A LEXICON IN SIGNED LANGUAGE AND ITS COMPREHENSIBILITY TO NORMALS

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TO MY BELOVED

C E R T I F I C A T E

This is to certify that the Dissertation entitled 'A lexicon in signed language and its comprehensibility to normals' is the bonafide work in part fulfilment for the degree of Master of Science, in Speech and Hearing of the student with Register No.6.

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C E R T I F I C A T E

This is to certify that this Dissertation is prepared under my supervision and guidance. .

GUIDE

/ D E C L A R A TI O N /

This Dissertation is the result of my own study undertaken under the guidance of Dr. (Mrs) Prathibha Karanth, Reader and Head of the Department, Speech Pathology, All India Institute of Speech and Hearing, and has not been submitted earlier at any University for any other Diploma or Degree.

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CHAPTER - I

INTRODUCTION

1.1 Alternate modes of communication for the Deaf

The education of children born deaf is essentially a war against cognitive poverty. In many western as well as eastern countries educators have committed themselves to the exclusive deployment of spoken language to wage this war.

Deafness is a population is the usual cause of wide use of alternate modes of communication. The ultimate goal of rehabilitation with the deaf is attainment of communicative skills.

For various purposes, methods of communication other than oral mode have been employed with the Deaf. These alternate modes of communication include,

1. Sign Language
2. Finger spelling
3. Gestural Language and
4. Total communication

It is argued that deaf children cannot become competent in oral communication unless they have a sound

foundation of language and the difficulties of learning to speak, lipread and use residual hearing are so great that oral media cannot by themselves provide on adequate grasp of language. It is necessary therefore to use finger spelling or signs or both at an early stage to develop language. At a later stage, manual media may be discarded.

Manual media has been widely used in many countries in the past. Today few people advocate a return to entirely silent methods and suggest the use of finger spelling. Signs or both as a substitute for oral communication.

Advocates of manual communication in school often point to difficulties which can be resolved by finger spelling key letters which cannot be distinguished in lipreading.

Manual communication provides a means of communication in adult life to enlarge the social and educational opportunities within the deaf community.

The following paragraphs give briefly the different modes of communication and their relative advantages and disadvantages.

1.1.1. Verbal/Oral Methods

Refer to "communication by word of mouth", for most of a hundred years much of western education for the deaf and education modelled on western ideas has depended on a relatively homogeneous set of principles collectively known as the oral philosophy of deaf education. It involves the dual ability to speak and to comprehend spoken utterances, both functions depending primarily on the sense of hearing. A child who has little or no hearing even for amplified sound, must be taught tow to produce the sounds of speech mechanically if he is to communicate orally. He cannot control the quality, volume rhythm of sound by hearing his own or other voices. To receive and understand the speech of others, he must learn to lipread (to perceive what is being said by its appearance on the lips of the speaker). Not all the sounds of speech one visible and some different sounds have an identical appearance. The teaching of these skills and the improvement of techniques for this purpose are important aspects of oral methods of education.

Ability to communicate orally effectively is dependent on some command of language Deaf childrens are

deprived of the means of acquring language naturally and are retarded in normal linguistic development and need to increase their command over language through reading and writing oral education, therefore can be described in its basic essentials as the combined teaching of speech, lipreading, reading and writing for the development of language and the acquisition of knowledge.

An important element in current oral methods is the training of, residual hearing. Occassionally the term 'oral/aurol' is used in preference to oral, since it indicates clearly those aspects of modern techniques which are regarded as essential for successful oral education. These are the use of amplified sound to exploit the residual hearing.

The oral philosophy embraces a mixture of pedagogic and rehabilitative principles. The more general rehabilitative aspects reflect sound educational and medical practice which would be regarded as essential to all educational programmes.

The essential pedagodic character of oralism closes involve unique principles. Foremost is that the

medium of instruction is speech without recourse to sign or gesture. The speech may be 'natural' in that the environment of instruction which is aimed at is similar to that of hearing children. The teacher speaks with normal conversational modulation. It is recognised that the imperfectly hearing child will depend for verbal content, not only on prosodic features of discourse hit en lipreading as well. For this reason, some schools of oral thought perfer a less natural but more precisely articulated manner of speaking, so as to emphasize the features of speech visible at or in the mouth. Sometimes the natural gestures which normally accompany speech are used. Great use in made of written language to reinforce spoken language, so as to establish the relationships between print-read, lip-read and heard forms and to emphasize into national patterning and syllabic stress which is available to the hearing child acoustically. Oral pedagodic principles insist that the oral environment be maintained outside the classroom as well. The practice of course varies. Because signing is a vernacular language amongst deaf adults, its preserve is virtually impossible to eradicate within a school community.

A classic defence of oralism relies as the example of deaf individuals who have become outstandingly successful members of society inspite of their handicap. These are extremely rare and certainly far too few to sustain an educational system intended for a majority of deaf children during (1960) referring to children who from an early age suffer from ".... profound subtotal as in a small minority total deafness" never-theless reports that "A good many of them have gone far in achieving high occupational status". These orally successful people exist they do not await the arrival of the ideal educational conditions.

There are no agreed qualities which define an orally successful child. Oral success in oral society becomes evident when occupational status has been established.

The ability to understand through speech is by definition central in any concept of oral success Fry(l975) has asserted that "there are many instances of children with very considerable losses of hearing, of the order of 80-100 dB who... have also learned to produce speech that is reading intelligible to the ordinary listener".

1.1.2. Finger spelling

As its name implies, consists of the spelling out of individual words of the written language, letter by letters, on the finger, each letter of the alphabet being represented by a particular sign. Some countries use two-handed alphabet and in some countries like United States one-handeld alphabet is used. It is clear that the one-handed, alphabet has advantage in leaving one hand free and it seems likely that there is greater case in watching hand and lip movements made simultaneously because the hand of the speaker can be held near the mouth. The disadvantage with one-handed alphabet is that it calls for greater dexterity and it is rather less expressive, purely as a form of manual gesturing, than the two-handed variety.

As a form of communication the linguistic state of finger spelling is no different from that of the written language and is capable of use by itself as a completely effective means of communication at a high level among educated deaf adults. Like oral communication, finger spelling may have practical. limitations for use with children or in school. There is a tendency to use abbre-

viations in finger spelling in the classroom, reducing the full notional value of the medium. This has an adverse effect on the use and development of language.

Reports from the U.S.S.R. suggests that the teaching techniques used there are considered to present no difficulties in the transition from finger spelling to speech.

The Russian method of teaching young deaf children is complex and has many interdependent features. It may not be capable of transplantation without modification. It is suggested that it is generally inadvisable to use finger spelling in teaching children up to the stage of about six years.

Sometimes teachers of older children make use of letters of the manual alphabet to indicate phonemes which are difficult or impossible to lipread. These teachers should make themselves familiar with the work on phonetic basis of English speech sounds.

Methods which combine fingerspelling with speech continuously or simultaneously way create problems of distraction or synchronization so careful attention must be taken while combining.

Speed of execution must be compatible with the children's ability to comprehend what is being presented.

Finger spelling might be justified for people with basic oral proficiency for whom it will be meant as a means of accelerating the speed or imparting informations.

Finger speaking may be used as a supplement to oral media, reading and writing, and many investigators suggest this as a means of helping deaf pupils with poor lipreading ability for which their residual hearing compensates inadequately.

Some consider use of finger spelling is incompatible with the aim of integration in hearing society.

The words represented in finger spelling are not a native part of vernacular signing, but is used when no sign is reading known to the people conversing. The extent of the use of finger spelling in conversation varies greatly depending on the content of conversation and people engaged in it. The English language and most others (Carmel, 1975) can be used

without any speech at all simply by finger spelling each word. As an exclusive mode of communication fingerspelling is generally regarded are too slow, though highly practised users may use surprisingly fast transmission. Since 1878 it is used with simultaneous speech at the Rochester School for the deaf in the U.S.A. and is named after it as "Rochester Method".

1.1.3. Signing

The study of sign language used by deaf people is still in its infancy with the advancement of modern linguistics with new issues developing in descriptive, theoritical and applied linguistics sign languages have assumed a new prominence among language scientists.

Sign language is defined as a system of signs which form a language. In practice, sign language presents as a signall ing code with some of the attributes of language, its elemets its signs equqte with the elements, the words of the language spoken in their native culture.

There are so many different kinds of signs and variaties of signing that a single definition cannot

be attempted. The distinction between natural gesture and signing is that in the former a movement is nearly always understood by a hearing person as by a deaf person and in signing, a system of formalized gestures needs to be learnt like a foreign language. The Reverend Canon T.H. Sutchiffe identified the following elements in signing:- gesture, used either naturally or in conventional form, facial expression; mime; and the identification of objects by reference to an outstanding characteristic, and of qualities by reference to objects possessing them.

Four main types of signing are recognised by Edward short and Lewisi-

(a) Signing as a means of communication used among some deaf pupils out of class in which spontaneous gesture often appears to predominate. In general, signing among deaf children at schools and to have developed incidentally from the childrens natural gesture often (developed) learned from each other from the signs learned at hoke by children of deaf parents and from signs learned by some children visiting clubs for deaf adults.

(b) Signing as means of communication used among deaf adults in combination with other means.

(c) A systematic sign language with normal grammatical structure, of which Paget systematic sign language and American sign language are examples.

(d) Sings used in combination with finger spelling and speech in combined communication. This form of signing is reported to have a modified linguistic structure in which indications of tense can be given and symbols are available for different parts of speech.

In signing as practised by deaf adults, the sign does not follow normal word sequence, verbs are used less frequently than in the common language and in uninflected form, symbols are lacking for certain parts of speech and sings sometimes represents words and sometimes ideas, feelings or attitudes. This form of signing is systematic neither in its structure, nor its meanings and combination of speech and finger spelling with this form provides for effective means of communication between adults.

Essentially, use of sign language has its impact educationally as a means of evading hearing deficit. It emphasizes a visual mode of language which, unlike lipreading, provides a linguistic singnal which is easily perceived. No special equipment is required to converse in sign language and though lacking the omni-directionality of speech for normally-hearing person, it is usable over a greater physical distance than speech. 'Sign language is a system of gestures principally centered on the hands and used for interpersonal communication. Signing is generally an autonomous gestural system with morphological and grammatical forms independent of the spoken language of the society to which the deaf-signers belong. It is the use of finite, though complex, set of units and rules which allow the generation of an unlimited variety of sentences". (Bonvillian, Nelson and Charrow, 1976).

The majoirty of these studies have centred on American sign Language (ASL). ASL has retained that essential characteristic of a living language in that if is free and rich in usage. Signing is a principal medium of instruction at Galludet College. Facility in ASL is a requirement for teaching staff. Cicourel and

Boese (1972) refer to its ".... capacity to generate a system of manual signals that makes distinctive use of physical space for generating a non-oral system of communication."

Following Stokoe's (1960) description of grammatical regularities, Lane, Boys-Braem and Bellugi (1976) have made a detailed analysis of the systematic way that space is used in ASL, defining four parameters of which a sing may be composed. Shape of the hand, location of the hand, orientation of the palm and movement of the hand. This description is an analogue of the description of phonetic features of spoken language. Bellugi et al (1974) showed that signs which shared common features, like words which share common phonemes are difficult to recallsBerially. ASL is capable of expressing remarkable linguistic nuance a systematic manner and represents the simplest communicative concept.

The vocabulary of sign language has often been assumed to consist of relatively few iconic gestures. Unquestionably there are many such signs with observable relationship to their referents (Charrow, 1974), giving rise to the notion that there as an international sign language which is universally used by deaf people. Sign

languages, like spoken languages, leave ancient origins and individual histories. Woodward and Enter (1975) have estimated that there are 25% common signs in ASL and sign language of Paris. Bellugi and Klinea (1972) point out that ASL has a vocabulary dis-cussion of topics such as religion, politics and ethics and itself to humour, poetry and even whispering.

A further potent area of confusion concerns the syntax both of ASL and British Sign Language (BSL) It is a commonly argued that sign language should not be used in schools because it is ungrammatical". Stockoe (1971) has clarified this in pointing out that some signs may be produced concurrently when the words of spoken language are always sequential. Fisher (1971) notes that sign may be repeated without necessarily indicating a plural and that meaning may depend on rate of repetition. As Brennan (1975) notes" once stated the absurdity of the claim is immediately apparent. We do not expect, Russian, French, Turkish 'Gaelic' to conform to English norms; so why BSL?" BSL does not follow the rules of English.

Some learn sign language from their deaf patents as mothertongue in exactly the same way as do

- raering infants. Some learn it later as an acquired language though they may be more fluent and comfortable in it than in their society is spoken language.

1.1.4 ORAL MANUAL CONTROVERSY

There are factors which distinguish one child from another and which may be relevent to the child's ability to learn to communicate verbally. So the performances of children vary with the method of choice of education. This is to say that all deaf children will not be successful with the oral education only or with the manual communication mode.

Though oral philosophy strictly restricts to the oral environment inside and outside the classroom, this becomes practically impossible. Because sign language is a language used by mose deaf adults and its presence cannot be completely eradicated from school community. It is especially so in the case of non-selective schools, where signing may be used outside the classroom. At play where children need to communicate over long distances, speech will be useless to deaf children. They will gesticulate as hearing children and if more meaningful signs are known, they will be used as well. Though speech is the official language of

. some teachers will use gestures or whatever sign they may know when communication by speech is self-evidently inadequate. It is well known that little progress is made during school life in the oral essential of lipreading, and speech production remains poor and frequently unintelligible.

By its nature, when oralism fails to create an orally thinking child, it also fails to provide the child with alternative modes of thought. It lacks imaginative incognianative vicinity of procedures appropriate to the needs of a population. In Britain, when schools for deaf children report on the use of manual instructional methods, it is usually reported for the latter part of school life when it becomes obvious that there has been only minimal communication between teacher and pupil for many years. Even then signing used by teachers to lacking in proficiency often having learnt what little they know from their pupils. As a generalization, the majority of deaf children remain in a private cognitive world which only touches, from time to time, that of their teachers. Whatever be the 'stuff' which forms the substrate of their internal language, it is not speech. Discussing the oral manual Controversy Lowell (1976) for instance asks what the agreed objectives are, whether performance on the

Stanford Achievement test, happiness, lip-reading still, ability to earn a living, manual fluency, mental health, the size of the bank account of a family, or the intelligibility of speech." We don't have ways of knowing the specific relationships among these aims, but our task of assessment is simplified by inclusion of the basic communication skills which becomes central to our enquiry and which no educator has minimised.

Watson (1976), speaking from the standpoint of training teachers of the deaf, remarks that, "....one is dissatisfied with the terminal attainments of pupils being educated by oral methods only", and urges the need to make the system work better. Lumsden (1953) has also made similar comments regarding standards: "It is said that they cannot speak intelligently, that they cannot write... that they cannot read" Ewing (1930) commented that 'oralism' is not what it was twenty years age". Not only is there council dissatisfaction with standards of attainment but there has been for at least fifty years, but accompanied by no discernible shift in theoretical emphasis.

Reeves (1976) provides an exhaustive list of defects in the oral education of deaf children in Britain.

These includes inadequate numbers of especially trained teachers and high staff turnover, failure to diagnose deafuess early enough, insufficient parental guidance, lack of amplification equipment of all kinds, both individual and group, together with inadequate servicing of what there is, poor facilities with respect to other classroom equipment and poor design of prupose-built premises Reeves opines that the same impoverished conditions will of course equally impair the progress of manual principles." This is true as a generality, the relative effects of attempting to correct these various deficiencies are probably not equally significant for pure-oral education and for education which uses manual communication as well. Two items may be singled out for note.

Firstly, failure to diagnose deafness early enough becomes a particularly important defect when linguistic development is critically based on the auditory channel. It Belays the application of special techniques and especially provision of a hearing aid. Once this opportunity is lost, we have to wait until it is clearly evident that normal speech is not developing.

A second broad condition impeding the application of correct oral principles, particularly in the early years of education, is insufficient provision and maintenance of equipment for amplifying speech in classroom contexts. This is a sensible requirement for optimal communication whether it be purely oral or oral augmented by signing. Poor facilities of this kind can be a hazardous excuse for poor oral standards. This oralism has conspicuously evaded. Ling (1975) has expressed this authoritatively ".....even the highest possible level of sophistication in auditory programming cannot compensate fully, or even mainly, for severe or profound. Learning impairment".

No set of educate oral principles can survive for long when the conditions claimed to be essential for their implementation cannot be met realistically. Not only are the material resources of any society limited and subject to provisties, but the resources of technology and knowledge are limited as well. A viable educational principle must be capable of adapting, not merely to the special requirements of its clients, but to the constraints which are imposed upon it by the socio-economic system in which it operates.

Universal benefits of oral success has become increasingly suspect as teachers themselves view the outcome of their own endeavours and parents of deaf children become aware of the discrepancy between promise and fulfilment. Oralism is regarded as the correct form of educational intervention but with an excluder. This appears in the quotation from Try (1975) "A great number of deaf children are able to learn to speak intelligebly".

Usually a caused attempt is made to specify which kinds of children constitute the minority who do not benefit from oral education and require treatments like manual communication.

Memorandum of the British National College of Teachers of the Deaf (1972) says that 'It may be for instance, that some profoudly deaf dhildren, who are also mentally handicapped may find their only simple means of communication in simple system of signs".

Mindel and Vernon (1971) refer to these children as those who have been filed by the oral method. The signing alternative is usually suggested as a last resort. Some consider as dangerous and some even hostile, some of the teachers feel superstitiously threatened by its use.

Hammings (1972) comment that teachers in partially hearing units felt this way.

Van Uden (1970) opines that the use of sign language results in "building up a primitive own world view, different from ours" and which will make the teaching of" our oral language" more difficult, it must be considered whether manual communication can provide easier access to oral language than does.

1.1.5 Total communication/Simultaneous Method

The term "combinedmethod" normally refers to any mode of communication where speech and lipreading in varying degrees, with or without ampliped sound, are used simultaneously with manual communication.

In America the term "simultaneous method" is applied to a combination of media of communication which includes signs.

To others total communication promises the dawring of a new day in deaf education, which will result in miraculous language and educational development for all deaf children. Some prefer to call it a 'philo-sophy rather than a "method".

In 1968, the Maryland School for the Deaf introduced a formulated programme of "total communication" in which sign language and finger spelling of words, as well as speech were incorporated into classroom teaching. Only now are the first children to have been wholly educated in this way beginning to reach school leaving age. Garretson (1976) reported that by 1976 almost 75% of all school programmes for deaf children with an enrolment of 100 children or more had reported to the introduction of total communication.

Well documented accounts of progress by deaf children in learning sign language in circumstances when it is taught by bearing people are rare, though it is happening in many places. Evans (1978) provides a very detailed account of the introduction of one-banded finger spelling in a residential school for deaf children in England. Children aged seven to sixteen years made very substantial progress in this one year.

Deaf children easily acquire sign language. The fact that both deaf and hearing children with deaf parents fluently use sign as a primarily language in early childhood and with little exception - establishes

manual communication as a natural development in conditions comparable to those in which oral language naturally develops. However, the problems of educating deaf children in Bilingual manual and oral modes are practical and many remain unsolved.

In recommending total communication as the preferred approach to the education of deaf children, Meadow considers it to mean the early, consistent, simultaneous use of spoken and signed English by all significant others in the deaf child's environment. This definition sets total communication apart from the old "simultaneous method" because it uses one of the newer sign language systems with English grammatical and syntactical markers it is introduced during the early months or years of the deaf child's life because it assumes that parents and siblings as well as teachers will use this communication with the deaf child, the term 'conssitent' implies that all communication addressed to the child or made in the child's presence will have to be bimodal. The communication can be simplified, but not by dropping ane or the other modality. This approach does not rule out the addition of gesture or pantomine or writing of these are useful in stimulating understanding and communication.

This approach and recommendation have developed from observing children at the University of California, San Franscisco. The children who were exposed to this "optimum" language environment - which included the introduction environment - which included the introduction of signs with (Spontaneous) spoken language no later than three years of age and as early as eighteen months of age, with consistent and careful amplifications, a program of counselling for parents, and intensive support services - acquired language is much the same way as hearing children do and at very similar rates. Parent-child interaction was marked by enjoyment and by the communication of meaning.

In contrast deaf children who enter kindergarten of first grade with no meaningful linguistic system, with additionalhandicapping problems, with busy-or parents, present a picture which already calls for remediation for rehabilitation rather than habilitation. If the children are bright and aware of their environment, they may well have developed their own historic languages or gestural system and can be subjected to Total Communi-cation.

Kathryn P. Meadow opines that deaf children with hearing parents should be exposed, as soon as their hearing defect is discovered, to the total communication, combined usage of spoken and signed English.

Research by Meadow (1967, 1968) Quigley and Frisina (1961) Quigley 1968 stuckless and Birch, 1966, vernon and Koh, 1970) has demonstrated that deaf children with deaf parents performed at least on the same level as deaf children of hearing parents. While these studies do not demonstrate the positive value of the additions of the visual mode, they indicate that the use of sign language does not have a negative effect on the development of linguistic, social and educational skills.

As these various studies became more widely known in the field of deaf education, many professionals relaxed their formal strictures against use of sign language. Some began to prescribe sign language for deaf children who had handcaps in addition to a hearing impairment and who had not successfully learnt oral skills by the time they were six or eight or ten years old.

Schlesinger followed the language development of two children, Ruth and Marie, whose hearing parents

were using both signed and spoken English as well as hearing aids and speech training. Ruth was observed and videotaped from the age of 2 years 8 months to 3 years 8 months. Her parents began to learn and to use total communication when she was 15 months odl. At 3 years of age, Ruth's vocabulary included a total of 348 words; at 3 years 4 months, she had a vocabulary of 604 words including one or more in each form and structure class. In the basis of texts of grammatical complexity administered when Ruth was 3, Schlesinger concluded that Ruth was following the same order of grammatical emergence in signed and spoken language as is demonstrated by hearing children. Marie was adopted by a hearing family at the age of 6.5 months and her parents began to use manual communication when she was 3 years 1 month old. She was followed by Schlesinger from the age of 3 years 4 months to 5 years 3 months. Data on Marie's language showed that she was incorporating English syntax and was appropriately using characteristics that are not a part of Ameslan, such as plurans and tense Marie's mother played fingerspelling anagram games with her and at 4 years 5 months Marie demonstrated that she was able to transfer her learning from these to reading materials. Marie also gave the evidence of acquisition of negation, as is seen with hearing

children. An assessment of lipreading skill showed that she was a more proficient lipreader that most 5 year or a deaf children. If the oral and manual systems of communication are competitive rather than mutually supportive, or if speech fails to develop in children exposed to signs, these children could be expected to reflect these theories.

Schlesinger made counts of the expressive language modes for the two deaf children:

	Age	Speech only	Signs only	Both
Ruth	2-11	10%	22%	68%
	3-1	24%	19%	57%
	3-3	29%	4%	66%
Marie	3-4	12%	79%	9%
	3-10	4%	81%	14%
	4-8	18%	58% -	24%

At successive ages, Ruth's use of speech alone increased while her use of signs alone decreased. Her combined use of speech and signs remained approximately the same. Marie, on the other hand increased her relative use of speech both alone and together with signs, while her use of signs alone decreased significantly. The possible explanations for the discrepancies are, (l) Ruth consistently had hearing aid amplification

more appropriate for her loss, than Marie had, and parents were been on keeping her hearing aids in working order

(2) Ruth's parents were more committed than Marie's.

(3) Ruth's mother used a combination of speech and signs consistently with her, while Marie's mother slipped into the use of signs alone more often.

Greenberg (1978) studied 28 children age's 3 to 5. Half of the children were in not only pre-school programmes, half were in total communication pre-school programmes. There were no differences in communicative behaviour between total and oral only children.

Inferential evidence from these studies about the efficiency of various methods show no reason to support continuing dedication to an oral only approach.

Children who are exposed to early manual or simultaneous manual-oral input appear to develop more adequate inner language, with no reduction in their abilities to use speech and speechreading for communication, than children who are not so exposed.

So far, Total Communication Approach has not been systematically used in India. The main reason being the nonavailability of information on Indian Sign Language.

The present study is a preliminary effort at establishing a basic sign lexicon and to evaluate its intelligibility to, normals. By arriving at a lexicon and intelligibility Quotient for the signs, we can evaluate the usefulness of the sign lexicon in total communication for the hard of hearing children.

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CHAPTER - II

REVIEW OF LITERATURE

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CHAPTER - II

REVIEW OF LITERATURE

This chapter comprises of some of the studies on American sign language and Indian Sign Language.

2.1 American Sign Language

American is used by approximately three-quarters of the deaf adults in the United States (Rainer, Allshuler and Kallmann, 1969).

American Sign Language is the primary language used for communication among deaf people in the United States and parts of Canada. It is the fourth most common language used in the United States (Mayberry, 1978), and has only recently been discovered by psychologists and linguists.

Sign language is not universal. The relation-ships among present-day sign languages are established through historical and comparative studies of sign languages (Jordaw) and Battisun, 1976 Woodward, 1976).

2.1.1. Linguistic Structure

The first truly comprehensive descriptions of the signs of Americans sign language is provided in 'A Dictionary of American Sign Language by Stokoe, casterline and Croneberg (1965). Their linguistic description based on the work of Stokoe (1960) and accompanying transcription system have provided a firm base for later investigations of American Sign Language.

Stokoe (1960) provided evidence that a sign could generally be described by reference to three components which he named tab, dez and sig. The tab of a sign refers to the location where a sign is made with respect to the signers body. The dez indicates the handshape used to make the sign. The sig describes the movement involved in producing the sign. These are roughly equivalent to the phonemes of a spoken language. In order to describe the more than 2000 signs in the dictionary, 55 phonemes were required. i2 places of articulation, 19 hand configurations and 24 movements. Symbols were assigned to each of these and conventions were established for providing an ordered written description for a sign. With this transcription system,

usually called Stokoe notation, signs can be represented on paper.

The handshapes used to form signs are similar to those used in fingerspelling.

(a) Phonology

Studies of ASL phonology since 1965 have focussed on three major areas; The components of sign formation have been described, investigators have tried to answer the question why and how the parameters are combined to form signs, and attempts have been made to de terminethe feasibility of applying oral language linguistic techniques and principles to ASL. These studies point strongly toward underlying universal principles while at the same time emphasising differences due to the modality of language perception and production.

Severalinvestigations argue that a fourth parameter orientation, is necessary for a complete and difficient description of ASL signs (Battison, 1974, Firedman, 1975, Frishberg, 1975). It is argued that the parameter of orientation is necessary to distinguish between certain minimal paris of signs - SHORT AND TRAIN. Both these signs are made in the open space

in front of the body. Orientation seem to be important.

Battison (1974) has described two conditions that constrain the formation of signs. First, is the symuretry condition. It holds for two-handed signs in which both hands move. For these signs, handshape and movement specifications are identical and symmetric: The second constraint, the dominance condition states that when the two handshapes of a two handed sign diffe] one hand, generally the dominant one, will move. A thirc constraint is added by Frisheberg (1976) The movement involved in producing some signs requires two points of contact with the body. In such cases, constraints on the combination of the two contract locations occur. If the body is divided into 4 major areas (head, trunk, arm, hand) only 8 of the 16 possible combinations occur.

Constraints such as those described provide redundancy in ASL in much the same way as similar constraints provide redundancy in spoken languages. Counterparts to other oral language phonological mecha-nisms have also been described for ASL. These include assimilation, dissimilation, deletion and insertion ((Battison, Markowicz, and Woodward, 1973 Frishberg, 1975, 1976)

Several investigators (Fisher, 1974, Frishberg, 1975, Klima, 1975) present a rather striking difference between ASL and spoken languages. In English and other spoken languages, the elements forming words occur sequentially in a linear order. The elements of a sign occur simultaneously, or at least are overlapping and cannot be analysed as temporal sequences.

The studies described so far have been primarily concerned with the sign qnits equivalent to morphenes and ph0ne9m.es in spoken languages.

Frishberg (1975) presents a typology of ASL morphenes. Lanes, Boyes-Braem and Bellugi (1976) have attempted to define distinctive features for the hand configurations of ASL. These analyses yielded 11 distinctives features for the 16 ASL handshapes. There is some evidence that these feature distinctions may differ for different sign languages (S.D. Fisher, 1974 a; Bellugi and Klima, 1975)

(b) Syntax and Semantics

The grammar of a language provides a set of mechanisms that can be nsed to convey the semantic

relations among lexical units in an utterance necessary for the understanding of that utterance. Grammar of ASL is uniquely its own, but it is difficult to identify and describe the actual syntactic devices used. The change in language modality and the availability of three-dimensional space provide many opportunities for syntactic mechanisms that are not available for spoken languages.

Again, the dictionary (Strokoe etal, 1975) provides a starting place for a discussion of ASL structure. Sign language utterances or sentences are as clearly defined in ASL as they are in spoken languages. ASL utterances occur within a space in front of the body consisting of an area bound by the waist and the top of the head and extending a few inches on each side of the body. The end of an ASL utterance is signaled by pause as the hands return to a position of rest near the bottom of the signing space Grosjean and Lane (1977) have demonstrated experimentally that pauses can be used not only to determine the end of an utterance but to ascertain major constitutent boundaries within the utterance itself.

It is remarked that ASL has free word order. While word order is freeer in ASL than it is in English order is used to show some syntactic relationships. Fisher (1974a 1975) has concluded that modern ASL has a basic SVO (Subject Verb - Object) word order since this is the most common order used when subject and object are reversible. Word order is generally free when the verb is intransitive or when the verb is transitive and the subject and object nonreversible, when an auxiliary is added to the signstring, the number of permissible orders is greatly reduced from those possible, and order becomes relatively fixed within embedded sentences.

Giventhe relative freedom of word order in ASL, we should expect it to have a rich infleclinal system. Generally recognised inflections are rarely found in ASL. Systematic modification of are or more of the parameters of a sign often serves the same function that an inflectional system or word-order constraint serves in a spoken language. The added grammatical information occurs contemporaneously with a sing. A motivation for this simultaneity is given by Bellegi and Fisher (1972) In a typical narrative situation, it takes longer to produce a sign than a spoken word, but prepositions, or simple sentences, take about the

same amount of time. This suggests that there is some underlying processing constaint in language perception (or production) that requires that the rate of information transfer must remain rather constant ASL, then must have mechanisms to compensate for the extended time necessary to produce signs.

Susan Fisher (1972) suggests three compensating mechanisms. One is simply to do with out certain kinds of mechanisms. A second, incorporation, involves the above-mentioned modification of signs to convey grammatical relations. Incorporation is a productive mechanism in ASL. It is used to express location, number, manner size and shape for example. Non manual signals including body movements and facial expressions, compose the third category of compensating mechansim. Both incorporation and nonmanual signals occur concurrently with a sign or signs, saving the time that would be necessary to add additional morphemes in spoken languages.

Certain grammatical mechanisms common to spoken languages occur in ASL but with the obvious change in modulity. For example, reduplication, the repetition of a lexical item, is used with ASL verbs to express the concepts of durative and habitual (S.D. Fisher 1973)

Other grammatical mechanisms are specific to the modality of ASL. Modification of the location of a sign in the signing space and of direction of movement are used to express grammatical relationships. Prono nalization is usually accomplished wither by pointing to the persons or object referred to or pointing to a location assigned to the person or object earlier in the narrative (S.D. Fisher, 1974, Friedman, 1975). A highly productive use of spatial referencing occurs with a large set of ASL verbs for which subject-object or subject-indirect object relationships are incorporated into the direction of movement of the sign (Fisher and Gough, 1978)

Verbs are not inflected for tense in ASL. Instead time is indicated lexically. Most of the time signs are related morphologically; their locations fall along what has been called the time line. This line describes an are beginning in front of the signer's dominant side, touching the cheek and continuing behind the signer's head (Friedman, 1975, Frishberg and Gough, 1973). Present-tense time signs occur in a plane parallel to the signer's body and intersecting at the front of the face. Future signs are located on the time line in front of this plane; past signs, behind it.

It has been suggested by S.D. Fisher (1974a) and others that facial expression and body attitude may serve as grammatical mechanisms in ASL. They correspond in many ways to intonation and stress in spoken languages (Covington, 1973). It is also noted that certain nonmanual. Signlas accompany manual indicators of grammatical relations. A questioning look or a headshake often acompany air ASL question, and head tilts and eye contact may indicate subordination. The actual role of these nonmanual signals is yet to be formulated for ASL.

De Matteo (1977) has suggested, that the discrete nature of the description will not capture some of the regulating in ASL and that, in addition to the traditional Approach, a system based onvisual analogues will be necessary for complete description of ASL.

2.1.2. PSYCHOLOGICAL PROCESSING

Most of the research involving deaf persons has not been directed toward an understanding of the processing of ASL. The reasons for this fact are varied but certainly include the growing emphasis on oral education in the United States from the turn of the century to the 1960s. Only within the last decade have more than a handful of researchers come to understand the complexity, productivity and arbitrariness

of ASL. With this change in attitude many recent studies have shown that the study of ASL can lead both to a greater understanding of manual language processing and to a better understanding of general psychological processes on well.

2.1.3. LANGUAGE ACQUISITION

A comparison of the general course of ASL and oral language acquisition suggests that a general underlying capacity guides the course of all language acquisition.

In order to draw a comparison between ASL and oral language acquisition, the contexts of language learning must be compenable. This means that the child studied should be deaf and have deaf parents who use ASL in the hone both with the child and with visitors to the home studies of this kind have led S.D. Fisher (1974b) and others to propose of the following parables between sign language acquisition and the acquisition of an oral language.

Hearing children begin to babble at approximately 6 months of age; deaf children to do also-but with their hands. This gestural babbling is reported by investigators attempting to study auditory babbling in deaf children as well as deaf parents. At about 1 year, children begin to produce a one word utterances. At the same age, a deaf

child in a sign environment begins to produce tringle signs. Two word strings are formed by hearing children at about 18-24 months of age. Deaf children within the same age range begin to form two-sign strings.

Ursula Bellugi (1973) studied mean length of utterance for one deaf child and this clearly parallels with data from three children acquiring English as a native language studied by Broan and his colleagues.

Bellugi and Fisher (1972) have shown that it takes almost twice as long to produce a sign as to say a word, and, short term mendry studies (Bellugi and siple, 1974) indicate that it also taken longer to reherse a sign.

Investigations of the acquisition of specific ASL constructions further support the contention that there are general cognitive or linguistic universals underlying language acquisition.

At the phonological level, Boyes and Mc Intire (1974) have investigated the acquisition of ASL handshapes developmentally. Boyes has nsed Jacobson (1968) concept of markedness to propose an order of acquisition for ASL handshapes. She argues from anatomical data that the A(or s) handshape is the first to be used by the child and thus

corresponds to an unmasked form. A set of features corresponding roughly to those proposed by Lane et al., (1976) are assured to be acquired in a given order first for the entire hand and then for individual fingers.

Data examined by Boyes (1973) and by Mc Intire (1974) support the general outline of handshape acquisition. Just as there is "baby talk" in spoken language, there are "baby signs" in ASL. An examination of the baby signs shows that in general, when an incorrect handshape is used for a sign, the substituted form is less marked. Brown (1973) has conducted that there is a universal principle underlying the first multiword utterances. Brown contends, stage 1 for all languages, expresses a small set of semantic relations and this set is ordered developmentally. Longitudinal studies of ASL acquisition support Brown's contention (Collins-Ahlgren, 1975, S.D. fisher, 1974b; Klinca and Bellugi, 1972, Nash, 1973, Schesinger and Meadow, 1972) The acquisition of negation in ASL looks similar to that for English because the grammatical mechanisms used are similar Locative relations are expressed differently in two languages and are more easily expressed in ASL because they are use spatial reference points. Both Yes-no and

questions occur in English and in ASL., but the mechanisms differ greatly and for stages of acquisition for questions, (S.D. Fisher, 1974b).

The study of sign language acquisition has only just beguni problems faced by investigators are enormous, following the tradition for spoken languages, free interaction sessions have been vedeotaped longitudinally for a few deaf children who are learning ASL from deaf parents in a native environment. The problems associated with the transcription of these tapes are the hardest. Investigators are seeking to standardize the methods of study so that important aspects of sign language can be recorded and comparisons among children can be made.

2.2. Indian Sign Language

- Madan Vasishta
- James Woodwards and
- Susan De Santis

Background of the project

As a first step in this project, a questionnaire was sent out by Vasishta to the principles of 117 schools for the Deaf in India. The findings from these responses suggested that there was a great interest among Indian educators of the Deaf in implementing a study of Indian Sing Language varieties.

Encouraged by this and with the help from the Galludet college Research Division and the All India Federation of the Deaf, Vasishta, Woodward and Kiok Wilson from the Boston University program in Psycholinguistics came to India in 1977 to collect the data. The research centered as a comparison of Indian and American Signs by Vasishta and Woodward and some synntctic description of free conversation transcribed by Vasishta and analysed by Wilson. The results of the research were described by Vasishta, Woodward and Wilson.

Vasishta, Woodw ard and Wilson (1978) found that Indian Sign Language is not related to the French Sign Language Group, which includes, French, Spanish and American Sign language while there is some influence from British Sign Language in the finger spelling system used with Indian Sign language and in some of the individual signs such as Good and Bad, the vast majority of Indian Signs are not related to European Sign Languages.

Vasishta, Woodward and Wilson's (1978) study revealed that there is only one Indian Sign Language. They have demonstrated (l) that varieties of Indian Sign Language are not directly related to European Languages.

(2) that varieties of Indian signing constitute one language

(3) that there is systematic variation in and between regions in India.

(4) that the amount of difference in signing should allow communication among cities without any major problems in language standardization and planning that are faced by the oral language communities.

2.2.1. Notes on Indian Sign Language Phonology

There is a level of sublexical structure in sign language analogous to but not dependent on the phonological components of oral languages (Battison, 1974) Linguistic research on sign language phonology has concentrated primarily on American Sign Language and has comprised both therotical studies and studies based on descriptive linguistic and psycholinguistic data.

Descriptive studies of American Sign Language phonology began with Stokoe (1960,1966) who performed preliminary structural analyses of American Sign Language phonology Stokoe showed that sign phonemes could be classified into three major groups; Tabs or places where signs are made, dezes or handshapes used in Signs movements making signs. Battison, Friedman, Woodward and Zambrauo attempted a feature analysis of places and handshapes and postulated that a fourth parameter of orientation of hands

was needed to describe formational properties of signs adequately. Battison (1978) and Wilbur (1979) have excellent summaries of Research in Sign Language phonology.

Due to the small amount of time available for producing this dictionary, Madan Vasishta, James Woodward, Susan De santis had no time to complete a detailed phonological analysis of Indian Sign Language. Rather they have included some notes on handshapes and location, the two most frequently studied parameters in sign language phonology. They have included these notes to show the regularity of the Indian Sign Language phonological inventory with the phonological inventories of other sign languages and hope to complete a detailed phonological analysis of Indian Sign Language in the following certain handshapes and locations in sign languages are less marked (complex) than others. Boyes (1973) and Mc Intire (1974, 1977) have shown that children differ systematically from adults in articulation of signs and that there is an ordering of the acquisition of handshapes into four stages. Woodward (1978b and 1979) shoved that similar levels of complexity are also predictable across adult sign languages. If a sign language has more complex handshapes, it will also have the simpler handshapes.

Indian Sign Language has all the least marked ie., the simplest handshapes found in all other researched sign languages. These handshapes are B,5,G,A,S,C bo, o & F. Indian Sign Languages also has more complex handshapes found in some other sign Languages: A,V,Y,I,3 and X. The following dhart gives the handshape analysis of the Indian signs.

HANDSHAPE	SIGN
B	ABLE
5	AFRAID
G	ABOVE
A	ADVERTISEMENT
S	ACCIDENT
C	APPLE
bO	BEE
O	ABOUT
F	ACT
F	FENCE
H	BARFI
V	BLIND
Y	AIR PLANE
I	BAD
3	COAL
X	CROCHET
8	TELEGRAPH

Indian Sign Language does not have certain other extremedly complex handshapes that are found in only a few sign languages. For example, Indian Sign Language does not have K,R,T,E,7,D,M and N. With the exception of 8 which is only relatively uncommon, the rest of the above complex handshapes are extremely rare in sign languages. Thus, Indian Sign Language phonology is highly systematic, since it follows the universal system of handshape complexity found in all

researched sign languages, although the individual handshapes are unique to Indian Sign Language.

The same situation helds true for locations in Indian Sign Language. De Santis (l979a,b) has shown that if a sign language has signs on the arm , it will also have signs as the trunk, face and hand. This is also true of Indian Sign Language which has arm, trunk, face, and hand signs. Indian Sign Language has lower and upper arm tabs; high , centre, low trunk and shoulder tabs, forehead, eyes, nose, mouth, chin, throat and cheek-ear tabs; and hand and zero tabs. These locations follow the universal system of location complexity found in all researched sign languages. Locations provide further evidence of the regularity of Indian Sign Language phonology.

2.2.2. NOTES ON INDIAN SIGN LANGUAGE SYNTAX

Kirk Wilson has done a preliminary analysis of a number of syntadic devides in varities of Indian Sign Language. It should be obvious that the grammar of Indian Singh Language is highly complex and that Wilson's study can only be considered preliminary in the quantity of rules analyzed.

1) Whenever there is a sentence containing a subject and a verb, the subject always preceded the verb.

MAN CRY

The man cried.

2) For sentences containing a subject, berb, and object, 95% of the sentences had a subject-object verb word order. Some of these sentences as well as the other 5% of the sentences relied on directionality in three dimensional space (movement from subject to object) for expressing subject object relationships.

WOMAN PRONOUN MAN PRONOUN LOOK

RIGHT LEFT (Directional from woman to man)

The woman looked at the man

3) Negatives in Bombay, Bangalore and Calcutta were always placed postverbally at the end of sentences. This was also the preferred order in Delhi. 77% of sentences had negatives postverbally at the end of sentences while 23% of the sentences placed the negative directly before the herb.

MAN CRY NOT

The man does not cry.

4) Past tense in Indian Sign Language is expressed by a past tense sign that is placed at the end of sentences. Wilson states "It also appears in Indian Sign Languages, a time frame is set by the use of the past market and no further reference is made until a tense shift is made", (Vasishta, Woodward and Wilson, 1973)

MAN CRY PAST

The man cried.

5) Wilson slates Adjectival modification provided the most striking example of a consistent Indian Sign Language grammatical process observer in each of the four cities and yet which does not bear a close relation with the indigenous spoken language. In over 97% of the sentences, the adjective occured after the noun. When the adjective was a color adjective, especially one that modified an ojbect noun, an equally high percentage of adjectives proceeded the noun.

MAN GOOD WOMAN LOOK

The good man looked at the woman.

MAN WHITE BALL LOOK

The man looked at the white ball. From these examples and other discussed by Wilson, Vasishta, Woodward (1978) conclude "It is clear that Indian Sign Language has

a definite set of grammatical rules for expressing sentence relations. It is also important to note that the regular nature of Indian Sign Language syntax does not parallel the syntax of the spoken languages with which various deaf communities have contact although Indian Sign Language shares some borrowed features from contact with Indian Spoken Languages".

2.2.3. FOCUS AND USE OF THE DICTIONARY OF INDIAN SIGN LANGUAGE

The dictionary is a representative but not exhaustive compilation of Indian Signs used in the Delhi area. If some Hindi words do not have a sign it does not mean that no sign exists.

The authors mention that there is regional variation in Indian sign language. Since this dictionary only includes signs used in the Delhi area, it should not be used indiscriminately in other parts of India. For example, the sign BLUB differs in Delhi and Bombay and Bangalore. Probably 70% of these signs are closely related variants of these signs with be used in other parts in India also. Potential users of this dictionary who come from different Regions should ask 5 to 10 Deaf people from their own region which of the signs are used in their own region. The users of the dictionary should not attempt to learn individual forms of signs solely

from this dictionary because the appropriate facial expression without signs movement is not maintained by models for the duration of a still photograph. Moreover it is no substitute for face-to-face interaction with native users of the language.

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CHAPTER - III

METHODOLOGY

3.1. Purpose

3.2. Subjects

3.3. Material

3.4. Procedure

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CHAPTER - III

METHODOLOGY

3.1. Purpose

The present study was aimed at establishing an inventory of signs (Lexicon) used by the deaf students of Deaf and Blind School, Mysore. The comprehensibility of the sign lexicon was checked on normal children of the same educational standard to evaluate its usefulness in the total communication approach for hard-of-hearing children.

3.2. Subjects

For this dictionary, signs were elicited from 30 deaf male signers who varied in age from 13 to 18 years. The deaf students were from four different educational standards, 3rd, 4th, 5th and 6tb standard. These deaf students were exposed to both American Sign Language and Indian Sign Language but were not taught sign language systematically. They learnt it from preyers. Deaf Students who had other handicaps (visual, physical) were excluded from the study.

To check the comprehensibility of the sign language, 30 normal children from four different educational standards from a local school (Demonstration School, Mysore-6) who varied in their age from 8 to 12 years were selected.

3.3. Material

The material for the study consisted of hundred words which were grouped into four different groups as concrete nouns, Abstract nouns, verbs and Adjectives. Each group consisted of 25 words.

The basic word list for the study comes from the first "Dictionary of American Sign Languages by William Stokoe, Dorothy Casterline and Carl Croneberg published by Galludet College Press, 1965 and a representative dictionary of the Indian Signs used in the Delhi area. "An Introduction to Indian Sign Language by Madan Vasishta, James Woodwards and suban de santis, published by All India Federation of the Deaf, 1980. Among the hundred words selected, some of the words such as ಬೆಳ್ಳಿ ಬಿಂದಳು (Moonlight) ಅಪಾಯ (Danger) to which the present deaf population was not exposed were eliminated, and familiar forms such as ತರಗತಿ (Class) ಚಳಿ (Cold) were used.

3.4. Procedure

The experiment was conducted in 2 phases. In the first phase deaf students were tested for eliciting the lexicon.

In the second phase of the experiment normal children who were not exposed to sign language were

tested to check the intelligibility of these signs.

First Phase

The words were written on cards and presented individually to the deaf students.

The experimenter presented the cards one after the other and the deaf students were instructed to use the appropriate sign for the written words. The instructions were given in sign language.

The order of presentation was concrete nouns followed by Abstract nouns, followed by verbs and Adjectives.

The deaf students were tested individually in a room where there was sufficient light. When the written words were not clearly understood, pictures and explanations if necessary were used.

The response of the individual student was recorded separately in a reponse sheet for every word in terms of the hand shape, hand movement and accompanied facial expression, if any.

If students used more than one form, the variant preferred by most signers was listed first and the variat forms were also recorded.

Second Phase

In the Second phase of the experiment, intelligibility of the signs to those who are not exposed to sign language was checked employing normal children. These children had no earlier exposure to sign language. A skilled signer signed before normal children words from the four different lists. Each list consisted of 25 words and the words used were categorized as concrete nouns, Abstract nouns, verbs and Adjectives. These children were given sheets ofpaper on which the 35 words had been printed and were instructed to familiarize themselves with the word list. The normal children were encouraged and to guess the meaning of the sign from among the 25 words listed as soon as the signer signed. While making such judgement, children were asked to rank the words in the order the signs were presented to them. The normal children had to select one word from the list and number it in the order of presented.

While testing normal children, the 6th standard students were tested first, next the 5th standard and then 4th and 3rd standard students respectively.

The order of presentation of the word lists was same as the one for the previous group. Concrete nouns followed by Abstract nouns, followed by verbs and adjectives.

The responses of the normal children were analyzed (l) to measure the intelligibility of the signs. (2) to evaluate the variance in intelligibility interns of the different classes of words and (3) in terms of the different age and educational standards included for the study.

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CHAPTER - IV

RESULTS AND DISCUSSION

4.1. Deaf Students

4.2. Normal hearing children

4.3. Discussion

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CHAPTER - IV

RESULTS AND DISCUSSION

The results were analyzed separately for the two groups (Deaf and normal). Among the normal children sub groups were made for the purpose of analysis. One group consisted of children who vere below 10 years and the other consisted of children who were above 10 years. Comprehensibility of signed lexicon was checked.

4.1. DEAF STUDENTS

The word lists were presented in this order, concrete nouns, abstract nouns, verbs and adjectives. While observing the response of the deaf students, sufficient care was taken regarding the movement of hands, use of hands (whether right or left), accompanied facial expressionand additional elnes if any needed for eliciting those signs. It was observed that all the deaf students used their right hand for signing. Only few signs as (laugh) నవు, (cry) ఏడ్చు, (fear) భయం, (sweet) తీపి, (sour) పుల్లి were accompanied by facial expression. Among the thirty deaf students very few students needed additional cues for eliciting signs. The additional cues provided were picture of the words and/or explanations. All the deaf

students provided the same signs for the hundred words used in this study and presented two or three forms for some words as (ball) ಚಾಲ್, (climb) ಹತ್ತಿ, . The word ball was represented by the game cricket, football, volley ball etc. in addition to the one presented in the picture. For the word ಹತ್ತು (hattu) two defferent meanings were provided; action of climbing and the number ten.

Because movement of a sign is difficult to represent and essential in the analysis of signs, the experimenter has used photographs as a way of displaying the signs. The model for this display was a good signer from Deaf and blind School, Mysore. An attempt was made to include appropriate facial expression in all photographs.

The elicited signs were compared with American Sign Language (ASL) and Indian Sign Language. It was found that some signs used by the deaf students in Mysore were similar to signs of American Sign Language, such as name(ಹೆಸರು), Aeroplane)(ವಿಮಾನ), Give (ಕೊಡು), eat (ತಿನ್ನು), love (ಪ್ರೀತಿ), More than thirty of the signs elicited in this study were similar to the signs of Indian sign language dictionary provided by Vasishta and others.

The signs are, aeroplane apple (ವಿಮಾನ), (ಸೇಬು), banana (ಬಾಳೆಹಣ್ಣು), bucket (ಬಕೆಟ್), ear (ಕಿವಿ), eye (ಕಣ್ಣು), eyeglass (ಕನ್ನಡಕ), fan(ceiling fan) (ಬೀಸಣಿಗೆ), time (ಸಮಯ), cold (ಚಳಿ), zero (ಸೊನ್ನೆ), bark (ಬೊಗಳು), brush(ಹಲ್ಲುಜ್ಜು), call (ಕರೆ), comb(ತಲೆಬಾಚು) cough (ಕೆಮ್ಮು), cry (ಅಳು), eat (ತಿನ್ನು), quarrel (ಜಗಳವಾಡು), feed(ತಿನ್ನಿಸು), read (ಓದು), run (ಓಡು), sew (ಹೊಲಿ), write (ಬರೆ), equal (ಸಮ), fat (ದಪ್ಪ), short (ಕುಳ್ಳ), strong (ಗಟ್ಟಿ), small (ಚಿಕ್ಕ), and thirsty (ಬಾಯಾರಿಕೆ.).

The photographs are presented in the following pages.

4.2. Normal Children

To assess the intelligibility of the signs obtained in this study, these signs were presented to thirty normal h aring children (of the same educational standard as the deaf students) studying in Demonstration Multipurpose School, Mysore. A good signer from the Deaf and Blind School Mysore was made to sign before the normal children. These normal children were given sheets on which the words were printed and they had to respond by marking the number (in order of presentation) against the words as the signer signed. They were given four lists of words.

The responses of normal children were scored right or wrong depending on the correctness of response. Score 1 (one) was provided for correct response and 0 (zero) for wrong response. The results are presented in tables in the following pages.

Table-1 shows the intelligibility quotient for the twentyfive concrete nouns. Mean intelligibility quotient for concrete nouns is 0.85 and standard deviation is 0.22.

In the intelligibility Quotient is expressed in terms of probability.

Table-2 shows the intelligibility Quotient for the twentyfive abstract nouns. Mean intelligibility Quotient for abstract nouns is 0.66 and standard deviation is 0.28.

Table 3 shows the intelligibility quotient for the twenty five verbs. Mean intelligibility Quotient is 0.91 and standard deviation is 0.14.

Table 4 shows the intelligibility quotient for the twenty-four adjectives. Mean intelligibility quotient is 0.74 and standard deviation is 0.42.

Table 5 shows mean values for thirty normal hearing subjects for concrete nouns.

/baketi/

/badane/

/hudugə/

/doni/

/gaddə/

/bal/

/baṭchaṇṇu/

/papə/

/vimanə/

/kappel/

/sebul/

/pustakə/

/bekkul/

/kaṭṭil/

/kivi/

/kaṇṇu/

/aṇṇadakə/

/hasu/

/nai/

/hul/

/paksi/

/raja/

/cʰitte/

/kattɛ/

/bisaniger

/vaisu/

/suttalu/

/kattalel

/beḷigel

/cʰaṭai/

/ratri/

/tiŋaḷu/

/hesaru/

/kʰali/

/vandane/

/dukʰa/

/tavagati/

/vidyucʰakti/

/dasara/

/bisilu/

/geḷeya/

/dipavaḷi/

/gaːṭi/

/sonne/

/samaya/

/Priti/

/madyana/

/kanasu/

/devaru/

/akaʃa/




/oḍu/ /snanamaːdu/ /hoːgu/ /kodu/




/tinnisu/ /tinnu/ /aḍu/ /boogaḍu/




/halluju/ /kare/ /useraːdu/ /mucchu/




/kemmu/ /hattu/ /eddukondu ba/ /bare/




/talabach^{h}u/

/atova:du/

/nagu/

/matana:du/

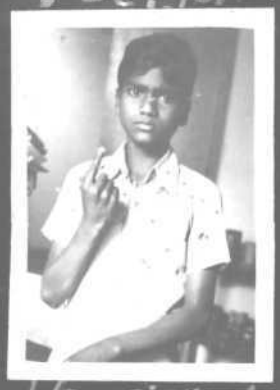
/jagalava:du/

/be:ga/

/sama/

/sihi/

/bayatikal/



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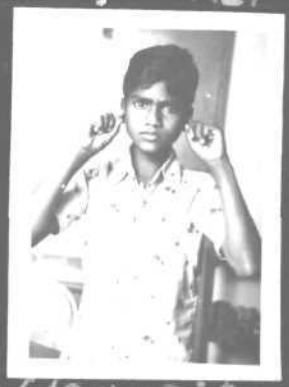

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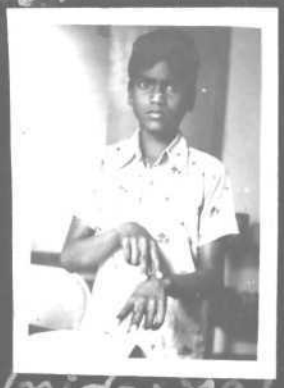

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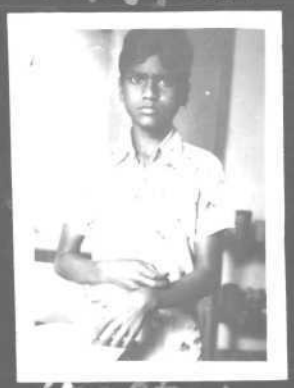

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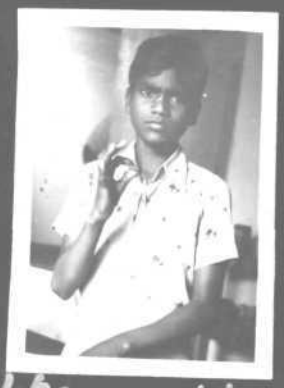

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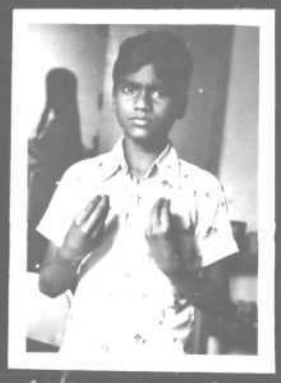

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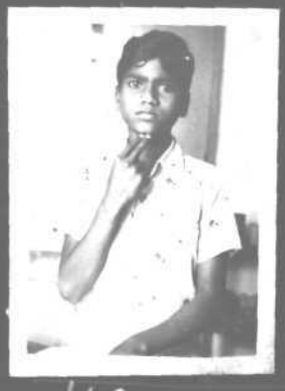

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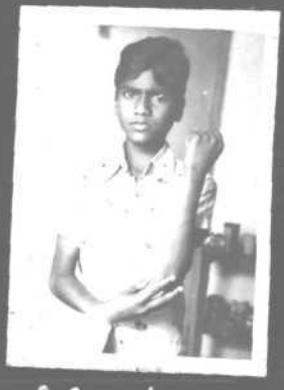

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Table 6- shows mean values for thirty normal hearing subjects for abstract nouns.

Table 7 shows mean values for thirty normal hearing subjects for verbs.

Table 8 shows mean values for thirty normal hearing subjects for Adjectives.

Table-9 shows mean and standard deviations for the two groups of normal hearing subjects for the four lists.

Table 10 shows sums and means for data.

Table 11 shows sums of squares.

Table 12 shows Analysis of Variance

Table 13 gives F ratios for rows, columns and interaction.

Analysis of Variance (ANOVA)

Analysis of variance was performed to see the significance of the results obtained.

2 x 4 way of analysis of variance was done.

Table 10 is a work-sheet layout in which are recorded sums squares, sums of squared scores and means

for cells and for the margins. The lower right corner contains values for the total group of two hundred observations.

The sums of squares and resulting variance estimates are brought together in table 12, we have four variance estimates which for the given situation are all estimates of the same population variance.

From this table 5^2w is used as the denominator of F to test the row, the column and the interaction effects.

We have for interaction,

From table 13, Frc=16.6 which indicates that the value is significant at 0.01 level of significance (from F table).

Next consider the effect of word groups on two age groups.

For age groups we have (from table 13) Fc= 27.8 which again shows that the value is significant at 0.01 level of significance.

The between rows effect is highly significant as judged by (from table 13) 27 which is significant at 0.01 level of significance.

The interaction effect is significant, which permits us to conclude that the age effect is not similar for the four groups of words tested.

MEAN INTELLIGIBILITY) 0.85
QUOTIENT FOR CONCRETE NOUNS) STANDARD DEVIATIONS 0.22

Sl No	WORDS	INTELLIGIBILITY QUOTIENT
1.		1.00
2.		0.73
3.		0.67
4.		0.97
5.		0.90
6.		0.83
7.		1.00
8.		1.00
9.		1.00
10.		0.97
11.		0.87
12.		0.9
13.		0.7
14.		0.7
15.		0.93
16.		0.87
17.		0.93
18.		0.9
19.		0.97
20.		0.9
21.		0.9
22.		0.67
23.		0.4
24.		0.7
25.		0.87

Table 1 Indicating the intelligibility Quotient expressed interms of probability for the concrete Nouns, for thirty normal hearing boys.

MEAN INTELLIGIBILITY)
QUOTIENT FOR CONCRETE NOUNS)0.91 STANDARD DEVIATIONS 0.14

WORDS	INTELLIGIBILITY QUOTIENT
1.	1.00
2.	1.00
3.	0.97
4.	0.93
5.	1.00
6.	0.90
7.	1.00
8.	1.00
9.	1.00
10.	1.00
11.	1.00
12.	1.00
13.	0.97
14.	1.00
15.	0.97
16.	1.00
17.	0.97
18.	0.77
19.	1.00
20.	0.83
21.	1.00
22.	0.70
23.	1.00
24.	1.00
25.	0.97

Table 3. indicating intelligibility Quotient (expressed in probability) for the verbs for thirty normal hearing subjects.

MEAN INTELLIGIBILITY) 0.74
QUOTIENT FOR ADJECTIVES) STANDARD DEVIATION = 0.42

	WORDS	INTELLIGIBILITY QUOTIENT
1.		0.20
2.		1.00
3.		0.77
4.		1.00
5.		1.00
6.		1.00
7.		0.27
8.		1.00
9.		1.00
10.		0.63
11.		1.00
12.		0.57
13.		0.30
14.		0.10
15.		1.00
16.		1.00
17.		0.30
18.		1.00
19.		1.00
20.		1.00
21.		0.47
22.		1.00
23.		0.23
24.		1.00
25.		1.00

Table 4 indicating intelligibility Quotient (expressed in probability) for the Adjectives for thirty normal hearing subjects.

Table 6- shows mean values for thirty normal hearing subjects for abstract nouns.

Table 7 shows mean values for thirty normal hearing subjects for verbs.

Table 8 shows mean values for thirty normal hearing subjects for Adjectives.

Table-9 shows mean and standard deviations for the two groups of normal hearing subjects for the four lists.

Table 10 shows sums and means for data.

Table 11 shows sums of squares.

Table 12 shows Analysis of Variance

Table 13 gives F ratios for rows, columns and interaction.

Analysis of Variance (ANOVA)

Analysis of variance was performed to see the significance of the results obtained.

2 x 4 way of analysis of variance was done.

Table 10 is a work-sheet layout in which are recorded sums squares, sums of squared scores and means

for cells and for the margins. The lower right corner contains values for the total group of two hundred observations.

The sums of squares and resulting variance estimates are brought together in table 12, we have four variance estimates which for the given situation are all estimates of the same population variance.

From this table S^2_W is used as the denominator of F to test the row, the column and the interaction effects.

We have for interaction,

From table 13, Frc=16.6 which indicates that the value is significant at 0.01 level of significance (from F table).

Next consider the effect of word groups on two age groups.

For age groups we have (from table 13) Fc= 27.8 which again shows that the value is significant at 0.01 level of significance.

The between rows effect is highly significant as judged by (from table 13) 27 which is significant at 0.01 level of significance.

The interaction effect is significant, which permits us to conclude that the age effect is not similar for the four groups of words tested.

MEAN INTELLIGIBILITY) 0.85
QUOTIENT FOR CONCRETE NOUNS) STANDARD DEVIATION= 0.22

Sl No	WORDS	INTELLIGIBILITY QUOTIENT
1.		1.00
2.		0.73
3.		0.67
4.		0.97
5.		0.90
6.		0.83
7.		1.00
8.		1.00
9.		1.00
10.		0.97
11.		0.87
12.		0.9
13.		0.7
14.		0.7
15.		0.93
16.		0.87
17.		0.93
18.		0.9
19.		0.97
20.		0.9
21.		0.9
22.		0.67
23.		0.4
24.		0.7
25.		0.87

Table 1 Indicating the intelligibility Quotient expressed interms of probability for the concrete Nouns, for thirty normal hearing boys.

Mean intelligibility Quotient for Abstract NOUNS 0.66

STANDARD DEVIATION 0.28

WORDS	INTELLIGIBILITY QUOTIENT
1.	0.40
2.	0.53
3.	0.57
4.	0.53
5.	0.50
6.	0.50
7.	0.60
8.	0.57
9.	0.93
10.	0.57
11.	0.53
12.	0.07
13.	0.73
14.	0.70
15.	0.43
16.	1.00
17.	1.00
18.	0.57
19.	0.33
20.	0.50
21.	0.57
22.	0.73
23.	0.63
24.	1.00
25.	0.50

Table 2 indicating intelligibility Quotient (expressed interms of probability) for the abstract NOUNS for thirty normal hearing subjects.

MEAN INTELLIGIBILITY)
QUOTIENT FOR VERBS) 0.91 STANDARD DEVIAVIONS 0.14

WORDS	INTELLIGIBILITY QUOTIENT
1.	1.00
2.	1.00
3.	0.97
4.	0.93
5.	1.00
6.	0.90
7.	1.00
8.	1.00
9.	1.00
10.	1.00
11.	1.00
12.	1.00
13.	0.97
14.	1.00
15.	0.97
16.	1.00
17.	0.97
18.	0.77
19.	1.00
20.	0.83
21.	1.00
22.	0.70
23.	1.00
24.	1.00
25.	0.97

Table 3. indicating intelligibility Quotient (expressed in probability) for the verbs for thirty normal hearing subjects.

MEAN INTELLIGIBILITY)
QUOTIENT FOR ADJECTIVES) 0.74 STANDARD DEVIATION = 0.42

	WORDS	INTELLIGIBILITY QUOTIENT
1.		0.20
2.		1.00
3.		0.77
4.		1.00
5.		1.00
6.		1.00
7.		0.27
8.		1.00
9.		1.00
10.		0.63
11.		1.00
12.		0.57
13.		0.30
14.		0.10
15.		1.00
16.		1.00
17.		0.30
18.		1.00
19.		1.00
20.		1.00
21.		0.47
22.		1.00
23.		0.23
24.		1.00
25.		1.00

Table 4 indicating intelligibility Quotient (expressed in probability) for the Adjectives for thirty normal hearing subjects.

Sl. No.	MEAN VALUES
1.	0.80
2.	0.96
3.	0.92
4.	0.84
5.	0.88
6.	0.88
71	0.84
8.	0.97
9.	0.92
10.	0.92
11.	0.77
12.	0.80
13.	0.77
14.	0.68
15.	0.88
16.	0.77
17.	0.88
18.	0.68
19.	1.00
20.	1.00
21.	0.97
22.	1.00
23.	0.92
24.	1.00
25.	1.00
26.	0.72
27.	0.80
28.	0.68
29.	0.77
30.	0.62

Table 5 showing the mean values for the 30 normal individual hearing boys for (List-1) Concrete NOUNS.

Sl. No.	MEAN VALUES
1.	0.32
2.	0.40
3.	0.28
4.	0.44
5.	0.24
6.	0.28
7.	0.56
8.	0.48
9.	0.24
10.	0.44
11.	0.28
12.	0.32
13.	0.28
14.	0.32
15.	0.28
16.	0.40
17.	
18.	0.88
19.	0.84
20.	0.84
21.	0.96
22.	0.88
23.	0.84
24.	0.92
25.	1.00
26.	0.84
27.	0.72
28.	0.88
29.	0.76
30.	0.80

Table 6 Showing the Mean Values for the 30 normal hearing boys for (List II) Abstract NOUNS

Sl. No.	MEANS VALUES
1.	0.97
2.	0.84
3.	0.88
4.	0.84
5.	0.92
6.	0.92
7.	0.92
8.	1.00
9.	0.97
10.	0.92
11.	0.92
12.	0.97
13.	0.97
14.	1.00
15.	1.00
16.	0.97
17.	1.00
18.	1.00
19.	0.97
20.	0.92
21.	1.00
22.	1.00
23.	1.00
24.	1.00
25.	0.97
26.	1.00
27.	1.00
28.	1.00
29.	1.00
30.	1.00

Table 7 Showing Mean Values for the 30 normal hearing boys for (List III) Verbs.

sl. No.	MEAN VALUES
1.	0.68
2.	0.64
3.	0.72
4.	0.72
5.	0.76
6.	0.72
7.	0.68
8.	0.68
9.	0.84
10.	0.80
11.	0.80
12.	0.72
13.	0.72
14.	0.64
15.	0.80
16.	0.80
17.	0.80
18.	0.76
19.	0.80
20.	0.80
21.	0.68
22.	0.76
23.	0.84
24.	0.76
25.	0.76
26.	0.80
27.	0.80
28.	0.80
29.	0.84
30.	0.84

Table-8 Showing the Mean values for the 30 normal hearing boys for (List IV) Adjectives.

	Concrete Nouns	Abstract Nouns	Verbs	Adjectives
Below 10 years (16 subjects)	M = 0.84	M = 0.34	M=0.94	M = 0.72
	SD = 0.22	SD = 0.27	SD=0.12	SD = 0.37
Above 10 years (14 subjects)	M = 0.86	M = 0.85	M=0.99	M = 0.78
	SD = 0.10	SD = 0.19	SD=o.O4	SD = 0.3

Table 9 Showing Mean and standard deviations for two groups of normal hearing subjects for the four lists.

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WORD LISTS	GROUPS BELOW 10 YEARS		ABOVE 10 years	TOTALS
CONCRETE NOUNS	= 21.22		= 21.74	= 42.96
	= 19.17		= 19.61	= 38.78
	= 0.85	-	= 0.87	= 0.86
ABSTRACT NOUNS	= 7.51		= 21.32	= 28.83
	= 4.81		= 19.04	= 23.85
	= 0.30		= 0;85	= 0.58
VERBS	= 23.45		= 24.65	= 48.1
	= 20.87		= 24.34	= 45.21
	= 0.94		= 0.99	= 0.96
ADJECTIVES	= 18.24		= 19.44	= 37.68
	= 16.62		= 17.32	= 33.95
	= 0.73		= 0.78	= 0.75
TOTALS	= 70.42 = 61.47 = 0.71		= 87.15 = 80.31 = 0.87	=157.57 =141.79 = 0.79

Table 10 showing sums and Means for data

SOURCE	SUM OF SQUARE FORMULAE	VALUES
ROWS		4.06
COLUMNS		1.39
INTERACTION		2.48
WITHIN CELLS		9.71
TOTAL		17.64

Table 11 showing sums of squares

SOURCE	SUM OF SQUARES	df	VARIANCE ESTIMATE
Word lists (Rows)	4.06	3	1.35
Age Groups (Columns)	1.39	1	1.39
Interaction Age and Word Groups	2.48	3	0.83
Individual Differences (within cells)	9.71	192	0.06
Total	17.65	199	

Table - 12 shows Analysis of Variance

Frc (interaction)	Interaction sum of squares	$\frac{0.83}{0.05} = 16.6$
Fc (age groups)	Between column sum of squares	$\frac{1.39}{0.05} = 27.8$
Fr (word groups)	Between row sum of squares	$\frac{1.35}{0.05} = 27$

Table 13 showing F ratios

4.3 DISCUSSION

There have been considerable attempts to study the usefulness of sign language in total communication. The current investigation was concerned with the comprehensibility of signed lexicon to normal hearing subjects.

Results of the data illustrated in the tables 1-4 indicate that the verbs have highest intelligibility quotient (0.91) and it was also observed that there was (chomogenity in the performance between the two age groups tested on this variable.

From table 1, the word dog (നായ) has the least intelligibility quotient ie., 0.4. This may be explained on the basis of complexity of the sign.

Similarly from table 2, we have month (ತಿಂಗಳು) sorrow (ದುಃಖ) Dusera (ದಸರಾ), class (ತರಗತಿ) which have intelligibility quotients less than 0.5.

From table 3, for verbs, we do not have any word which has a intelligibility quotient less than 0.5.

From table 4, we have the following words which have intelligibility quotients less than 0.5. These words are easy (ಸುಲಭ), r e ಕೆದಿr i c h (ಶ್ರೀಮಂತ) poor (ಬಡವ), green (ಹಸಿರು), sweet (ಸಿಹಿ), quick (ಚುರುಕು), Again the low score may be explained on the basis of complexity and unfamiliarity.

Results of the current study revealed differences in the comprehensibility when two age groups were tested, only on abstract nouns. The results are almost nearly equal for other words groups as concrete nouns, verbs and adjectives, (from table 9)

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CHAPTER - V

SUMMARY AND CONCLUSIONS

The present study was aimed at assessing the usefulness of total communication with the hard of hearing children. For this purpose signed lexicon was elicited from thirty deaf students from Deaf and Blind School, Mysore and its comprehensibility was checked on thirty normal hearing children from a local school.

Signs are represented by photographs.

Responses of normal children were analyzed by computing means and standard deviations for the whole group and sub groups (below 10 years and above 10 years).

2 x 4 way of analysis of variance was done and F ratios were computed for interaction, for rows and for columns. From the results obtained following conclusions were made.

1. Normal hearing subjects performed well on concrete nouns with little variation between two are groups tested.

For the whole group (Thirty subjects)	M = 0.85	SD = 0.22
For sub groups (below 10 years) (sixteen subjects	M = 0.84	SD = 0.22
For sub group (above 10 years) Fourteen subjects	M = 0.86	Sd = 0.10

2. Subjects above ten years performed comparatively better than the subjects below ten years on abstract nouns.

For the whole Group (Thirty subjects	M = 66	SD =0.28
For sub group (below ten years) sixteen subjects	M = 0.34	SD =0.27
For sub group (above ten years) Fourteen subjects	M = 0.85	SD =0.19

3. Both the sub groups performed well comprehending verbs, with very little variation.

For the whole Group (Thirty subjects)	M = 0.91	SD =0.14
For sub group (below ten years) sixteen subjects	M = 0.94	SD =0.12
For sub group (above ten years) Fourteen subjects	M = 0.99	SD =0.44

4. Both the sub groups performed well for comprehension of Adjectives

For the whole Group (Thirty subjects)	M = 0.74	SD = 0.42
For sub Groups (below ten years) (sixteen subjects)	M = 0.72	SD = 0.37
For sub group (above ten years) (Fourteen subjects)	M = 0-78	SD = 0.3

5. F ratio computed from analysis of variance for interaction of age and word groups indicated significant differences at 0.01 level of significance.

6. F ratio computed for word groups (rows) indicated significant differences in performance for the four group of words at 0.01 level of signifidance.

7. F ratio computed for age groups (columns) indicated significant differences in performance between the two age groups dested at 0.01 level of signifiance.

Limitations of the Study

1. Only signed lexicon was established. Phonology syntax and semantics were not studied.

2. Sampling of the lexicon was limited to only 100 words.

3. The comprehensibility of signed lexicon was checked only on normals.

Recommendations

1. Results of this study can be validated on large number of population.

2. Future studies must be aimed at establishing phonology, Syntax and Semantics of Sign language.

3. Future attempts must be made the employ these signs in total communication with the hard-of-hearing children.

IMPLICATIONS

As normal hearing children have responded well in comprehending these signs, it proves useful to be employed in total communication with the hard-of-hearing children.

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Appendix I

1. /baket/ - represented by handle and action of carrying by right hand.

2 /badane/- represented by twisting movement of right hand.

3./huduga/- Represented by hair style of men.

4. /Pakfi/- Represented by wings with both hands.

5./doni/- represented by rowing action.

6./gadda/-represented by the downward movement near the onin.

7./bal/-represented by circular shape.

8./balehannu/- represented by peeling action.

9./Papa/- represented by the two hands such that palms faced each other.

10./raja/-represented by crownwhich a king wears.

11./ Sebu/- represented by signing it isred and circular shape.

12./Pustaka/-represented by turning pages with both tae hands.

13./ bekku/- represented by signing that it has mustache.

14./Chitte/- represented by signing that it flies.

15./Kivi/- Represented by pointing to ear with right index finger.

16./Kannu/-represented by pointing to eye witn right index finger.

17./Kafi/-by placing right fist over the left fist and signing that we drink.

18./vimana/- by keeping folding right middle and ring fingers,other three fingers were used to represent taking off of a plan from a ground.

19./Koppal/-represented by hopping movement.

20./Kannadata/-by circling with thumb and index fingers on the eye.

21./bisanige/- represented by pointing the ceiling and circular movement.

2g./hasu/-represented by keeping index & middle finger on head, indicating the horns.

23./nai/-by keping right thumb and index together on the nose and moving other fingers.

24./hu/-represented by keping right hand below the nose indicating fragrance and it is placed on head.

25./katte/-represented by keeping right fist over left fist and

moving right fist

Appendix-2

1. /Vaisu/ -by placing right thumb and index on forehead and moving it away.
2. /Suttalu/- by circling with index finger.
3. /Kattale/- by placing right fist behind head indicating that it will be Hack.
4. /belige/- by keeping two hands bear the face such that palms faced the face and moving them away indicating sun will rise).
5. /madyana/- represented by keeping right hand perpendicularly on left palm indicating that sin will be exactly on the head.
6. /chali/ -by keeping both the fist near the chest.
7. /ratri/s-by keeping right palm over the left hand indicating that there will not be light.
8. /tianlu/ -by moving right index over left index.
9. /hesaru/ - by crossing right index and middle finger over the left index and middle finger.
10. /priti/- by plaoing right fist near the left part of the chest and moving the hand there.
11. /khali/- by moving the hand to indicate there is nothing.
12. /vandane/- by placing right palm over the left palm and holding tightly.
13. /dukha/ - by keeping right fist on right chin and moving the hand clockwise.
14. /taragati/-by placing four finger (exeept thumb) on chin and moving it away.
15. /devaru/ -by folding the two hands as in 'naaaste'
16. /Vidyuchakthi/-by facing the right fist against the left palm and moving the right fist away from it,indicating shock
17. /dasara/ -by placing right fist on teech indicating elephants procession.
18. /bisalu/-by indicating it is 'hot'
19. /geleya/-by placing right index on left index moving both.
20. /kanasu/ -by placing right index near the head indicated a process while sleeping.
21. /dipav.li/-by lifting both index to the ear level indicated the presence of cracker noise.
22. /sali/ -by moving both the hands towards the face indicating we inhale.

23./sonne/-by moving the right hand in the way we write 'zero' by circling with index & thumb.

24./ samaya/- by pointing to watch with index finger.

25./ akasha/ -by pointing to thesky with index.

Appendix -3

1. /Odu / -by keeping both fists at the level of chest and indicated running action.
2. /snamamadu/- by placing both the fists on the right shoulder and shifting it to left shoulder.
3. /ho;gu / - with right index movement away from body level.
4. /Kodu / -action of giving.
5. /jagala;madu / by bringing both the hands near with force.
6. /tinnisu/ -action of feeding.
7. /tinnu/ - taxing the right hand close to couth by folding the finger.
8. /alu/ - indicated by downward movement of index from eyes (flow of tears.)
9. /bogalu/ - by opening tne hands and moving away from face indicating how a dog jumps.
10. /matana;du/ -by keeping right index in mouth and moving away from it.
11. /hallujju/- by showing brushing action.
12. /kare/ - by moving right index towards the face.
13. / Usiradu/ - by keeping both index middle fingers near tne nostrils indicated we inhale & exhale.
14. /muchu/ -by holding both the hands such that palms face outwards.
15. /talebachu/ -by combing action.
16. /kemmu / - indicated by coughing action.
17. /hattu/by placing index and middle fingers of right and left hand togetner and moving upwards.
18. /tagedukonduba/- by holding hand in a position of taking something and calling.
19. /bare/- indicated by action of writing.
20. /nagu /- by keeping circled right index and thumb near the mouth and moving index finger.
21. /adigemadu/- by holding both tne hands in circular form & moving them up and down (boiling was demonstrated).
22. /holi/ - demonstrated by action of sewing.
23. /hadukelu/- indicated by tapping and keeping index finger near theear.
24. /Odu/- by holding hands together such that palms face the face which indicated a book.
25. atavadu/ by folding inwards index,middle and ring fingers of both tne hands and moving up and down extending the thumb and little finger.

Appendix-4.

1. /be;ga /-by moving index and middle fingers of both the hands up and down.
2. /sama /- by placing both the hands in the same level in such a way that palms faceddonwards.
3. /sihi /- by placing the fingers on the cheek much that fingers are at the right angle to the band.
4. /bayarike/- by moving the right hand in the throat.
5. /gatti/ -by holding both fists at the level of the chest indicating strong.
6. /hasiru/ -by holding thethumb near the index and folding other fingers inwards.
7. /olleya/ -bymoving the right hand from th= level of the body outwards.
8. /baleya/ - by moving the hand behind the head.
9. /joragi/ -by keeping both the hands near the ears.
10. /badava/- by holding left hand erect and movement with right hand at the bottom of tne left hand.
11. /Srimanta/ -by moving right hand away from left hand,by keeping palms facing each other.
12. /Chikka/ - by bringing both the palms together close to each other.
13. /Kullu/ -by keeping right palm below the body level such tnat palm faced downwards.
14. /Ettara/- by keeping right palm above the head level such tnat palm faced down wards.
15. /hasivu/ -by pointing to the stomachwith the right hand.
16. / nida;na/ - by moving index & middle fingers of the right hand on left hand slowly.
17. /dappa/ -indicated by size, keeping both the hands away from the body.
18. /kasta/ -by placing angled right index & middle finger on left hand.
19. /Sulabha/- by placing the right palm behind the left palm and moving both.

20/kempu/ - by placing index and middle fingers at the level of the chin.

21./Channagide/ - oy making circle with index & thumb and movement of the hand forwards.

22./hull/ -by bringing all the fingers inwards towards the thumb.

23./bhaya/- by placing both the hands near the chest by folding fingers inwards.

24./haladi/ -by placing right palm on right chin and making movements there indicating women put on their chin.

25/ketta/- by moving the right hand away from the body by keeping fingers folded.

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