | 10=normal hearing 0=no hearing | 0.50 | 0.75 | 150.2 |
| Rating of aided average warble tone threshold | 10=normal hearing 0=no hearing | 0.88 | 0.76 | 86.6 |
| Absolute average warble tone threshold shift. ( aided minus unaided responses) | — | 26.95 | 13.91 | 51.6 |
| Rated unaided speech detection threshold (SDT) | 10=normal hearing 0=no hearing | 4.29 | 1.62 | 37.71 |
| Rated aided speech detection threshold | 10=normal hearing. 0=no hearing | 6.86 | 1.91 | 27.85 |
| Absolute SDT shift ( aided SDT minus unaided SDT) | — | 24.01 | 13.48 | 56.10 |
| Rated unaided speech discrimination scores | 10=100% SDS 0=0% SDS | 2.15 | 3.66 | 170.00 |
| Rated aided speech discrimination scores (SDS) | 10=100% SDS 0=0% SDS | 2.4 | 3.57 | 148.83 |
| Absolute SDS shift (aided minus unaided SDS) | — | 2.67 | 14.52 | 543.8 |
| Parents report of aided performance | Max.score=5 Min.score=0 | 2.42 | 1.74 | 71.66 |
| Teachers report of aided performance | Max.=4 Min.=0 | 2.72 | 1.11 | 40.70 |
| Hearing aid use (teachers report) | Max.=10 Min.=0 | 8.02 | 1.61 | 20.05 |

TABLE 6

**The correlation between the rated PTA under headphones with the other auditory test.**

| Auditory test | Correlation Co-efficient |
|---|---|
| Rated unaided average warble tone threshold | 0.94* |
| Rated aided average warble tone threshold | 0.83* |
| Absolute warble tone threshold shift | 0.39* |
| Rated unaided SDT | 0.84* |
| Rated aided SDT | 0.81* |
| Absolute SDT shift | 0.27 |
| Rated unaided SDS | 0.82* |
| Rated aided SDS | 0.85* |
| Absolute SDS shift | -- 0.35** |
| Aided auditory response (Parent report) | 0.64* |
| Aided auditory response (teacher report) | 0.24 |
| Hearing aid use (teacher report) | 0.11 |

* Significant at 0.01 level ** Significant at 0.05 level.

Linguistic Abilities:

A comparison of the mean number of sentences used and mean number of correct sentences used by the subjects indicates that the latter is considerably less than the former (Table-7). Thus the majority of the sentences produced by the hearing-impaired are grammatically incorrect. Tabie-7 aiso shows that the parents tend to have a more positive opinion about their children's expressive ability, than that of the class teacher. The mean scores of the children's expression as reported by the parent was 17.3 points higher than the class teachers report. Though the mean scores varied, there was a positive correlation (r=72) between the teachers and the parents report about the children's expressive ability.

**TABLE 7**

**Mean, SD and coefficient of variation of the tests / ratings used to evaluate the linguistic abilities of hearing-impaired subjects.**

| TEST / RATING | MEAN | SD | CV% |
|---|---|---|---|
| Comprehension (TACL) | 53.6 (Max.score =101) | 21.9 | 40.93 |
| Expression (MLU) | 2.6 (Range 0 to 8.38) | 1.9 | 71.95 |
| Expression -No.of sentences used | 14.8 (Range=0 to 41) | 8.5 | 57.75 |
| Expression - No.of correct sentences used | 2.4 (Range 0 to 21) | 4.5 | 188.47 |
| Teachers report on expressive ability | 48.6 (Max.score=100) | 28.2 | 58.03 |
| Parents report on expressive ability | 65.9 (Max.score=100) | 22.1 | 33.53 |

The ability of the subjects to comprehend speech had a positive correlation at the 0.01 level of significance with all the measures used to evaluate the linguistic ability of the children (Table-8). These measures included the mean length of utterance; number of sentences used; number of correct sentences used; teachers' report of expression and parents' report of expression.

**TABLE 8**

**Correlation of the comprehension test (TACL) with other tests of linguistic abilities.**

| TEST / RATING | CORRELATION |
|---|---|
| Expression (MLU) | 0.74* |
| Expression - No.of sentence used | 0.71* |
| Expression - No.of correct sentences used | 0.56* |
| Teachers report of expression | 0.77* |
| Parents report of expression | 0.72* |

* Significant at the 0.01 level.

**Correlation of linguistic abilities with academic performance:**

Ail but one of the sub-tests used to evaluate the linguistic abilities of the children had a significant coefficient of correlation either at the 0.05 or at the 0.01 level with most of the academic sub-tests (Table-4).

Comprehension as evaluated by the test of auditory comprehension of language (TACL), had a significant correlation at the 0.01 level with the children's performance in social studies, their writing ability and carry- out discussions, and the overall and total academic performance. At the 0.05 level of significance, the ability to comprehend correlated with the children's performance in the first language, the second language, mathematics and science. The spelling ability of the children was the only academic sub-test that did not correlate with the results of the comprehension test. This indicates that the level at which the children can comprehend language affects their performance in most academic subjects, but does not affect their ability to spell.

The expression as measured by the mean length of utterance (MLU) correlated with all the academic sub-tests except with the second language performance. This can be explained by the fact that the mean length of utterance varies from language to language. This finding has been noted in this study. The mean length of utterance was significantly different in Kannada speaking and English speaking children. This was found for both the normal hearing and hearing-impaired children.

The mean length of utterance had a significant coefficient of correlation at the 0.01 level with the performance of the children in mathematics, science, writing , their discussion ability, and the overall and total academic performance. At the 0.05 level of significance, a correlation was noted with the first language, social science and the spelling ability of the children. Thus, it can be seen that the mean length of utterance is an good indicator of the academic performance of the children.

As with the mean length of utterance the number of sentences used by the subjects correlated significantly either at the 0.05 or the 0.01 level with ail the academic subjects, except the second language. Six of the academic subjects correlated at the 0.01 level with the number of sentences used. These were first language, mathematics, writing, spelling, overall and total academic performance. Performance in science, social studies and the ability to carry-out discussions correlated at the 0.05 level with the number of sentences used by the children. Hence, like the mean length of utterance the number of sentences used by the children to express themselves, is a good indicator of the academic performance of the children.

The parents and teachers report on the expression abilities of the children also correlated fairly highly with the academic performance of the children. The teachers' report had a higher correlation coefficient than the parents' report (Table-4). The report given by the teachers correlated at the 0.01 level with all the academic subjects except with the performance in the second language, where the correlation was at the 0.05 level. In contrast the report given by the parents correlated at a relatively lower level with all the academic subjects. Only four of the academic subjects correlated with the parents report of the children's expression at the 0.01 level . These included performance in the first language, discussion abilities, and overall and total academic performance. Performance in science, social studies and the writing ability of the children correlated at the 0.05 level. However, their performance in the second language, mathematics and their ability to spell, did not correlate with the parents' report even at the 0.05 level of significance.

The variation in the questions to be answered by the parents and the teachers about the expressive ability of the children, could possibly account for difference in the results obtained.

**Speech Intelligibility**

The mean speech intelligibility scores of the hearing-impaired subjects, as rated by the parents and teachers were not very much lower than the maximum scores. In contrast the speech intelligibility rating by the two specialists was relatively much lower than the maximum scores (Table-9).

Table-10 shows the correlation matrix of the speech intelligibility rating of the parents, teachers and two speech and hearing specialists. The correlation was highest for the ratings by the two speech and hearing specialists (0.75). The correlation was lower (0.50) for the ratings between the parents and the teachers. The correlation between the rating scores of the teachers and second speech and hearing specialist was the least (0.39). All the correlations were significant at the 0 01 level.

TABLE 9

**Maximum scores, mean, SD and CV % of the speech intelligibility as judged by parents, teachers and specialists.**

| SPEECH INTELLIGIBILITY RATING | MAX. SCORES | MEAN | SD | CV% |
|---|---|---|---|---|
| Parents report | 3 | 1.77 | 0.8 | 45.08 |
| Teachers report | 4 | 2.63 | 1.00 | 38.28 |
| Specialist I report | 12 | 3.78 | 3.83 | 101.36 |
| Specialist II report | 12 | 3.38 | 3.22 | 95.53 |

TABLE 10

**Correlation of speech intelligibility rating scores of the parents, teachers, and specialists.**

| SPEECH INTELLIGIBILITY RATING | PARENTS | TEACHERS | SPECIALIST | |
|---|---|---|---|---|
| | | | Ist | IInd |
| Parents | 1 | 0.50 | 0.52 | 0.43 |
| Teacher | | 1 | 0.60 | 0.39 |
| First specialist | | | 1.00 | 0.75 |
| Second specialist | | | | 1.00 |

**Correlation of speech intelligibility with the academic achievement:**

The children's speech intelligibility as rated by the parents, teachers and the two specialists varied in their correlation with the various academic subjects. In genera! it was noted that the report of all four groups did not correlate with the children's performance in mathematics even at the 0 05 level. Except for the ratings given by the teachers, no correlation was also seen at the 0.05 level with the performance in the second language and the children's ability to carry-out discussions. All four reports correlated with the performance in science, and the overall and total academic performance (Table-4). Thus, it can be seen that speech intelligibility correlated with performance in some of the academic subjects and not with others.

**Mode of Communication:**

The communication strategies used, i.e. the quantity of speech and/or gestures used by the following were analyzed:

a) Teacher with the hearing-impaired child.
b) Hearing-impaired child with the teacher or peers.
c) Parents with the hearing-impaired child.
d) Hearing-impaired child with the parents, and
e) Peers with the hearing-impaired child.

in Table-11 a low mean score with reference to the maximum attainable score would indicate that more of gestures were used than speech. Likewise a high mean score with reference to the maximum scores would reflect that speech was used more often than gestures. As a!! the mean scores are more than half the maximum scores, it is evident that the hearing impaired children parents, teachers and peers used more speech than gestures in communication with the hearing-impaired. The hearing- impaired children also used a greater amount of speech than gestures to communicate with their parents, teachers and peers.

Table-12 reveals that the communication strategies used by the teachers correlated at the 0.05 level with the strategies used by the hearing- impaired children (r=0.34). However, the mode of communication used by the teachers did not correlate significantly with a) those used by the parents with the hearing-impaired children, b) hearing-impaired children with the parents and c) peers with the hearing-impaired children.

It can also be seen in Table-12 that the mode of communication used by the hearing-impaired children to communicate with the teachers/peers correlated at the 0.01 level with the communication mode used by: a) the parents to communicate with the hearing-impaired children, b) the hearing-impaired children to communicate with their parents and c) the peers to communicate with the hearing-impaired children.

The communication strategy used by the parents with their children, correlated highest with the strategies used by the hearing-impaired children with their parents (r=0.72). The strategies used by the hearing- impaired children with their parents also correlated at the 0.01 level (r=0.53) with the methods used by peers to communicate with the hearing impaired children.

TABLE 11

**Maximum scores, mean, SD & CV% of the mode of communication used by hard - of - hearing children, parents, teachers/peers.**

| COMMUNICATION STRATEGIES USED BY | MAX. SCORES ATTAINABLE | MEAN | SD | CV% |
|---|---|---|---|---|
| Teacher with hearing-impaired child | 7 | 4.94 | 0.84 | 16.93 |
| Hearing-impaired child with teachers/peers | 12 | 8.34 | 2.11 | 25.27 |
| Parents with hearing-impaired child | 2 | 1.61 | 0.25 | 15.68 |
| Hearing-impaired child with parents | 2 | 1.55 | 0.27 | 17.21 |
| Peer with hearing-impaired child | 6 | 4.34 | 1.35 | 31.08 |

TABLE 12

Correction matrix of the communication stragies used by the hearing-impaired(HI) children,parents, teachers and peers.

| Communication strategies used by | Teachers with HI Children | HI child-ren with teacher | Parents with HI children | HI child ren with parents | Peer with HI children |
|---|---|---|---|---|---|
| Teachers with HI childrer | 1 | 0.34** | 0.11 | 0.14 | 0.22 |
| HI children with teachers / peers | | 1 | 0.51* | 0.55* | 0.71* |
| Parents with HI children | | | 1 | 0.72* | 0.30** |
| HI children with parents | | | | 1 | 0.53* |
| Peer with HI children | | | | | 1 |

* Significant at the 0.01 level ** Significant at the 0.05 level.

**Correlation coefficient of mode of communication with academic achievement:**

The mode of communication correlated with most of the academic subjects either at the 0.01 or at the 0,05 levels. The mode of communication used by the child to communicate with the teachers or the peers correlated at the 0.01 level with the following academic subjects: first language, mathematics, science, social studies, writing ability, spelling ability and the overall and total academic performance. At the 0.05 level, it correlated with the performance of the children in the second language, and their ability to carry-on discussion (Table-4).

The parents-to-child communication mode correlated at the 0.01 level with the performance in the first language writing ability and the overall and total academic performance. At the 0.05 level, a correlation was noted with the performance in mathematics, science, and social studies. No correlation was observed at the 0.05 or 0.01 level for the performance in the second language, spelling ability, and discussion ability (Table-4).

The child-to-parent communication mode correlated only with the performance in the first language at the 0.01 level. Performance in science, social studies, the writing ability and the overall and total academic performance correlated at the 0.05 level. Four of the academic sub-tests did not correlate with the mode of communication used by the child with the parents. These were performance in the second language, mathematics and ability to spell and carry out discussions.

The peer to child communication correlated at the 0.01 level with the performance in the first language, science, social science, writing ability, spelling ability and overall and total academic performance. The performance in mathematics and the ability to carry-out discussions correlated at the 0.05 level, The scores in the second language was the only academic subject that did not correlate even at the 0.05 level (Table-4).

The above findings suggests that when speech is used for communication, the higher is the chance of the children being able to perform better academically. Whereas if they use more of gestures to communicate, the lesser is the chance of them doing well in school.

**Speech read ina Ability:**

The speechreading ability of the hard-of-hearing children was analyzed in four different conditions, the four conditions were as follows:

Condition-I : Speechreading with auditory and contextual clues (SR+A+C)

Condition-I I: Speechreading with auditory clues (SR+A)

Condition-Ill: Speechreading with no additional clues (SR)

Condition-IV: Speechreading with contextual clues (SR+C)

In each of these conditions, the ability to speechread commands and isolated words were analyzed.

it is evident form Table-13 that the mean scores for condition-i was the highest for both the command and the word sub-tests. This is to expected as speechreading, auditory and contextual clues were given.

A significant difference between means was established between condition-! (SR+A+C) and the three other conditions that were evaluated i.e. condition-ll (SR+A), condition-ill (SR) and condition-lV (SR+C), The significant difference occurred at the 0.01 level with all the conditions except with the command sub-test in condition-IV, where it was significant at the 0.05 level (Table-14).

The mean scores for condition-Hi (SR) was the lowest for both the command and word subsections, as evident in Table-13. The significance of difference between means was calculated for condition-Ill (SR) with the three other conditions i.e. condition-l (SR+A+C), condition-ll (SR+A) and condition-Ill (SR+C). The t values and level of significance for both the sentences and words sub-tests are given in Tab!e-15. The mean scores of condition-Ill was found to be significantly different from the mean scores of the remaining three conditions at the 0.01 ievei.

Significance of difference between means when all four conditions (i.e. conditions i+ll+lll+IV) were considered and when condition-Ill was eliminated (i.e. I+II+IV) was found to be significant only at the 0.1 level (t=1.94) (Garrett and Woodworth, 1966).

TABLE 13

**Maximum scores, mean, SD and CV for speech reading of sentences and isolated words, under four test conditions and the teachers' ratings of the speech reading ability of the children.**

| TEST CONDITION | TEST STIMULI | MAX. SCORES | MEAN | SD | CV% |
|---|---|---|---|---|---|
| Condition-I ie speech reading, auditory and contextual clues given (SR+A+C) | sentences | 6 | 3.65 | 1.68 | 46.03 |
| | words | 5 | 4.35 | 1.01 | 23.16 |
| Condition-II: ie speech reading and auditory clues given (SR+A) | sentences | 6 | 2.60 | 2.08 | 79.97 |
| | words | 5 | 2.97 | 1.70 | 57.21 |
| Condition-III: ie only speech reading clues given (SR) | sentences | 6 | 1.39 | 1.37 | 98.43 |
| | words | 5 | 2.16 | 1.33 | 52.46 |
| Condition-IV: ie speech reading and contextual clues gives (SR+C) | sentences | 6 | 3.17 | 1.75 | 55.08 |
| | words | 5 | 4.09 | 1.13 | 27.55 |
| Conditions I+II+III+IV | Total score for sentences and words | 100% | 55.47% | 21.73 | 39.17 |
| Conditions I+II+IV | Total score for sentences and words. | 100% | 62.30% | 22.90 | 36.74 |
| Teacher rating of speech reading | ___ | 4 | 3.60 | 0.59 | 16.40 |

TABLE 14

**Signigicance of difference between means of condition-I with conditions II, III and IV for sentences and words.**

| TEST CONDITION | STIMULI | t- VALUE | LEVEL AT WHICH SIGNIFICANT |
|---|---|---|---|
| Diffenence between condition-I and condition-II | sentences | 3.52 | 0.01 |
| | words | 6.27 | 0.01 |
| Difference between condition-I and condition-III | sentences | 9.41 | 0.01 |
| | words | 11.71 | 0.01 |
| Difference between condition-I and condition-IV | sentences | 2.09 | 0.05 |
| | words | 2.84 | 0.01 |

TABLE 15

**Signigicance of difference between means for condition III and the other three conditions for sentences and words.**

| TEST CONDITION | STIMULI | t- VALUE | LEVEL AT WHICH SIGNIFICANT |
|---|---|---|---|
| Difference between condition-III and I | sentences | 9.41 | 0.01 |
| | words | 11.71 | 0.01 |
| Difference between condition III and II | sentences | 4.32 | 0.01 |
| | words | 3.38 | 0.01 |
| Difference between condition III and IV | sentences | 3.99 | 0.01 |
| | words | 9.90 | 0.01 |

A positive correlation at the 0.01 level of significance was found between all but two conditions, for both the command and word subsection. The command sub-tests in condition-Ill (SR) and condition-!V (SR+C) had a correlation at the 0 05 level of significance with the word subsection in condition-!V (SR+C) (Table-16).

TABLE 16

**Correlation matrix of Speechreading tests.**

| TEST CONDITION | CONDITION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | I+II+III+IV | I+II+IV |
| | Sent. | Words | Sent. | Words | Sent. | Words | Sent. | Words | Sent.+Words | Sent.+Words |
| **Condition-I** | | | | | | | | | | |
| Sentences | 1* | 0.54* | 0.70* | 0.76* | 0.61* | 0.54* | 0.66* | 0.47* | 0.87* | 0.88* |
| Words | | 1* | 0.63* | 0.72* | 0.49* | 0.56* | 0.48* | 0.76* | 0.78* | 0.88* |
| **Condition-II** | | | | | | | | | | |
| Sentences | | | 1* | 0.69* | 0.74* | 0.46* | 0.55* | 0.41* | 0.83* | 0.83* |
| Words | | | | 1* | 0.51* | 0.60* | 0.58* | 0.59* | 0.87* | 0.89* |
| **Condition-III** | | | | | | | | | | |
| Sentences | | | | | 1* | 0.46* | 0.54* | 0.32** | 0.72* | 0.65* |
| Words | | | | | | 1* | 0.60* | 0.45* | 0.72* | 0.65* |
| **Condition-IV** | | | | | | | | | | |
| Sentences | | | | | | | 1* | 0.32** | 0.78* | 0.77* |
| Words | | | | | | | | 1* | 0.64* | 0.65* |
| **Conditions - I+II+III+IV** | | | | | | | | | | |
| Sentences + Words | | | | | | | | | 1* | 0.97* |
| **Conditions - I+II+IV** | | | | | | | | | | |
| Sentences + Words | | | | | | | | | | 1* |

* Correlation at the 0.01 level of significance.
** Correlation at the 0.05 level of significance.

The correlation was the highest (0.97) between conditions !+!!+!!i+!V and conditions I+H+IV. This was significant at the 0.01 level. (Here the scores for the word and the command sub-tests were combined to yield a total score. This total score was combined further for the different conditions, i.e. conditions l+ll+lll and conditions !+l!+!l!+!V).

**Correlation coefficient of speechreading with the academic achievement:**

The speechreading sub-tests for words and commands correlated with most of the academic sub-tests at either the 0.01 or the 0.05 level of significance. This was true for all four conditions that were evaluated. All the four conditions and two sub-tests (i.e. words and command sub-tests) correlated at the 0.05 level with the performance of the children in the first language except for the word subsection of condition-IV. The latter did not correlate even at the 0.05 level with the performance in the first language.

The same was true for the performance in mathematics. The scores of the children in all the speechreading conditions correlated at the 0.01 level except for the word sub-test in condition-IV (Table-4).

The performance in social studies and the overall and total academic performance of the children correlated at the 0.01 level with both the sub-tests of all the four speechreading conditions. The performance of the children in science and their writing ability correlated at the 0 01 level in all but one subsection in which the correlation was significant at the 0.05 level. The former correlated only at the 0.05 level of significance with the command subsection of condition-!! (i.e. speechreading ability for commands with visual and auditory clues). The latter (i.e. writing ability) had a correlation coefficient that was significant at the 0.05 level with the word subsection of condition IV (i.e. speechreading ability for words when only speechreading and contextual clues were given) (Tab!e-4).

The spelling ability of the children had a coefficient of correlation that was significant at the 0.01 level with the following speechreading sub-tests: speechreading ability for commands in conditions-l (SR), and -IV (SR+C), and speechreading ability for words in conditions-l (SR+A+C) and -II (SR+A) At the 0 05 level the spelling ability of the children correlated with the speechreading ability for commands in condition-! (SR+A+C) and with speechreading ability for words in condition-IV (SR+C). The speechreading ability for words with no additional clues i.e. condition-Ill, did not correlate even at the 0 05 level with the spelling ability of the children (Table-4).

The ability of the children to carry-on discussions correlated at the 0,01 level with three of the eight speechreading subsections. They were, speechreading ability for words in condition-!! (SR+A) and condition-IV (SR+C) and speechreading ability for commands in condition-IV (SR+C). The three sub-tests that had a significant coefficient of correlation at the 0.05 level were, speechreading ability for commands in conditions-ll (SR+A), III (SR), and speechreading ability for words in condition-!!! (SR). Two of the sub-tests did not have a significant coefficient of correlation at even the 0.05 level. These were speechreading ability for commands in condition-i (SR+A+C) and speechreading ability for words in condition-ll (SR+A), (Table-4).

The speechreading ability of the children correlated least with their academic performance in the second language. The only sub-test that correlated at the 0.01 level with the children's performance in the second language was the ability to speechread commands in condition-IV (SR+C). The three sub-tests that correlated at the 0.05 level of significance were speechreading for commands in conditions-l (SR+A+C), - II (SR+A), and -III (SR) (Table-4).

The "Total speechreading performance" obtained by averaging the scores the children got in al! the four conditions and the two sub-tests were found to have a significant correlation at the 0.01 level with all the ten academic sub-tests. There continued to be a significant correlation at the 0.01 level with al! but one of the academic sub-tests, when condition-HI (i.e. only speechreading clues given) was excluded. With the scores obtained in condition-Ill excluded, the academic performance in the second language correlated only at the 0.05 level with "total speechreading performance" (Table-4).

In contrast to the findings of the speechreading tests, where a relatively high correlation coefficient was obtained with most of the academic sub-tests, the ratings by the teachers of the speechreading abilities of the children, did not correlate significantly with most of the academic sub-tests. The performance in the second language was the only academic sub-test that correlated at the 0.01 level with the teachers' rating of the speechreading ability of the children. The performance in the first language, mathematics and the total academic performance correlated at the 0.05 level of significance. The other academic sub-tests did not have a significant correlation with the teachers' rating even at the 0.05 level (Table-4).

The ratings of speechreading ability of the children by the class teacher did not correlate even at the 0.05 level of significance with any of the speechreading sub-tests.

intelligence:

The scores on the IQ tests revealed that only 12 subjects had IQs below the average level and 28 of them had average IQ. Of the 12 who were found to have below average IQ, 10 were classified as having "mild mental retardation" and two as having "borderline mental retardation"

Correlation coefficient of the intelligence tests with the academic achievement:

A correlation, significant at the 0.01 level, was obtained between the level of intelligence of the children and their writing ability", ability to carry out discussions, and their overaii and total academic performance. Three academic sub-tests correlated at the 0.05 level with the intelligence level of the children. These were, performance in the first language, science, and spelling ability. Their performance in the second language, mathematics, and social studies did not have correlation coefficient that was significant at the 0.05 level or the 0.01 level of significance (Table-4).

**Cognition:**

Cognition test scores had a relatively low correlation coefficient with all the academic sub-tests. The ability of the children to carry out discussions was the only academic sub-test that had a significant correlation at the 0.05 level with cognition test scores. None of the other academic sub-tests had a significant correlation coefficient either *at* the 0.05 or the 0.01 level of significance (Table-4).

**Therapy:**

Information as to whether the children continued to attend therapy after being integrated in normal school, was analyzed here. It was found that this aspect correlated at the 0.05 level with six of the academic sub-tests. These were performance in mathematics, science, writing and spelling abilities, and the overall and total academic performance. The remaining four academic sub-tests did not correlated at either of the two levels of significance (Table-4).

The average duration for which the children attended therapy was 4.76 years with the range being 2 months to 11 years. The standard deviation was 2.90 and (CV) 8.17.

**Psycho-social aspects of the child:**

The psycho-social aspects of the children as rated by the parents and teachers were analyzed. The maximum scores obtainable, mean, standard deviation and coefficient of variation are reported in Table-17. The mean psycho-social behavior report, as given by the parents was closer to the maximum score, than that reported by the teachers, The means were significantly different at the 0.01 levels, thus indicating that the parents rated the children as having higher and better psycho-social behavior than the teachers.

TABLE 17

**Maximum scores, mean, SD, and CV% of the psycho-social ratings given by the parents and teachers.**

| VARIABLES | MAX. SCORE | MEAN | SD | CV% |
|---|---|---|---|---|
| Psycho-social behaviour (parents report) | 4 | 3.17 | 0.71 | 22.43 |
| Psychosocial behaviour (teachers report) | 6 | 3.85 | 1.00 | 26.01 |

Correlation **coefficient of the psycho-social aspects - Teacher Report with the academic achievement:**

The psycho-social aspects of the child as reported by the class teachers had a relatively low correlation with most of the academic sub-tests. The significant correlation was obtained at the 0.05 level with only three of the academic sub-tests i.e. performance in science, social studies and the ability of the children to speli (Tabie-4).

**Parent-Teacher interaction. Parent-Teacher meeting** and **Parent-Specialist interaction:**

In this section the information regarding the interaction between the parents and teachers and between the parents and the speech and hearing specialist were analyzed. Parent-teacher interaction referred to the report given by the parents and parent-teacher meeting referred to the report given by the teacher regarding similar information i.e. regarding the meetings and discussions between them. Information regarding the Parent-specialist interaction was given by the parents.

Table-18 indicates that the mean scores for the ratings given by the parents and teachers regarding the interaction/meeting between them, was greater than half the maximum scores obtainable. The same was true regarding the mean of the "parent-specialist interaction[11]. This reveals that the majority of the parents met the teachers and speech and hearing specialists and discussed the requirements of the children.

TABLE 18

**Maximum scores, mean, SD and CV% of the parent - teacher interaction, parent-teacher meeting and parent- specialist interaction.**

| VARIABLES | MAX. SCORE | MEAN | SD | CV% |
|---|---|---|---|---|
| Parent-teacher interaction | 8 | 5.21 | 1.50 | 28.73 |
| Parent-teacher meeting | 7 | 4.63 | 2.03 | 43.98 |
| Parent-specialist interaction | 7 | 4.32 | 2.08 | 48.10 |

**TABLE 19**

**Maximum scores, mean, SD and CV% of the scores of the attitudes of the parents and teachers.**

| VARIABLES | MAX. SCORE | MEAN | SD | CV% |
|---|---|---|---|---|
| Parents attitude | 10 | 7.76 | 1.34 | 17.26 |
| Teachers attitude | 10 | 6.57 | 1.75 | 26.60 |

**Correlation with the academic sub-tests:**

No correlation that was significant at the 0.01 level was obtained with any of the academic sub-test and the "parent-specialist interaction". The parent-specialist interaction had a significant correlation at the 0.05 level of significance with the performance in mathematics, the writing ability and the overall and total academic performance. The other academic subjects did not have a significant correlation even at the 0,05 level (Table-4).

The parent-teacher interaction, and the parent-teacher meeting did not correlate even at the 0.05 level with any of the academic sub-tests.

**<u>Attitudes of the parents and teachers:</u>**

Information regarding the parents and teachers attitudes, obtained from the questionnaires answered by them was analyzed. Tabie-19 gives the maximum scores obtainable mean, standard deviation and coefficient of variation for the rated attitudes of the parents and teachers. The parents obtained a higher mean score and showed lesser variability when compared to the scores of the teachers. The teachers' attitude had more variability, which is indicated by the higher values in SD and CV%. The significance of different between the two means indicated that there was a statistically significant different (t=4.76) at the 0.01 level.

**Correlation of parental and** teacher attitudes with the academic **sub-tests:**

Both the parental attitude and the teachers' attitude were found to correlate relatively low with academic performance. Of the two, parental attitude had a lower correlation than the teachers' attitude. The former had a significant correlation at the 0.05 level only with performance of the children in science. The latter had a significant correlation at the 0.01 level with performance in the second language, and a significant correlation at the 0.05 level with the performance in science, the writing ability and the total academic performance (Table-4).

Hearing aid check:

The ability of the class teachers to check the hearing aids of the hearing-impaired child was analyzed in this section.

The mean scores for the hearing aid check carried out by the teachers was less than half the maximum scores, as can be seen in Tab!e-20. This indicates that majority of the teachers did not know how to check the functioning of the hearing aid.

**Correlation of hearing aid** check by the teachers with the academic **sub-tests:**

The hearing aid check carried out by the class teachers had a low correlation with the academic performance of the children. The performance in science was the only academic sub-test that had a significant correlation at the 0.05 level with the hearing aid check. None of the other academic sub-tests had a significant correlation either at the 0.01 or the 0.05 levels of significance (Table-4).

Hearing **aid** intervention:

Table-21 reveals that the mean age at which the children first used a hearing aid was more than half the maximum score that was attainable. This indicates that on an average the hearing-impaired children wore their hearing aid within one year of identification of the hearing loss.

**Correlation of hearing aid intervention with academic sub-tests:**

The hearing aid intervention correlated with six of the academic sub-tests. Of them three correlated at the 0.01 level of significance. These were performance in the first language, and the writing and spelling abilities of the children. The sub-tests that correlated at the 0.05 ievei of significance were performance in science, ability to carry out discussions and the total academic performance.

TABLE 20

Maximum rated scores, mean, standard deviation and coefficient of variation of the hearing aid check carried out by teachers.

| VARIABLES | MAX. SCORE | MEAN | SD | CV% |
|---|---|---|---|---|
| Hearing aid check | 4 | 1.63 | 1.58 | 95.24 |

TABLE 21

Maximum rated scores, mean, SD and CV% of the rated age at which children first used a hearing aid.

| VARIABLES | MAX. RATED SCORE | MEAN | SD | CV% |
|---|---|---|---|---|
| Hearing aid intervention | 4 | 2.38 | 1.23 | 51.95 |

**Class strength:**

The class strength was the only variable that had a negative correlation with the academic sub-tests. A negative correlation, that was significant at the 0.05 level was obtained between the class strength and the spelling ability and total academic performance.

Several variables did not have a significant correlation either at the 0.01 or 0.05 level with the academic sub-tests. These included a) the rated unaided sound field warble tone threshold (b) unaided speech detection threshold (c) aided speech detection threshold (d) the number of correct sentences used by the children (e) teacher-to-child communication (f) visual acuity test scores (g) parent-teacher interaction, (h) the number of years the children attended therapy (i) peer interaction, as reported by the teachers, (j) teacher training (k) parent-teacher meeting (i) therapy intervention, (m) mothers' education (n) father's education, (o) age of the children (p) number of languages spoken to the children and (q) the class in which the children were studying (r) SDT shift (s) SDS shift (t) parent report of the psychosocial aspect of the children.

## ii. RESULTS OF THE PRINCIPAL COMPONENT ANALYSIS:

In the second stage of the analysis the variables evaluated in the correlation matrix were further subjected to a principal component analysis (Harris, 1975). This was done to further determine the factors that contribute to the academic achievement of the integrated hearing-impaired children. Seven factors were extracted from the principal component analysis, Table-22 shows the eigen values, trace value and cumulative value of the seven principal components, !t also indicates that a!! the seven principal components had an Eigen value of greater than one, however, only the first three had a trace value that approximated 10%, The seven principal component had a cumulative value of 70.28%,

Table-23 lists the variables of each of the seven principal components. Only those variables that had a factor loading of greater than 0.40 have been listed.

Some of the variables had a loading of more than 0.40 in more than one principal component, indicating that they have more than one theoretical dimension. Parental attitude was present in principal components 3 and 7. Threshold shifts for speech and warble tones were present in principal components 3 and 4.

The variable "mode of communication used by teachers to the children" did not have a significant loading in all the seven principal components.

**TABLE 22**

**Eigen values, trace values and cumulative values of the principal components.**

| PRINCIPLE COMPONENT | EIGEN VALUE | TRACE % | CUMULATIVE |
|---|---|---|---|
| 1 | 16.51 | 33.69 | 33.69 |
| 2 | 5.50 | 11.23 | 44.92 |
| 3 | 3.98 | 8.12 | 53.04 |
| 4 | 2.42 | 4.93 | 57.97 |
| 5 | 2.23 | 4.55 | 62.52 |
| 6 | 2.07 | 4.22 | 66.74 |
| 7 | 1.73 | 3.53 | 70.28 |

Graph 2: Trace Values (%) of the Principal Components

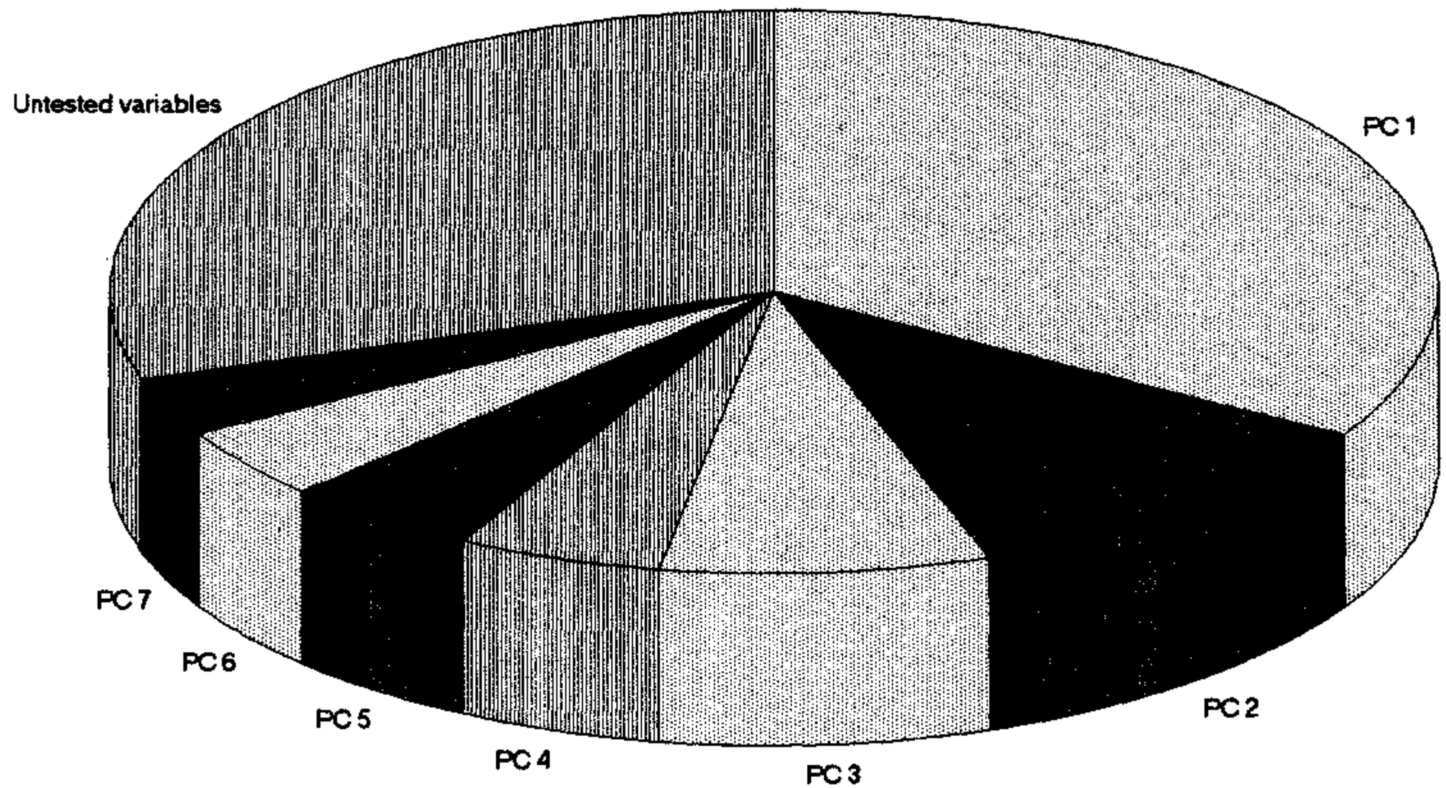


TABLE 23

**Composition of the principal components.**

**Principal components 1**

| Variable | | Loading |
|---|---|---|
| **Speech reading** | | |
| Overall speech reading ability | (conditions I+II+III+IV%) | 0.91 |
| Speech reading sentences | (condition I: SR+A+C) | 0.84 |
| Speech reading words | (condition II: SR+A) | 0.82 |
| Speech reading sentences | (condition II: SR+A) | 0.81 |
| Speech reading sentences | (condition IV: SR+C) | 0.67 |
| **Linguistic ability** | | |
| Expression-teachers report. | | 0.89 |
| Comprehension (TACL) | | 0.83 |
| Number of sentences child uses (expression) | | 0.79 |
| Number of correct sentences child uses | | 0.53 |
| **Mode of communication** | | |
| Child to teacher/peer communication | | 0.79 |
| Child to parent communication | | 0.72 |
| **Speech Intelligibility** | | |
| Speech intelligibility | (specialist report) | 0.74 |
| Speech intelligibility | (teacher report) | 0.74 |
| **Auditory ability** | | |
| Aided warble tone threshold | | 0.64 |
| Pure tone threshold | | 0.63 |
| Aided speech discrimination scores | | 0.63 |
| Aided speech detection thresholds | | 0.60 |
| Unaided warble tone thresholds | | 0.52 |
| **Others** | | |
| Hearing aid intervention | | 0.48 |
| Teacher attitude | | 0.46 |

Continued on next page.

| Continuation. | |
|---|---|
| **Principal Component 2** | |
| **Variable** | **Loading** |
| **Auditory ability** | |
| Aided speech detection thresholds | 0.64 |
| Unaided warble tone thresholds | 0.63 |
| Pure tone threshold | 0.62 |
| Aided speech discrimination scores | 0.54 |
| Aided warble tone threshold | 0.53 |
| **Special training** | |
| Therapy attendance after school enrollment | -0.60 |
| Parent specialist interaction | 0.43 |
| **Principal component 3** | |
| **Variable** | **Loading** |
| **Therapy** | |
| Therapy duration (years) | -0.69 |
| Therapy attendance regularity | -0.41 |
| **Hearing threshold shift** | |
| Average warbletone threshold shift | -0.57 |
| Speech detection threshold shift | -0.48 |
| **Family background** | |
| Parental attitude | -0.53 |
| Mothers education | -0.48 |
| **Miscellaneous** | |
| Cognition test scores | -0.42 |
| Languages spoken to the child | 0.46 |

Continued on next page.

Continuation.

Principal component 4

| Variable | Loading |
| --- | --- |
| Number of correct sentences child uses | 0.51 |
| Speech detection threshold shift | -0.42 |
| Average warble tone threshold shift | -0.41 |

Principal component 5

| Variable | Loading |
| --- | --- |
| Therapy intervention | 0.44 |
| Age of the child | -0.59 |
| Class | -0.66 |

Principal component 6

| Variable | Loading |
| --- | --- |
| Fathers education | -0.55 |
| Teacher training | -0.48 |

Principal component 7

| Variable | Loading |
| --- | --- |
| Parental attitude | -0.47 |

Principal component 1, which had a trace value of 33.69% consisted of twenty variables. These twenty variables could be classified under six sub-headings. These were speechreading ability, linguistic ability, tne mode of communication, the speech intelligibility of the hearing-impaired children, auditory abilities and others. Under the subheading 'others', hearing aid intervention and teacher attitude were included. The overall speechreading ability (i.e. conditions !+!l+ll!+IV) obtained the highest loading of 0 91, followed by the teachers report of the ability of the children to express themselves.

Principal component 2, had a trace value of 11.23% and was composed of five variables, which were classified under two sub-headings. These subheadings were the auditory ability, and special training.

Principal component 3, was made up of five variables, which were classified as therapy, hearing threshold shift, family background and miscellaneous.

Though the iast four principal components account for a relatively lower amount of variability, they have been reported because the Eigen value happens to be greater than one.

Principal Component 4 included three variables, two dealing with threshold shift and one regarding the number of correct sentences used.

Principal component 5 consisted of the following three variables: therapy intervention, age of the child, and class in which the child studied.

Principal Component 6 comprised of two variables i.e. the fathers' education, and the teachers' training.

Principal component 7 included just one variable, i.e. the parental attitude.

**III. RESULTS OF THE EXPERIMENTAL GROUP VS. THE CONTROL GROUP:**

For the purpose of analysis the subjects were divided into four groups i.e.:

1) Hearing-impaired children studying in Kannada medium classes
2) Hearing-impaired children studying in English medium classes
3) Normal hearing children studying in Kannada medium classes
4) Normal hearing children studying in English medium classes

In order to compare the performance of the hearing-impaired children with that of the normal hearing children, the Duncan's Multiple Range Test was used.

The analysis was done for the following tests:

a) Mean length of utterance (MLU)
b) Number of sentences used
c) Number of correct sentences used
d) Comprehension (TACL)

e) Cognition

f) Speedhreading for commands: Condition I(SR+A+C)

g) Speechreading for words: Condition I (SR+A+C)

h) Speechreading (Total): Condition I (Sentence + Words)

i) Speechreading for commands: Condition II (SR+A)

j) Speechreading for words: Condition II (SR+A)

k) Speechreading (Total): Condition II (Sentence + Words)

l) Speechreading for commands: Condition III (SR)

m) Speechreading for words: Condition III (SR)

n) Speechreading (Total): Condition III (Sentence + Words)

o) Speechreading for commands: Condition IV (SR+C)

p) Speechreading for words: Condition IV (SR+C)

q) Speechreading (Total): Condition IV (Sentence + Words)

r) Speechreading for commands (Grand total): Condition I+II+III+IV

s) Speechreading for words (Grand total): Condition I+II+III+IV

The significance of the difference between means was calculated using the Duncan's Multiple Range Test.

<u>Comparison of hearing-Impaired children with normal hearing children, studying in Kannada medium:</u>

The Duncan's Multiple Range Test revealed that there was a significant difference between means for all the variables analyzed, except for the speechreading ability for commands in condition-III (SR) and condition -IV (SR+C) and the grand total speechreading ability for words (i.e. conditions-I+II+III+IV).

Among the mean values listed in Table-24, the normal hearing subjects obtained significantly higher values than the hearing-impaired children in the following tests:

a) MLU
b) Number of sentences used
c) Number of correct sentences used
d) Comprehension (TACL)
e) Cognition
f) Speechreading ability for commands: condition-I (SR+A+C)
g) Speechreading ability for words: condition-I (SR+A+C)
h) Speechreading total i.e. command+words: condition-I (SR+A+C)
i) Speechreading ability for commands (condition-II (SR+A)
j) Speechreading ability for words: condition-II (SR+A)
k) Speechreading total i.e. command+words:condition-II (SR+A)
l) Speechreading grand total for commands: condition-I+II+III+IV
m) Speechreading grand total for words: condition-I+II+III+IV

It was not always that the normal hearing subjects performed significantly better than the hearing-impaired group. Given below is the list of sub-tests where the hearing-impaired children obtained significantly higher mean values than the normal hearing children.

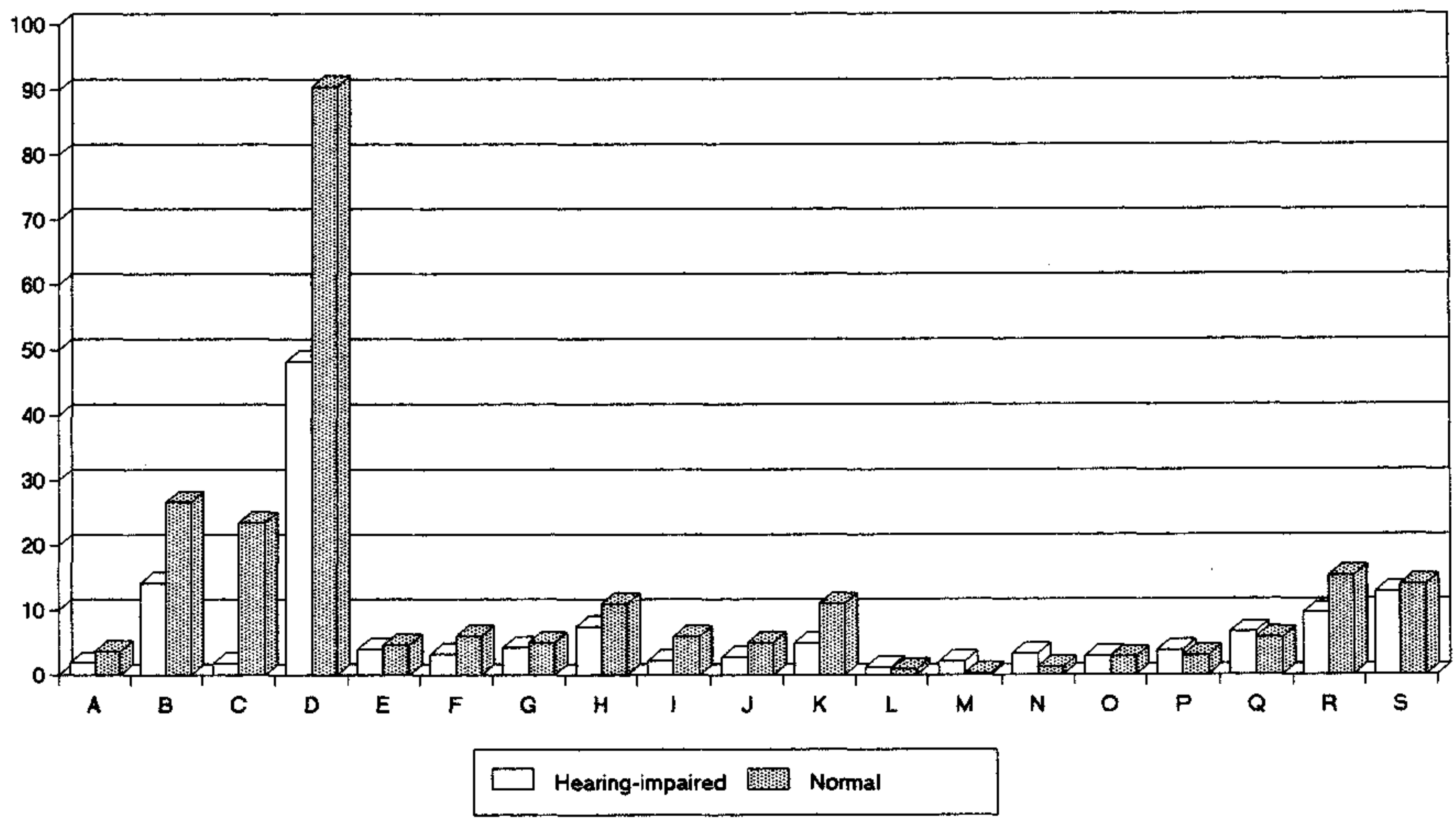
a) Speechreading ability for words - condition III (SR)
b) Speechreading total i.e. commands+words - condition III (SR)
c) Speechreading for words - condition IV (SR+C)
d) Speechreading, total i.e. commands+words - condition IV (SR+C)

Table 24

**Mean scores for tests administered to hearing-impaired and normal hearing children studying in Kannada medium schools.**

| Variables | Means for hearing-impaired (Kannada medium) | Means for normal hearing (Kannada medium) |
|---|---|---|
| A) MLU | 1.87 | 3.67 |
| B) No. of sentences used | 14.16 | 26.68 |
| C) No. of correct sentences used | 1.77 | 23.52 |
| D) Comprehension (TACL) | 48.23 | 90.52 |
| E) Cognition | 3.98 | 4.66 |
| F) Speechreading (Sentence) Condition-I (SR+A+C) | 3.26 | 5.98 |
| G) Speechreading (Words) Condition-I (SR+A+C) | 4.23 | 5 |
| H) Speechreading (Total) Condition-I (Sentence+Words) | 7.48 | 10.98 |
| I) Speechreading (Sentence) Condition-II (SR+A) | 2.21 | 5.98 |
| J) Speechreading (Words) Condition-II (SR+A) | 2.73 | 5 |
| K) Speechreading (Total) Condition-II (Sentence+Words) | 4.94 | 10.98 |
| L) Speechreading (Sentence) Condition-III (SR) | 1.19 | 0.89 |
| M) Speechreading (Words) Condition-III (SR) | 2.05 | 0.29 |
| N) Speechreading (Total) Condition-III (Sentence+Words) | 3.24 | 1.18 |
| O) Speechreading (Sentence) Condition-IV (SR+C) | 2.89 | 2.79 |
| P) Speechreading (Words) Condition-IV (SR+C) | 3.81 | 2.98 |
| Q) Speechreading (Total) Condition-IV (Sentence+Words) | 6.6 | 5.77 |
| R) Speechreading (Grand total) Condition I+II+III+IV for Sentences | 9.55 | 15.29 |
| S) Speechreading (Grand total) Condition I+II+III+IV for Words | 12.76 | 13.89 |

Graph 3 : Mean test scores for hearing-impaired & normal children in Kannada medium schools (see Table 24).



<u>Comparison of hearing-impaired children with normal hearing children studying in English medium:</u>

A significant difference between means was found for the following tests:

a) Mean length of utterance
b) Number of correct sentences used
c) Comprehension (TACL)
d) Speechreading ability for commands: condition I (SR+A+C)
e) Speechreading total (i.e. commands + words): condition I (SR+A+C)
f) Speechreading ability for commands: condition II (SR+A)
g) Speechreading ability for words: condition II (SR+A)
h) Speechreading total scores: condition II (SR+A)
i) Speechreading ability for words : condition III (SR)
j) Speechreading total i.e. commands + words: condition III (SR)
k) Speechreading ability for words : condition IV (SR+C)

In Table-25, the mean scores are presented for all the tests for the hearing-impaired and the normal hearing children studying in English medium schools.

Among the tests that had a significant difference between means, the normal hearing children got a higher mean value on the following:

a) Mean length of utterance
**b) Number of correct sentences**
c) Comprehension (TACL)

d) Speechreading ability for commands : condition I (SR+A+C)

e) Speechreading total i.e. commands + words : condition I (SR+A+C)

f) Speechreading ability for commands: condition II (SR+A)

g) Speechreading ability for words : condition II (SR+A)

h) Speechreading total i.e. commands + words : condition II (SR+A)

The hearing-impaired children got a higher mean value for the following tests that had a significantly different mean score:

1. Speechreading ability for words: condition III (SR)
2. Speechreading total i.e. commands + words: condition III (SR)
3. Speechreading ability for words: condition IV (SR+C)

In not all the tests was there a significant difference between the normal hearing and the hearing-impaired children who studied in English medium schools. The following are the tests where there was no such difference:

a) Number of sentences used

b) Cognition

c) Speechreading ability for words: condition I (SR+A+C)

d) Speechreading ability for commands: condition III (SR)

e) Speechreading ability for commands: condition IV (SR+C)

f) Speechreading, total i.e. commands + words: condition IV (SR+C)

g) Total speechreading ability for commands:conditions I+II+III+IV

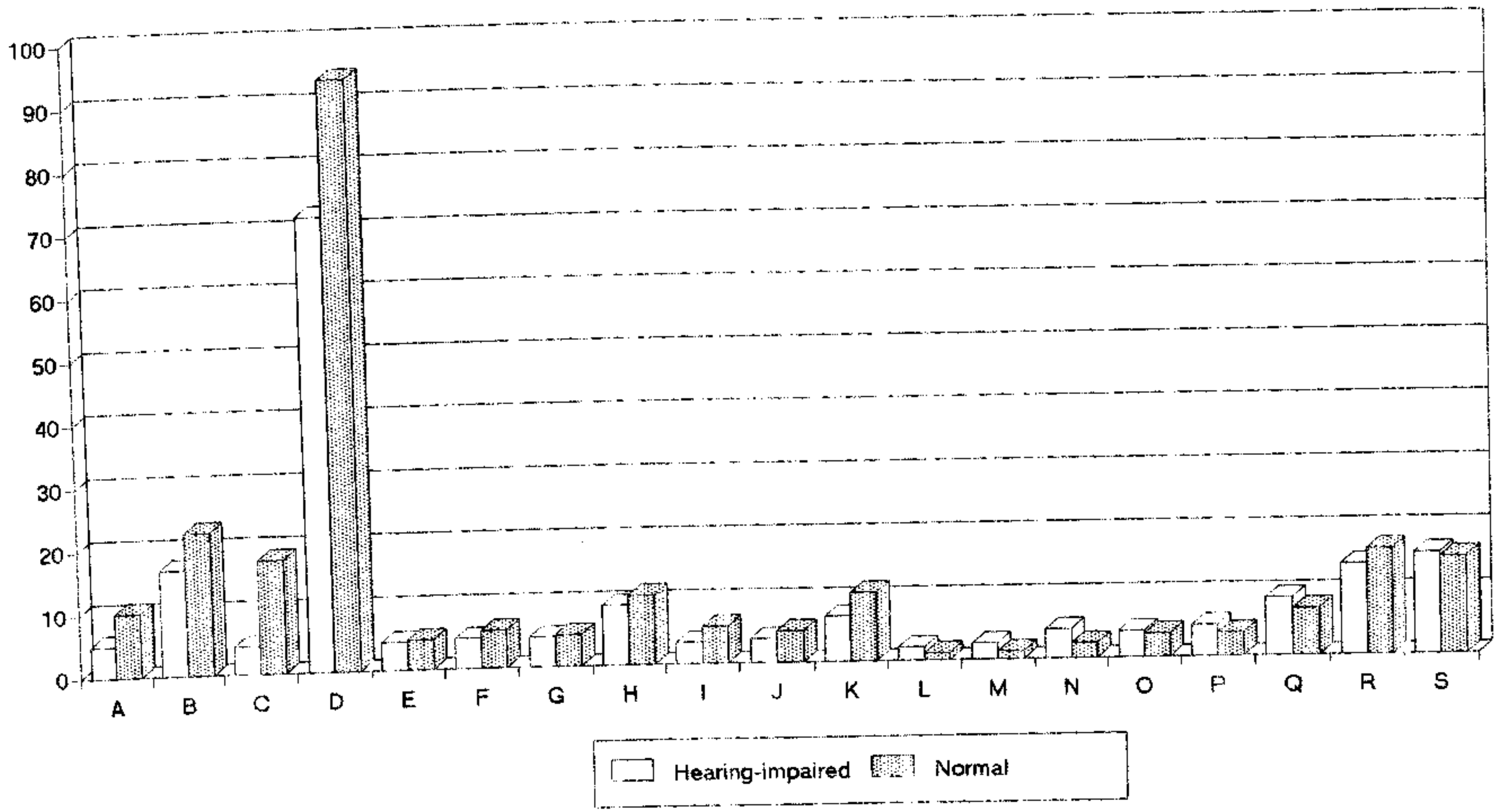
h) Total speechreading ability for words: conditions I+II+III+IV

**Table 25**

**Mean scores for tests administered to hearing-impaired and normal hearing children studying in English medium schools.**

| Variables | Means for hearing-impaired (English medium) | Means for normal hearing (English medium) |
|---|---|---|
| A) MLU | 4.99 | 10.08 |
| B) No. of sentences used | 16.78 | 22.56 |
| C) No. of correct sentences used | 4.44 | 18.00 |
| D) Comprehension (TACL) | 72.11 | 93.78 |
| E) Cognition | 4.44 | 4.72 |
| F) Speechreading (Sentence) Condition-I (SR+A+C) | 4.78 | 6.00 |
| G) Speechreading (Words) Condition-I (SR+A+C) | 4.72 | 5.00 |
| H) Speechreading (Total) Condition-I (Sentence+Words) | 9.48 | 11.00 |
| I) Speechreading (Sentence) Condition-II (SR+A) | 3.39 | 5.89 |
| J) Speechreading (Words) Condition-II (SR+A) | 3.78 | 5.00 |
| K) Speechreading (Total) Condition-II (Sentence+Words) | 7.17 | 10.89 |
| L) Speechreading (Sentence) Condition-III (SR) | 2.06 | 1.11 |
| M) Speechreading (Words) Condition-III (SR) | 2.56 | 1.22 |
| N) Speechreading (Total) Condition-III (Sentence+Words) | 4.61 | 2.33 |
| O) Speechreading (Sentence) Condition-IV (SR+C) | 4.17 | 3.72 |
| P) Speechreading (Words) Condition-IV (SR+C) | 5.00 | 3.72 |
| Q) Speechreading (Total) Condition-IV (Sentence+Words) | 9.17 | 7.44 |
| R) Speechreading (Grand total) Condition I+II+III+IV for Sentences | 14.39 | 16.72 |
| S) Speechreading (Grand total) Condition I+II+III+IV for Words | 16.06 | 15.39 |

Graph 4 : Mean test scores for hearing-impaired & normal children studying in English medium schools.
(see Table 25).



**<u>Comparison of hearing-impaired children studying in Kannada medium, with the hearing-impaired children studying in English medium schools:</u>**

There was a significant difference between the mean scores as indicated by the Duncan's Multiple Range Test, between hearing-impaired children studying in Kannada and English medium schools. In certain tests the hearing-impaired children studying in the English medium schools got significantly higher scores while on certain other tests the hearing- impaired children in the Kannada medium schools obtained higher scores. The tests where the hearing-impaired children studying in English medium schools had significantly higher means are:

a) Mean length of utterance
b) Comprehension (TACL)
c) Speechreading ability for commands : condition I (SR+A+C)
d) Speechreading total i.e. commands + words: condition I (SR+A+C).
e) Speechreading ability for commands: condition II (SR+A)
f) Speechreading ability for words: condition II (SR+A)
g) Speechreading total i.e. commands + words: condition II (SR+A)
h) Speechreading ability for commands: condition IV (SR+C)
i) Speechreading grand total for commands: condition I+II+III+IV
j) Speechreading grand total for words: condition I+H+III+IV

The hearing-impaired children studying in Kannada medium schools had higher means on the following sub-tests:

a) Speechreading total score i.e. commands + words: condition III (SR)
b) Speechreading ability for words: condition IV (SR+C)
c) Speechreading total i.e. commands + words: condition IV (SR+C)

**<u>Comparison of performance of normal hearing children studying in Kannada medium, with normal hearing children studying in English medium schools.</u>**

A significant difference between means was found for three sub-tests between normal hearing children studying in Kannada and English medium schools. The English medium children performed significantly better on a) the mean length of utterance and b) speechreading ability for words i.e. condition III (SR). The children studying in Kannada medium schools performed better on one sub-test i.e. number of correct sentences that were used. No significant difference was found between these two groups for the remaining tests.

The implications of the findings of the present study with reference to integrating the hearing-impaired in regular schools are discussed in the following chapter. The variables that should be evaluated when integrating a hearing-impaired child and the relative importance of one variable with reference to the other are discussed.

# DISCUSSION

In this chapter the results are discussed with reference to the factors that contribute to successful integration. The findings of the present study are also compared with that of other experts. Initially, the performance of the hearing-impaired children in the academic sub-tests are discussed. Following this, the correlation of the independent variables with the academic sub-tests are reported. The relative importance of these variables in relation to each other are discussed based on the principal component analysis, in the final section, the performance of the hearing-impaired children is compared with the control group (normal hearing) children for those tests that did not have norms on the Indian population.

## Academic performance;

It is evident from Table 2 and Figure 1, that among the academic sub-tests, the hearing-impaired children performed best on the writing ability sub-test. A possible reason as to why this occurred was because the teachers rated the children's ability to copy or their rote memory rather than their creative writing abilities. Their spelling abilities probably also involves rote memory and hence the mean scores in this was ranked the second highest. The performance of the children in the other academic sub-tests perhaps involved higher cognitive abilities. This could be a reason as to why there existed a statistically significant difference in the performance of the children in the writing ability and the other academic sub-tests (i.e. mathematics, first language, discussion, science, social studies and second language.

**Auditory response:**

The tests used to evaluate the auditory abilities of the children with and without their hearing aids on, correlated with only a few of the academic sub-tests. The coefficient of correlation was mainly significant at the 0.05 level. The aided speech discrimination score was the only auditory task that correlated with one of the academic sub-tests, i.e. first language, at the 0.01 level of significance (Table-4).

The parents' report of the auditory abilities of the children had a relatively low correlation which was significant at the 0.05 level with just three of the academic sub-tests. In contrast, the teachers' report of the auditory abilities of the children correlated with most of the academic sub-tests at the 0.01 level. Possibly the teachers judged the children based on some other aspect rather than their actual auditory ability as they had no prior training to base their judgment on. The poor judgment of teachers regarding the auditory abilities of the children is substantiated by the findings shown in Table-6. The report given by the teachers had a low correlation coefficient which was not significant even at the 0.05 level, with the pure tone thresholds (average of 500 Hz, 1000 Hz and 2000 Hz). However, the report given by the parents correlated at a high level with the pure tone average (r=0.64). This correlation was significant at the 0.01 level. Thus it may be concluded that the parents were better judges of the auditory ability of the children when compared to the teachers. The greater interaction of parents with the speech and hearing professionals when compared to the teachers, might have enabled them to be better judges of the auditory abilities of their children.

Among the auditory tests, the unaided speech discrimination scores had a positive correlation with the maximum number of academic sub-tests i.e. four academic sub- tests. The aided rated warble tone threshold had a significant correlation at the 0.05 level with only one academic sub-test.

The relatively low importance given to the auditory abilities of the children, compared to some of the other variables evaluated, is again highlighted in Table-23. The principal component analysis indicated that the loading given to the auditory abilities which formed a part of principal component 1, 2, 3 and 4 was relatively low when compared to the other aspects that were included in principal component- 1. The fact that the various sub-tests of the auditory abilities were present in more than one principal component, indicates that it is related to several variables that were evaluated in the present study.

Of the thirteen subsections used to evaluate the auditory abilities of the children, only seven were found to be of importance as per the principal component analysis. These were, in the order of greatest loading to least loading, aided speech detection thresholds, unaided warble tone thresholds, pure tone average, average warble tone threshold shift, aided speech discrimination scores, aided warble tone threshold and speech detection threshold shift.

The improvement in auditory thresholds for warble tones and speech, with the use of a hearing aid, was found to have a loading high enough to be included in both principal components 3 and 4. Thus, it can be seen that the auditory threshold shift interacted with the variables included in this study in more ways than one.

From the findings of this study it can be concluded that though the auditory abilities did contribute towards the academic achievement of the hearing-impaired children, it was not a major contributing factor.

Several investigators have reported on the feasibility possibility of integrating hearing-impaired children based on the auditory abilities only in terms of the degree of hearing loss. The other auditory aspects that have been considered in this study have not been given much consideration.

The results of this study find partial support from the studies conducted by Pflaster (1980). She considered the auditory behavior of the children to be a relevant factor that should be given due importance while integrating a child. However, the weightage given by her to the auditory behavior was considerably higher than what was found in this study. In addition, she did not give any importance to the degree of hearing loss, but considered only the functional use of residual auditory ability as a relevant factor.

A possible reason as to why Pflaster (1980) did not consider the sensitivity of hearing to be of any importance was because sensitivity of her subjects ranged from 30 dB HL to 110 dB HL in the better ear. In the present study the range of hearing of the subjects in the better ear was from 43 dB HL (3 frequency average) to 120 dB HL (two frequency average). For six of the subjects in this study the better ear average had to be calculated from one or two frequencies instead of the conventional three frequency average, as they gave no response even at the maximum audiometric limits. Only one child had moderate hearing loss in the better ear while eight had moderately-severe, six had severe and the remaining twenty-five had profound hearing loss in the better ear (classification based on Goodman, 1965). Thus it can be concluded that the children in this study had considerably lower residual hearing when compared to the children in Piaster's (1980) study. This could be a reason as to why the level of hearing was given due importance in this study but not in Pflaster's (1980) study.

Rudy and Nace (1973), in their study regarding the "Transitional Instrument", gave equal scores to intelligence, achievement, social adjustment and hearing loss. The loading assigned to the different variables in this study, indicated that hearing level cannot be given the same weightage as the other variables. Hearing level received much lower weightage when compared to the other variables. The scores assigned by Rudy and Nace (1973) were arbitrary values.

The "Integration Rating Guide" developed by Bunch (1987) only partially concurs with the findings of this study with regard to the auditory abilities of the children. His test does not give any importance to the degree of hearing loss, but gives due importance to the "speech reception via the auditory mode" as in the present study. Bunch (1987) reported that the weightage given to the variables to select a candidate for integration, was based on the frequency in which they were mentioned in literature. In the table given by Bunch (1987) denoting the frequency Of occurrence of various variables, "hearing acuity" has been listed. However, it has not been given any significance in the "Integration Rating Guide" the reason for the omission not being stated.

**Linguistic abilities:**

The linguistic abilities of the children were found to be of major importance with regard to the contribution towards academic achievement. This is evident from Table-4 and Table-5. From Table-4, it can be seen that both comprehension and expression of the hearing-impaired children had a significant coefficient of correlation with most of the academic sub-tests. Of the six aspects used to study the linguistic competence of the children, five of them were found to have a significant correlation with most of the academic sub-tests. These included comprehension as tested by Test of Auditory Comprehension of Language, expression in terms of the mean length of utterance, number of sentences used, and the reports of the parents and teachers regarding the ability of the children to express themselves. The number of correct sentences used by the children was the only linguistic variable that did not have a significant correlation with any of the academic sub-tests.

The comprehension ability of the children was found to have the highest correlation with the total academic achievement, followed by writing ability, overall academic performance, and the ability to carry out discussion. Spelling ability was the only academic sub-test that did not correlate significantly with the comprehension ability of the children.

The mean length of utterance correlated best with the performance in science and the total performance, followed by the overall academic performance, writing ability, ability to carry out discussions and performance in mathematics. Performance in the second language was the only academic sub- test that did not correlate with the mean length of utterance .

The number of sentences used by the children showed maximum correlation with their writing ability followed by the total academic performance, spelling ability, performance in the first language and mathematics. Performance in the second language was the only academic subject that did not correlate with the number of sentences which the children used to express themselves.

Teachers' judgment of the expressive ability of the children had a higher correlation with all the academic sub- tests when compared with the parents' judgment of the same ability (Table-4). This variance probably occurred because the teachers were better judges of the linguistic abilities of the children. This is also highlighted in Table-8 where it can be noted that the teachers' report on the expressive abilities of the children had the highest coefficient of correlation with comprehension abilities of the children which was evaluated by the Test of Auditory Comprehension of Language.

The number of correct sentences used by the children did not correlate significantly with any of the academic sub- tests. This could indicate that as long as the children use speech to communicate and made themselves understood it was not necessary that they should use grammatically correct sentences.

Only four of the six parameters used to judge the linguistic ability of the children formed part of the principal component-1. These included the teachers' report of the expressive ability of the children, comprehension (as evaluated by the Test of Auditory Comprehension of Language) and the number of sentences used and the number of correct sentences used by the children (Table 23). Thus, these three tests seem to be adequate to evaluate the linguistic abilities of a hearing-impaired child when considering him/her for integration.

These components of the linguistic abilities, except for the number of correct sentences used, had a fairly high loading indicating that they were important variables. Hence, they should be taken into consideration when selecting a hearing-impaired child for integration or judging the academic success of a mainstreamed hearing-impaired child.

The number of correct sentences used by the children formed a part of principal component 1 and 4. The loading given to this variable was considerably lower when compared to the other linguistic variables included in principal component-1.

This study reveals that though it is important for the children to have good comprehension and expression, it was not as important that they use grammatically correct sentences for them to succeed academically.

The findings of this study concur with that of Bunch (1987) who also considered the language level of the hard-of- hearing children to be the most important aspect while mainstreaming them. He gave language arts' the highest weightage in his test for selecting candidates for mainstreaming. Pflaster (1980) and McCartney (1984) also echoed the importance of the children's language level.

Brackett & Henninges (1976) noted that children with better language skills interacted more with their normal hearing peers than those with poor language skills. Thus it can be concluded from these findings that children with better language skills would also be better candidates for integration. The findings of the present study are in agreement with those of Brackett & Henninges (1976).

It can be construed that the linguistic abilities of the children is an important variable irrespective of the language spoken, i.e. English or Kannada.

**Mode of communication:**

The academic sub-tests were found to correlate positively with the mode of communication employed by:

a) the parents with the hearing-impaired children,
b) the peers with the hearing-impaired children,
c) the hearing-impaired children with their parents, and
d) the hearing-impaired children with their teachers (Table- 4).

However, the mode of communication used by the teachers with the hearing-impaired children was not found to correlate significantly with any of the academic sub-tests.

In general, children who used speech to a greater extent to communicate with their class teachers or peers tended to do well academically compared to those who used primarily gestures.

However, 25% of the children reported to use mainly speech to communicate with the teacher or peers performed below average academically. This means that it is not only the ability to use oral communication that improves academic performance, other factors also play a role.

The mode of communication used by the children to communicate with the class teachers or peers had a higher correlation coefficient with most of the academic sub-tests. In contrast, the mode used by the children to communicate with the parents had a relatively low correlation with the academic sub-tests. Only 50% of the children who were reported to use mainly speech to communicate with the parents, did well academically. However, only two children who performed well in the academic subjects did not employ speech as a tool for communication with their parents. Thus, it is evident that only children who use speech to communicate, usually perform well academically.

The mode used by the parents and the peers to communicate with the mainstreamed hearing-impaired children had a significant correlation with most of the academic sub-tests. The mode used by the peers tended to correlate higher with the academic sub-tests as compared to the mode used by the parents. This can be explained by the fact that only three of the parents reported that they used speech to a lesser extent compared to gestures to communicate with their children. The remaining parents reported that they mainly used speech to communicate with their hearing-impaired child.

Once again, not every child with whom the peers communicated mainly through speech, performed well academically. Thirty-five percent of the children with whom the peers mainly communicated through speech, performed poorly academically.

The principal component analysis revealed that the mode of communication used by the child with the teacher/peer and with the parents formed a part of principal component-1. The mode of communication adopted by the child with the teachers or peers had a higher loading than that used by them with the parents. This demonstrates that the oral mode of communication in the academic environment as well as at home is of significance.

The results of the present study are in consonance with the findings of Northcott (1973) and Pflaster (1980). They also concluded that the extent to which a hearing-impaired child can benefit from placement in a regular class depends primarily upon the child's ability to understand and employ spoken language. Pflaster (1980) reported that oral communication skills' which included information on speech and speechreading ability was the most outstanding factor relating to the academic performance of integrated hearing- impaired children.

The results of this study regarding the mode of communication that should be used by and with the hard-of- hearing children is in consonance with the recommendations of Behrens (1972) and Hoemann and Briga (1981). They too believed that the use of speech is not an absolutely essential criteria to decide whether a child can be integrated or not and that the mode of communication has been given far too much importance.

One of the main purposes of integrating a hard-of- hearing child, is to ensure, among other things, that he learns to communicate the way normal hearing individuals do. Moreover, in a country like India, where there is no common, standard method of sign language used throughout the country, the introduction of manual communication in integrated classes would create considerable confusion.

It can be summarized from the findings of this study that the mode of communication used by the child with his teachers/peers and his parents was an aspect that contributed to academic success or failure. The greater the extent to which the child used speech in communicating, the greater was the probability of his academic success in an integrated school. Likewise, the greater the extent of use of gestures, the lesser was the chance of the child succeeding academically in the integrated class. However, not every child who used gestures to a greater extent performed poorly academically and vice versa. The children who used the manual form of communication and succeeded in school, may have had other factors that contributed to their success. It is possible that these children had to resort to using the manual mode of communication due to the poor acoustic conditions in the classroom. The present study has shown that using the manual form of communication should not deter the hearing-impaired from being integrated provided the other factors that contribute to successful integration are present.

### Speech intelligibility:

The parents and the teachers rated the speech of the hearing-impaired children to be more intelligible than did the experts. This was probably because the parents and the teachers were more familiar with their speech than the specialists, who were not associated with the children on a day-to-day basis.

The speech intelligibility scores correlated significantly with a majority of the academic sub-tests. In addition, the speech intelligibility assessed by the experts and the teachers also formed a part of principal component-1. These findings indicate that good speech intelligibility is associated with good academic performance.

Hoversten and Fomby (1981) have also reported that itinerant teachers considered it important that the hearing-impaired children should have sufficient speech intelligibility to be understood by regular classroom teachers.

**Speechreading abilities:**

All the four speechreading conditions included in the present study (SR+A+C, SR+A, SR, and SR+C) were found to correlate at a significant level with most of the academic sub-tests. This was true for both the sentence and word subsection of the speechreading tests (Table-4). Though there was a significant correlation between the four conditions (Table-16), there was also a significant difference between the means (Table 14 & 15) for the same. This indicates that with additional clues such as auditory clues or contextual clues, the mean scores of the speechreading ability of the children did vary. For both the sentence and word sub-tests, the mean speechreading scores were highest when auditory and contextual clues were given as in condition-I, (Table-13) followed by condition-IV where contextual clues were mean scores were the least when no additional clues were given (condition-III).

The principal component analysis highlights the fact that the overall speechreading ability, which is an aggregate of the scores conditions I, II, III & IV for both the sentence and word sub-tests obtained the highest loading. Thus the overall speechreading ability is a good indicator of the possible success of a hearing-impaired child in an integrated set-up. In addition, the following speechreading sub-tests were also included in principal component-I: speechreading of sentences with auditory and contextual clues (condition-I); speechreading of words with auditory clues (condition-II); speechreading of sentences with auditory clues (condition-III); and speechreading of sentences with contextual clues (condition-IV). From these results it can be construed that speechreading of sentences was a better indicator of the potential academic success of a child than speechreading for words, except when auditory clues were used along with speechreading. Speechreading for words and sentences, without the presence of auditory or contextual clues was not included in any of the principal components. Thus, to evaluate a hearing-impaired child before integrating him, his speechreading ability with additional clues such as contextual or auditory clues, should be used.

The speechreading ability of the children as rated by the class teachers had a low correlation with most of the academic sub-tests. This may have occurred because the teachers had not received any formal training in evaluating speechreading abilities.

Based on the present study, it can be concluded that speechreading ability is one of the main factors that contributed to the success of hearing-impaired children in regular schools. This aspect should be assessed before integrating the hearing-impaired children in regular schools.

To facilitate speechreading, as it is a major factor contributing to successful integration, it is imperative that the classrooms should have good illumination. The children should also have their vision evaluated periodically. The class teachers should also maximize the use of contextual clues with speechreading to help the children understand speech to a greater extent.

This result is in consonance with the findings of Pflaster (1976, 1980, 1981). As in the present study, Pflaster (1980) found that the speechreading ability of her subjects (which was part of a factor termed "oral communication") was one of the major variables that was related to the academic performance of the children. Pflaster in 1981 once again identified "speechreading skills" and the use of "supra segmentals" as two major communicative factors that are required for the hearing-impaired children to function in the mainstream.

The results of this study is also in agreement with the opinion of several other experts who have noted that good speechreading ability is one of the prerequisites for mainstreaming hearing-impaired children (Northcott, 1972; Lowe, 1972; Perier, 1972; Healey, 1976; Bitter & Mears, 1973; Frick, 1973 and Ling, Ling and Pflaster, 1977).

**Intelligence:**

The intelligence of the children, assessed using non- verbal tests correlated significantly with seven of the ten academic sub-tests. Of these seven, three correlated only at the 0.05 level, with the remaining correlating at the 0.01 level.

A possible reason as to why the children's IQ received a relatively low loading was due to the homogeneity of the children in terms of their intelligence level, in this study. A majority of the children in this study had average intelligence. Only twelve of the children had below average intelligence, with ten of them being classified as mildly retarded and two as having borderline retardation. Eleven of these twelve children obtained below average scores in the total academic performance and only one of the mildly retarded children performed above average. However, thirteen children who were labelled as having average intelligence obtained below average scores in the total academic performance score, which was a part of the academic sub-tests.

The findings are in partial agreement with those noted by Yater (1977). He noted that the higher the intelligence of a hearing-impaired child, the greater is the probability of his success in a regular class. Several other authors have also reported that it is essential to evaluate the intelligence of a hearing-impaired child who is to be integrated. (Rudy & Nace, 1973; Downs, 1974; Nix, 1979; Hoversten & Fomby, 1981; Bunch, 1987). In the present study it has been noted that the lower the intelligence of the child the lower was his academic performance. However, the converse was not true. One cannot presume that a child with average or better intelligence would perform well academically.

From the scores of the tests developed by Rudy & Nace (1973) and Bunch (1987) it is evident that children may obtain high scores on the intelligence sub-test and yet may not be suitable candidates for integration. This can occur when a child gets high scores in the intelligence sub-tests but gets low scores on the other variables, considered in the tests. The finding of the present study indicates such a possibility. It has been noted in the present study that it cannot be presumed that a child with average intelligence would perform well academically. As in the above studies, these children probably performed poorly on some of the other variables that have been evaluated.

As in this study, Bunch (1987) allocated the intellectual potential of a child who is to be integrated, a relatively low weighting i.e. 20 out of a total of 215. However, in contrast with the results of this study, Rudy & Nace (1973) gave the child's intelligence as much importance as the three other variables that they considered. The weightage that they gave to the sub-tests was not based on any systematic study, as in the present study.

From the findings of the present study it can be construed that if a hearing-impaired child has normal intelligence it is not always certain that he/she would perform at an average or above average level academically. However, if the hearing-impaired child had a lower than average IQ, he or she was more likely to perform poorly academically.

**Cognition:**

The cognitive abilities of the children had a relatively low correlation with all the academic sub-tests , and also had a relatively low loading in the principal component analysis, when compared to the other variables considered in this study. This might have been due to the fact that the test used in the present study evaluated only the cognitive ability for sequencing events. A test evaluating other areas of cognition might have yielded different results.

Few studies have investigated the effect of cognitive abilities on the outcome success of integration, successful or otherwise.

**Therapy:**

Contrary to what has been reported in the review of literature, attendance in therapy after being enrolled in school had a rather low correlation with most of the academic sub-tests. The correlation coefficient was significant only at the 0.05 level.

A review of literature indicated that several authors advocated the need for supportive help from a specialist even after the hearing-impaired child has been integrated. (Fallis, 1975; Yater, 1977; Hoemann and Briga, 1981; Vernon & Prickett, 1976; Bitter & Mears, 1973). However, no systematic study seems to have been done to evaluate the actual efficiency or the content of such support programs.

The number of years the children attended therapy also did not have a significant correlation with the academic sub- tests. It was expected that those children who attended therapy for a longer duration would perform better academically than those who attended therapy for a shorter duration. The nature of therapy received by these children could have been a variable that might have resulted in these unexpected findings. It was beyond the purview of this study to evaluate the content of therapy received by these children. It is also possible that some of the children could have developed adequate speech and language at a faster pace, and therefore would have attended therapy for a lesser number of years. Though these children may not have attended formal therapy, they may have got additional help from the family members. Many of the parents are taught home training activities by the speech and hearing professionals. In addition, the parents may have also been in touch with the professional even after the children stopped attending therapy. Hence it can be concluded only with reservation that therapy is not important for integration.

Though the attendance in therapy, after being enrolled in school and the number of years for which the children attended therapy had a low correlation coefficient with the academic sub-tests, they formed a part of the second and third principal components. These variables had a negative loading of -0.60 and -0.69 respectively. Attendance in therapy after being enrolled in school loaded in both principal component-2 and principal component-3. Its loading in principal component-3 was comparatively lower than in principal component-2. These variables probably formed a part of the principal components despite having a low correlation with the academic sub-tests, on account of their interaction with the other variables included in this study. Thus it can be stated that the number of years a child attends therapy and whether he continues to attend therapy even after being enrolled in school indirectly affects the academic performance of a child. It may have correlated with other variables that are directly correlated with academic achievement.

Other experts have also expressed similar findings. McConnell and Horton (1970) considered the duration and type of training received by the hearing-impaired to affect or facilitate their communication and learning abilities.

**Psvchosocial aspects of the children:**

The psychosocial aspects included information concerning the hearing-impaired children's willingness to socialize with normal hearing children, acceptance of their hearing aid, the age of their peers when compared to them and whether the presence of their deviant speech disturbed them. The results indicated that a majority of the children got high scores in both the parents' and teachers' reports indicating that most of the children had a positive psychosocial behavior.

The psychosocial aspects of the child as rated by the class teacher had a rather low coefficient of correlation with only three of the academic sub-tests, which was significant at the 0.05 level. The ratings given by the parents regarding the same aspect however, did not have a significant coefficient of correlation with any of the academic sub-tests. The ratings of both the teachers and the parents, regarding the psychosocial aspects of the children had relatively low loading and **hence Were not included in any of the principal components.**

The homogeneity of the group with regard to the psychosocial behavior, could possibly account for the lack of correlation between their psychosocial behavior and their academic performance. Thus it can be construed that as long as the children are rated as having a positive psychosocial behavior it does not have much of an impact on their academic performance. It possible that a negative psychosocial behavior in the children might affect their academic performance.

The finding of this study is not in agreement with that of Rudy & Nace (1973). They considered the social adjustment the children to be an important factor that should be assessed when considering a child for integration. However, the aspects they used to assess the social adjustment of the children, differed from what was used in the present study. This could be a reason why the two studies are not in agreement.

Several other experts have studied the social behavior of hearing-impaired children in integrated class (Montague, 1956; Kennedy et al., 1976; McCauley et al., 1976; Conway, 1979; Antia, 1982; Soderhan and Whiren, 1985; Raimondo & Maxwell, 1987). However, they have not relate this aspect to the academic success of the integrated hearing-impaired children in the school.

**Parent-teacher interaction, parent-teacher meeting: parent-specialist interaction:**

Contrary to the expectations, informal the parent- teacher interaction and the formal parent-teacher meeting did not have a significant correlation with any of the academic sub-tests. The high mean scores (Table-18) reveal that the interaction/meeting of the parents and teachers was frequent. This highlights the fact that frequent meetings and discussions with the class teachers did not have a positive effect on the academic achievement of the children. This is contrary to the expected finding. It was expected that the children of those parents who met and had discussions with the teachers more frequently, would perform better academically than those who did not meet the teachers frequently. It is possible that the content of the meeting and nature of the interaction would be more significant than the frequency of the meeting itself. The administrators can decide the frequency of parent-teacher meeting and also outline the content of the meetings. This should be planned both at a formal and at an informal level.

A review of literature brings to light that for successful mainstreaming, coordinated efforts between the school teachers and the parents of hearing-impaired children in integrated classes is required (Ezold & Boss, 1978; Yater, 1977; Bunch, 1987; Pollack & Ernst, 1973). The findings of the present study are contrary to what has been suggested by these experts. In the present study, the quality of the discussion was not evaluated. The unexpected finding might be due to the variations in the quality of the discussions between the parents and the teachers. Moreover, the cultural milieu in which these studies have been made, may also contribute to the variations in the findings.

Interaction between the parents and the specialists who were speech and hearing professionals, yielded a higher coefficient of correlation with the academic sub-tests when compared to the interaction between the parents and the school teachers. Though the correlation coefficient was significant only at the 0.05 level with four of the ten academic sub-tests, it indicates that the meetings and discussions with the speech and hearing professionals did have an impact on the academic performance of the children.

In the principal component analysis the parent- specialist interaction formed a part of principal component- 2. The loading given to this aspect was relatively low (0.43) indicating that it was not as important as the other factors that have been considered. From the above, it can be noted that the parent-specialist interaction was found to have an influence on the academic performance of the children while the parent-teacher interaction did not. From the experience of the investigator it is seen that the parents have more access to discuss their children with the speech and hearing professionals compared to the teachers. This is because the speech and hearing clinics are more informal than regular schools. Further, the school teachers in India may not have the time to have in-depth discussions with the parents since the strength of the class is rather high.

This outcome is in agreement with the suggestions put forth by Ling, Ling & Pflaster (1977) and Manning (1987) who advocate giving supportive help to the parents by the professionals. In neither of these reports do they state the relative importance of parent-specialist interaction when compared to the other variables that are considered while integrating a child.

**Parental and teacher attitudes:**

The fact that the mean scores of the parental attitude was higher than that of the mean scores of the teacher's attitude, indicates that the parents had a more positive attitude towards the hearing-impaired children than the teachers. This difference in attitude was found to be statistically significant. The variability seen in the parental attitude was not as much as that seen in the teachers' attitude. This suggests that a majority of the parents had a positive attitude whereas the teachers differed to a greater extent, among themselves, in terms of their attitude.

In the principal component analysis, the parental attitude was found to be included in two of the principal components, i.e. principal component-3 and principal component-7. This highlights that the parental attitude can be viewed from more than one dimension and is related to more than one set of variables. The teachers' attitude on the other hand, formed a part of principal component 1. In comparison with the other variables, the attitude of the parents and the teachers received a lower loading indicating that the other variables included in the present study should be given more importance when compared to these two variables.

The findings of this section of the study is in partial consonance with the findings of Pflaster (1980). In her factorial analysis of the variables that contributed to successful integration, the attitude of the parents and the teachers were found to be minor variables that were

Martin et al. (1988) also reported that the teachers generally had a positive attitude towards mainstreaming. However they preferred to teach hearing-impaired children only if they had access to considerable support personnel and if in-service training was also made available. In the present study also, most of the teachers requested for more support from the parents and professionals. Other authors have also reported similar findings (McCartney, 1984; Hoversten & Fomby, 1981; Perier, 1972; Nix, 1979; Yater, 1977).

**Hearing aid check:**

The low correlation between the hearing aid check that was carried out by the class teachers and the academic sub- tests can be attributed to the fact that most of the teachers did not know how to check the functioning of the hearing- aids. A majority of them reported that they had not received any formal training regarding the care of the hearing aid or training in handling the hearing-impaired child in an integrated set-up. The hearing aid check was probably carried out by the parents/family members since all the children studied in day schools.

Martin et al. (1988) also reported that the teachers in their study did not consider it their responsibility to check the functioning of their students' hearing aids. They attributed this to the lack of information on the subject of amplification devices. The results of this study concur with the above observation.

**Intervention:**

Hearing aid intervention included information regarding the age at which the child first started to use a hearing aid, and also the age at which the child started to wear the hearing aid regularly. This aspect was found to correlate at the 0.01 level with three of the academic sub-tests, and at the 0.05 level with another three academic sub-tests. Hearing aid intervention formed a part of principal component 1 revealing its importance while integrating a hearing- impaired child.

The age of intervention with reference to therapy, did not correlate significantly with any of the academic sub-tests, however it was included in principal component 5. This aspect probably had an indirect influence on the academic achievement of the children.

Though intervention with reference to therapy and hearing aid use was included in principal components 1 and 5, their loading was much lower than the other variables evaluated in this study. Hence, it can be construed that though hearing and intervention and therapy intervention play a role in the academic achievement of a hearing-impaired child, they are not variables of major importance.

Several studies have also reported the importance of early intervention for the hearing-impaired (Lowe, 1972b; Davis and Hardick, 1981; and Rubin, 1981).

**Class strength:**

The negative correlation seen between the strength of the class and two of the academic sub-tests highlights the fact that the higher the number in a class, the poorer was the academic performance of the children. The negative correlation was low, being significant only at the 0.05 level. Thus, it does not always follow that a child who studies in a class that has a higher strength would perform poorly academically. In addition the loading that was assigned to the class strength in the principal component analysis was not high enough for it to be included in any of the principal components.

The findings of this study is in part agreement to the opinion of several authors who suggest that for a hearing- impaired child to succeed in an integrated class, the strength of the class should be low. (Auble, 1972; Brill, 1975; Maxon & Brackett, 1981). A class strength of as low as six to eight pupils has been suggested by Brill (1975).

**Educational level of the parents:**

The educational level of the parents was found to indirectly influence the academic abilities of the hearing- impaired children. In the correlation matrix, no statistically significant correlation was noted between the education of the parents and the academic sub-tests. However, the mothers' and the fathers' level of education were included in principal component-3 and 6 respectively. The presence of the educational level of the parents in two different principal components indicates that these two variables have an influence on a different set of variables. The mothers' level of education loaded along with the following aspects: therapy attendance, parental attitude, cognitive abilities of the children and the number of languages used with the children. The fathers' level of education was found to load along with the amount of training received by the teachers.

In general trend was that children whose parents had at least high-school education, tended to perform better academically than those children whose parents were not so educated. This was especially true when both the parents were educated.

The educational level of the parents is a variable that has not received any importance in the Western countries. This is probably because illiteracy is not a variable to contend with in those countries.

Teacher training:

The training the teachers received regarding hearing impairment, formed a part of principal component-6 though there was no significant correlation between it and the academic sub-tests. It received a relatively low loading, indicating that it was not a major variable contributing to the academic performance of the integrated child. This probably occurred because the majority of the teachers reported that they had not received any special training.

In the literature, also, several experts have expressed the need for teachers to undergo special training to handle hearing-impaired children (Dale, 1967; Northcott, 1970; Kristensen, 1972; Leckie, 1973; Craig and Salem, 1975; and Greco et al., 1983). This is because most of the teaching in schools is done through the auditory mode. When there is any sensory deprivation, the teachers require training to know its impact on the child. They also need to know as to how they can maximize understanding in the class. Information regarding how other senses can be used to compensate for the deprivation and information on amplification devices would help them handle a hearing-impaired, integrated child better. Training would also help them decide as to when the hearing- impaired child should seek professional help.

**Number of languages spoken to the children:**

The number of languages in which the children were spoken to was found to have no significant correlation with the academic sub-tests. Nevertheless, it had a loading high enough to be included in principal component-2. This indicates that though it had no direct effect on the academic scores of the hearing-impaired children, indirectly it had an influence.

The number of languages spoken to a hearing-impaired child and its influence on their academic performance has not been evaluated by most experts interested in the integration of the hearing-impaired.

## EXPERIMENTAL GROUP VS. CONTROL GROUP

A comparison of the hearing-impaired children with the normal hearing children was done for those tests that had no Indian norms. These included the tests for linguistic abilities (expression and comprehension), speechreading ability, and cognition.

## Linguistic abilities:

### Experimental Vs Control Group:

From the results it is evident that from among those children studying in the Kannada medium schools, the normal hearing children performed significantly better than the hearing-impaired children in all tests dealing with the linguistic abilities. These tests included the mean length of utterance (MLU), the number of sentences used, the number of correct sentences used and the comprehension (as evaluated by the test of auditory comprehension of language).

A similar finding was obtained for three of the linguistic tests administered to the normal hearing and the hearing-impaired children studying in English medium classes. The three tests were mean length of utterance, the number of correct sentences used and comprehension (as assessed by the test of auditory comprehension of language, TACL). The number of sentences used by the hearing-impaired and the normal hearing children studying in English medium schools, did not differ significantly. Thus it can be seen that though the hard-of-hearing children studying in English medium schools, may not use grammatically correct sentences, they were on par with the normal hearing children with regard to the number of sentences they used to describe a situation.

**Kannada speaking Vs English speaking children:**

Normal hearing group:

The number of sentences used to describe events, was not significantly different for the normal hearing children, no matter whether they spoke English or Kannada. The events to be described were identical for the Kannada test and English test. The same was true for the comprehension scores where the children, tested in the two different languages did not perform significantly differently. This indicates that the Kannada translation of the test of auditory comprehension of language (TACL) was equivalent to the original English version.

The mean length of utterance and the number of correct sentences used by the two language groups were found to be significantly different. The mean length of utterance was found to be significantly longer in the English speaking children. However, they produced a higher number of grammatical errors. In contrast the normal hearing, Kannada speaking children used shorter yet grammatical correct sentences.

The higher number of grammatical errors seen in the children speaking English, could have been because it is not their native language. Most of the children studying in English medium schools reported that they used English only when they were inside the classrooms and used their mother tongue for most of their day-to-day communication. This could account for the high number of grammatical errors seen in their utterances.

The mean length of utterance of the two languages were not comparable due to the inherent syntactic differences that exist in them.

Hearing-impaired children:

As with the normal hearing children, there was a significant difference between the mean length of utterance produced by the Kannada speaking and the English speaking children. This difference can be attributed to the syntactic differences between the two languages, rather than to the abilities of the two groups of hearing-impaired children. Like the normal hearing group, the English speaking children had a longer mean length of utterance than the Kannada speaking children.

No significant difference was obtained between the comprehension scores, as evaluated by the test of auditory comprehension of language (TACL), between the normal hearing, Kannada and English speaking children. Thus it can be construed that the test of auditory comprehension of language (TACL) was equally capable of testing the comprehension of Kannada and English speaking children. However, among the hearing-impaired group, the Kannada speaking children had a lower score on the test of auditory comprehension of language (TACL) when compared to the English speaking children. Hence, it may be interpreted that the hearing-impaired, Kannada speaking children had a lower level of comprehension when compared to the English speaking, hearing-impaired children.

No significant difference was obtained between the 'number of sentences used' and the number of correct sentences used[1] by the hearing-impaired, Kannada and English speaking children. Thus, it can be seen that no matter whether the children were in Kannada medium or in English medium classes, or whether they were normal hearing or hearing-impaired, there was no significant difference with regard to the number of sentences they used to describe the pictures used in this study.

The nonexistence of a significant difference between the Kannada and English speaking, hearing-impaired children indicates that the number of errors by both groups were similar. This is in contrast to what was seen in the normal- hearing group, where the English speaking children made a greater number of errors.

## Cognition:

### Experimental Vs Control Group:

Among the Kannada medium children, the normal hearing children obtained a significantly higher score for the cognition test. However for the English speaking children such a significant difference was not observed. The mean scores obtained by the English speaking hearing-impaired children was almost equivalent to that obtained by their normal hearing counter parts. There is probably a interaction between the cognitive abilities of the children and their auditory comprehension of language. The hearing- impaired, Kannada speaking children obtained lower comprehension scores on the test of auditory comprehension of language, when compared to the English speaking children.

**Kannada Vs English speakers:**

No significant difference was obtained between the Kannada speaking and the English speaking children, on the cognitive abilities, irrespective of whether they were normal hearing or hearing-impaired. Though there was no significant difference between the two language groups between the hearing-impaired children, the Kannada speaking children obtained a relatively lower score on the cognition test, than English speaking, hearing-impaired children (the difference being 0.46) in contrast the difference in scores between the two language groups among the normal hearing children was considerably less ( the difference being 0.06). Thus it can be seen that the Kannada speaking, hearing-impaired children had the lowest scores on the cognition test.

**Speechreadina:**

**Control Vs Experimental Group:- Kannada Medium Children**

The normal hearing children obtained higher scores than the hearing-impaired children in all the speechreading tests in which auditory clues were given. This was true for both the word and the sentence subsection. This is to be expected since the hearing-impaired children do not utilize auditory clues to the same extent as their normal hearing peers. In contrast, those speechreading conditions where the information was transmitted basically through the visual mode, the Kannada speaking, hearing-impaired children either obtained scores that were significantly higher or scores that were equivalent to those obtained by the normal hearing children. In general, in the word sub-tests, the hearing- impaired children performed better than the normal hearing children. Where as in the sentence subsections there was no significant difference in their performance.

**Control Vs Experimental Group:- English medium children:**

As with the Kannada speaking children, the normal hearing, English speaking children performed significantly better on the speechreading sub-tests in which auditory clues were also given along with the visual clues. However, in the word subsection of Condition-I where auditory and contextual clues were given along with the speechreading clues, there was no significant difference between the normal hearing and the hearing impaired children. Therefore, it can be seen that the hearing-impaired children studying in English medium schools could comprehend isolated words like the normal hearing children, when maximum clues are given. However their performance drops at the sentence level even when maximum clues were given.

In the speechreading conditions where no auditory clues were given, the hearing-impaired children either got a mean score, that was either significantly higher or that was not significantly different from that of the normal hearing children. In general, in the word subsection without auditory clues, the hearing-impaired children performed better, and in the sentence without auditory clues subsection, they performed at a level that was not significantly different from the normal hearing children. Thus it can be observed that the performance of the children studying in English medium schools was very much similar to that of the children studying in Kannada medium schools,

**Kannada Vs English speaking children:- Normal hearing children:**

The Kannada speaking and the English speaking normal hearing children were found not to be significantly different in their performance on all but one of the speechreading sub- tests. The English medium children had a significantly higher score for the speechreading ability of words when no additional clues were given (condition-Ill).

**Kannada Vs English speaking children:- Hearing-Impaired children:**

The English speaking hearing impaired children were found to perform significantly better than the Kannada speaking children for the speechreading sub-tests when auditory clues were also given. This was found either with or without contextual clues. However when no auditory clues were given, the Kannada speaking children in general, tended to perform better. Such a finding was not established for all the sub-tests in which no auditory clues were given. In one of the sub-tests i.e. speechreading ability for sentence in condition IV, where contextual clues were given along with the speechreading clues, the English speaking children performed better. Also, for the sentence sub-test, when no additional clues were given, (condition-Ill), there was no significant difference between the two groups. Thus it can be generalized that, for the sentence sub-tests in all four conditions, the English speaking children either performed better or at a comparable level as the Kannada speaking children. When the scores for the sentence subsection and the word subsections were combined, the Kannada speaking children performed significantly better.

From the results of the present study it may be concluded that the speechreading ability of the hearing-impaired child is the major factor that contributes to academic success in an integrated school. This is followed by linguistic ability, mode of communication used, speech intelligibility, training obtained, auditory abilities, the education of the parents, the attitude of the parents, the number of languages spoken to the child and the cognitive ability of the child. These variables have been listed in the order of the loading they received in the principal component analysis. The first variable had the highest loading and the last one, the least loading.

In the literature, most of these variables have been reported to influence the success of mainstreaming the hearing- impaired. However, the majority of experts do not mention the relative importance of one variable over the other. The present study has attempted to do so. The loading obtained in the principal component analysis indicates the relative importance of one variable over the other. In addition, some of the variables that have not been evaluated in earlier studies have been investigated. These include the number of languages the child is exposed to and the educational level of the parents which are of major significance in India. The implications of the present are investigation are summarized in the following chapter.

# SUMMARY. CONCLUSIONS AND SUGGESTIONS

In the literature it is reported that several factors contribute to successful integration in the classroom of the hearing-impaired. The factors are those that are directly related to the hearing-impaired child, his family, his teachers/therapists or to the environment in which he learns. Several studies have been carried out in the Western countries regarding the factors that contribute to integration. There does not seem to be a systematic study of the factors that are important for integration done in India. The present study was undertaken to identify factors that contribute to integration.

The subjects chosen for the study were forty hearing-impaired children studying in regular schools. Their age ranged from seven years to twenty-one years with an average age of 12.58 years. There were fifteen females and twenty-five males. The children from twenty different schools were enrolled in classes from first standard to eleventh standard. Forty parents of these children were interviewed while forty teachers of the children were required to complete a questionnaire. A matched group of forty normal hearing children were also part of the study.

The hearing-impaired children were evaluated on several tests. These included a) audiological tests which established the following: i) Pure tone thresholds under earphones, ii) Unaided sound-field warble tone thresholds, iii) Unaided sound-field speech detection thresholds

(SDT), iv) Unaided sound-field speech discrimination scores (SDS), v) Aided sound-field warble tone threshold, vi) Aided sound-field speech detection threshold (SDT), vii) Aided sound-field speech discrimination scores (SDS) and viii) Aided sound-field uncomfortable level (UCL). The audiological tests were carried out using a clinical audiometer (Madsen OB 822) equipped with a headset fitted with matched earphones (TDH-39) enclosed in noise excluding aural domes (ME 70) and a bone vibrator (Radioear B-71). A matched loudspeaker was used to present the signals in the sound-field. The tests were carried out in a sound-treated, test-control suite.

b) Language competence, which included expression ability and comprehension were evaluated. Expression was tested using pictures that represented everyday activities. The expressive language of the children was taped using a tape recorder (Sony Cassette-Corder TCS-350). Comprehension ability was evaluated by the "Test for Auditory Comprehension of Language" developed by Carrow (1973).

c) Speechreading ability, speech intelligibility and cognitive abilities were studied using tests that were designed for the purpose.

In addition, the children were also evaluated for,

d) their intelligence and

e) their visual acuity.

To evaluate the academic achievement of the children, in the absence of any standard test, the teachers' rating of the academic performance was used.

The hearing-impaired children wore their own individual hearing aids that were prescribed by audiologists, during most of the tests. They removed their hearing aids during the unaided test procedures or when the testing condition called for precluding any auditory cues from being present.

To compare the performance of the hearing-impaired children with the normal hearing children on tests that were developed/modified during the study, a control group was studied. These tests were, a) Language competence, which included expression ability and comprehension ability, b) Speechreading ability and c) Cognition. All the tests except the audiological tests were carried out in a quiet room free from distraction.

The data obtained from the parents, the teachers, the hearing-impaired children and the normal hearing children were analyzed. Information regarding the hearing-impaired subjects was initially analyzed. This included data collected from the parents, the teachers and the hearing-impaired children. A correlation matrix was obtained between ten dependent variables i.e. academic achievement and sixty-two independent variables. The significance of difference between some of the variables was also calculated. The variables evaluated in the correlation matrix were further subjected to a principal component analysis (Harris, 1975). Subsequently, the significance of the difference between the means was calculated for twenty-one variables for scores obtained on the normal hearing and the hearing-impaired subjects.

## Conclusions:

Based on the results the conclusions were:

1) The speechreading ability of the children was the highest predictor of the academic success of a mainstreamed hearing-impaired child.

2) The linguistic abilities of the hearing-impaired children was found to be a major contributory factor towards academic achievement. This was true for both the comprehension and expressive abilities of the children. It was noted that the children should have the capacity to express and comprehend speech, but need not always use grammatically correct sentences so as to be successfully integrated.

3) In general, those children who used more speech tended to perform better than those who used more gestures in their communication.

4) The intelligibility of the children's speech is another factor that is important for the successful integration of the hearing-impaired children.

5) The auditory abilities of the children, did influence their academic achievement but not to the same extend as their speechreading ability, linguistic ability, mode of communication used and speech intelligibility.

6) The number of years a child attended speech therapy, the regularity with which he attended the same and whether he continues to

attend therapy after being enrolled in school indirectly affected the academic performance of a child favorably. It did not correlate directly with the academic sub-tests, but did so with other variables that had a direct influence on the academic achievement.

7) The positive attitude of the parents and the teachers, though not a major contributory factor, did affect the academic achievement of the hearing-impaired children.

8) The educational level of the parents was also found to indirectly influence the academic achievement of the children. Children of educated parents tended to perform academically better compared to children whose parents were not so educated.

9) In India, children live in a diverse linguistic environment are thus exposed to a number of languages. It was found that the number of languages used to communicate to the hearing-impaired children, indirectly influence their academic achievement. This was however not a major variable. Based on the findings of the present study, it is recommended that a mainstreamed child should not be exposed to several languages at a time.

10) The cognitive abilities of the children with reference to sequence of events, did influence their academic achievement though not to the same extent as some of the other variables.

11) Teachers' training regarding the hearing-impaired was found to be a variable of lesser importance that contributed to the academic performance of the mainstreamed child. This was probably so because the majority of the teachers reported that they had not received any

special training. The influence of training needs to be investigated further.

12) The interaction between the parents and the professionals (speech & hearing) was concomitant with the child's academic achievement. Though the interaction between the parents and the speech and hearing professionals should be taken into account, it is not a major factor to be considered when integrating a child.

13) The informal parent-teacher interaction and the formal parent-teacher meeting did not affect favorably the academic performance of the children. The findings in this study are probably related to the variation in the quality of the discussions between the parents and the teachers. Further investigation regarding the quality and content of the discussion may throw more light.

14) The higher the strength of the class, the poorer was the academic performance of the children. However, this was not always the case.

15) Having normal or superior intelligence in itself, did not lead to a child performing at an average or above average level academically. On the other hand, lower than normal IQ was concomitant with poor academic performance.

16) The psychosocial behavior of the child as rated by the parents and the teachers was not found to contribute to the academic achievement of the children. This could have occurred due to the homogeneity of the group studied. Both the parents and the teachers ratea tne children as naving a positive psycnosociai oenavior. fnus, as

long as the children had normal psychosocial behavior, it did not have an impact on the academic performance of a child.

17) The other variables that were investigated and not found to have a significant influence on the academic achievement were the peer interaction and the visual acuity. The majority of the children in the present study did not have any visual problem that would hamper their studying abilities. There was also no adverse report regarding their interaction with their peers. It can be construed that as long as the children did not have any major visual problems or any adverse peer interaction, it did not influence their academic achievement.

18) The performance of the hearing-impaired children in different academic subjects can be judged by their overall academic performance or total academic performance.

19) The hearing-impaired children tended to perform better in those academic subjects that involved copying or rote learning (i.e. writing ability and spelling ability) compared to those subjects that required greater comprehension and expressions (i.e. second language, social studies, science, discussion, first language and mathematics).

20) The normal hearing children performed better than the hearing-impaired children on most of the tests administered during the study.

In conclusion, as per this study the major factors that need to be considered when integrating hearing- impaired children are their speechreading ability, linguistic ability, mode of communication used by them and the intelligibility of their speech. The other variables that are of lesser importance are the training obtained, auditory abilities of the children, the education of the parents, the attitude of the parents, the number of languages spoken to the children and the cognitive abilities of the children. These variables have been listed in the descending order of the loading they received in the principal component analysis. The first variable had the highest loading and the last one, the least loading.

In the literature, most of these variables have been reported to influence the success of an integration program. However, the majority of experts do not mention the relative importance of one variable over the other. The present study has attempted to do so. In addition, some of the variables that have not been evaluated in earlier studies have been investigated. These include the number of languages the child is exposed to and the educational level of the parents.

The relative importance of the variables that have been investigated in the present study are discussed. No matter whether a variable is a major variable or a minor one, a hearing-impaired child who is to be integrated in an Indian set-up should be assessed for it prior to integration.

**Suggestions for further research:**

Additional research is possible based on the present study. These suggestions are listed below.

1) It would be interesting to find out whether the same factors that contribute to successful integration at the school level, would be applicable at the collage level also.

2) A follow-up of the children evaluated in the present study could be done to see if those children who had done academically well at the school level were also doing so at the collage level.

3) The present study mainly evaluated children who had congenital hearing loss. The effect of varying onsets of hearing loss may be evaluated to note if this would have an influence on the factors that may determine the success of a hearing-impaired child in a regular school.

4) Studies could be carried out to explore whether the contributory factors would change if the children were provided with sophisticated devices and better acoustic/visual conditions in the classrooms.

5) The influence of pacing of integration on academic success of the hearing-impaired children needs to be studied. This aspect could not be evaluated in the present study as such facilities were not available to the children.

6) A study could be done to compare the academic success of hearing-impaired children who are taught by teachers who have undergone special training with those who have been taught by teachers who have not undergone special training. Thus, the impact of the training programs that are being given to teachers can be evaluated.

7) With the content of the therapy administered to the hearing-impaired being controlled, it would be interesting to note the performance of children who are integrated.

8) A study of the factors that contribute to successful integration if the children had additional physical problems, could be done.

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# APPENDIX - A

## QUESTIONNAIRE FOR PARENTS

I am collecting information regarding hard of hearing children who are studying in normal school. Please answer the following questions about your child by ticking ( \ ) the most appropriate answer.

Name:........................... Case No.......................

Age........................... Name of the school.........................................

1. Age at which hearing loss was first noticed:............................

If difference between age at which hearing loss was first noticed and age at which hearing aid was first used is:

a) less than one year Score =2
b) less than two years =1
c) more than two years =0

2. Age at which hearing aid was first used by the child:.................................

If difference between age at which hearing loss was first noticed and age at which hearing aid was first used is:

a) less than one year Score =2
b) less than two years =1
c) more than two years =0

3. Age at which child started wearing the hearing aid throughout the day.

If difference between age at which hearing aid was first used and age at which hearing was used throughout the day was:

a) less than six months =2
b) less than one year =1
c) more than one year =0

4, Does any other member of the family have a hearing loss? Yes/No

IF YES:

| NAME | AGE / SEX | RELATION to CHILD |
|---|---|---|
| | | |
| | | |
| | | |

5. List the number of children that you have:

| NAME | SEX | AGE |
|---|---|---|
| | | |
| | | |
| | | |

**Language spoken to child:** **SCORE**

**1.** Is the medium of instruction and the language spoken at home (mother tongue) the same?

| | | |
|---|---|---|
| | Yes | 1 |
| | No | 0 |

IF NO:

2. Is the child most often spoken to at home:

| | | |
|---|---|---|
| a) in the language taught at school (i.e. medium of instruction), | Yes | 1 |
| | No | 0 |
| b) in your mother tongue? | Yes | 0 |
| | No | 1 |

3. What other languages, besides the mother tongue is the child exposed to:

1)....................................................
2)....................................................
3)....................................................
4)....................................................

| | |
|---|---|
| a) only one language | 2 |
| b) two languages | 1 |
| c) more than two languages | 0 |

## Parents report of child's auditory response with hearing aid on:

1. Do you think the child usually hears your speech when he cannot see you (at a distance of about five feet):

| | | |
|---|---|---|
| a) when you speak at normal loudness, | Yes | 1 |
| | No | 0 |
| b) when you speak louder than usual? | Yes | 1 |
| | No | 0 |
| 2. Does he differentiate a man's voice | Yes | 1 |
| from a woman's voice? | No | 0 |
| 3. Does he differentiate music from speech? | Yes | 1 |
| | No | 0 |
| 4. Do you have to call the child several | Yes | 0 |
| times to get his attention? | No | 1 |

## Speech Intelligibility : Parent's report:

1. Is your child's speech intelligible most of the time to:

| | | |
|---|---|---|
| a) the family members. | Yes | 1 |
| | No | 0 |
| b) class teacher. | Yes | 1 |
| | No | 0 |
| c) others who are unfamiliar | Yes | 1 |
| with the child. | No- | 0 |

## Parent - Child communication:

1. When you communicate with your child, do you use:

| | | |
|---|---|---|
| a) only speech, | Yes | 2 |
| | No | |
| b) only gestures, | Yes | 0 |
| | No | |
| c) a combination of speech and | Yes | 1 |
| gestures. | No | |

If you use a combination:

| | | |
|---|---|---|
| i) do you use more gestures and less speech, | Yes | 0.25 |
| | No | |
| ii) do you use more speech and less gestures. | Yes | 0.50 |
| | No | |

2. When your child communicates with you, does he/she use:

| | | |
|---|---|---|
| a) only speech, | Yes | 2 |
| | No | |
| b) only gestures, | Yes | 0 |
| | No | |
| c) a combination of speech and gestures, | Yes | 1 |
| | No | |

If the child uses a combination:

| | | |
|---|---|---|
| i) does he use more gestures and and less speech, | Yes | 0.25 |
| | No | |
| ii) does he use more speech and less gestures. | Yes | 0.50 |
| | No | |

3. Does your child usually speak in:

| | | |
|---|---|---|
| a) single words. | Yes | 1 |
| | No | |
| b) incomplete sentences (or phrases), | Yes | 2 |
| | No | |
| c) complete sentences. | Yes | 3 |
| | No | |

(NOTE: Only the highest score is considered).

## <u>Parent-Teacher Interaction:</u>

| | | |
|---|---|---|
| 1. Do you meet the class teacher and talk about your child? | Yes | 1 |
| | No | 0 |

2. Do you meet the teacher:

| | | |
|---|---|---|
| a) once in a school term, | Yes | 0.5 |
| | No | 0 |

| | | |
|---|---|---|
| b) once in a month or more often. | Yes | 1 |
| | No | |
| c) once in a week or more often, | Yes | 2 |
| | No | |
| d) once in a day. | Yes | 3 |
| | No | |

(NOTE: Only the highest score is considered)

| | | |
|---|---|---|
| 3. Does the teacher tell you what to teach the child at home? | Yes | 1 |
| | No | 0 |
| 4. Is the child taught regularly at home? | Yes | 1 |
| | No | 0 |

IF YES:

5. Are the class lessons taught:

| | | |
|---|---|---|
| a) before they are taught at school. | Yes | 1 |
| | No | 0 |
| b) after they are taught at school. | Yes | 1 |
| | No | 0 |

## <u>Therapy:</u>

1. Age at which speech and language therapy was first started:.................

| | |
|---|---|
| within six months of hearing loss being noticed | 2 |
| within one year | 1 |
| within two years | 0.5 |
| after two years | 0 |

(NOTE: Only the highest score is considered

2. Duration for which therapy was given:

a).......................weeks,

b).......................months,

c).......................years.

3. Number of sessions that the child attended:

a)…………..session per week,

b)…………..session per month.

4. Duration of each session:

a)…………..minutes,

b)…………..hours.

| | | |
|---|---|---|
| 5. Does the child attend therapy after being enrolled in the regular school ? | Yes<br>No | 1<br>0 |

IF YES:

6. Does the child attend therapy:

| | | |
|---|---|---|
| a) during school days, | Yes<br>No | 1<br>0 |
| b) during holidays? | Yes<br>No | 1<br>0 |

## Parent-Specialist Interaction;

| | | |
|---|---|---|
| 1. Do you consult the speech and hearing specialist to discuss your child? | Yes<br>No | 1<br>0 |

2. How often do you consult the speech and hearing specialist:

| | | |
|---|---|---|
| a) once a week or more often, | Yes<br>No | 3 |
| b) once a month or more often, | Yes<br>No | 2 |
| c) only during the school holidays? | Yes<br>No | 1 |

(NOTE: Only the highest score is considered).

| | | |
|---|---|---|
| 3. Do you attend the therapy sessions? | Yes<br>No | 1<br>0 |
| 4. Do you help during the therapy sessions? | Yes<br>No | 1<br>0 |

| | | |
|---|---|---|
| 5. Do you carry out the therapy activities at home? | Yes | 1 |
| | No | 0 |

## Psychological Aspects of the Child:

1. Does your child usually play with:

| | | |
|---|---|---|
| a) normal hearing children, | Yes | 1 |
| | No | 0 |
| b) other hard of hearing children? | Yes | 1 |
| | No | 0 |
| 2. Does your child usually, willingly wear the hearing aid? | Yes | 1 |
| | No | 0 |
| 3. Does the child get upset when others do not follow his speech? | Yes | I |
| | No | 0 |

IF YES:

4. Does he most often:

| | | |
|---|---|---|
| a) repeat what he says in an attempt to make them understand what he said, | Yes | 2 |
| | No | |
| b) use gestures to clarify what he said, | Yes | 1 |
| | No | |
| c) drop the conversation, | Yes | 0 |
| | No | 1 |
| d) ask some one who can understand his speech to interpret what he said? | Yes | 1.5 |
| | No | |

(NOTE: Only the highest score is considered)

## Parental attitude:

| | | |
|---|---|---|
| 1. Do you feel dejected or unhappy that your child has a hearing loss ? | Yes | 0 |
| | No | 1 |
| 2. Do you feel ashamed that your child has a hearing loss ? | Yes | 0 |
| | No | 1 |

| | | |
|---|---|---|
| 3. Do you remove the hearing aid from your child when you take him out? | Yes<br>No | 0<br>1 |
| 4. Do you dislike a hearing aid being worn by your child? | Yes<br>No | 0<br>1 |
| 5. Do you feel that you have to spend too much time on your hard of hearing child? | Yes<br>No | 0<br>1 |
| IF YES: | | |
| Do you feel so because: | | |
| a) you have to forgo other activities such as watching TV, going out visiting, going out to the cinema, etc., | Yes<br>No | 0<br>0.5 |
| b) you cannot spend enough time on your other children, | Yes<br>No | 0.5<br>0 |
| c) others (please specify)? | | |
| 6. Do you have to spend too much money on your child due to his hearing loss? | Yes<br>No | 0<br>1 |
| IF YES: | | |
| Does it affect the financial position of your family? | Yes<br>No | 0<br>0.5 |
| 7. Do you think that your child would perform better than what he is doing now if he were in a school for the deaf? | Yes<br>No | 0<br>1 |
| 8. Did you admit your child into the school for the normal hearing children because: | | |
| a) you wanted to do so, | Yes<br>No | 1 |
| b) the specialist suggested it. | Yes<br>No | 1 |

| | | |
|---|---|---|
| c) you wanted to do so and the specialist also suggested it? | Yes<br>No | 2 |
| 9. Are you happy that your child studies in a school for normal hearing children ? | Yes<br>No | 1<br>0 |

Please give reasons:

a)..................................

b)...................................

c)...................................

d)..................................,.

# ಪ್ರಶ್ನಾವಳಿ - ತಂದೆತಾಯಿಯರಿಗೆ

ನಾನು ಸಾಮಾನ್ಯ ಶಾಲೆಯಲ್ಲಿ ಓದುತ್ತಿರುವ ಶ್ರವಣದೋಷವುಳ್ಳ ಮಕ್ಕಳ ಬಗ್ಗೆ ವಿವರಗಳನ್ನು ಸಂಗ್ರಹಿಸುತ್ತಿದ್ದೇನೆ. ದಯವಿಟ್ಟು ನಿಮ್ಮ ಮಗುವಿನ ಬಗ್ಗೆ ಈ ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳನ್ನು ಉತ್ತರಿಸಿ. ಸರಿಯಾದ ಉತ್ತರವನ್ನು ( ✓ ) ಎಂದು ಗುರುತಿಸಿ.

ಹೆಸರು : ............................ ಕೇಸ್ ನಂಬರ್ : ............................

ವಯಸ್ಸು : ............................ ಶಾಲೆಯ ಹೆಸರು : ............................

1. ಕಿವುಡುತನವನ್ನು ಮೊದಲು ಗಮನಿಸಿದಾಗ ನಿಮ್ಮ ಮಗುವಿನ ವಯಸ್ಸು: ................

2. ಶ್ರವಣೋಪಕರಣವನ್ನು ಮೊದಲನೆ ಬಾರಿ ಉಪಯೋಗಿಸಲು ಶುರು ಮಾಡಿದಾಗ, ಮಗುವಿನ ವಯಸ್ಸು : ................

3. ಶ್ರವಣೋಪಕರಣವನ್ನು ದಿನಃಪೂರ್ತಿ ಉಪಯೋಗಿಸಲು ಶುರು ಮಾಡಿದಾಗ ಮಗುವಿನ ವಯಸ್ಸು : ................

4. ನಿಮ್ಮ ಮನೆತನದಲ್ಲಿ ಬೇರೆ ಯಾರಿಗಾದರೂ ಕಿವುಡುತನ ಉಂಟೆ? ................

' ಹೌದು ' ಎಂದಾದಲ್ಲಿ :

| ಹೆಸರು | ವಯಸ್ಸು | ಮಗುವಿನೊಂದಿಗೆ ಸಂಬಂಧ |
|---|---|---|
| | | |

5. ನಿಮಗೆ ಎಷ್ಟು ಜನ ಮಕ್ಕಳು ಎಂದು ತಿಳಿಸಿ.

| ಹೆಸರು | ಲಿಂಗ | ವಯಸ್ಸು |
|---|---|---|
| | | |

**ಮಗುವಿನೊಂದಿಗೆ ಮಾತನಾಡಲು ಬಳಸುವ ಭಾಷೆ**

1. ಶಾಲೆಯಲ್ಲಿ ಓದುವ ಮಾಧ್ಯಮದ ಭಾಷೆಯು ಹಾಗೂ ಮನೆಯಲ್ಲಿ ಮಾತನಾಡುವ (ಮಾತೃ ಭಾಷೆ) ಭಾಷೆಯು ಒಂದೇ ಆಗಿದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

**ಉತ್ತರವು 'ಇಲ್ಲ' ಎಂದಾದರೆ :**

2. ಮನೆಯಲ್ಲಿ ಮಗುವಿನೊಂದಿಗೆ ಸಾಮಾನ್ಯವಾಗಿ ಮಾತನಾಡುವಾಗ
   ಅ) ಶಾಲೆಯಲ್ಲಿ ಓದುವ ಮಾಧ್ಯಮದ ಭಾಷೆಯೇ ? ಹೌದು : ಇಲ್ಲ :
   ಆ) ನಿಮ್ಮ ಮಾತೃಭಾಷೆಯೇ? ಹೌದು : ಇಲ್ಲ :

3. ಮಾತೃಭಾಷೆಯನ್ನು ಬಿಟ್ಟು ಮಗುವು ತನ್ನ ಸುತ್ತಮುತ್ತ ಇತರ ಯಾವ ಯಾವ ಭಾಷೆಗಳನ್ನು ಕೇಳುತ್ತಿರುತ್ತಾನೆ/ಳೆ?
   1)
   2)
   3)
   4)

**ಶ್ರವಣೋಪಕರಣವನ್ನು ಧರಿಸುವಾಗ ಮಗುವಿನ ಶ್ರವಣ ಪ್ರತಿಕ್ರಿಯೆಯನ್ನು ಕುರಿತು ತಂದೆತಾಯಿಯರ ವರದಿ/ವಿಮರ್ಶೆ**

1. ನಿಮ್ಮ ಮಗುವು ನಿಮ್ಮ ಮುಖವನ್ನು ನೋಡದಿದ್ದರೂ ಅವನಿಗೆ (ಸುಮಾರು ಐದು ಅಡಿಗಳ ದೂರದಲ್ಲಿ) ನಿಮ್ಮ ಮಾತು ಕೇಳಿಸುತ್ತದೆಯೇ?
   ಅ) ಸಾಧಾರಣ ಧ್ವನಿಯಲ್ಲಿ ಮಾತನಾಡಿದಾಗ ಕೇಳಿಸುತ್ತದೋ: ಹೌದು : ಇಲ್ಲ :
   ಆ) ಗಟ್ಟಿಯಾದ (ಸಾಧಾರಣಕ್ಕಿಂತಲೂ ಜೋರಾಗಿರುವ) ಧ್ವನಿಯಲ್ಲಿ ಮಾತನಾಡಿದಾಗ ಕೇಳಿಸುತ್ತದೋ? ಹೌದು : ಇಲ್ಲ :
2. ಅವನಿಗೆ/ಅವಳಿಗೆ ಗಂಡಸರ ಹಾಗೂ ಹೆಂಗಸರ ಧ್ವನಿಗಳಲ್ಲಿನ ವ್ಯತ್ಯಾಸ ತಿಳಿಯುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :
3. ಅವನಿಗೆ/ಅವಳಿಗೆ ಸಂಗೀತ ಹಾಗೂ ಮಾತಿನ ನಡುವಿನ ವ್ಯತ್ಯಾಸ ತಿಳಿಯುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :
4. ಮಗುವಿನ ಗಮನವನ್ನು ನಿಮ್ಮೆಡೆ ಸೆಳೆಯಲು ಹಲವಾರು ಬಾರಿ ಕರೆಯಬೇಕಾಗುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

**ಮಾತಿನ ಸ್ಪಷ್ಟತೆ:ತಂದೆತಾಯಿಗಳ (ವಿಮರ್ಶೆ) ವರದಿ :**

1. ನಿಮ್ಮ ಮಗುವಿನ ಮಾತು ಎಲ್ಲಾ ಸಮಯಗಳಲ್ಲೂ ಕೇಳಕಂಡವರಿಗೆ ಸ್ಪಷ್ಟವಾಗಿರುತ್ತದೆಯೇ?

| | | |
|---|---|---|
| ಅ) ಮನೆಯವರಿಗೆ | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ಶಾಲೆಯ ಅಧ್ಯಾಪಕರಿಗೆ | ಹೌದು : | ಇಲ್ಲ : |
| ಇ) ಮಗುವಿನ ಪರಿಚಯವಿಲ್ಲದಿರುವ ಇತರರಿಗೆ | ಹೌದು : | ಇಲ್ಲ : |

**ತಂದೆ-ತಾಯಿ ಹಾಗೂ ಮಗುವಿನ ನಡುವಿನ ಸಂಪರ್ಕ :**

1. ನಿಮ್ಮ ಮಗುವಿನೊಡನೆ ಸಂಪರ್ಕಿಸುವಾಗ ನೀವು

| | | |
|---|---|---|
| ಅ) ಕೇವಲ ಮಾತನ್ನು ಮಾತ್ರ ಉಪಯೋಗಿಸುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ಕೇವಲ ಸನ್ನೆಯನ್ನು ಮಾತ್ರ ಉಪಯೋಗಿಸುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| ಇ) ಮಾತು ಮತ್ತು ಸನ್ನೆ ಎರಡನ್ನೂ ಉಪಯೋಗಿಸುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |

**ನೀವು ಮಾತು ಮತ್ತು ಸನ್ನೆ ಎರಡನ್ನೂ ಉಪಯೋಗಿಸುತ್ತಿದ್ದಲ್ಲಿ:**

| | | |
|---|---|---|
| i) ಮಾತಿಗಿಂತ ಹೆಚ್ಚಾಗಿ ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| ii) ಸನ್ನೆಗಿಂತ ಹೆಚ್ಚಾಗಿ ಮಾತನ್ನು ಉಪಯೋಗಿಸುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |

2. ನಿಮ್ಮ ಮಗು ನಿಮ್ಮೊಂದಿಗೆ ಸಂಪರ್ಕಿಸುವಾಗ ಅವನು/ಅವಳು

| | | |
|---|---|---|
| ಅ) ಕೇವಲ ಮಾತನ್ನು ಮಾತ್ರ ಉಪಯೋಗಿಸುತ್ತಾನೆ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ಕೇವಲ ಸನ್ನೆಗಳನ್ನು ಮಾತ್ರ ಉಪಯೋಗಿಸುತ್ತಾನೆ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |
| ಇ) ಮಾತು ಮತ್ತು ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |

**ಮಗುವು ಮಾತು ಮತ್ತು ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಿದ್ದಲ್ಲಿ**

| | | |
|---|---|---|
| i) ಅವನು/ಅವಳು ಮಾತಿಗಿಂತ ಹೆಚ್ಚಾಗಿ ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾರೆಯೇ: | ಹೌದು : | ಇಲ್ಲ : |
| ii) ಅವನು/ಅವಳು ಸನ್ನೆಗಿಂತ ಹೆಚ್ಚಾಗಿ ಮಾತನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಹೌದು: | ಇಲ್ಲ : |

3. ನಿಮ್ಮ ಮಗುವು ಮಾತನಾಡುವಾಗ

ಅ) ಒಂದೇ ಪದದ ವಾಕ್ಯವನ್ನಾಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಅಪೂರ್ಣವಾದ ವಾಕ್ಯಗಳಲ್ಲಿ ಮಾತನಾಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಇ) ಪೂರ್ಣವಾದ (ಅರ್ಥಪೂರ್ಣವಾದ) ವಾಕ್ಯಗಳಲ್ಲಿ ಮಾತನಾಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

## ತಂದೆತಾಯಿಗಳ - ಶಾಲಾ ಉಪಾಧ್ಯಾಯರ ಸಂಬಂಧ

1. ನೀವು ಶಾಲಾ ಉಪಾಧ್ಯಾಯರನ್ನು ಭೇಟಿ ಮಾಡಿ ಅವರೊಂದಿಗೆ ನಿಮ್ಮ ಮಗುವಿನ ಬಗೆ ಮಾತನಾಡುವಿರಾ/ಚರ್ಚಿಸುವಿರಾ? ಹೌದು : ಇಲ್ಲ :

2. ನೀವು ಎಷ್ಟು ಬಾರಿ ಶಾಲಾಉಪಾಧ್ಯಾಯರನ್ನು ಭೇಟಿ ಮಾಡುವಿರಿ?

ಅ) ಒಂದು ವರ್ಷಕ್ಕೊಮ್ಮೆ ಹೌದು : ಇಲ್ಲ :

ಆ) ಒಂದು ತಿಂಗಳಿಗೊಮ್ಮೆ ಅಥವಾ ಇನ್ನೂ ಹೆಚ್ಚು ಬಾರಿ ಹೌದು : ಇಲ್ಲ :

ಇ) ಒಂದು ವಾರಕ್ಕೊಮ್ಮೆ ಅಥವಾ ಇನ್ನೂ ಹೆಚ್ಚು ಬಾರಿ ಹೌದು : ಇಲ್ಲ :

ಈ) ಒಂದು ದಿನಕ್ಕೊಮ್ಮೆ ಹೌದು : ಇಲ್ಲ :

3) ಮನೆಯಲ್ಲಿ ನೀವು ಮಗುವಿಗೆ ಏನನ್ನು ಕಲಿಸಬೇಕೆಂಬುದನ್ನು ನಿಮಗೆ ಶಾಲೆಯ ಉಪಾಧ್ಯಾಯರು ತಿಳಿಸುತ್ತಾರೆಯೇ? ಹೌದು : ಇಲ್ಲ :

4) ಮಗುವಿಗೆ ತಪ್ಪಿಸದೆ ಪ್ರತಿ ನಿತ್ಯ ಪಾಠ ಹೇಳಿಕೊಡುವಿರಾ? ಹೌದು : ಇಲ್ಲ :

' ಹೌದು ' ಎಂದಾದರೆ

5) ನೀವು ಮನೆಯಲ್ಲಿ ಪಾಠಗಳನ್ನು

ಅ) ಶಾಲೆಯಲ್ಲಿ ಹೇಳಿಕೊಡುವ ಮುನ್ನವೇ ಹೇಳಿಕೊಡುವಿರಾ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಶಾಲೆಯಲ್ಲಿ ಹೇಳಿಕೊಟ್ಟ ನಂತರ ಹೇಳಿಕೊಡುವಿರಾ? ಹೌದು : ಇಲ್ಲ :

## ಭಾಷಾ ತರಬೇತಿ/ಥೆರಪಿ

1. ಮಾತು ಹಾಗೂ ಭಾಷಾ ತರಬೇತಿಯನ್ನು ಮೊದಲು ಪ್ರಾರಂಭಿಸುವಾಗ ಮಗುವಿನ ವಯಸ್ಸು ................

2. ತರಬೇತಿಗೊಳಪಟ್ಟ ಕಾಲಾವಧಿ:

ಅ) ................ ವಾರಗಳು

ಆ) ................ ತಿಂಗಳುಗಳು

ಇ) ................ ವರ್ಷಗಳು

3. ಮಗುವು ಎಷ್ಟು ಭಾಷಾ ತರಬೇತಿಯ ತರಗತಿಗಳಿಗೆ ಹೋಗಿದ್ದಾನೆ/ಳೆ

ಅ) ವಾರಕ್ಕೆ .......... ತರಗತಿಗಳು

ಅಥವಾ

ಆ) ತಿಂಗಳಿಗೆ ......... ತರಗತಿಗಳು

4. ಪ್ರತಿ ತರಗತಿಯ ಕಾಲಾವಧಿ

ಅ) ............ ನಿಮಿಷಗಳು

ಆ) ............ ಗಂಟೆಗಳು

5. ಸರಿಯಾಗಿ ಕಿವಿ ಕೇಳುವ ಮಕ್ಕಳ ಶಾಲೆಯಲ್ಲಿ ಕಲಿಯಲು ಪ್ರಾರಂಭಿಸಿದ ನಂತರ ನಿಮ್ಮ ಮಗು ಭಾಷಾ ತರಬೇತಿಯನ್ನು ಪಡೆಯುತ್ತಿದ್ದಾನೆಯೇ/ಳೆಯೇ? ಹೌದು: ಇಲ್ಲ:

ಹೌದು ಎಂದಾದರೆ

6) ಮಗು ಭಾಷಾ ತರಬೇತಿಗೆ

ಅ) ಶಾಲೆಯಿರುವ ದಿನಗಳಲ್ಲಿ ಹೋಗುತ್ತಾನೆಯೇ?ಳೆಯೇ? ಹೌದು: ಇಲ್ಲ:

ಆ) ರಜೆಯ ದಿನಗಳಲ್ಲಿ ಮಾತ್ರ ಹೋಗುತ್ತಾನೆಯೇ?ಳೆಯೇ? ಹೌದು: ಇಲ್ಲ:

ತಜ್ಞರೊಂದಿಗೆ ತಂದೆತಾಯಿಯರ ಸಂಬಂಧ

1. ನಿಮ್ಮ ಮಗುವಿನ ಅಭಿವೃದ್ಧಿ ಬಗ್ಗೆ ವಿವರ ಪಡೆಯಲು ವಾಕ್ ಮತ್ತು ಶ್ರವಣ ತಜ್ಞರನ್ನು ಕಾಣುವಿರಾ ? ಹೌದು : ಇಲ್ಲ :

2. ವಾಕ್ ಮತ್ತು ಶ್ರವಣ ತಜ್ಞರನ್ನು ನೀವು ಎಷ್ಟು ಬಾರಿ ಕಾಣುವಿರಿ?

ಅ) ವಾರಕ್ಕೊಮ್ಮೆ ಅಥವಾ ಇನ್ನೂ ಹೆಚ್ಚು ಬಾರಿ ಹೌದು : ಇಲ್ಲ :

ಆ) ತಿಂಗಳಿಗೊಮ್ಮೆ ಅಥವಾ ಇನ್ನೂ ಹೆಚ್ಚು ಬಾರಿ ಹೌದು : ಇಲ್ಲ :

ಇ) ಶಾಲಾ ರಜೆಯ ದಿನಗಳಲ್ಲಿ ಮಾತ್ರ ಹೌದು : ಇಲ್ಲ :

3. ಭಾಷಾ ತರಬೇತಿಯ ತರಗತಿಗಳಿಗೆ ನೀವು ಹೋಗುವಿರಾ? ಹೌದು : ಇಲ್ಲ :

4. ತರಬೇತಿಯ ತರಗತಿಗಳಲ್ಲಿ ನೀವು ಸಹಾಯ ಮಾಡುವಿರಾ? ಹೌದು : ಇಲ್ಲ :

5. ತರಬೇತಿಯ ತರಗತಿಗಳಲ್ಲಿತ್ತ ಸಲಹೆಗಳನ್ನು : ಚಟುವಟಿಕೆಗಳನ್ನು ಮನೆಯಲ್ಲಿ ಮಾಡುವಿರಾ ? ಹೌದು : ಇಲ್ಲ :

ಮಗುವಿನ ಸಾಮಾಜಿಕ ಹಾಗೂ ಮಾನಸಿಕ ಚಟುವಟಿಕೆಗಳ ಬಗ್ಗೆ ವಿವರಗಳು :

1. ನಿಮ್ಮ ಮಗುವು

ಅ) ಕಿವಿ ಕೇಳುವ ಇತರ ಮಕ್ಕಳೊಂದಿಗೆ ಆಡುತ್ತಾನೆ:ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಶ್ರವಣದೋಷವಿರುವ ಇತರ ಮಕ್ಕಳೊಂದಿಗೆ ಆಡುತ್ತಾನೆ:ಳೆಯೇ? ಹೌದು: ಇಲ್ಲ :

2. ನಿಮ್ಮ ಮಗುವು ಸಾಮಾನ್ಯವಾಗಿ, ಸ್ವ ಇಚ್ಛೆಯಿಂದ ಶ್ರವಣೋಪಕರಣವನ್ನು ಧರಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

3. ಮಗುವು ತನ್ನ ಮಾತನ್ನು ಇತರರು ಅರ್ಥಮಾಡಿಕೊಳ್ಳ - ದಿದ್ದರೆ ಬೇಸರಗೊಳ್ಳುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

'ಹೌದು' ಎಂದಾದರೆ

4. ಅವನು/ಅವಳು

ಅ) ಬೇರೆಯವರಿಗೆ ಅರ್ಥವಾಗಲೆಂದು ತಾನು ಹೇಳಿದ್ದನ್ನು ಪುನರುಚ್ಛರಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಸನ್ನೆಗಳಿಂದ ಅವನು/ಅವಳು ಹೇಳಿದ್ದನ್ನು ಸ್ಪಷ್ಟಪಡಿಸಲು ಪ್ರಯತ್ನಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಇ) ಮಾತನಾಡದೆ ಸುಮ್ಮನಿದ್ದು ಬಿಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಈ) ಬೇರೆ ಯಾರನ್ನಾದರೂ ತಾನು ಹೇಳಿದ್ದನ್ನು ಸ್ಪಷ್ಟ ಪಡಿಸಲು ಕೇಳುತ್ತಾನೆಯೇ/ಳೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ತಂದೆ ತಾಯಿಯರ ಭಾವನೆಗಳು :

1. ನಿಮ್ಮ ಮಗುವಿಗೆ ಶ್ರವಣದೋಷವಿರುವುದರಿಂದ ನಿಮಗೆ ದುಃಖ ಹಾಗೂ ಜಿಗುಪ್ಸೆ ಆಗುವುದೇ ? ಹೌದು : ಇಲ್ಲ :

2. ನಿಮ್ಮ ಮಗುವಿಗೆ ಶ್ರವಣದೋಷವಿರುವುದು ನಿಮಗೆ ಅವಮಾನಕರವೆಂದು ತೋರುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

3. ನಿಮ್ಮೊಂದಿಗೆ ಮಗುವನ್ನು ಹೊರಗೆಲ್ಲಾದರೂ ಕರೆದೊಯ್ಯುವಾಗ ಶ್ರವಣೋಪಕರಣವನ್ನು ತೆಗೆದಿರಿಸುವಿರಾ ? ಹೌದು : ಇಲ್ಲ :

4. ನಿಮ್ಮ ಮಗು ಶ್ರವಣೋಪಕರಣವನ್ನು ಧರಿಸುವುದು ನಿಮ್ಮ ಇಚ್ಛೆಗೆ ವಿರುದ್ಧವಾದುದೇ? ಹೌದು : ಇಲ್ಲ :

5. ಶ್ರವಣದೋಷವಿರುವ ನಿಮ್ಮ ಮಗುವಿನೊಂದಿಗೆ ನೀವು ಹೆಚ್ಚು ಸಮಯ ಕಳೆಯಬೇಕೆಂದೆನಿಸುವುದೇ? ಹೌದು : ಇಲ್ಲ :

'ಹೌದು' ಎಂದಾದರೆ

ಅ) ನಿಮ್ಮ ಇತರ ಚಟುವಟಿಕೆಗಳನ್ನು ಮುಂದೂಡಬೇಕಾಗಬಹುದು ಹೌದು : ಇಲ್ಲ :
(ಉದಾ: ಟಿ.ವಿ. ನೋಡುವುದು, ಸಿನಿಮಾ ನೋಡುವುದು, ಇತ್ಯಾದಿ)

ಆ) ನಿಮ್ಮ ಇತರ ಮಕ್ಕಳೊಂದಿಗೆ ಸಾಕಷ್ಟು ಕಾಲ ಕಳೆಯಲು ಅಸಾಧ್ಯವೆನಿಸುವುದರಿಂದಲೇ ? ಹೌದು : ಇಲ್ಲ :

ಇ) ಇತರ ಕಾರಣಗಳು (ದಯವಿಟ್ಟು ಸ್ಪಷ್ಟ ಪಡಿಸಿ)

........................

........................

6. ನಿಮ್ಮ ಮಗುವಿಗೆ ಶ್ರವಣದೋಷವಿರುವುದರಿಂದ ಅವನಿಗೆ/ಅವಳಿಗೆ ನೀವು ಹೆಚ್ಚು ಹಣ ವೆಚ್ಚ ಮಾಡಬೇಕಾಗುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

'ಹೌದು' ಎಂದಾದರೆ

ಅದು ನಿಮ್ಮ ಮನೆಯ ಆರ್ಥಿಕ ಸ್ಥಿತಿಗೆ ತೊಂದರೆಯೆನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

7. ನಿಮ್ಮ ಮಗುವು ಕಿವುಡು ಮಕ್ಕಳ ಶಾಲೆಗೆ ಸೇರಿದ್ದರೆ ಈಗಿರುವುದಕ್ಕಿಂತ ಹೆಚ್ಚು ಅಭಿವೃದ್ಧಿ ಹೊಂದುತ್ತಿದ್ದಳು ಎಂದು ನಿಮಗೆ ಅನಿಸುವುದೇ ? ಹೌದು : ಇಲ್ಲ :

8. ನಿಮ್ಮ ಮಗುವನ್ನು ಕಿವಿ ಕೇಳಿಸುವಂತಹ ಮಕ್ಕಳ ಶಾಲೆಗೆ ಸೇರಿಸುವುದರ ಕಾರಣ :

ಅ) ನಿಮ್ಮ ಇಚ್ಛೆಯಿಂದಾಗಿ ಹೌದು : ಇಲ್ಲ :

ಆ) ನಿಮ್ಮ ತಜ್ಞರ ಸಲಹೆಯ ಮೇರೆಗೆ ಹೌದು : ಇಲ್ಲ :

ಇ) ನಿಮ್ಮ ಇಚ್ಛೆ ಮತ್ತು ತಜ್ಞರ ಸಲಹೆ ಒಂದೇ ಆದ ಕಾರಣ ಹೌದು : ಇಲ್ಲ :

9. ನಿಮ್ಮ ಮಗುವು ಕಿವಿ ಕೇಳಿಸುವಂಥಹ ಮಕ್ಕಳೊಡನೆ ಓದುತ್ತಿರುವುದು ನಿಮಗೆ ಸಂತೋಷವೇ ? ಹೌದು : ಇಲ್ಲ :

ದಯವಿಟ್ಟು ಕಾರಣಗಳನ್ನು ತಿಳಿಸಿ.

1)

2)

3)

4)

# APPENDIX - B

## Questionnaire for Class Teachers

I am collecting information regarding the performance of hard of hearing children studying in schools for normal hearing children. Please answer the following questions about the haid of hearing child in your class. Please tick (V ) the most appropriate answer.

Name (Child)............................Age...............

Address.............................

Name (School)...........................Class.............

Medium of instruction................

Total No. of children in the class.....

No. of hard of hearing children in the class....

No. of hard of hearing children in the entire school.....

Academic Achievement of Child;

Performance in :-

| | RATING | SCORE |
|---|---|---|
| 1) First language | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |
| 2) Second language | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |

| | | |
|---|---|---|
| 3) Mathematics | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |
| 4) Science | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |
| 5) Social Studies | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |
| 6) Writing ability | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |
| 7) Spelling ability | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |
| 8) Overall performance in class (in terms of rank) | Above average | 2 |
| | Average | 1 |
| | Below average | 0 |
| 9) Participation of child in class discussions | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

## Auditory behaviour (with hearing aid on)

1) Do you think the child usually hears your speech when he/she cannot see your face (at a distance of about 5 ft):

| | | |
|---|---|---|
| a) when you speak at normal loudness? | Yes | I |
| | No | 0 |
| b) when you raise your voice? | Yes | 1 |
| | No | 0 |

## Hearing aid use:

Does the child:

| | | |
|---|---|---|
| 1) wear the hearing aid at school? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| 2) report when the hearing aid is not working? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| 3) Take care of the hearing aid function such as: | | |
| a) manipulating On-Off switch? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| b) volume control? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| c) putting on mold into the ear? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| d) inserting battery? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

## Speech Intelligibility[7]:

| | | |
|---|---|---|
| 1) Can you understand his/her speech? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| 2} Can you understand his/her speech if he/she uses gestures also? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

## Speech reading:

| | | |
|---|---|---|
| 1} Does he/she look at your face when you speak to him/her? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

| | | |
|---|---|---|
| 2) Do you face the child when you talk in class? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

## Linguistic ability:

| | | |
|---|---|---|
| 1) Does the child use appropriate vocabulary? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| 2) Does the child usually speak in: | | |
| a) single word? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| b) in phrases (incomplete sentences)? | Usually | 4 |
| | Sometimes | 3 |
| | Never | 0 |
| c) complete sentences? | Usually | 6 |
| | Sometimes | 5 |
| | Never | 0 |
| | (Note:Only highest score is considered). | |
| 3) If the child can speak in sentences does he/she use: | | |
| a) 3-4 word sentences? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| b) 5-6 word sentences? | Usually | 4 |
| | Sometimes | 3 |
| | Never | 0 |
| c) complex sentences? | Usually | 6 |
| | Sometimes | 5 |
| | Never | 0 |
| | (Note:On!y highest score is considered). | |
| 4) Does the child understand what he/she reads? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

5) When the hard of hearing child talks with other children, is the conversation started by:

| | | |
|---|---|---|
| a) the hard of hearing child? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| b) other children? | Usually | 1 |
| | Sometimes | 2 |
| | Never | 0 |
| 6) Does the child start a conversation with you and other adults? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

7) Does the child use:

| | | |
|---|---|---|
| a) speech? | Usually | 6 |
| | Sometimes | 5 |
| | Never | 0 |
| b) gestures? | Usually | 1 |
| | Sometimes | 2 |
| | Never | 0 |
| c) a combination of speech and gestures? | Usually | 3 |
| | Sometimes | 4 |
| | Never | 0 |

(Note:Only highest score is considered).

8) If the child uses a combination:

| | | |
|---|---|---|
| a) does he/she use more gestures and less speech? | Usually | 0.25 |
| | Sometimes | 0.5 |
| | Never | 0 |
| b) does he/she use more speech and less gestures? | Usually | 1 |
| | Sometimes | 0.75 |
| | Never | 0 |

**Psycho-social aspects:**

| | | |
|---|---|---|
| 1) Does he/she play with other children? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |

| | | |
|---|---|---|
| 2) Does he/she get upset when you do not understand his/her speech? | Usually | 2 |
| | Sometimes | 1 |
| | Never | 0 |
| 3) Compared to the other children in the class, is he old for the class? | Not old | 2 |
| | 2 yrs old | 1 |
| | More than *2* yrs old | 0 |

4) What is the average age of the children in his class? . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**Peer Interaction:**

| | | |
|---|---|---|
| 1) Do the other children mind having a hard of hearing child in the class? | Like having | 2 |
| | Don't mind | 1 |
| | Don't like | 0 |
| 2) Do the other children help him/her in his/her studies or school work? | Usually | 2 |
| | Sometime | 1 |
| | Never | 0 |
| 3) Do the other children make fun of his/her speech? | Usually | 2 |
| | Sometime | 1 |
| | Never | 0 |
| 4) Do the other children make fun of his/her hearing aid or hearing ability? | Usually | 2 |
| | Sometime | 1 |
| | Never | 0 |
| 5) Do the other children ask him/her to play with them? | Usually | 2 |
| | Sometime | 1 |
| | Never | 0 |

6) Do most of the other children communicate with him/her using:

| | | |
|---|---|---|
| a) speech? | Usually | 6 |
| | Sometime | 5 |
| | Never | 0 |
| b) gestures? | Usually | 1 |
| | Sometime | 2 |
| | Never | 0 |

| | | |
|---|---|---|
| c) a combination of speech and gestures? | Usually | 3 |
| | Sometime | 4 |
| | Never | 0 |

If the other children use a combination :

| | | |
|---|---|---|
| a) do they use more gesture and less speech? | Usually | 0.25 |
| | Sometime | 0.5 |
| | Never | 0 |
| b) do they use more speech and less gestures? | Usually | 1 |
| | Sometime | 0.75 |
| | Never | 0 |
| | (Note:Only highest score is considered). | |

## School/Class Environment:

| | | |
|---|---|---|
| 1) Is it noisy in the classroom: If Yes: What is the source of noise? (Eg. Vehicles, noise created by children, others.) | Yes | 0 |
| | No | 1 |
| 2) Is the classroom well lit? | Yes | 1 |
| | No | 0 |
| If Yes: The source of light is: | | |
| a) through day light? | Yes | |
| | No | |
| b) through artificial light? | Yes | |
| | No | |
| 3) In the classroom, does the child sit: | | |
| a) in the front? | Yes | 2 |
| | No | |
| b) in the middle? | Yes | 1 |
| | No | |
| c) at the back? | Yes | 0 |
| | No | |
| 4) Does the child sit: | | |
| a) in the center of the class? | Yes | 1 |

| | | |
|---|---|---|
| b) to the side of the class? | Yes<br>No | 0 |

## <u>Teacher Training:</u>

| | | |
|---|---|---|
| 1) Did a speech and hearing specialist talk to you about the child before he/she was admitted in the school/class? | Yes<br>No | 1<br>0 |
| 2) Have you met a specialist during last school year? | Yes<br>No | 1<br>0 |
| 3) How many times have you met the speech and hearing specialist in the school year?. . . . . . . . . . . . . . . . . . . . . . . . . . . | | |
| 4) If the specialist does not visit you. do you try to meet or write to write to her/him? | Yes<br>No | 1<br>0 |
| 5) Do you discuss with the specialist the problems you have with the hard of hearing child in your class? | Yes<br>No | 1<br>0 |
| 6) Have you read any books/pamphlets/ papers/or seen films on how to handle the hard of hearing child? | Yes<br>No | 1<br>0 |
| 7) Have you taught hard of hearing children before? | Yes<br>No | 1<br>0 |
| 8) When the hard of hearing child is taught by others, do you watch them to get experience? | Yes<br>No | 1<br>0 |
| 9) Have you been taught how to look after the hearing aid; | | |
| a) by the specialist? | Yes<br>No | 1<br>0 |
| b) by the parents? | Yes<br>No | 1<br>0 |

## Hearing aid check:

| | | |
|---|---|---|
| 1) Does the child wear the hearing aid regularly? | Yes<br>No | 1<br>0 |
| 2) Do you try to see if the hearing aid working? | Yes<br>No | 1<br>0 |
| 3) How often do you see if the hearing aid is working? | Yes<br>No | 1<br>0 |
| 4) Do you know how to: | | |
| a) put the battery into the hearing aid? | Yes<br>No | 1<br>0 |
| b) switch the aid on and off? | Yes<br>No | 1<br>0 |
| c) make the sound louder or softer? (depending on noise in the environment and battery strength) | Yes<br>No | 1<br>0 |

## Teacher-Child Communication:

| | | |
|---|---|---|
| 1) When you communicate with the hard of hearing child do you use: | | |
| a) only speech? | Yes<br>No | 2 |
| b) only gestures? | Yes<br>No | 0 |
| c) both speech and gestures? | Yes<br>No | 1 |
| 2) If you use a combination: | | |
| a) do you use more gestures and less speech? | Yes<br>No | 0.25 |
| b) do you use more speech and less gestures? | Yes<br>No | 0.5 |

| | | |
|---|---|---|
| 3) do you make sure that the child is looking at you, before you talk to him/her? | Yes<br>No | 1<br>0 |
| 4) In the classroom, do you stand where light falls on your face? | Yes<br>No | 1<br>0 |
| 5) Do you sit/stand in one place when you are teaching? | Yes<br>No | 1<br>0 |
| 6) Do you often speak while you are facing the blackboard (with your back to the child)? | Yes<br>No | 0<br>1 |
| 7) Do you make sure that the class is quiet before you talk to the child or teach the class? | Yes<br>No | 1<br>0 |

## Teacher Attitude:

| | | |
|---|---|---|
| 1) Do you feel that you have to work more since you have a hard of hearing child in your class? | Yes<br>No | 0<br>1 |
| 2} Does having a hard of hearing child in the class interfere with your normal work? | Yes<br>No | 0<br>1 |
| 3) Do you think the child should be taught in a special school for the deaf? | Yes<br>No | 0<br>1 |
| 4) Do you think the child should be taught: | | |
| a) sign language and not speech? | Yes<br>No | 0 |
| b) both sign language and speech? | Yes<br>No | 0.5 |
| c) speech only? | Yes<br>No | 1 |
| 5) Do you think that you need more help than what you have to teach the | Yes<br>No | 0<br>1 |

| | | |
|---|---|---|
| 6) Do you think that the parents should help the child more? | Yes<br>No | |
| 7) Do you think that the speech and hearing specialist should help the child more? | Yes<br>No | |
| 8) Do you give extra help to the child? | Yes<br>No | 1<br>0 |
| 9) Do you think that you should have less number of children since you have a hard of hearing child in the class? | Yes<br>No | 0<br>1 |
| 10) Do you feel the parents of the child or the speech and hearing specialist demand too much from you? | Yes<br>No | 0<br>1 |
| 11) Have you told the normal hearing children about the problems of the hard of hearing child? | Yes<br>No | 1<br>0 |
| 12) Do you stop the normal children if they make fun of the hard of hearing child? | Yes<br>No | 1<br>0 |

## Parent-Teacher Meeting:

| | | |
|---|---|---|
| 1) Do you meet the parents of the hard of hearing child to discuss about him/her. | Yes<br>No | 1<br>0 |
| 2) Do you meet the parents: | | |
| a) along with other parents (PTA meetings) ? | Yes<br>No | 1<br>0 |
| b) not along with other parents | Yes<br>No | 1<br>0 |
| 3) If the parents do not come to talk to you, do you ask them to come? | Yes<br>No | 1<br>0 |
| 4) Do you tell the parents what they should teach the child at home? | Yes<br>No | 1<br>0 |

| | | |
|---|---|---|
| 5) Do the parents help in training the child? | Yes | 1 |
| | No | 0 |
| 6) Did the parents discuss with you the problems of the child before he/she was admitted into your class? | Yes | 1 |
| | No | 0 |

## ತರಗತಿಯ ಶಿಕ್ಷಕರಿಗೆ ಪ್ರಶ್ನಾವಳಿ

ನಾನು ಸಾಮಾನ್ಯ ಶಾಲೆಯಲ್ಲಿ ಓದುತ್ತಿರುವ ಶ್ರವಣದೋಷವುಳ್ಳ ಮಕ್ಕಳ ಕ್ರಿಯಾಶೀಲತೆಯ ಬಗ್ಗೆ ವಿವರಗಳನ್ನು ಸಂಗ್ರಹಿಸುತ್ತಿದ್ದೇನೆ. ದಯವಿಟ್ಟು ನಿಮ್ಮ ತರಗತಿಯಲ್ಲಿರುವ ಶ್ರವಣ ದೋಷವುಳ್ಳ ಮಗುವಿನ ಬಗ್ಗೆ ಈ ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳನ್ನು ಉತ್ತರಿಸಿ. ಸರಿಯಾದ ಉತ್ತರವನ್ನು ಗುರುತಿಸಿ. ಉದಾ: ಪ್ರಶ್ನೆಗೆ ಉತ್ತರ 'ಹೌದು' ಎಂದಾದರೆ (ಹೌದು) ಎಂದು ಗುರುತಿಸಿ.

## ತರಗತಿಯ ಶಿಕ್ಷಕರಿಗೆ ಪ್ರಶ್ನಾವಳಿ

ವಿದ್ಯಾರ್ಥಿಯ ಹೆಸರು: .................................... ವಯಸ್ಸು : ..........

ಶಾಲೆಯ ಹೆಸರು: ........................................ ತರಗತಿ: ............

ಶೈಕ್ಷಣಿಕ ಮಾಧ್ಯಮ: ..................................

ತರಗತಿಯಲ್ಲಿರುವ ಮಕ್ಕಳ ಸಂಖ್ಯೆ: .....................

ತರಗತಿಯಲ್ಲಿರುವ ಶ್ರವಣ ದೋಷವುಳ್ಳ ಮಕ್ಕಳ ಸಂಖ್ಯೆ : ................

ಶಾಲೆಯಲ್ಲಿರುವ ಶ್ರವಣ ದೋಷವುಳ್ಳ ಮಕ್ಕಳ ಸಂಖ್ಯೆ: ....................

ಶೈಕ್ಷಣಿಕ ಸಾಧನೆಗಳು :

| | | | |
|---|---|---|---|
| 1. ಮೊದಲನೆ ಭಾಷೆ | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 2. ಎರಡನೆ ಭಾಷೆ | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 3. ಗಣಿತ | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 4. ವಿಜ್ಞಾನ | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 5. ಸಮಾಜ ಪರಿಚಯ | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 6. ಬರೆಯುವ ಸಾಮರ್ಥ್ಯ | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 7. ಬರೆಯುವಿಕೆಯಲ್ಲಿ ಅಕ್ಷರಮಾಲೆಯನ್ನು ಬಳಸುವ ಸಾಮರ್ಥ್ಯ | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 8. ವಿದ್ಯಾರ್ಥಿಯ ಶೈಕ್ಷಣಿಕ ಕಾರ್ಯಗಳ ನಿರ್ವಹಣೆ (ಕ್ರಿಯಾಶೀಲತೆ) (ರ್‍ಯಾಂಕುಗಳ/ಅಂಕಶ್ರೇಣಿಯ ಅನುಸಾರವಾಗಿ) | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |
| 9. ತರಗತಿಯಲ್ಲಿ ನಡೆಯುವ ಚರ್ಚೆಗಳಲ್ಲಿ ಭಾಗವಹಿಸುತ್ತಾನೆಯೋ/ಳೆಯೋ? | ಸಾಧಾರಣಕ್ಕಿಂತ ಉತ್ತಮ : | ಸಾಧಾರಣ: | ಸಾಧಾರಣಕ್ಕಿಂತ ಕಡಿಮೆ : |

ಶ್ರವಣೋಪಕರಣ ಧರಿಸುವಾಗ ಶಬ್ದಕ್ಕೆ ವಿದ್ಯಾರ್ಥಿಯ ಪ್ರತಿಕ್ರಿಯೆ :

1) ಅವನು/ಅವಳು ನಿಮ್ಮ ಮುಖ ನೋಡದಿದ್ದಾಗ ಅವನಿಗೆ/ಅವಳಿಗೆ ಯಾವಾಗಲೂ ನಿಮ್ಮ ಮಾತು ಅರ್ಥವಾಗುತ್ತದೆ ಎಂದೆನಿಸುತ್ತದೆಯೇ? (5 ಅಡಿಗಳ ದೂರದಲ್ಲಿ)

| | |
|---|---|
| a) ನೀವು ಸಾಧಾರಣ ಧ್ವನಿಯಲ್ಲಿ ಮಾತನಾಡಿದರೆ | ಹೌದು : ಇಲ್ಲ |
| b) ಸಾಧಾರಣಕ್ಕಿಂತ ಜೋರಾಗಿ (ಗಟ್ಟಿಯಾಗಿ) ಮಾತನಾಡಿದರೆ | ಹೌದು : ಇಲ್ಲ |

ಶ್ರವಣೋಪಕರಣದ ಉಪಯೋಗ :

| | | | |
|---|---|---|---|
| 1. ಅವನು/ಅವಳು ಶಾಲೆಯಲ್ಲಿ ಶ್ರವಣೋಪಕರಣ ಧರಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 2. ಶ್ರವಣೋಪಕರಣ ಸರಿಯಾಗಿ ಕೆಲಸ ಮಾಡದಿದ್ದಾಗ ನಿಮಗೆ ತಿಳಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 3. ಶ್ರವಣೋಪಕರಣ ಬಳಕೆಗೆ ಸಂಬಂಧಪಟ್ಟ ಈ ಕೆಳಗಿನ ಕಾರ್ಯಗಳನ್ನು ಮಾಡಬಲ್ಲನೇ/ಳೇ? | | | |
| ಅ) ಆನ್-ಆಫ್ ಸ್ವಿಚ್ಚನ್ನು ಉಪಯೋಗಿಸಬಲ್ಲನೇ/ಳೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| ಆ) ಧ್ವನಿ ನಿಯಂತ್ರಿಸಬಲ್ಲನೇ/ಳೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| ಇ) ಅಚ್ಚನ್ನು ರಿಸೀವರ್‌ನೊಂದಿಗೆ ಕಿವಿಗೆ ಹೊಂದಿಸಬಲ್ಲನೇ/ಳೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| ಈ) ಬ್ಯಾಟರಿಯನ್ನು ಶ್ರವಣೋಪಕರಣಕ್ಕೆ ಹಾಕಬಲ್ಲನೇ/ಳೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |

ತುಟಿ ಹಾಗೂ ನಾಲಿಗೆಯ ಚಲನೆಗಳ ಸಹಾಯದಿಂದ ಮಾತಿನ ಗ್ರಹಿಕೆ:

| | | | |
|---|---|---|---|
| 1. ನೀವು ಮಾತನಾಡುವಾಗ ಅವನು/ಅವಳು ನಿಮ್ಮ ಮುಖವನ್ನು ನೋಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 2. ತರಗತಿಯಲ್ಲಿ ನೀವು ಮಾತನಾಡುವಾಗ ಅವನ/ಅವಳ ಎದುರಿನಿಂದ ಮಾತನಾಡುತ್ತೀರಾ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |

ಭಾಷಾ ಸಾಮರ್ಥ್ಯ:

| | | | |
|---|---|---|---|
| 1. ಅವನು/ಅವಳು ಸಂದರ್ಭಕ್ಕೆ ತಕ್ಕ ಪದಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 2. ಅವನು/ಅವಳು ಮಾತನಾಡುವಾಗ | | | |
| ಅ) ಒಂದೇ ಪದದ ವಾಕ್ಯವನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |

| | | | |
|---|---|---|---|
| ಆ) ಅಪೂರ್ಣವಾದ ವಾಕ್ಯಗಳಲ್ಲಿ ಮಾತನಾಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| ಇ) ಪೂರ್ಣವಾದ ವಾಕ್ಯಗಳಲ್ಲಿ ಮಾತನಾಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| 3) ಅವನು/ಅವಳು ಪೂರ್ಣವಾದ ವಾಕ್ಯಗಳಲ್ಲಿ ಮಾತನಾಡುತ್ತಿದ್ದಲ್ಲಿ | | | |
| ಅ) ಮೂರು-ನಾಲ್ಕು ಪದಗಳ ವಾಕ್ಯಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| ಆ) ಐದು-ಆರು ಪದಗಳ ವಾಕ್ಯಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| ಇ) ಅದಕ್ಕೂ ಹೆಚ್ಚಿನ ಪದಗಳ ವಾಕ್ಯಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| 4) ಅವನು/ಅವಳು ತಾನು ಓದಿದ್ದೆಲ್ಲಾ ಅರ್ಥ ಮಾಡಿಕೊಳ್ಳುತ್ತಾನೆಯೇ/ಳೆಯೇ | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| 5) ಅವನು/ಅವಳು ಬೇರೆ ಮಕ್ಕಳೊಂದಿಗೆ ಮಾತನಾಡುವಾಗ ಸಂಭಾಷಣೆಯನ್ನು | | | |
| ಅ) ತಾನೇ ಪ್ರಾರಂಭಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| ಆ) ಬೇರೆ ಮಕ್ಕಳು ಪ್ರಾರಂಭಿಸುತ್ತಾರೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| 6) ನಿಮ್ಮ ಹಾಗೂ ಬೇರೆ ಹಿರಿಯರ ಜೊತೆ ಅವನು/ಅವಳು ತಾನಾಗಿಯೇ ಸಂಭಾಷಣೆಯನ್ನು ಪ್ರಾರಂಭಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| 7) ಅವನು/ಅವಳು | | | |
| ಅ) ಮಾತನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| ಆ) ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| ಇ) ಮಾತು ಹಾಗೂ ಸನ್ನೆ ಎರಡನ್ನೂ ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| 8) ಮಾತು ಹಾಗೂ ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಿದ್ದಲ್ಲಿ, | | | |
| ಅ) ಮಾತಿಗಿಂತ ಹೆಚ್ಚಾಗಿ ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |
| ಆ) ಸನ್ನೆಗಳಿಂದ ಮಾತನ್ನು ಹೆಚ್ಚಾಗಿ ಉಪಯೋಗಿಸುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ | ಕೆಲವೊಮ್ಮೆ | ಯಾವಾಗಲೂ ಇಲ್ಲ |

ಮಾನಸಿಕ ಹಾಗೂ ಸಾಮಾಜಿಕ ಬೆಳವಣಿಗೆಯನ್ನು ಕುರಿತು :

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| 1) ಅವನು/ಅವಳು ಬೇರೆ ಮಕ್ಕಳೊಂದಿಗೆ ಆಡುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 2) ಅವನ/ಳ ಮಾತು ನಿಮಗೆ ಅರ್ಥವಾಗದಿದ್ದರೆ ಅವನಿಗೆ/ಅವಳಿಗೆ ಬೇಸರ/ದುಃಖ ಆಗುತ್ತದೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 3) ತರಗತಿಯ ಇತರ ಮಕ್ಕಳಿಗಿಂತ ಅವನು/ಅವಳು ದೊಡ್ಡವನೇ/ಳೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 4) ತರಗತಿಯ ಇತರ ಮಕ್ಕಳ ಸರಾಸರಿ ವಯಸ್ಸೆಷ್ಟು? | ______________ | | |

ಅವನ/ಅವಳ ವಯಸ್ಸಿನ ಇತರ ಮಕ್ಕಳೊಡನೆ ಒಡನಾಟ:

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| 1) ಇತರ ಮಕ್ಕಳು ಶ್ರವಣ ದೋಷವಿರುವ ಹುಡುಗ/ಹುಡುಗಿ ತಮ್ಮೊಡನೆ ತರಗತಿಯಲ್ಲಿ ಇರುವುದನ್ನು ಇಚ್ಛಿಸುತ್ತಾರೆಯೇ? | ಇಷ್ಟಪಡುತ್ತಾರೆ: | ಏನೂ ಭಾವಿಸುವುದಿಲ್ಲ: | ಇಷ್ಟಪಡುವುದಿಲ್ಲ: |
| 2) ಇತರ ಮಕ್ಕಳು ಅವನಿಗೆ/ಅವಳಿಗೆ ಓದಿನಲ್ಲಿ ಮತ್ತು ಶಾಲೆಯ ಬೇರೆ ಕೆಲಸಗಳಲ್ಲಿ ಸಹಾಯ ಮಾಡುತ್ತಾರೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 3) ಇತರ ಮಕ್ಕಳು ಅವನ/ಅವಳ ಮಾತಿನ ಬಗ್ಗೆ ತಮಾಷೆ ಮಾಡುತ್ತಾರೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 4) ಇತರ ಮಕ್ಕಳು ಅವನ/ಅವಳ ಶ್ರವಣೋಪಕರಣ/ಶ್ರವಣಶಕ್ತಿಯ ಬಗ್ಗೆ ತಮಾಷೆ ಮಾಡುತ್ತಾರೆಯೇ? | ಯಾವಾಗಲೂ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 5) ಇತರ ಮಕ್ಕಳು ಅವನನ್ನು/ಅವಳನ್ನು ತಮ್ಮೊಡನೆ ಆಡಲು ಕರೆಯುತ್ತಾರೆಯೇ? | ಸಾಧಾರಣವಾಗಿ: | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| 6) ಇತರ ಮಕ್ಕಳು ಅವನ/ಅವಳೊಡನೆ ಸಂಭಾಷಿಸುವಾಗ; | | | |
| ಅ) ಮಾತನಾಡುತ್ತಾರೆಯೇ? | ಸಾಧಾರಣವಾಗಿ : | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ : |
| ಆ) ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾರೆಯೇ? | ಸಾಧಾರಣವಾಗಿ : | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ : |
| ಇ) ಮಾತು ಮತ್ತು ಸನ್ನೆ ಎರಡನ್ನೂ ಉಪಯೋಗಿಸುತ್ತಾರೆಯೇ? | ಸಾಧಾರಣವಾಗಿ : | ಕೆಲವೊಮ್ಮೆ: | ಯಾವಾಗಲೂ ಇಲ್ಲ: |

ಇತರ ಮಕ್ಕಳು ಸನ್ನೆ ಹಾಗೂ ಮಾತು ಎರಡನ್ನೂ ಉಪಯೋಗಿಸುತ್ತಿದ್ದಲ್ಲಿ,

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| ಅ) ಹೆಚ್ಚು ಸನ್ನೆ ಮತ್ತು ಕಡಿಮೆ ಮಾತನ್ನು ಉಪಯೋಗಿಸುತ್ತಾರೆಯೇ? | ಸಾಧಾರಣವಾಗಿ : ಕೆಲವೊಮ್ಮೆ : ಯಾವಾಗಲೂ ಇಲ್ಲ: |
| ಆ) ಹೆಚ್ಚು ಮಾತು ಮತ್ತು ಕಡಿಮೆ ಸನ್ನೆ ಉಪಯೋಗಿಸುತ್ತಾರೆಯೇ? | ಸಾಧಾರಣವಾಗಿ : ಕೆಲವೊಮ್ಮೆ : ಯಾವಾಗಲೂ ಇಲ್ಲ: |

<u>ಮಾತಿನ ಸ್ಪಷ್ಟತೆ :</u>

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| 1) ಅವನ/ಅವಳ ಮಾತು ಅರ್ಥವಾಗುತ್ತದೆ | ಯಾವಾಗಲೂ : ಕೆಲವೊಮ್ಮೆ : ಯಾವಾಗಲೂ ಇಲ್ಲ : |
| 2) ಅವನ/ಅವಳ ಮಾತಿನ ಜೊತೆ ಸನ್ನೆಯನ್ನು ಉಪಯೋಗಿಸಿದರೆ ಮಾತು ಅರ್ಥವಾಗುತ್ತದೆ. | ಯಾವಾಗಲೂ : ಕೆಲವೊಮ್ಮೆ : ಯಾವಾಗಲೂ ಇಲ್ಲ : |

<u>ಶಾಲಾ/ತರಗತಿಯಲ್ಲಿ ವಾತಾವರಣ :</u>

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| 1) ತರಗತಿಯಲ್ಲಿ ಶಬ್ದ ಹೆಚ್ಚಾಗಿರುತ್ತದೆಯೇ? ಹೌದಾದರೆ ಆ ಶಬ್ದಕ್ಕೆ ಕಾರಣ ಯಾವುದು? (ಉದಾ: ವಾಹನಗಳಿಂದ/ಮಕ್ಕಳ ಆಟ ಪಾಠದಿಂದ/ ಇತರ ಕಾರಣಗಳಿಂದ) | ಹೌದು : | ಇಲ್ಲ : |
| | ______________ | |
| 2) ತರಗತಿಯಲ್ಲಿ ಸಾಕಷ್ಟು ಬೆಳಕಿದೆಯೇ? ಇದ್ದರೆ, ಅದರ ಮೂಲ; | ಹೌದು : | ಇಲ್ಲ : |
| ಅ) ಪ್ರಾಕೃತಿಕ ಬೆಳಕು | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ಕೃತಕ ದೀಪದ ಬೆಳಕು | ಹೌದು : | ಇಲ್ಲ : |
| 3) ತರಗತಿಯಲ್ಲಿ ಅವನು/ಅವಳು | | |
| ಅ) ಮುಂದೆ ಕುಳಿತುಕೊಳ್ಳುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ಮಧ್ಯದಲ್ಲಿ ಕುಳಿತುಕೊಳ್ಳುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |
| ಇ) ಹಿಂದೆ ಕುಳಿತುಕೊಳ್ಳುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |
| 4) ಅವನು/ಅವಳು : | | |
| ಅ) ತರಗತಿಯ ನಡುವಿನಲ್ಲಿ ಕುಳಿತುಕೊಳ್ಳುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ತರಗತಿಯ ಒಂದು ಬದಿಯಲ್ಲಿ ಕುಳಿತುಕೊಳ್ಳುತ್ತಾನೆಯೇ/ಳೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |

## ಶಿಕ್ಷಕರ ತರಬೇತಿ

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| 1) ಮಗುವನ್ನು ಶಾಲೆಗೆ ಸೇರಿಸುವ ಮುನ್ನ ವಾಕ್-ಶ್ರವಣ ತಜ್ಞರು ನಿಮ್ಮೊಡನೆ ಚರ್ಚಿಸಿದ್ದರೇ? | ಹೌದು : | ಇಲ್ಲ : |
| 2) ಕಳೆದ ಶೈಕ್ಷಣಿಕ ವರ್ಷದಲ್ಲಿ ನೀವು ವಾಕ್-ಶ್ರವಣ ತಜ್ಞರನ್ನು ಸಂಪರ್ಕಿಸಿದ್ದಿರೇ? | ಹೌದು : | ಇಲ್ಲ : |
| 3) ಕಳೆದ ಶೈಕ್ಷಣಿಕ ವರ್ಷದಲ್ಲಿ ಎಷ್ಟು ಬಾರಿ ವಾಕ್-ಶ್ರವಣ ತಜ್ಞರನ್ನು ಭೇಟಿ ಮಾಡಿದ್ದೀರಿ? | ______________ | |
| 4) ವಾಕ್-ಶ್ರವಣ ತಜ್ಞರು ನಿಮ್ಮಲ್ಲಿಗೆ ಬರದಿದ್ದರೆ ನೀವು ಅವರನ್ನು ಭೇಟಿ ಮಾಡಲು ಅಥವಾ ಕಾಗದದ ಮೂಲಕ ಸಂಪರ್ಕಿಸಲು ಪ್ರಯತ್ನಿಸುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| 5) ನಿಮ್ಮ ತರಗತಿಯಲ್ಲಿರುವ ವಾಕ್-ಶ್ರವಣ ದೋಷವಿರುವ ಮಗುವಿನೊಂದಿಗೆ ನೀವು ಎದುರಿಸುವ ತೊಂದರೆಗಳ ಬಗ್ಗೆ ವಾಕ್-ಶ್ರವಣ ತಜ್ಞರ ಬಳಿ ಚರ್ಚಿಸುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| 6) ಶ್ರವಣ ದೋಷವಿರುವ ಮಗುವನ್ನು ನೋಡಿಕೊಳ್ಳುವ ಬಗ್ಗೆ ಯಾವುದಾದರೂ ಪುಸ್ತಕ:ಭಿತ್ತಿ ಪತ್ರ:ಪೇಪರ ಓದಿದ್ದೀರಾ ? ಅಥವಾ ಸಿನಿಮಾ ನೋಡಿರುವಿರಾ ? | ಹೌದು : | ಇಲ್ಲ : |
| 7) ನೀವು ಮೊದಲು ಶ್ರವಣ ದೋಷವಿರುವ ಮಗುವಿಗೆ ಕಲಿಸಿದ್ದೀರಾ ? | ಹೌದು : | ಇಲ್ಲ : |
| ಅ) ಮನೆಯಲ್ಲಿ | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ಶಾಲೆಯಲ್ಲಿ | ಹೌದು : | ಇಲ್ಲ : |
| 8) ಶ್ರವಣ ದೋಷವಿರುವ ಮಗುವಿಗೆ ಬೇರೆಯವರು ಕಲಿಸುವಾಗ ನೀವು ಅನುಭವ ಪಡೆಯಲು ಅವರನ್ನು ಗಮನಿಸುತ್ತೀರಾ ? | ಹೌದು : | ಇಲ್ಲ : |

### ಶ್ರವಣೋಪಕರಣದ ಪರಿಶೀಲನ:ಪರೀಕ್ಷೆ

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|---|---|---|
| 1) ಪ್ರತಿದಿನವೂ ಮಗುವು ಶ್ರವಣೋಪಕರಣವನ್ನು ಧರಿಸುತ್ತಾನೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |
| 2) ಶ್ರವಣೋಪಕರಣವು ಕೆಲಸ ಮಾಡುತ್ತಿದೆಯೇ ? ಇಲ್ಲವೇ ಎಂಬುದನ್ನು ಪರೀಕ್ಷಿಸಲು ನೀವು ಪ್ರಯತ್ನಿಸುವಿರಾ ? | ಹೌದು : | ಇಲ್ಲ : |
| 3) ಹೌದಾದರೆ ಶ್ರವಣೋಪಕರಣ ಕೆಲಸ ಮಾಡುತ್ತಿದೆಯೇ, ಎಂದು ಎಷ್ಟು ದಿನಕ್ಕೊಮ್ಮೆ ಪರೀಕ್ಷಿಸುತ್ತೀರಾ ? | ______________ | |

4) ನಿಮಗೆ,

ಅ) ಶ್ರವಣೋಪಕರಣದಲ್ಲಿ ಬ್ಯಾಟರಿಯನ್ನು ಹಾಕಲು ಗೊತ್ತಿದೆಯೇ ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಸ್ವಿಚ್ಚನ್ನು 'ಆನ್-ಆಫ್' ಮಾಡಲು ಗೊತ್ತಿದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಇ) ಬ್ಯಾಟರಿ ಶಕ್ತಿ ಮತ್ತು ವಾತಾವರಣದ ಶಬ್ದಕ್ಕನು- ಗುಣವಾಗಿ ಶಬ್ದ ನಿಯಂತ್ರಣವನ್ನು ಕಡಿಮೆ ಅಥವಾ ಹೆಚ್ಚು ಮಾಡಲು ನಿಮಗೆ ಗೊತ್ತಿದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

5) ಶ್ರವಣೋಪಕರಣದ ರಕ್ಷಣೆಯ ಬಗ್ಗೆ ನೀವು ಕಲಿತದ್ದು

ಅ) ತಜ್ಞರಿಂದ ಹೌದು : ಇಲ್ಲ :

ಆ) ತಾಯಿ ತಂದೆಯರಿಂದ ಹೌದು : ಇಲ್ಲ :

ಮಗು ಮತ್ತು ಶಿಕ್ಷಕರ ಸಂಪರ್ಕ

1) ಶ್ರವಣದೋಷವಿರುವ ಮಗುವಿನೊಂದಿಗೆ ಸಂಪರ್ಕಿಸುವಾಗ ನೀವು

ಅ) ಮಾತನ್ನು ಮಾತ್ರ ಉಪಯೋಗಿಸುತ್ತೀರಾ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಸನ್ನೆಗಳನ್ನು ಮಾತ್ರ ಉಪಯೋಗಿಸುತ್ತೀರಾ ? ಹೌದು : ಇಲ್ಲ :

ಇ) ಮಾತು ಮತ್ತು ಸನ್ನೆ ಎರಡನ್ನೂ ಉಪಯೋಗಿಸುತ್ತೀರಾ? ಹೌದು : ಇಲ್ಲ :

2) ಮಾತು ಮತ್ತು ಸನ್ನೆ ಎರಡನ್ನೂ ಉಪಯೋಗಿಸುತ್ತಿದ್ದಲ್ಲಿ

ಅ) ಮಾತಿಗಿಂತ ಹೆಚ್ಚಾಗಿ ಸನ್ನೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತೀರಾ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಸನ್ನೆಗಳಿಗಿಂತ ಹೆಚ್ಚಾಗಿ ಮಾತನ್ನು ಉಪಯೋಗಿಸುತ್ತೀರಾ? ಹೌದು : ಇಲ್ಲ :

3) ಮಾತನಾಡುವ ಮೊದಲು ಮಗು ನಿಮ್ಮ ಮುಖ ನೋಡುತ್ತಿದೆ ಎಂಬುದನ್ನು ನೀವು ದೃಢಪಡಿಸಿಕೊಳ್ಳುತ್ತೀರಾ ? ಹೌದು : ಇಲ್ಲ :

4) ತರಗತಿಯಲ್ಲಿ ನಿಮ್ಮ ಮುಖದ ಮೇಲೆ ಬೆಳಕು ಬೀಳುವಂಥ ಕಡೆ ನೀವು ನಿಲ್ಲುತ್ತೀರಾ ? ಹೌದು : ಇಲ್ಲ :

5) ನೀವು ತರಗತಿಯಲ್ಲಿ ಒಂದೇ ಸ್ಥಳದಲ್ಲಿ ನಿಂತು/ಕುಳಿತು ಕಲಿಸುತ್ತೀರಾ? ಹೌದು : ಇಲ್ಲ :

6) ನೀವು ಆಗಾಗ್ಗೆ ಕಪ್ಪು ಹಲಗೆಯ ಕಡೆ ತಿರುಗಿರುವಾಗ, ಮಾತನಾಡುತ್ತೀರಾ? (ಮಗುವಿನ ಕಡೆ ಬೆನ್ನು ಮಾಡಿ ನಿಂತಾಗ) ಹೌದು : ಇಲ್ಲ :

7) ನೀವು ಪಾಠ ಮಾಡುವ ಮಗುವಿನ ಜೊತೆ ಮಾತನಾಡುವ ಮೊದಲು ತರಗತಿ ನಿಶ್ಶಬ್ದವಾಗಿದೆಯೇ ಎಂಬುದನ್ನು ದೃಢಪಡಿಸಿಕೊಳ್ಳುತ್ತೀರಾ? ಹೌದು : ಇಲ್ಲ :

ಶಿಕ್ಷಕರ ಭಾವನೆಗಳು :

1) ನಿಮ್ಮ ತರಗತಿಯಲ್ಲಿ ಶ್ರವಣದೋಷವಿರುವ ಮಗು ಇರುವುದರಿಂದ ನೀವು ಹೆಚ್ಚು ಕೆಲಸ ಮಾಡಬೇಕೆಂದು ನಿಮಗೆ ಅನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

2) ನಿಮ್ಮ ತರಗತಿಯಲ್ಲಿ ಶ್ರವಣದೋಷವಿರುವ ಮಗು ಇರುವುದರಿಂದ ಸಾಮಾನ್ಯವಾದ ಕೆಲಸಗಳಿಗೆ ಅಡ್ಡಿ ಉಂಟಾಗುತ್ತದೆಯೇ ? ಹೌದು : ಇಲ್ಲ :

3) ಮಗುವು ಕಿವುಡು ಮಕ್ಕಳಿಗಾಗಿ ಇರುವಂಥ ವಿಶೇಷ ಶಾಲೆಯಲ್ಲಿ ಕಲಿಯಬೇಕೆಂದು ನಿಮಗೆ ಅನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

4) ಮಗುವಿಗೆ

ಅ) ಮಾತನ್ನು ಕಲಿಸದೆ ಸನ್ನೆಯನ್ನು ಕಲಿಸಬೇಕೆಂದು ಅನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

ಆ) ಮಾತು ಮತ್ತು ಸನ್ನೆ ಎರಡನ್ನೂ ಕಲಿಸಬೇಕೆಂದು ಅನ್ನಿಸುತ್ತದೆಯೇ ? ಹೌದು : ಇಲ್ಲ :

ಇ) ಮಾತನ್ನು ಮಾತ್ರ ಕಲಿಸಬೇಕೆನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

5) ಶ್ರವಣದೋಷವಿರುವ ಮಗುವಿಗೆ ನೀವು ಕಲಿಸಬೇಕಾದ ಕಾರಣ ನಿಮಗೆ ಇನ್ನೂ ಹೆಚ್ಚಿನ ಸಹಾಯ ಬೇಕೆಂದೆನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

6) ತಾಯಿ ತಂದೆಯರು ಮಗುವಿಗೆ ಇನ್ನೂ ಹೆಚ್ಚಿನ ಸಹಾಯ ನೀಡಬೇಕೆನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

7) ವಾಕ್‌ಶ್ರವಣ ತಜ್ಞರು ಮಗುವಿಗೆ ಇನ್ನೂ ಹೆಚ್ಚಿನ ಸಹಾಯ ನೀಡಬೇಕೆನ್ನಿಸುತ್ತದೆಯೇ ? ಹೌದು : ಇಲ್ಲ :

8) ನೀವು ಮಗುವಿಗೆ ಹೆಚ್ಚಿನ ಸಹಾಯ ನೀಡುತ್ತೀರಾ ? ಹೌದು : ಇಲ್ಲ :

9) ತರಗತಿಯಲ್ಲಿ ಶ್ರವಣದೋಷವುಳ್ಳ ಮಗುವಿರುವ ಕಾರಣ ತರಗತಿಯ ಒಟ್ಟಾರೆ ಮಕ್ಕಳ ಸಂಖ್ಯೆ ಕಡಿಮೆ ಇರ-ಬೇಕೆಂದು ನಿಮಗೆ ಅನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

10) ಮಗುವಿನ ತಾಯಿ-ತಂದೆ ಅಥವಾ ವಾಕ್-ಶ್ರವಣ ತಜ್ಞರು ನಿಮ್ಮಿಂದ ಹೆಚ್ಚು ನಿರೀಕ್ಷಿಸುತ್ತಾರೆ ಎಂದು ನಿಮಗನ್ನಿಸುತ್ತದೆಯೇ? ಹೌದು : ಇಲ್ಲ :

| | | |
|---|---|---|
| 11) ತರಗತಿಯ ಇತರ ಮಕ್ಕಳಿಗೆ ಶ್ರವಣದೋಷವಿರುವ ಮಗುವಿನ ತೊಂದರೆಗಳ ಬಗ್ಗೆ ತಿಳಿಸುವಿರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| 12) ಇತರ ಮಕ್ಕಳು ಶ್ರವಣ ದೋಷವಿರುವ ಮಗುವಿನ ಬಗ್ಗೆ ತಮಾಷೆ ಮಾಡಿದರೆ, ನೀವು ಅವರನ್ನು ತಡೆಯುವಿರಾ? | ಹೌದು : | ಇಲ್ಲ : |

<u>ಪೋಷಕ -ಶಿಕ್ಷಕರ ಭೇಟಿ :</u>

| | | |
|---|---|---|
| 1) ಶ್ರವಣದೋಷವಿರುವ ಮಗುವಿನ ಬಗ್ಗೆ ಚರ್ಚಿಸಲು ಮಗುವಿನ ತಾಯಿ-ತಂದೆಯರನ್ನು ನೀವು ಭೇಟಿ ಮಾಡುತ್ತೀರಾ? ಹೌದಾದರೆ : ಎಷ್ಟು ಬಾರಿ ಭೇಟಿ ಮಾಡುತ್ತೀರಾ ? | ಹೌದು : ________ | ಇಲ್ಲ : |
| 2) ನೀವು ತಾಯಿ-ತಂದೆಯರನ್ನು ಭೇಟಿ ಮಾಡುವುದಾದರೆ | | |
| ಅ) ಬೇರೆ ಮಕ್ಕಳ ತಾಯಿ-ತಂದೆಯರು ಇರುವಾಗ ಭೇಟಿ ಮಾಡುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| ಆ) ಬೇರೆ ಮಕ್ಕಳ ತಾಯಿ-ತಂದೆಯರು ಇಲ್ಲದಿರುವಾಗ ಭೇಟಿ ಮಾಡುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| 3) ತಾಯಿ-ತಂದೆಯರು ನಿಮ್ಮೊಂದಿಗೆ ಮಾತನಾಡಲು ಬಾರದಿದ್ದರೆ, ನೀವು ಅವರಿಗೆ ಬರಲು ತಿಳಿಸುತ್ತೀರಾ ? | ಹೌದು : | ಇಲ್ಲ : |
| 4) ಮಗುವಿಗೆ ಮನೆಯಲ್ಲಿ ಏನನ್ನು ಕಲಿಸಬೇಕೆಂದು, ತಾಯಿ-ತಂದೆಯರಿಗೆ ನೀವು ಹೇಳುತ್ತೀರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| 5) ಮಗುವಿನ ತರಬೇತಿ ಕಾರ್ಯಗಳಲ್ಲಿ ತಾಯಿ-ತಂದೆಯರು ನಿಮಗೆ ಸಹಾಯ ಮಾಡುತ್ತಾರಾ? | ಹೌದು : | ಇಲ್ಲ : |
| 6) ಮಗುವನ್ನು ತರಗತಿಗೆ ಸೇರಿಸುವ ಮೊದಲೇ ಅವನ/ಅವಳ ತೊಂದರೆಯ ಬಗ್ಗೆ ತಾಯಿ-ತಂದೆಯರು ನಿಮ್ಮೊಂದಿಗೆ ಚರ್ಚಿಸಿದ್ದಾರೆಯೇ? | ಹೌದು : | ಇಲ್ಲ : |

## APPENDIX • C

### Noise Levels in the test room

| Octave Frequency | Level in dBSPL |
|---|---|
| 125 Hz | 18 |
| 250 Hz | 21 |
| 500 Hz | 14 |
| 1000 Hz | 12 |
| 2000 Hz | 11 |
| 4000 Hz | 11 |
| 8000 Hz | 12 |
| C - Scale | 33 |

# APPENDIX - D

## Calibration Procedure

### Earphone Calibration:

Both intensity and frequency calibration was done for the pure tones generated by the clinical audiometer (Madsen OB 822).

#### Intensity Calibration:

Intensity calibration for air-conducted tones were carried out with the output of the audiometer set at 70 dB HL (ANSI, 1969). Through the earphones (TDH 39 with MX-41/AR ear cushions) the acoustic output of the audiometer was given to a condenser microphone (B and K 4144) which was fitted into an artificial ear (B and K 4152). The signal was then fed to a sound level meter (B and K 2209) attached to an octave filter set (B and K 1613) through a pre-amplifier (B and K 2616). The sound level meter was fitted with a half inch to one inch adapter (B and K DB 0962). At each of the test frequencies, i.e. 250 Hz to 8 KHz, the output sound pressure level (SPL) value was noted. A discrepancy of more than 2.5 dB between the observed SPL value and the expected value (ANSI Standards, 1969), was corrected by means of internal calibration.

Bone vibrator calibration:

The intensity calibration for the bone vibrator (Radioear B- 71) was done, for the frequencies 250 Hz to 4 KHz. The output of the audiometer was set at 40 dB HL (ANSI, 1969). From the bone conduction vibrator (Radioear B-71) the acoustic signal was fed to the artificial mastoid (B and K 4930). This output was then fed via a pre-amplifier (B and K 2616) to the sound level meter (B and K 2209). A difference of more than 2.5 dB between the observed SPL value and the expected value (ANSI standards, 1969), was internally calibrated. Thus, the output of the audiometer was maintained within 2.5 dB of the standards (ANSI, 1969).

Frequency calibration:

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

## Sound Field Calibration:

### Intensity calibration:

Intensity calibration for warble tones in the sound field was carried out with setting the audiometer output to 70 dB. A one inch condenser microphone (B and K 4145) with a 90 degree grid azimuth was placed at the point in the room where the head of the subject wouid be positioned during testing. The distance from the microphone to the loudspeaker was one meter. The microphone was connected to a sound level meter (B and K 2209) and the octave filter set (B and K 1613). The output SPL was compared for the frequencies 250 Hz to 6 KHz, with the values given by Morgan et al. (1979). A discrepancy of more than 2.5 dB between the observed SPL values and the expected values (Morgan et al., 1979), was corrected by means of internal calibration.

### Microphone calibration:

Microphone input calibration for speech audiometry was done by presenting a recorded 1 KHz signal at 70 dB. The VU meter gain was set so that the needle peaked at '0'. The placement of the sound level meter was similar to that done for sound- field warble tone testing. The output SPL was noted on the sound level meter on the linear scale and compared with the standards (Morgan et ai., 1979). if the reading of exceeded 2.5 dB, internal calibration was done.

**Linearity check:**

The linearity of the audiometer attenuator was checked. The procedure used was similar to that utilised to check the intensity calibration except that the intensity dial of the audiometer was set at the maximum level and the frequency dial was set to 1000 Hz, The attenuator on the sound level meter was set at a level corresponding to the maximum level on the audiometer. The attenuator setting on the audiometer was decreased in 5 dB steps till 30 dB and the corresponding reading on the sound level meter was noted. For every decrease in the attenuator setting the sound level meter indicated a corresponding reduction.

**Frequency response characteristics of earphones and loudspeaker:**

The frequency response characteristics of the TDH-39 earphone and the free field loudspeaker were obtained using B and K signal generator (1023) microphone (B and K 4145/4144), B and K frequency analyser (2107) and a graphic level recorder (B and K 2616). The electrical output of the signal generator (1023) was fed to the loudspeaker. The output picked-up by the microphone (B and K 4145) was fed to the frequency analyser (B and K 2107). This output was recorded on the graphic level recorder (B and K 2616). The frequency response of the earphone was obtained using a similar procedure except that a pressure microphone (B and K 4144) was used instead of a free field microphone (B and K 4145). The frequency response curves for the loudspeaker and the earphone are given below.

# APPENDIX - E

## Audiological Test Results

Unaided thresholds for pure tones under headphones/ BC Vibrator:

| | 250 Hz | 500 Hz | 1 KHz | 2 KHz | 4 KHz | 8 KHz |
|---|---|---|---|---|---|---|
| Right | | | | | | |
| Left | | | | | | |
| BC | | | | | | |

Unaided warble tone thresholds:

| 250 Hz | 500 Hz | 1 KHz | 2 KHz | 4 KHz | 6 KHz |
|---|---|---|---|---|---|
| | | | | | |

Unaided Speech Detection Thresholds:___________dB.

Unaided Speech Recognition scores for `a', `i', `u', `sh', `s'.

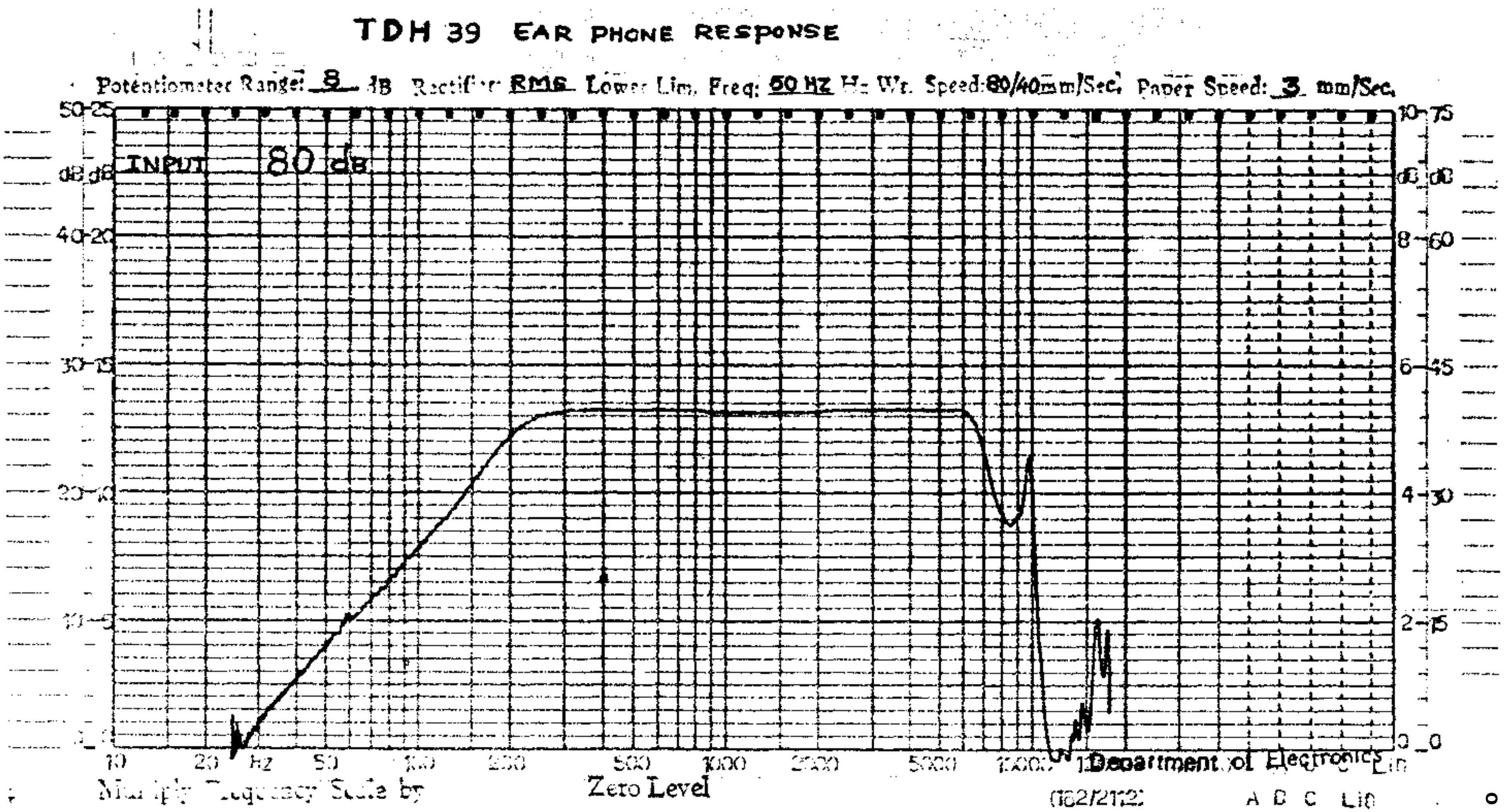
Aided warble tone thresholds:

| 250 Hz | 500 Hz | 1 KHz | 2 KHz | 4 KHz | 6 KHz |
|---|---|---|---|---|---|
| | | | | | |

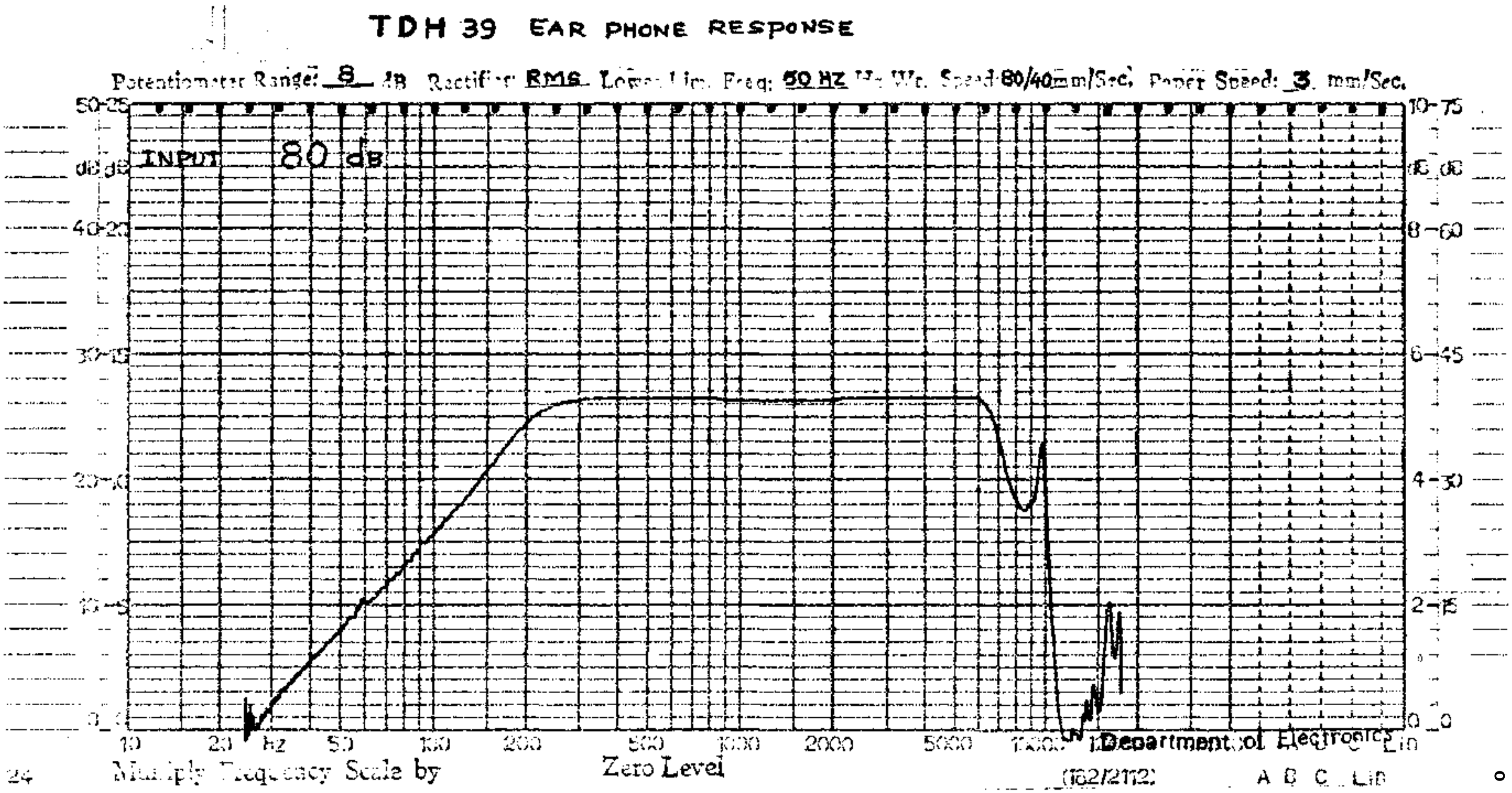
Aided Speech Detection thresholds:___________dB.

Aided Speech Recognition scores for `a', `i', `u', `sh', `s'.

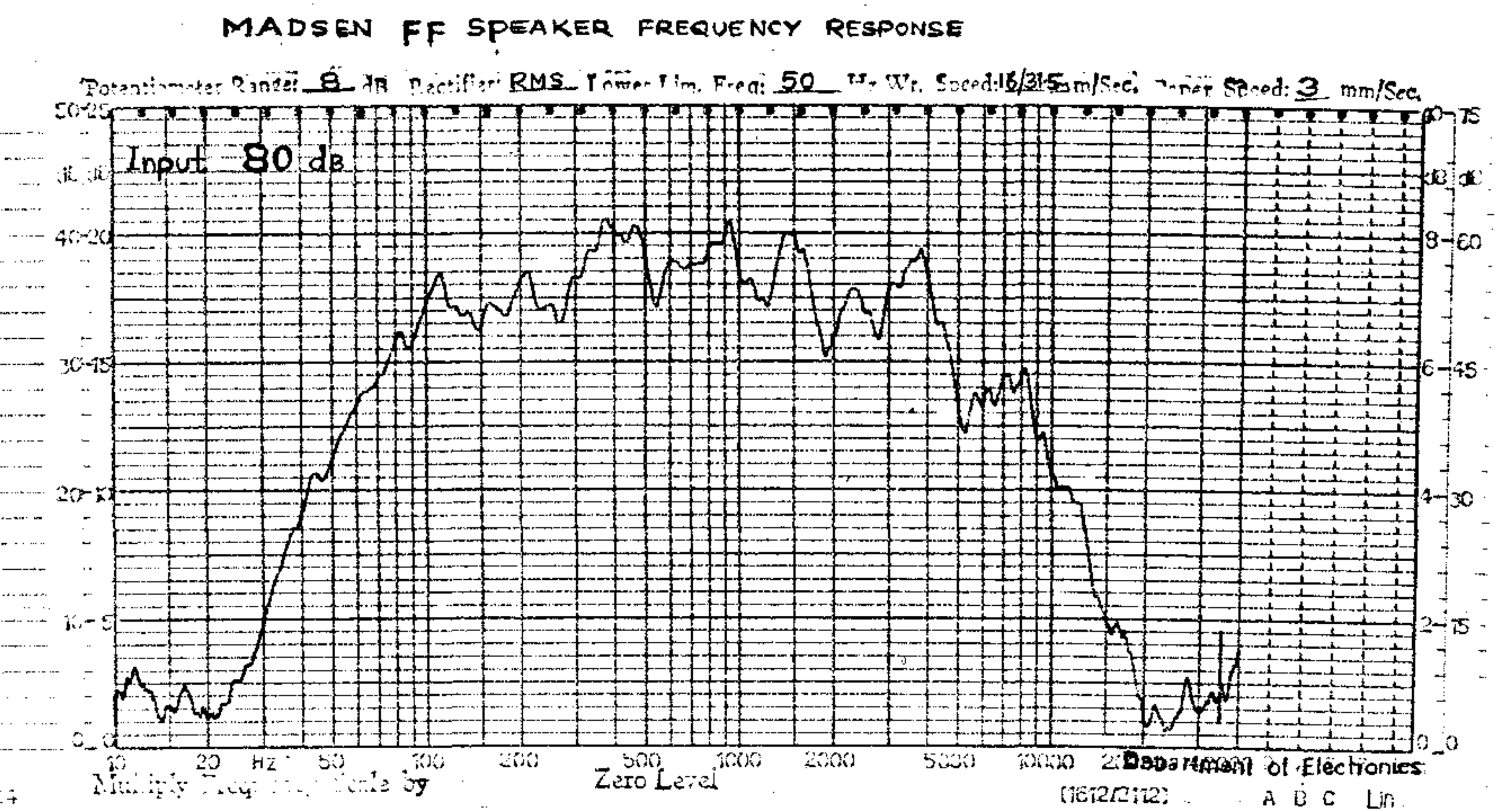
Aided UCL for speech_____________dB.




Frequency response of right ear phone.




**Frequency response of left ear phone.**




**Frequency response of loudspeaker.**

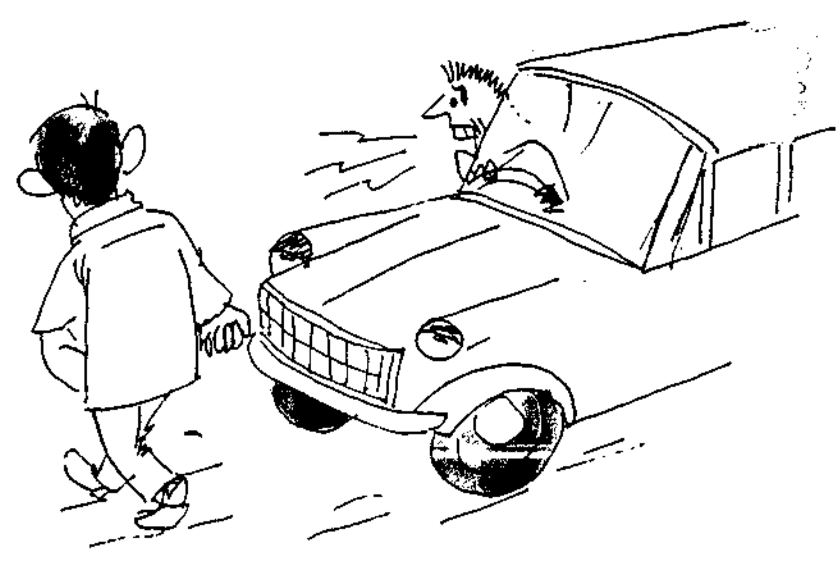
# APPENDIX - F

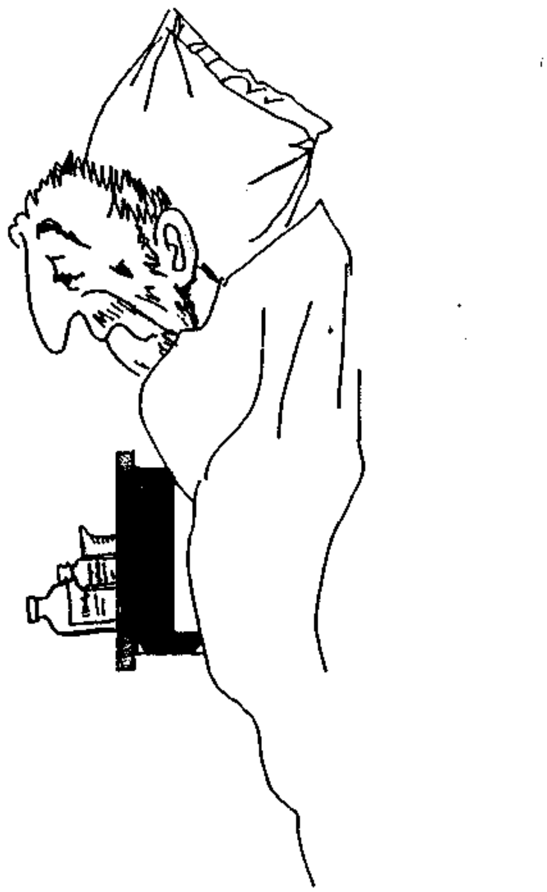
Pictures used to evaluate expression of language.
(English & Kannada)

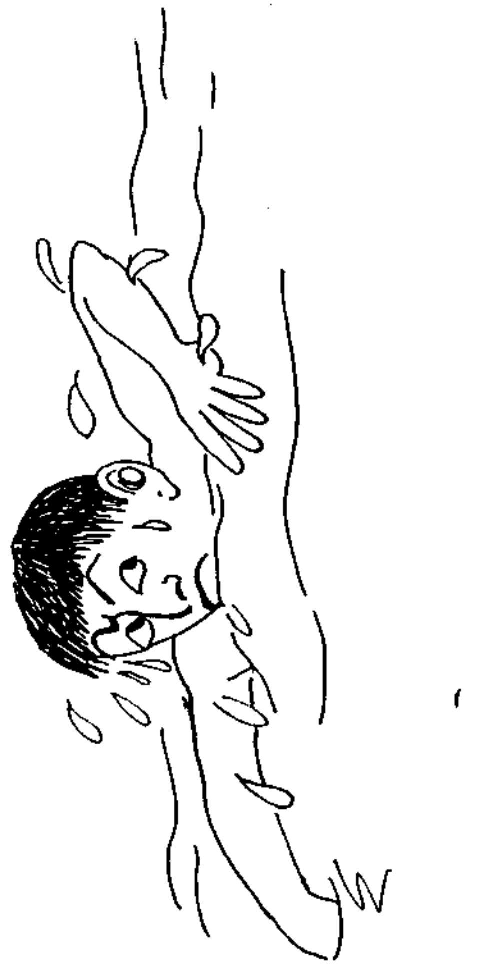
**Pictures used to evaluate expression of language** (English and Kannada).

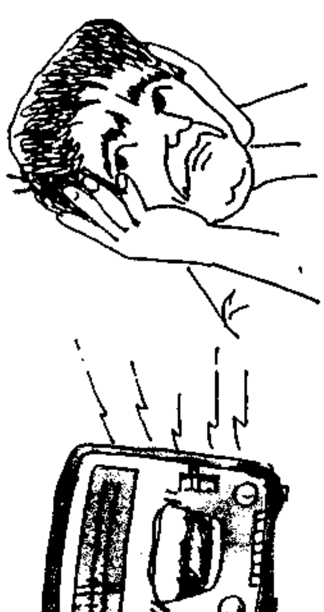
Practice items:

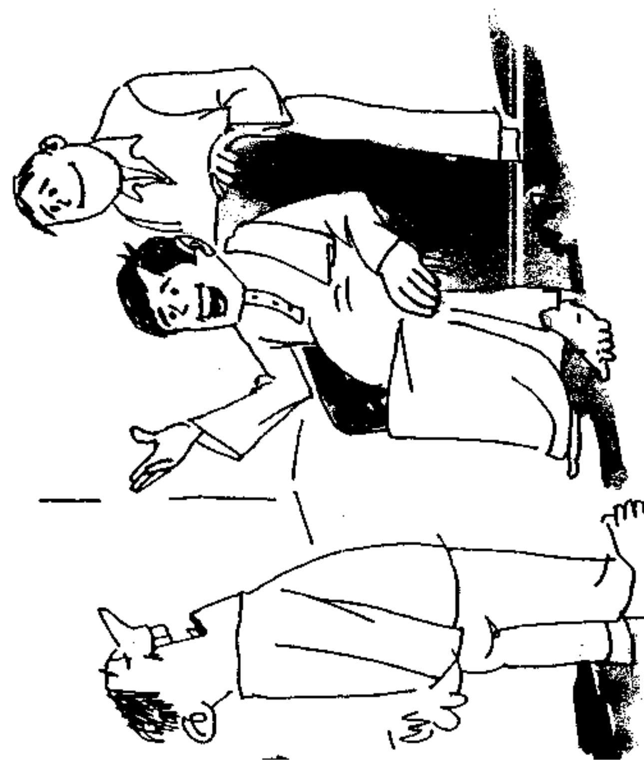
Test items:

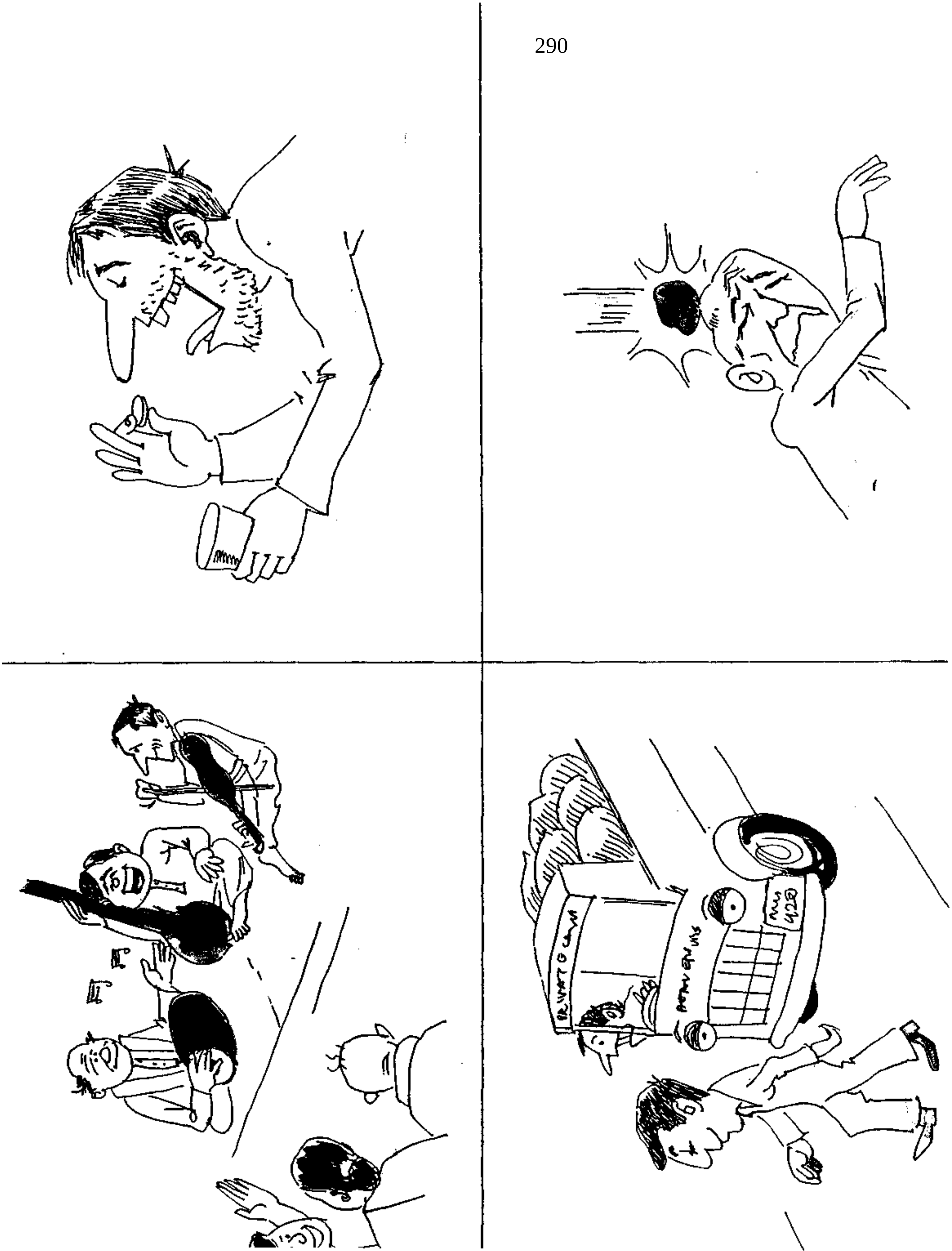












# APPENDIX - G

## Test for Auditory Compression of Language

| Item No. | Child's Response | Correct Response | Test Item |
|---|---|---|---|
| 1 | ______ | 2 | Bicycle |
| 2 | ______ | 2 | Bird |
| 3 | ______ | 1 | Girl |
| 4 | ______ | 3 | Cat |
| 5 | ______ | 2 | Farm |
| 6 | ______ | 3 | Sheep |
| 7 | ______ | 1 | Hand |
| 8 | ______ | 1 | Man |
| 9 | ______ | 3 | Paint |
| 10 | _ _ _ _ _ _ _ | 2 | Pair |
| 11 | ______ | 1 | Red |
| 12 | ______ | 3 | Black |
| 13 | ______ | 1 | Yellow |
| 14 | ______ | 2 | Big |
| 15 | ______ | 1 | Fast |
| 16 | ______ | 3 | Little |

| | | | |
|---|---|---|---|
| 20 | ____________________ | 1 | These two are different |
| 21 | ____________________ | 1 | Two |
| 22 | ____________________ | 3 | Some |
| 23 | ____________________ | 3 | Many |
| 24 | ____________________ | 2 | Find the middle car |
| 25 | ____________________ | 3 | More |
| 26 | ____________________ | 3 | Four |
| 27 | ____________________ | 1 | A few |
| 28 | ____________________ | 2 | Second |
| 29 | ____________________ | 1 | Half |
| 30 | ____________________ | 1 | Here is a star. Now point to the bottle on the left. |
| 31 | ____________________ | 3 | Eating |
| 32 | ____________________ | 3 | Jump |
| 33 | ____________________ | 1 | Running |
| 34 | ____________________ | 2 | Coming |
| 35 | ____________________ | 3 | Going |
| 36 | ____________________ | 2 | Hitting |
| 37 | ____________________ | 1 | Catching |
| 38 | ____________________ | 1 | Giving |
| 39 | ____________________ | 2 | Up |
| 40 | ____________________ | 3 | Easily |
| 41 | ____________________ | 1 | Gently |
| 42 | ____________________ | 2 | That |
| 43 | ____________________ | 2 | These |
| 44 | ____________________ | 1 | On the table. |
| 45 | ____________________ | 3 | Under the table. |

| | | |
|---|---|---|
| 47______________________1 | | The boy is at the side of the car, |
| 48______________________2 | | The cat is between the cars. |
| 49______________________1 | | The dog is in front of the car. |
| 50______________________1 | | Farmer |
| 51______________________3 | | Painter |
| 52______________________2 | | Hitter |
| 53______________________3 | | Fisherman |
| 54______________________2 | | Smaller |
| 55______________________1 | | Taller |
| 56______________________2 | | Fattest |
| 57______________________1 | | Bicyclist |
| 58______________________1 | | Pianist |
| 59______________________2 | | They |
| 60______________________1 | | He |
| 61______________________3 | | She |
| 62______________________3 | | Mother gave the ball to her. |
| 63______________________1 | | His puppy is black and white. |
| 64______________________1 | | She is going shopping. |
| 65______________________2 | | We're eating apples. |
| 66______________________1 | | Chairs |
| 67______________________3 | | Balls |
| 68______________________1 | | Coats |
| 69______________________2 | | Tables |
| 70 1 | | The sheeo is eating. |

| | | |
|---|---|---|
| 72 | 2 | The girl is sewing. |
| 73 | 2 | The girl is jumping. |
| 74 | 3 | The man painted the house. |
| 75 | 3 | The lion has eaten. |
| 76 | 1 | He will hit the ball. |
| 77 | 3 | The man has been cutting trees. |
| 78 | 1 | The boy pushes the girl. |
| 79 | 2 | The car bumps the train. |
| 80 | 1 | The donkey is carried by the man. |
| 81 | 1 | The boy is chased by the dog. |
| 82 | 3 | Who is by the table? |
| 83 | 2 | When do you sleep? |
| 84 | 3 | What do we eat? |
| 85 | 2 | The girl is drawing. |
| 86 | 2 | It's not black. |
| 87 | 1 | The girl isn't running. |
| 88 | 3 | Neither the boy nor the girl is jumping. |
| 89 | 1 | Go! |
| 90 | 2 | Don't cross! |
| 91 | 1 | Sleeps |
| 92 | 1 | Has ice cream. |
| 93 | 3 | Find the car that is on |

| | | |
|---|---|---|
| 94 | 2 | Find the cat with no eyes. |
| 95 | 1 | She shows the girl the boy. |
| 96 | 3 | A large blue ball. |
| 97 | 3 | A small red car. |
| 98 | 1 | The girl is not swimming. |
| 99 | 2 | if you're the teacher, point to the dog; if you're not point to the bear. |
| 100 | 2 | Find the one that is neither the ball nor the table. |
| 101 | 1 | Look at the third picture, then point to the baby of this animal. |

ಭಾಷೆಯ ಕೇಳುವಿಕೆ ಗ್ರಹಣಶಕ್ತಿಯ ಪರೀಕ್ಷೆ

| ಸಂಖ್ಯೆ | ಮಗುವಿನ ಪ್ರತಿಕ್ರಿಯೆ | ಸರಿಯಾದ ಪ್ರತಿಕ್ರಿಯೆ | |
|---|---|---|---|
| 1. | ———— | 2 | ಸೈಕಲ್ಲು |
| 2. | ———— | 2 | ಪಕ್ಷಿ |
| 3. | ———— | 1 | ಹುಡುಗಿ |
| 4. | ———— | 3 | ಬೆಕ್ಕು |
| 5. | ———— | 2 | ಹೊಲ |
| 6. | ———— | 3 | ಕುರಿ |
| 7. | ———— | 1 | ಕೈ |
| 8. | ———— | 1 | ಗಂಡಸು |
| 9. | ———— | 3 | ಬಣ್ಣ |
| 10. | ———— | 2 | ಜೋಡಿ |
| 11. | ———— | 1 | ಕೆಂಪು |
| 12. | ———— | 3 | ಕಪ್ಪು |
| 13. | ———— | 1 | ಹಳದಿ |
| 14. | ———— | 2 | ದೊಡ್ಡದು |
| 15. | ———— | 1 | ಬೇಗ |
| 16. | ———— | 3 | ಚಿಕ್ಕ |
| 17. | ———— | 1 | ಮೃದು |
| 18. | ———— | 2 | ಎತ್ತರ |
| 19. | ———— | 3 | ಒಂದೇ ತರ ಇರುವ ಎರಡನ್ನೂ ತೋರಿಸು |
| 20. | ———— | 1 | ಇವೆರಡು ಬೇರೆ ಬೇರೆ |

| | | | |
|---|---|---|---|
| 21. | ____________ | 1 | ಎರಡು |
| 22. | ____________ | 3 | ಕೆಲವು |
| 23. | ____________ | 3 | ತುಂಬಾ |
| 24. | ____________ | 2 | ಮಧ್ಯದ ಕಾರನ್ನು ಹುಡುಕು |
| 25. | ____________ | 3 | ಜಾಸ್ತಿ |
| 26. | ____________ | 3 | ನಾಲ್ಕು |
| 27. | ____________ | 1 | ಸ್ವಲ್ಪ |
| 28. | ____________ | 2 | ಎರಡನೆ |
| 29. | ____________ | 1 | ಅರ್ಧ |
| 30. | ____________ | 1 | ಇಲ್ಲಿ ಒಂದು ನಕ್ಷತ್ರ ಇದೆ. ಈಗ ಎಡರ್ ಇರುವ ಶೀಷೆಯನ್ನು ತೋರಿಸು |
| 31. | ____________ | 3 | ತಿನ್ನುವುದು |
| 32. | ____________ | 3 | ಹಾಡು |
| 33. | ____________ | 1 | ಓದುವುದು |
| 34. | ____________ | 2 | ಬರುವುದು |
| 35. | ____________ | 3 | ಹೋಗುವುದು |
| 36. | ____________ | 2 | ಹೊಡೆಯುವುದು |
| 37. | ____________ | 1 | ಹಿಡಿಯುವುದು |
| 38. | ____________ | 1 | ಕೊಡುವುದು |
| 39. | ____________ | 2 | ಮೇಲೆ |
| 40. | ____________ | 3 | ಸುಲಭವಾಗಿ |
| 41. | ____________ | 1 | ಮೃದುವಾಗಿ |
| 42. | ____________ | 2 | ಅದು |

| | | | |
|---|---|---|---|
| 43. | ———————— | 2 | ಇವುಗಳು |
| 44. | ———————— | 1 | ಮೇಜಿನ ಮೇಲೆ |
| 45. | ———————— | 3 | ಮೇಜಿನ ಕೆಳಗೆ |
| 46. | ———————— | 2 | ಪೆಟ್ಟಿಗೆಯಲ್ಲಿ |
| 47. | ———————— | 1 | ಹುಡುಗನು ಕಾರಿನ ಬದಿಯಲ್ಲಿದ್ದಾನೆ |
| 48. | ———————— | 2 | ಬೆಕ್ಕು ಕಾರುಗಳ ಮಧ್ಯದಲ್ಲಿದೆ. |
| 49. | ———————— | 1 | ನಾಯಿಯು ಕಾರಿನ ಎದುರು ಇದೆ. |
| 50. | ———————— | 1 | ರೈತ |
| 51. | ———————— | 3 | ಚಿತ್ರಕಾರ |
| 52. | ———————— | 2 | ಹೊಡೆಯುವವನು |
| 53. | ———————— | 3 | ಮೀನುಗಾರ |
| 54. | ———————— | 2 | ಅದಕ್ಕಿಂತ ಚಿಕ್ಕದು |
| 55. | ———————— | 1 | ಅದಕ್ಕಿಂತ ಎತ್ತರ |
| 56. | ———————— | 2 | ಎಲ್ಲಕ್ಕಿಂತ ದಪ್ಪದು |
| 57. | ———————— | 1 | ಸೈಕಲ್ ಓಡಿಸುವವನು |
| 58. | ———————— | 1 | ಪಿಯಾನೋ ನುಡಿಸುವವನು |
| 59. | ———————— | 2 | ಅವರು |
| 60. | ———————— | 1 | ಅವನು |
| 61. | ———————— | 3 | ಅವಳು |
| 62. | ———————— | 3 | ತಾಯಿಯು ಅವಳಿಗೆ ಚೆಂಡನ್ನು ಕೊಟ್ಟಳು |
| 63. | ———————— | 1 | ಅವನ ನಾಯಿಮರಿಯ ಬಣ್ಣ ಕಪ್ಪು ಮತ್ತು ಬಿಳಿ |
| 64. | ———————— | 1 | ಅವಳು ಅಂಗಡಿಗೆ ಹೋಗುತ್ತಿದ್ದಾಳೆ |
| 65. | ———————— | 2 | ನಾವು ಸೇಬನ್ನು ತಿನ್ನುತ್ತಿದ್ದೇವೆ |
| 66. | ———————— | 1 | ಕುರ್ಚಿಗಳು |
| 67. | ———————— | 3 | ಚೆಂಡುಗಳು |

| | | | |
|---|---|---|---|
| 68. | ------------ | 1 | ಕೋಟುಗಳು |
| 69. | ------------ | 2 | ಮೇಜು |
| 70. | ------------ | 1 | ಕುರಿಯು ತಿನ್ನುತ್ತಿದೆ. |
| 71. | ------------ | 3 | ಮೀನುಗಳು ತಿನ್ನುತ್ತಿವೆ |
| 72. | ------------ | 2 | ಹುಡುಗಿಯು ಹೊಲಿಯುತ್ತಿದ್ದಾಳೆ. |
| 73. | ------------ | 2 | ಹುಡುಗಿಯು ಹಾರುತ್ತಿದ್ದಾಳೆ |
| 74. | ------------ | 3 | ಗಂಡಸು ಮನೆಗೆ ಬಣ್ಣ ಹೊಡೆದನು |
| 75. | ------------ | 3 | ಸಿಂಹವು ತಿಂದಾಯಿತು |
| 76. | ------------ | 1 | ಅವನು ಚೆಂಡನ್ನು ಹೊಡೆಯುತ್ತಾನೆ |
| 77. | ------------ | 3 | ಗಂಡಸು ಮರಗಳನ್ನು ಕಡಿಯುತ್ತಿದ್ದಾನೆ |
| 78. | ------------ | 1 | ಹುಡುಗ ಹುಡುಗಿಯನ್ನು ತಳ್ಳು ತ್ತಾನೆ |
| 79. | ------------ | 2 | ಕಾರು ರೈಲಿಗೆ ಡಿಕ್ಕಿ ಹೊಡೆಯುತ್ತದೆ |
| 80. | ------------ | 1 | ಕತ್ತೆಯನ್ನು ಗಂಡಸು ಹೊತ್ತುಕೊಂಡಿದ್ದಾನೆ |
| 81. | ------------ | 3 | ಮೇಜಿನ ಪಕ್ಕದಲ್ಲಿ ಯಾರು ಇದ್ದಾರೆ? |
| 82. | ------------ | 2 | ನೀನು ಯಾವಾಗ ಮಲಗುತ್ತೀ |
| 83. | ------------ | 3 | ನಾವೇನು ತಿನ್ನುವುದು |
| 84. | ------------ | 2 | ಹುಡುಗಿ ಚಿತ್ರ ಬರೆಯುತ್ತಿದ್ದಾಳೆ |
| 85. | ------------ | 2 | ಅದು ಕಪ್ಪಲ್ಲ |
| 86. | ------------ | 1 | ಹುಡುಗಿ ಓಡುತ್ತಿಲ್ಲ |
| 87. | ------------ | 3 | ಹುಡುಗ, ಹುಡುಗಿ ಯಾರೂ ಹಾರುತ್ತಿಲ್ಲ |
| 88. | ------------ | 1 | ಹೋಗು |
| 89. | ------------ | 2 | ದಾಟಬೇಡ |
| 90. | ------------ | 1 | ಮಲಗುವುದು |

| | | | |
|---|---|---|---|
| 91. | ____________ | 1 | ಐಸ್‌ಕ್ರೀಂ ಇದೆ |
| 92. | ____________ | 3 | ಬೀದಿಯಲ್ಲಿರುವ ಕಾರು ಯಾವುದು? |
| 93. | ____________ | 2 | ಕಣ್ಣುಗಳಿಲ್ಲದ ಬೆಕ್ಕನ್ನು ಹುಡುಕು |
| 94. | ____________ | 1 | ಅವಳು ಹುಡುಗಿಗೆ ಹುಡುಗನನ್ನು ತೋರಿಸುವಳು |
| 95. | ____________ | 3 | ದೊಡ್ಡ ನೀಲಿ ಚೆಂಡು |
| 96. | ____________ | 3 | ಸಣ್ಣ ಕೆಂಪು ಕಾರು |
| 97. | ____________ | 1 | ಹುಡುಗಿ ಈಜುತ್ತಿಲ್ಲ |
| 98. | ____________ | 2 | ನೀನು ಚೀಚರಾಗಿದ್ದರೆ ನಾಯಿಯನ್ನು ತೋರಿಸು; ಇಲ್ಲವಾದರೆ ಕರಡಿಯನ್ನು ತೋರಿಸು |
| 99. | ____________ | 2 | ಚೆಂಡು ಅಥವಾ ಮೇಜು ಅಲ್ಲದಿರುವುದನ್ನು ಹುಡುಕು |
| 100. | ____________ | 1 | ಮೂರನೇ ಚಿತ್ರವನ್ನು ನೋಡು. ಆಮೇಲೆ ಈ ಪ್ರಾಣಿಯ ಮರಿಯನ್ನು ತೋರಿಸು. |

# APPENDIX • H

## Test items used to evaluate speechreading ability

### Practice items

a) Touch your ear.

b) You drink water.

### List!

Commands:

a) Brush your teeth.

b) Wash your face.

c) Comb your hair.

d) Show your tongue.

e) Stand and clap your hands.

Words:

Bus, Chair, Man, Fish, Pencil.

List II

Commands:

a) Open your mouth.

b) Blink your eyes.

c) Touch your nose.

d) Show your teeth.

e) Lift your hands and stand.

Words:

Pen, Car, Mouth, Food, Bucket.

List HI

Commands:

a)Clap your hands.

b) Eat your food.

c) Lift your hand.

d) Show your hair.

e) Close your eyes and clap.

Words:

Book, Shirt, Ball, Fan, Biscuit.

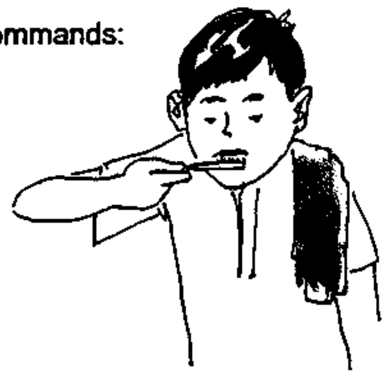
Speechreading scores

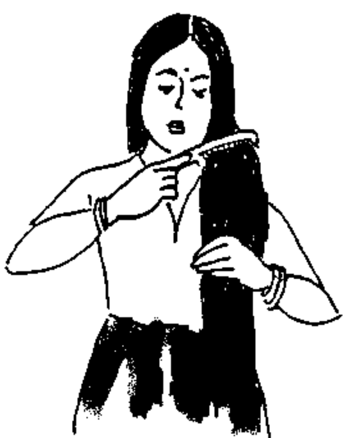
| | Commands | Words |
|---|---|---|
| a) Speechreading scores with auditory clues and context known. | /6 | /5 |
| b) Speechreading scores with auditory clues only. | /6 | /5 |
| c) Speechreading scores without auditory clues and context known. | /6 | /5 |
| d) Speechreading scored without auditory dues and context known. | /6 | /5 |

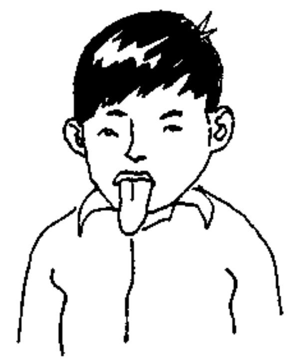
**Pictures used to give contextual clues for speechreading**

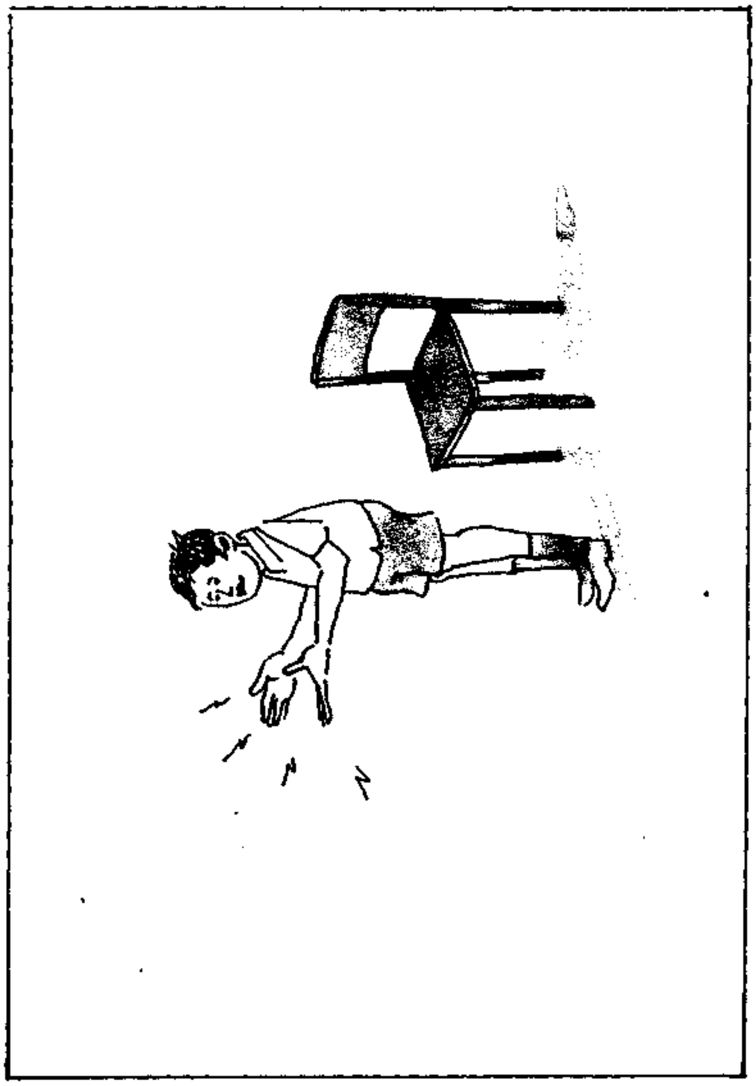
**(English version).**

List I - Commands:

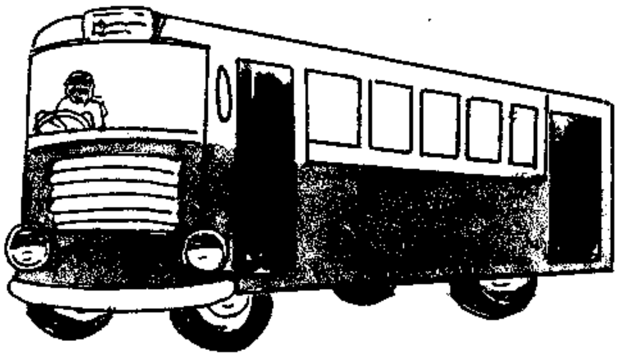


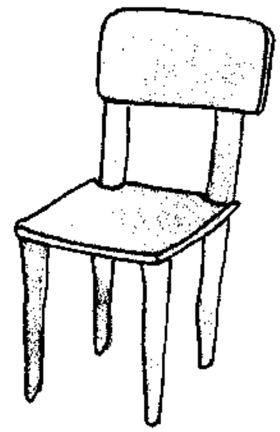


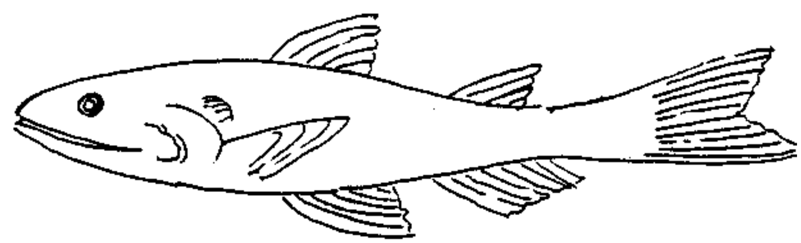


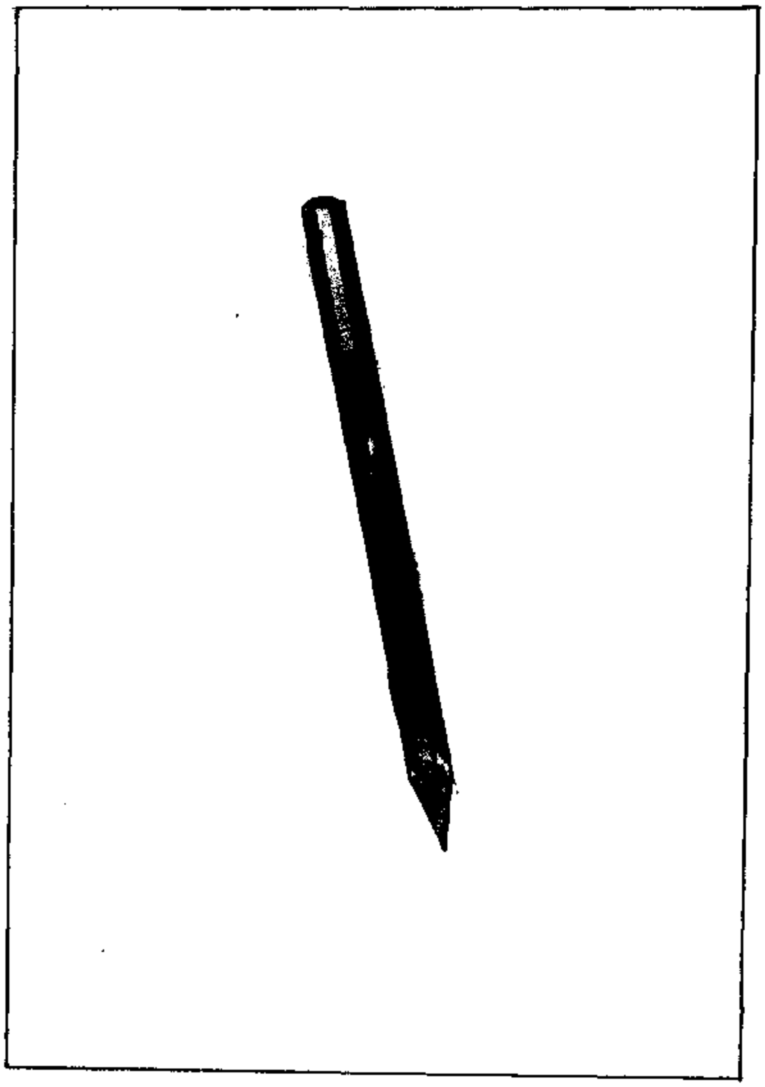


List I - Words:









## ತುಟಿ ಚಲನೆಯಿಂದ ಮಾತನ್ನು ಗ್ರಹಿಸುವುದು - ಪರೀಕ್ಷಾ ಪಟ್ಟಿಗಳು

### ಅಭ್ಯಾಸ ಅಂಶಗಳು

(1) ನಿನ್ನ ಕಿವಿ ಮುಟ್ಟು

(2) ನೀನು ನೀರು ಕುಡಿ

**ಆಜ್ಞಾಧಾರಕ ಪಟ್ಟಿ**

### ಯಾದಿ - 1

(1) ನಿನ್ನ ಹಲ್ಲು ಉಜ್ಜು

(2) ನೀನು ತಿಂಡಿ ತಿನ್ನು

(3) ನಿನ್ನ ತಲೆ ಬಾಚು

(4) ನಿನ್ನ ನಾಲಿಗೆ ತೋರಿಸು

(5) ನೀನು ನಿಂತುಕೊಂಡು ಚಪ್ಪಾಳೆ ಹೊಡಿ

**ಪದ ಪಟ್ಟಿ**

ಬಸ್ಸು, ಕುರ್ಚಿ, ಮನುಷ್ಯ, ಲೋಟ, ಬಕೇಟು

### ಯಾದಿ - 2

**ಆಜ್ಞಾಧಾರಕ ಪಟ್ಟಿ**

(1) ನೀನು ಕಣ್ಣು ಮುಚ್ಚು

(2) ನಿನ್ನ ಹಲ್ಲು ತೋರಿಸು

(3) ನಿನ್ನ ಬಾಯಿ ತೆಗಿ

(4) ನೀನು ಚಪ್ಪಾಳೆ ಹೊಡಿ

(5) ನಿನ್ನ ಕಣ್ಣು ಮುಚ್ಚಿಕೊಂಡು ನಿಲ್ಲು

**ಪದ ಪಟ್ಟಿ**

ಪೆನ್ನು, ಕಾರು, ಬಾಯಿ, ತಿಂಡಿ, ಪಟಾಕಿ

ಯಾದಿ - 3

<u>ಆಜ್ಞಾಧಾರಕ ಪಟ್ಟಿ</u>

(1) ನಿನ್ನ ಕೈ ತೋರಿಸು

(2) ನಿನ್ನ ಕೂದಲು ತೋರಿಸು

(3) ನಿನ್ನ ಮೂಗು ಮುಟ್ಟು

(4) ನಿನ್ನ ಮೊಖ ತೊಳಿ

(5) ನೀನು ಕೈ ಎತ್ತುಕೊಂಡು ನಿಂತುಕೋ

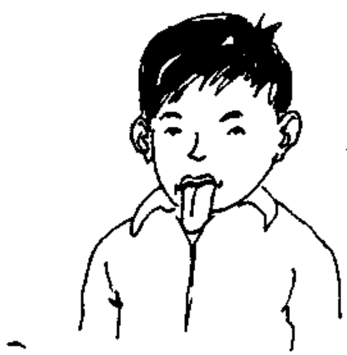
<u>ಪದ ಪಟ್ಟಿ</u>

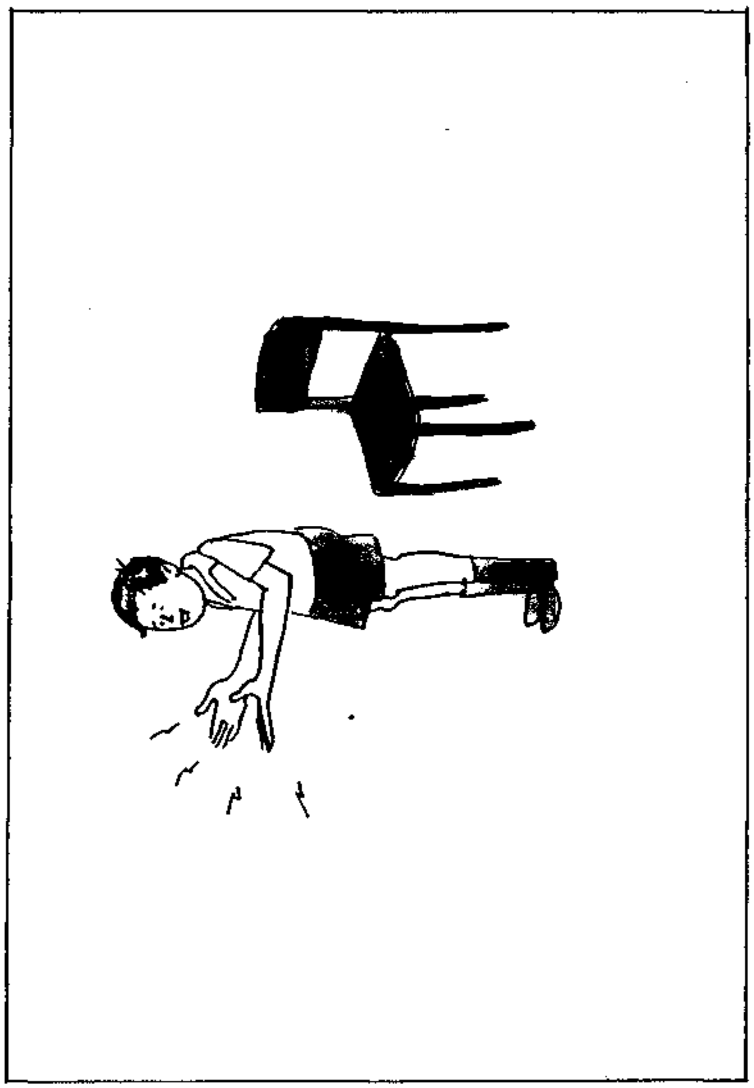
ಬೆಕ್ಕು, ಕಾಲು, ಮನೆ, ತಟ್ಟೆ, ಪೆನ್ಸಿಲು

List I - Commands:

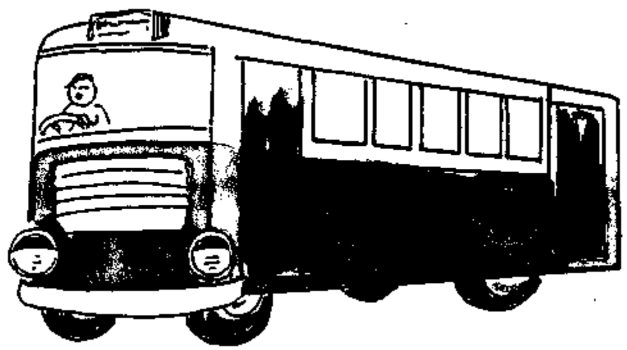
**Pictures used to give contextual clues for speechreading**

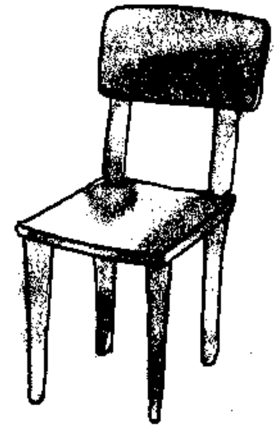
(Kannada version).

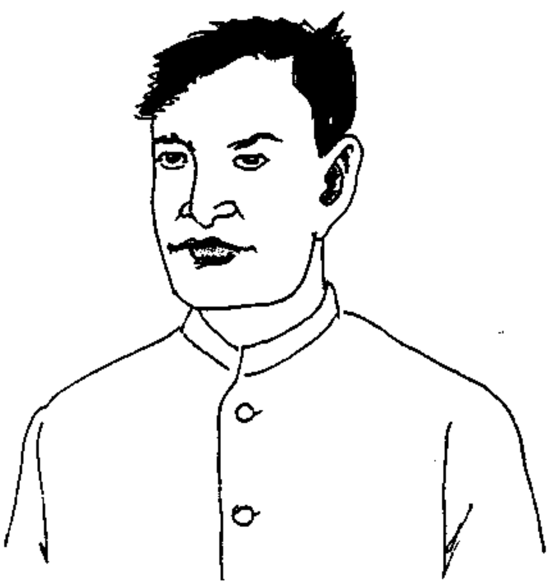


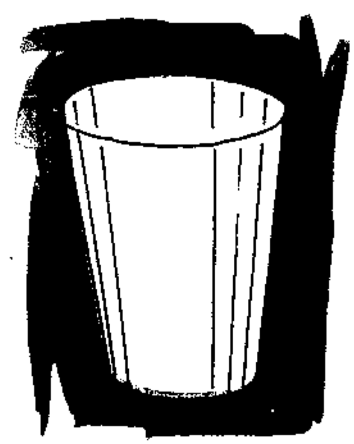


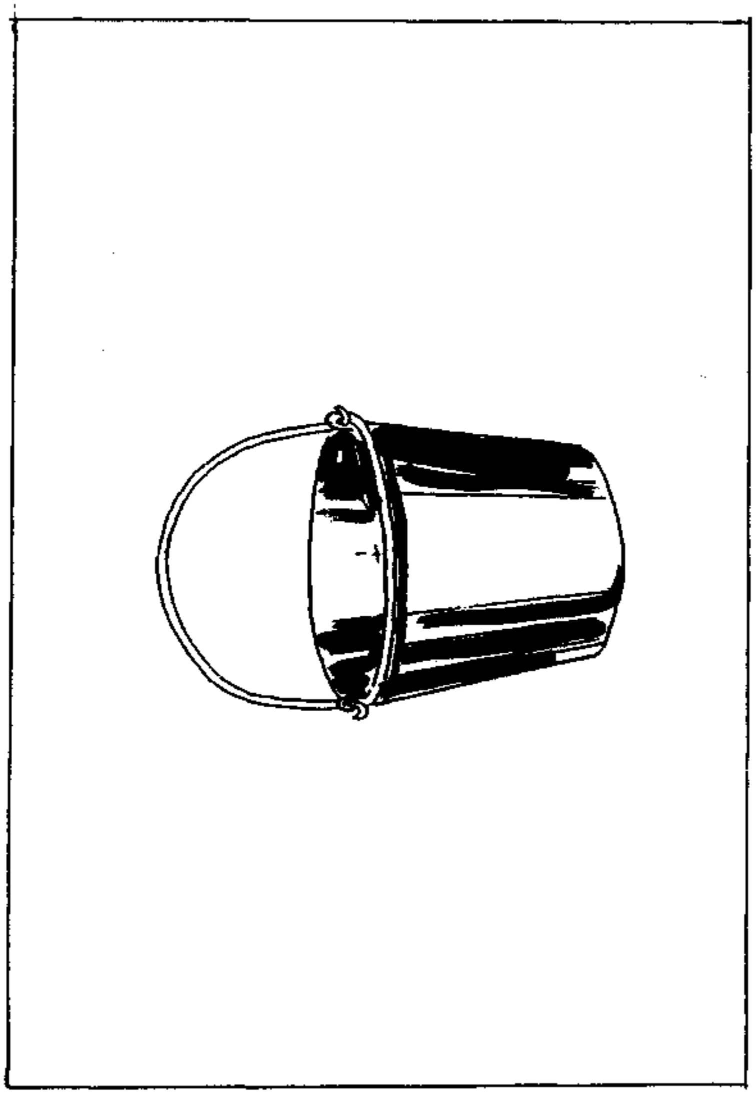
List I - Words:











# APPENDIX -1

**"Speech Intelligibility Scale" - Recording sheet**

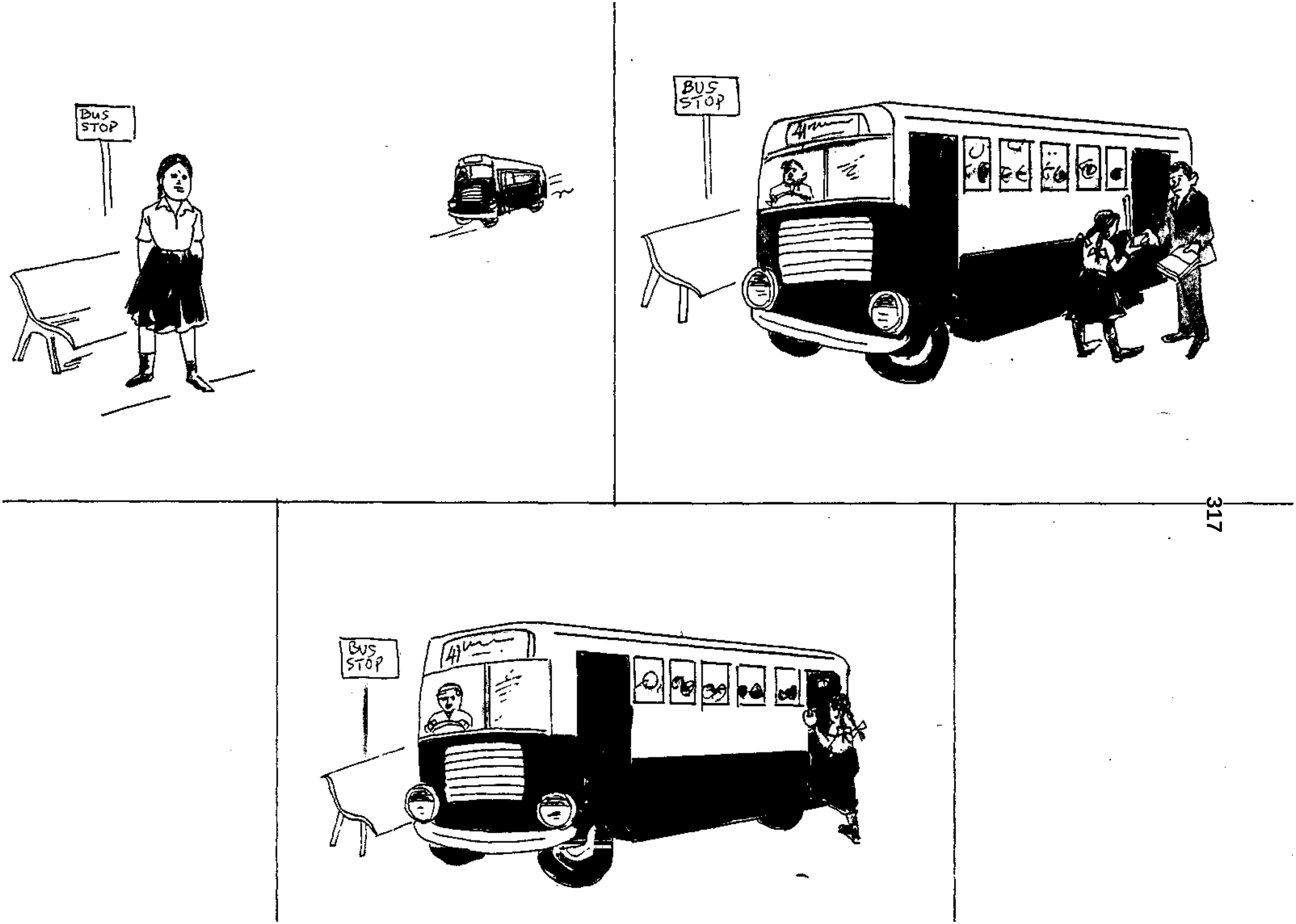
| | Usually | Sometime | Never |
|---|---|---|---|
| | 75-100% | 25-75% | <25% |
| 1) Articulation is precise | | | |
| 2) Rate of speech is appropriate | | | |
| 3) Pitch is appropriate | | | |
| 4) Appropriate intonation variations are present | | | |
| 5) Overall speech is intelligible | | | |

# **APPENDIX - J**

Pictures used to evaluate cognition (sequencing).

**Pictures used to evaluate cognition (sequencings).**

Practice items:


BUS STOP
BUS STOP
BUS STOP

Test items: