



DEVELOPMENT OF PICTURE SPEECH IDENTIFICATION TEST FOR YOUNGER CHILDREN IN ASSAMESE LANGUAGE.

1 Tanushree Sarma, 2 Maruthi Krishna Goud. K, 3 H. S. Suparna, 4 Sravani Udayan, 5 S. Laxmi Prasanna

1 Audiologist at MAA ENT Hospitals, Hyderabad, 2 Assistant Professor in Speech Language Pathology Composite Regional Centre for Skill Development, Rehabilitation & Empowerment Of Persons with Disabilities (Divyangjan), Nellore, Andhra Pradesh, 3 Associated Professor in Speech Language Pathology Sweekaar Academy of Rehabilitation Sciences Secunderabad, Hyderabad, 4 Audiologist at MAA ENT Hospitals, Hyderabad, 5 Associated Professor in Speech Language Pathology Sweekaar Academy of Rehabilitation Sciences Secunderabad, Hyderabad

Abstract: Speech has always been considered as a power medium for verbal communication, and reflects the personality of the speaker. The ability to speak is interlinked with the ability to hear. For children, hearing is most significant because the ability to develop and use oral language is closely related to the ability to process speech through ears. The purpose of this study was to develop and determine the validity of Picture Speech identification test for 3 to 6 years old children in Assamese language and compare the developed test on Assamese speaking children with profound hearing loss and Cochlear Implant users. A monosyllabic word list was developed keeping in mind that the words had to be pictorial. It was further validated and administered by performing on Assamese speaking bilateral severe to profound hearing impaired children and children using Cochlear implant and the scores were compared. The study revealed that Picture speech identification test developed for children showed a validity and children using Cochlear implants performed better compared to children without amplification i.e. bilateral severe to profound hearing loss. This study therefore proves that Picture speech identification test can be used as a valid tool for evaluation and therapy in the field of Pediatric Audiology. The test helps us find out the speech identification abilities of hearing impaired children and accordingly assign them to different auditory training groups.

Index Terms: Verbal Communication, Speech Identification, profound, Cochlear implant

I.INTRODUCTION

Speech is the ability to express thoughts and feelings by articulating sounds. Speech has been a long time source of curiosity of human beings. Always speech has been considered as a power I medium for verbal communication, and reflects the personality of the speaker. The ability to speak is interlinked with the ability to hear. Speech is acquired and monitored through hearing. Elliot & Elliot, (1994) stated that the foetus in the womb is stated to have the ability to respond to sound thus hearing plays a vital role in the acquisition of speech. It is through audition that the speech and language are usually effortlessly developed Ross & Gidos, (1978).

Communication is interlinked with speech and language, without speech and language communication is worthless. Speech intelligibility may be defined as match between intention of speaker and response of the listener to the speech passed through transmission system. Educators consider the effect of the impairment on the ability to communicate when recommending educational placement. Geers and Moog (1987) opined that perception and comprehension of speech is an important ingredient in the development of spoken

language and language abilities. Specific tests of speech perception have been devised for particular purpose, but that many of these original materials have been applied in ways or to populations for which they were never intended. Best, McRoberts and Sithole (1998) reported that it is best that the native language of a speaker be used while assessing speech identification abilities.

II. REVIEW OF LITERATURE

2.1. Guidelines for development of materials for speech Audiometry

Over 65 years ago, Hudgins, Hawkins, Karlin & Stevens (1947) suggested several guidelines for the development and evaluation of materials for speech audiometry testing which are still useful. Subsequent developments in recording technology and psychometric have expanded and clarified these guidelines (ASHA, 1988; Brandy, 2002).

First, the materials must be familiar to the child being tested. The items should be as simple and familiar as possible. It was evident with unfamiliar words of PB-50 lists which showed poor inter-list reliability (Hirsh, Davis, Silverman, Reynolds, Eldert & Benson, 1952). This guideline also suggests that materials should be in patient's own language and dialect. Weisleder and Hodgson (1989) found that performance on SRT tasks was negatively affected when listening to recordings from a talker with a different dialectal background, even within a shared language. If possible, native talkers of the intended language should be used to develop, record and present materials.

2.2 Importance of Speech Audiometry test in native language of the child.

Audiological test materials should be appropriate for the age, education, and linguistic background of the listener; therefore, an appropriate audiological assessment consists of procedures and test materials that are developmentally and culturally appropriate and free of any cultural bias (American Speech-Language-Hearing Association, 2002; Davis, 1978; Desjardins et al., 2019; Gaeta & John, 2015). Characteristics of stimuli used in such assessments are likely to influence performance on word recognition tasks. These include the familiarity and complexity of test items, dialectical characteristics of test items, and ease of administration of the test by a clinician with limited language proficiency.

2.3 Administration Speech Audiometry tests in children using amplification devices

A study done by Dawson, Arunachalam & Boominathan attempted to assess the closed set word identification abilities in children with cochlear implant (CI) with a picture identification test developed in Tamil. The test was validated on typically developing children with normal hearing (NH) to build a reference for comparison. Participants for the study included 205 children with NH between the age range of 3–6 years and 45 children with cochlear implant within the age range of 3–11 years. The picture identification test was developed using bisyllabic words with corresponding pictures in Tamil. Two lists were created with 25 words each and administered to the children with NH and CI. The scores of both the groups were analyzed. The results indicated that the mean scores improved as age increased for children in the NH group. Also, there was no significant difference in performance between the two-word lists. Significant difference in scores was noted between the CI and the NH group ($p < 0.01$). However, the mean scores in the CI group increased as the experience with CI increased. The picture identification test in Tamil is deemed appropriate to elicit closed set word identification responses for children with CI between the ages of 3–6 years. The test will provide supplemental information for mapping and to plan habilitation for children with CI.

III. NEED OF THE STUDY

It is a well-known fact that an individual's perception of speech is reported to be influenced by his/her mother tongue (Singh & Black, 1966). **Assamese language** is spoken in eastern parts of the India. It is the official language of the state of Assam. Geersand Moog (1987) opined that perception and comprehension of speech is an important ingredient in the development of spoken language and language abilities. Speech audiometry is a fundamental tool in hearing loss assessment. Speech materials to assess Speech Recognition Scores and Speech Identification Score have been developed by Lisa Gogoi (2017) in Assamese language. In order for speech audiometry to be valid an accurate evaluation, children during their developmental stage should be tested in their native language (Ramiksson, 2001). No tests are available to identify speech identification in Assamese language for children between 3 – 6 years of age. Hence this study is formulated.

IV. AIM OF THE STUDY

The purpose of the present study is to develop and determine the validity of Picture Speech identification test for 3 to 6 years old children in Assamese language and compare the developed test on Assamese speaking children with profound hearing loss and Cochlear Implant users.

V. OBJECTIVES OF THE STUDY

The objectives of the present study are:

1. To develop a Phonetically Balanced word list with pictures in Assamese language
2. To validate the developed Picture Speech Identification test
3. To administer the developed test in 3 – 6 years' old Assamese speaking children with Bilateral Severe to Profound Hearing Loss.
4. To administer the developed test in 3 – 6 years' old Assamese speaking children using Cochlear Implant.
5. To compare the performance of Picture Speech Identification test in 3 – 6 years' old Assamese speaking children with Bilateral Severe to Profound Hearing Loss and children using Cochlear Implant

VI. HYPOTHESIS

The following null hypothesis or alternate hypothesis has been formulated in order to fulfill the objectives of the study. Is there a significant difference in performance of children with bilateral severe to profound hearing loss and children using unilateral cochlear implant.

VII. METHODOLOGY

The study was carried out in 3 stages. A total of 20 subjects were participated in the study.

Stage 1: Test material development:

A total of 110 words were taken from books of pre primary and class 1. These words were given to 20 preschool teachers for familiarity check where 0-Not familiar and 1-familiar. Therefore, a total of 28 words were selected. For each selected word, 3 coloured realistic pictures were collected. These pictures and words were given to 2 Linguists who had background of translation or verification and validation.

The verified and validated words with pictures were given to 3 Audiologist for final validation.

Stage 2: Validation of the developed test

The developed test was normalized and validated by obtaining picture identification scores on 50 typically developing Assamese speaking children between the age ranges of 3 – 6 years. Initially the clinician built up a rapport with each of the subject. The subjects responded by pointing to one of the four – choice pictures of the picture plate. The correct response is scored as one and incorrect response as zero. The raw score was converted to percentage as below:

$$\text{Total score (\%)} = \frac{\text{Total number of correct responses}}{\text{Total number of words presented}} \times 100$$

Stage 3: Administering the developed test in Bilateral Severe to Profound Hearing Loss and on Cochlear implant users.

Total of 20 children with the age range of 3-6 years which were further divided into 2 sub groups. All the subjects were native speakers of Assamese language.

Group 1: 10 Assamese speaking children having congenital bilateral severe to profound hearing loss between the age ranges of 3 – 6 years participated in the study. These children had no associated problems other than Hearing Impairment.

Group 2: 10 Assamese speaking children using Cochlear implant between the age range of 3 – 6 years participated in the study. They had to be diagnosed as congenital bilateral severe to profound hearing loss within 1.5 years of age. They had to be implanted before 2 years of age. All of them were implanted with cochlear implant monaurally. They had undergone minimum one year of Auditory Verbal Therapy. These children had no associated problems other than Hearing Impairment.

Statistical analysis

The statistical analysis was done using Statistical Package for the Social Sciences software. Descriptive Statics has been used to find the maximum, minimum, standard deviation, mean and normally distribution of the data of all the variables of the study. Normal distribution of data shows the sensitivity of the variables towards the periodic changes and speculation. Independence t-test was used for Equality of Means.

VII. RESULTS AND DISCUSSION

Results were statistically analysed. 2 tailed t-tests were used to find the statistical significance between the group. Results show that there is a statistical significance difference between group 1 and group 2 in all the categories.

Group Statistics

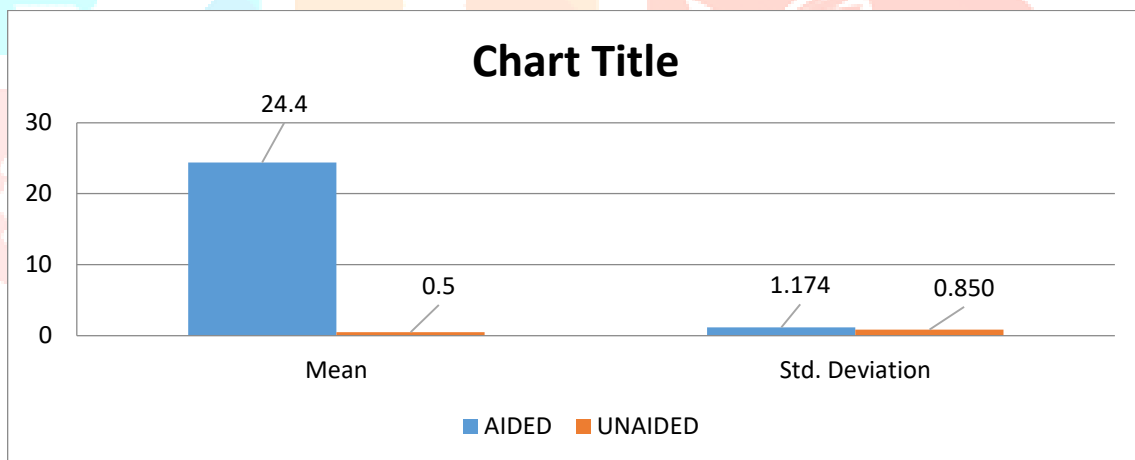
Table1: Shows the mean and SD scores of aided and unaided subjects.

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
TOTAL	AIDED	10	24.4000	1.17379	.37118
	UNAIDED	10	.5000	.84984	.26874

Table 2: Shows the significance difference between aided and unaided subjects.

		t-test for Equality of Means						
		t	df	Sig. (2- tailed)	Mean Differ ence	Std. Error Differenc e	95% Confidence Interval of the Difference	
							Lower	Upper
TOTAL	Equal variances assumed	52.154	18	.000	23.9000 0	.45826	22.937 24	24.86276
	Equal variances not assumed	52.154	16. 4	.000	23.9000 0	.45826	22.930 47	24.86953

It was found out that children using Cochlear implants performed better compared to children without amplification i.e. bilateral severe to profound hearing loss. Avaniya Atreyee, Aparna Ravichandran in 2007 stated that earlier the age of amplification better will be the performance of hearing impaired children.



Graph 1: Shows the mean and standard deviation of aided and unaided subjects

The results are evident that speech identification abilities of children who have received more number of years of speech therapy have better speech identification abilities than those with less number of years of speech training.

VIII. CONCLUSION

Speech materials to assess Speech Recognition Scores and Speech Identification Score have been developed by Lisa Gogoi (2017) in Assamese language. In order for speech audiometry to be valid an accurate evaluation, children during their developmental stage should be tested in their native language (Ramiksson, 2001). No tests are available to identify speech identification in Assamese language for children between 3 – 6 years of age. Hence this study is formulated.

The aim of the present study was to develop and determine the validity of Picture Speech identification test for 3 to 6 years old children in Assamese language and compare the developed test on Assamese speaking children with profound hearing loss and Cochlear Implant users. It mainly dealt with the

development, validation and administration of the developed test in Assamese speaking hearing impaired children.

In the present study, Picture Speech Identification was developed in Assamese language for the children in the age range of 3 – 6 years and was validated. Then the developed test was administered in Assamese speaking bilateral severe to profound hearing impaired children and children using Cochlear implant and the scores were compared.

It was found out that Picture speech identification test developed for children showed a validity and children using Cochlear implants performed better compared to children without amplification i.e. bilateral severe to profound hearing loss.

Speech Identification test is a challenging part of Audiological evaluation among children. By assessing Speech identification test, we will be able to obtain valuable information about child's use of audition. It was found out that Picture speech identification test developed for children showed a validity and children using Cochlear implants performed better compared to children without amplification i.e. bilateral severe to profound hearing loss. The present study appears to be potentially valuable clinical tool in Pediatric audiology. Therefore, it should be routinely included in pediatric Audiological evaluation.

IX. CLINICAL IMPLICATIONS OF THE STUDY

1. This test helps us find out the speech identification abilities of hearing impaired children and accordingly assign them to different auditory training groups.
2. This test also helps us in special schools at the beginning of the term and based on the results, auditory training programs can be devised and implemented, efficiency of the same could be assessed by repeating the test at frequent intervals and at the end of the term.
3. This test helps the audiologists and / or speech and language therapists' to assess the effectiveness of their training programs by a longitudinally evaluating the scores.

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