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Effect of Training in Lip Reading on Speech Reception of Children with Hearing Impairment in Inclusive Education Classroom in Nigeria: Implication for Regular Teachers.

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Abstract:

The study investigated the effect of training in lip reading on speech reception of children with hearing impairment in inclusive classroom in Nigeria and its implication for regular teachers. Quasi-experimental design of pretest-post-test design with two experimental groups receiving equal treatment on lip reading training (LRT) was used for the study. The population of the study was thirty six (36) children with hearing impairment in primary five in primary school for the deaf in Enugu Nigeria. The instrument for data collection was researchers' made test called Lip-Reading Test (LRT) drawn from everyday sentences of IOWA- Keaster forms A and B. Mean and standard deviation was used to analyse the data and ANCOVA to test the hypotheses. The findings revealed that the use of amplification (hearing aid) facilitated the reception of speech by children with hearing impairment (CWHI). The study then recommended that training in lip reading should be given to children with hearing impairment (CWHI) and teachers to be equipped to participate and interact effectively in the inclusive education classroom CWHI.

Keywords: Inclusion, impairment, images, perception, reception

1. Introduction:

The contribution of lip reading to communication for children with hearing impairment (CWHI) is apparently, practically obvious and real. But little is known about how lip reading is developed in children or factors associated with the process of developing lip reading in children especially hearing impaired listeners. There are various terms that are used to explain the process through which the visual images of speech are used in order to assist CWHI comprehend spoken messages. These terms include, speech reading otherwise known as lip reading, visual cues, auditory cues, facial expression and body movement, gestures and environmental cues are often used to convey spoken words to CWHI. But in spite of the above terminologies, lip reading appears to be an important means of receiving spoken messages for CWHI listeners.

Lip reading is the ability to read lips or observe the lips movement during speech or interaction by the listeners. According Davis and Herdlick (1986), lip reading constituted the earliest form of rehabilitation for children and adult with hearing impairment. Hallahan and Kauffman (2000) also perceive lip reading as teaching CWHI to use visual information to understand what is said to them. Okuyibo (2009) acknowledged that lip reading is the

method of watching carefully at the face of a speaker, to observe the movement of the mouth, lips, teeth, in short, all the articulators to be able to attach meaning to them. Visual information or cue implies the words the children can see in the speakers' lips. When a child is diagnosed as hearing impaired, one of the means to rehabilitate him is try to restore his lost speech as much as possible, and one of the ways to restore his lost speech is through lip reading. It is in view of the above that Davis and Hardlick (1986) reported that lip reading is the primary rehabilitative procedure, especially adults with hearing impairment. They further reported that the patient most likely to benefit from lip-reading lessons is one who experiences sudden hearing loss, resulting in a severally disrupted ability to communicate. The disrupted ability to communicate is largely due to poor linguistic skills, and because many speech sounds and syllables are not visible on the lips. A few available research studies on lip reading process concentrated on the mental and personality characteristics of the lip reader as the primary determinant of lip reading performance. Most of the researchers revealed negative findings in that neither intelligence nor personality variables such as introspection or motivation appear to correlate highly with lip reading ability of the children. According to Davis and Hardlick (1986), lip reading performance is strongly related to the rate of transmission of coded visual information through neural system. The researchers did not however consider the importance of auditory and visual cues as an aid to lip reading. Hallohan and Kauffman (2000) support the above assertion when they concurred that lip reading makes use of the visual acuity of the lip reader as an important factor in lip reading performance. Looking at the above views by Davis and Hardick (1986) and Hallahan and Kauffman (2000), one can say that the final goal of lip reading preparation is the effective use of visual cue to obtain meaning from speech.

As CWHI are going to be taught together with hearing ones in the same classroom by a regular teacher or special educator who may have little or no knowledge of educating CWHI, there is the need to prepare these children in lip reading to enable them fit adequately in the classroom and outside classroom setting. However, there are certain factors that may impinge on the lip reading performance. According to Sander (1982), such factors include, stimuli arising from the environment in which the communication is taking place. Stimuli associated directly with the message, but not part of speech production, stimuli directly associated with the production of speech sounds. Davis and Hardick (1986) add that visibility of speech sounds on the lip, the speaker's differences and the distance between the speaker and the lip reader can also affect reading performance. Okuyibo (2009) also added that light on the face of the speaker, a good model speaker without any articulatory problem, no secondary disability of the lip reader, close distance and fluency of the speaker are condition that would be observed for effective lip reading performance. These factors either acting alone or in combination influence effective lip reading performance.

However, there are conflicting opinions on the performance of the lip readers with amplifications and those without amplifications (hearing aids). While Spitzer, Leder, Milver, Philips and Giolast (1987) observed that children with amplifications perform better in lip reading through the use of cochlear implant, Davis and Hardick (1986) conclusion contrarily that amplification has no significant correlation with lip reading performance. No reported data exist in Nigeria on the effect of lip reading on speech perception of CWHI with amplification. The purposes of this study are to determine whether training CWHI in lip reading will help them benefit from inclusive classroom learning, and to find out whether children with amplification will perform better in lip reading than those without amplification. The study will also seek to explore the influence of gender and interaction effect of lip reading.

Research questions reception of CWHI

Three research questions and three hypotheses which were raised to guide this study are:

1. To what extent do the mean achievement scores of children with amplification exposed to lip reading differ from those without amplification.
2. To what extent does gender influence speech reception mean achievement scores of CWHI
3. What is the interaction effect of gender and lip reading on speech reception mean achievement scores of CWHI?

Three null hypotheses which guided the study were tested at 0.05 levels of significance and they include:

H01. There is no significant difference in the speech reception mean achievement scores of CWHI exposed to lip reading with amplification and those without amplification.

2. Gender has no significant influence on the mean achievement scores of CWHI as measured by their mean scores lip reading test (LRI)

3. There is no significant interaction effect of gender and experiential groups on lip reading on speech reception of CWHI as measured by their mean scores on LRT.

1.1 Method:

1.11 Design of the Study

- The quasi-experimental design was used to determine the effect of the experimental groups receiving treatment on lip reading. It is a pretest-posttest design with two experimental group receiving equal treatment on LRT.

1.1.2 Area of the Study:

- The study was carried out at Ogbete Special Education Centre in Enugu State of Nigeria.

1.1.3 Population of the Study:

- The population of the study comprises 36 CWHI in primary five class in primary school for the deaf in Enugu. Twenty four (24) of the children were males while twelve (12) were females. The entire population was small, so, all the population was used for the study. A stratified random sampling technique was employed to ensure that different genders are accounted for in the treatment groups. On the whole, eight (8) boys with amplification were in the treatment group 1 while twelve (12) boys without amplification were in the treatment group 2. For girls, six (6) girls with amplification were in experimental group 1 while remaining six (6) girls without amplification were in the experimental group 2. Those with amplification have had amplifications experiences ranging from 5 to 15 years. So they have acquired a lot of experiences on the use of amplification. All the experimental groups were exposed lip reading lesson.

1.1.4 Instrument for Date Collection:

- The instrument for data collection for this study was researchers' made test called Lip Reading Test (LRT). The lip reading tests were drawn from everyday sentences of Iowa – keaster form A and B. The everyday sentences (ES) of lowa-keaster were chosen because the ES have been used on children with cochlear implant, and were found to be valid and reliable. It is hoped that when they are used on CWHI in Nigeria with up to fifteen years of experience of wearing amplification and observing lips of the speaker, the result that will be obtained will be valid.

1.1.5 Procedure

The lowa-keaster of ES will be administered to the two groups through face to face (3 – dimensional presentation) live presentation. The idea is to present reading materials live to help maintain interest in the tasks, and to ensure that the children are observing closely when stimulus items are presented. The reading materials to be lip read are provided under optimal viewing conditions. The viewing should be straight on a slight angle of 40 degree or less. Lighting where lip reading training is carried out should be done on the speaker's face.

1.1.6 Method of Training

The speech reading training employed two methods to teach how to read lips to the children. The sounds of each word were taught in isolation (analytic) using visual and auditory cues of each word they will lip read in each sentence. (synthetic) The sounds /p/b/m/f/v/oo/ are produced in isolation for example /p/, /b/, /m/, /f/, /v/ /oo/ are produced by lip, jaw and tongue movement to lip read homophonous words such as ill, pill, mill, ton, alone, done. These homophonous words can be differentiated through visual cues. Hence the sounds are taught in word form; and the lip readers are drilled on how the words are produced on the lips, jaws and mouth. The lip reading training lasted for six (6) weeks covering one hour per lesson period each week.

1.1.7 Method of Data Analysis:

The data collected from the study was analysed using mean and standard deviation for research questions while the analysis of covariance (ANCOVA) was used to test the hypotheses. The test of homogeneity was carried out in this study and the calculated F value for the test of homogeneity is 1.435 which was significant at 0.05. In order to indicate the direction of the differences among the mean scores of the experimental groups, Scheffe Multiple Companion Technique was employed.

1.1.8 Results

Responses for the lip reading test were presented based on the three research question and three corresponding hypotheses raised. (see table in appendix)

Table 1 indicate that CWHI with amplification exposed to lip reading had a pre-test mean score of 12.50 and a standard deviation of 3.54 while the post-test mean score in 11.67 and a standard deviation of 2.72. The mean gain score between pre-test and post-test score was 6.17 for CWHI without amplification, the pre-test mean score was 10.08 with a standard deviation of 3.50 while the post-test mean score 10.75 with a standard deviation of 2.34. They had mean gain score of 8.67. The CWHI with amplification exposed to lip reading had the highest post-test mean score of 12.50 more than CWHI without amplification exposed to lip reading. The results suggest that CWHI with amplification received training on lip reading performed higher than CWHI without amplification exposed to the same treatment in speech reception.

Result in Table 2 shows that the treatment as main factor has a significant effect on children's achievement in speech reception. The F value of 9.38 of the treatment as the main effect is significant at .001 and also significant at 0.05. This shows that there is a significant difference in post-test mean achievement scores on speech reception of CWHI due to differential wearing of amplification. In order to ascertain the nature and direction of the differences with regards to amplification use, scheffer test was used and the result is shown below.

Table 3 indicates that there is a significant difference in the post-test mean achievement scores of CWHI with amplification exposed to lip reading lesson and CWHI without amplification exposed to the same treatment. This is indicated by the mean difference score of -6.061 which is significant at .000 and therefore significant at 0.05 level.

1.1.9 Research Question 2:

To what extent does gender influence the mean achievement scores of CWHI with amplification and those without amplification as measured by lip reading test.

Lip reading test(see tables in appendix)

Results in Table 4 have shown that male children had a mean score of 6.25 and a standard deviation of 2.32 in the pre-test and a mean score of 13.79 with a standard deviation of 3.43 in the post-test. The female children had an overall mean score of 5.28 and a standard deviation of 2.37 in the pre-test, while in the post-test, they had a mean score of 12.28 and a standard deviation of 1.49 respectively.

The results in Table 4 suggest that male children with amplifications performed higher than the female children in the lip reading test. A corresponding hypothesis raised to further address the research question two in HO_2. Gender is not a significant factor in the speech reception achievement of CWHI as measured by their lip reading Test. Result in table 2 indicates that there is no significant difference in the mean post-test achievement scores of male and female children in the lip reading tests. This is because the F – value of 3.244 in respect of gender as main effect is shown to be significant at .087, but not significant at 0.05 level. The well hypothesis of no significant influence of gender on speech reception of CWHI is, therefore, accepted.

1.1.10 Research Question 3

What is the interaction of gender and treatments on the speech reception post-test mean achievement scores of CWHI?(See tables in appendix)

Results in Table 5 reveal that male children with amplification exposed to lip reading had a lower post-test mean achievement score of 12.25 and a standard deviation of 1.83 as against the female children exposed to lip reading test with a post-test mean achievement score of 15.50 and a standard deviation of 1.29. Table 5 also reveal that male children without amplification had a post-test mean achievement score of 14.38 and a standard deviation of 2.39 as against female children without amplification with a post-test mean achievement score of 12.50 and a standard deviation of 1.92. A corresponding hypothesis to further explain the research question three is HO_3: There is no interaction effect of gender and treatments on speech reception of CWHI as measured by their mean achievement score on the lip reading test.

The interaction effect of gender and the lip reading test on speech reception was significant at 0.05 level. As indicated in Table 2, the observed F – value of gender and treatment in significant at .032 and therefore significant at 0.05. The hypothesis is therefore rejected.

1.1.11 Discussion

The result of the study showed that the use of amplification during lip reading had a significant effect on speech reception of CWHI. The groups that had amplification during lip reading training performed better than those without amplification. This corresponds to what Sptzer etal (1987) reported that CWHI with amplification

performed higher than those without amplification. The findings pertaining gender influence on speech reception showed that there was significant difference as indicated in Table 2.

In research question three, the study found out that there was significant interaction effect between gender experimental groups. The findings of the study were same what in agreement with the view of Davis and Hardick (1986) who found out that lip reading performance is strongly related to the rate of transmission of coded visual information through neural system.

1.1.12 Conclusion and Recommendation

From the findings of the study, the use of amplification (hearing aid) facilitated the reception of speech by CWHI. The study further revealed that the use of amplification during lip reading would help CWHI to fit well in inclusive classroom since they will understand what would be said to them. It is therefore, recommended that training CWHI in lip reading should be given to the children and teachers to equip them to participate and interact effectively with others in the same classroom.

Implications for regular teachers

As CWHI are going to study together in the same classroom with their hearing counterparts, and to be handled by a teacher who has little or no knowledge on how to communicate with these children, there is the need for the teachers to be aware of the following as put together :

- The teacher should not cover his mouth, turn while talking or show any annoying mannerism while speaking.
- Teacher should ensure that all pupils with hearing impairment are seated in the front row close to him.
- Teacher should ensure that there is no obstruction between him and the children.
- Teacher should ensure that there is adequate light in the classroom especially on him.
- Teacher should ensure that the children put on their amplifications if any and they are in good working condition.
- Teacher should ensure that pupils pay full attention and be focused on his face.
- In addition, teacher should ensure that his beard and mustache are trimmed in order not to prevent the children from seeing his lips or mouth movement.
- Teacher should always use visual cues to introduce topics to be discussed and to explain the rules of the activities to be followed. Spoken materials should be presented in a logical order so that the context can be used as an aid to understanding.

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APPENDIX

Tables indicating performances of participants

Table 1: Responses for research question one.
CWHI Pre-test and post-test mean scores and standard deviation on lip reading. N = 36.

Experimental groups	Pre-test	Post-test	Main gain scores
Group 1 Mean	12.50	11.67	
N	18	12	6.17
STD	3.54	2.72	
Group 1 Mean	10.08	10.75	
N	18	12	8.67
STD	3.50	2.34	
Total Mean	6.94	14.31	
N	36	36	7.37
STD	2.35	2.35	

Table2: Summary of the one way analysis of covariance (ANCOVA) on CWHI post-test scores on lip reading test.

Sources	Type III Sum	df	Mean square	F	Significant decision at 0.05	
Corrected model	197.511a	6	33.252	2.972	.00	
Intercept	653.855	1	653.855	158.912	.000	
Post-test	1.843	1	1.843	.449	.508	
Treatment	76.279	3	38.140	9.384	.001	.S
Gender	12.915	1	12.915	3.244	.087	.NS
Treatment X	31.942	2	15.971	3.888	.032	.S
Error	115.032	2	4.108			
Total	6516.00	30				
Corrected total	311.543	36				

* Significant at 0.05 level
* Not significant at 0.05 level of significance

Table 3: Result of scheffe test for post-test on lip reading.
Test Achievement score of the treatment group:

Experimental Groups (1)	Mean difference	Std	Sign
Experimental Groups			
with CWHI amplification	6.061*	.936	.124
CWHI without amplification	-3.083*	.916	.008

The mean difference is significant at 0.05 level.

Table 4: Mean and standard deviation of CWHI's scores in pre-test, post-test in lip reading test by gender.

Gender of children		Pre-test	Post-test
Male	Mean	6.25	13.79
	N	24	24
STD		2.32	3.43
Female	Mean	5.28	12.28
	N	12	12
STD		2.37	1.49
Total	Mean	5.94	13.31
	N	36	36
STD		2.36	3.04

Table 5: post-test mean scores and standard deviations of male and female children in lip reading test (treatment X gender level).

Experimental Groups	Mean	STD	N
Gender Groups			
CWHI with male amplification	12.25	1.83	12
Female with amplification	15.50	1.29	6
Total	10.67	1.72	18
Group 2			
Male with amplification	14.38	2.39	12
Female with amplification	12.50	1.92	6
Total	13.75	2.34	18