

## INTELLIGENCE, CREATIVE THINKING ABILITIES AND ACADEMIC ACHIEVEMENT OF CHILDREN WITH HEARING IMPAIRMENT - A CORRELATION STUDY

\*Vijetha, P. & \*\*Jangaiah, C.

### Abstract

*The present study investigated the relationship between intelligence and creative thinking abilities, intelligence and academic achievement and also academic achievement and creative thinking abilities of 11 to 13 years old children with hearing impairment studying in Residential special schools in Mysore. For testing Intelligence, Standard Progressive Matrices by J. C. Raven and for testing creative thinking abilities, Non- Verbal test of Creative Thinking Abilities by Baqer Mehdi tools were used for the study. These tools were administered on 50 (24 boys and 26 girls) 11 to 13 years old children with hearing impairment. Participants were instructed and the data was scored as per the manual. For testing the Academic achievement both the present and past class exam marks were collected from school records. The results indicated that there exists no significant relationship between intelligence and creative thinking abilities, academic achievement and creative thinking abilities. But there exists significant relationship between intelligence and academic achievement. The study also revealed that children scoring Intelligence Grade V indicating "intellectually impaired" outperformed in creative thinking abilities compared to those children scoring Grade III indicating "intellectually average" and Grade IV indicating "below average in intellectual capacity". The results of the current study can be used to plan special programs based on the abilities and talents of children with hearing impairment rather than intelligence and school exam marks in order to foster their creative thinking abilities and thereby prepare them for appropriate and productive vocations.*

**Key words: Special programs, abilities, productive vocations**

Education is the fundamental right of every child. Children with disability have a right to education that promotes them to their fullest potential. In India, there are billion persons and Census of India (2001) revealed that over 21 million people in India are suffering from one or the other kind of disability which is equivalent to 2.1% of the population. Among them (7.5%) and (5.8%) of population has some kind of speech or hearing disability respectively.

Early identification and early intervention of children with hearing impairment has its own benefits and rewards. But at the same time in the society there are children with hearing impairment, who are late identified, who come from poor-social economic backgrounds, those who are born in rural areas or less advantaged and they are quite sizeable in society. So, it is imperative to develop services to

cater to these children with hearing impairment in order to actualize their potential.

At present there are approximately 700 special schools for children with hearing impairment in India. Most of these schools tend to focus their educational objectives and goals on remediation related to different aspects of their disability rather than focusing on identifying and fostering special abilities and talents hidden in children with hearing impairment. Due to which they are often gone unrecognized and undeveloped. Consequently these lacunae lead to many ill effects. And one of the major ill effects is their underemployment and unemployment. Large numbers of deaf people seem to be employed in jobs that are far beneath their ability (Schein & Delk, 1974). Therefore it is very important to recognize and develop special abilities and talents. Shanker (1968)

---

*\*Lecturer in Special Education, All India Institute of Speech and Hearing, Manasagangothri, Mysore 570006, email: vijetha\_k21@yahoo.co.in, \*\* Associate Professor, English and Foreign Languages University, Hyderabad 500605, email: jan.chinthala@yahoo.com*

points out that the study of exceptional types of children with a view to finding ways and means of their proper location, care, rehabilitation, education and guidance is essential both from the individual and the social points of view. In order to support these thoughts strong evidence based research is required. Buch (1991) also suggested that there is a need to devise programs and methods, which would promote creativity and divergent thinking.

In addition to the above, a review of related literature emphasized that very few studies worked on creative thinking abilities of children with hearing impairment especially compared to typically developing children. Further hardly any study found to have correlated Intelligence and Academic Achievement to Creative thinking abilities of children with hearing impairment. This is the major research gap. Thus, keeping this in view the present study is taken up to find out whether any significant relationship exists between *Intelligence, Creative Thinking Abilities and Academic Achievement* of children with hearing impairment.

In this context, the present study on “**Intelligence, Creative Thinking Abilities and Academic Achievement of children with hearing impairment - A correlation study**” is mainly aimed at studying the relationship between the three variables - Intelligence, Creative thinking Abilities and Academic Achievement of Children with Hearing Impairment.

#### **Objectives of the Study**

1. To study the relationship between Intelligence and Creative thinking abilities of children with hearing impairment.
2. To study the relationship between Intelligence and Academic Achievement of children with hearing impairment.
3. To study the relationship between Creative thinking abilities and Academic Achievement of children with hearing impairment.
4. To study the Gender differences for Intelligence.
5. To study the Gender differences for Academic Achievement.
6. To study the Gender differences for Creative thinking abilities.

#### **Operational Definitions**

A number of terms and concepts have been used in the study. To convey the specific meaning an attempt has been made to explain in what sense

these terms and concepts have been used in the present study.

#### **Children with Hearing Impairment**

Children with hearing impairment are those who have problems in hearing the various sounds. In the present study, children with hearing impairment refers to those who have hearing loss of 60dB or above in the better ear in the conversational range of frequencies.

#### **Creative Thinking Abilities**

Creative thinking abilities refer to the ability of an individual to think creatively. In the present study, it refers to the ability of an individual in the three non-verbal sub-tests namely Picture construction, Picture completion, and Triangles and Ellipses. The creative thinking abilities are measured by using Baqer Mehdi's Non-verbal test of creativity.

#### **Academic Achievement**

It refers to the marks obtained by children with hearing impairment in Annual Examination of present class and previous class in the school.

#### **Intelligence**

In the present study, it refers to the score and grade obtained using Standard Progressive Matrices by J.C. Raven.

#### **Method**

**Sample:** The sample consisted of fifty children with hearing impairment. They were studying in Residential special schools for children with hearing impairment in Mysore. The participants included 24 boys and 26 girls in the age range of 11 to 13 years. The method of teaching in these special schools is Total communication. The sample for the study is selected by means of convenience sampling which included the following criteria: (i) *Severe to Profound hearing loss*, (ii) *Age range between 11 to 13 years* and (iii) *No additional impairment*.

**Tools used for the Study:** For testing Intelligence, Raven, J. C. Court, J.H. & Raven, J. (1998) “*Manual for Raven's Progressive Matrices Vocabulary Scale*”, Standard Progressive Matrices was used. It is made up of five sets of diagrammatic puzzles. Each puzzle has a part, which the person taking the test has to find among the options. The standard test consist of 60 problems divided into five sets (A, B, C, D and E), each made up of 12 problems. These five sets provide five opportunities to grasp

the method of thought required to solve the problems and five progressive assessment of a person's capacity for intellectual activity. After completing the test the raw scores were computed and converted into the scaled scores, which are then totaled, and the grade of intellectual capacity was obtained from the Manual.

For testing Creative thinking abilities, Mehdi, B. (1989) *Manual for Non-verbal Tests of Creative Thinking* was used. It is intended to measure the individual's ability to deal with figural content in a creative manner. Three types of activities are used for this purpose, viz., *picture construction, picture completion, and triangles and ellipses*. Scoring is done for elaboration and originality dimensions. Elaboration is represented by a person's ability to add more ideas to the minimum and primary response to the stimulus figure. The minimum and the primary response to the stimulus figure is that the response, which gives essential meaning to the picture. It is important to see the primary and minimum response is meaningful and relevant to the stimulus. Originality is represented by uncommonness of a given response.

**Procedure:** Standard Progressive Matrices was administered on each child with hearing impairment individually at school in a quiet classroom. Every attempt was made to ensure a good testing environment. The child was instructed carefully to closely observe the pictures and to note the responses in the score sheet. Each child required approximately 35 to 40 minutes for completing the test. The investigator computed the raw scores and converted them into scaled scores as per the manual. The degree of intelligence against this scaled score was established from the manual. Non-verbal test of Creative thinking abilities was administered in a group of approximately ten children with hearing impairment. It was administered in a good classroom environment away from unnecessary noise and distractions. Children were instructed to think and carefully draw the pictures with the given figure. Any clarifications required by the children were given individually. Each child required approximately 40 to 45 minutes to complete the test. After completing the test, raw scores were computed as per the guidelines given in the manual in terms of two dimensions *elaboration* and *originality*. For testing

the Academic achievement, previous and present class exam marks of children were obtained personally from the school records with the permission of the School Principal.

### Results and discussion

**Statistical Techniques Employed:** Descriptive statistics are given for Intelligence, creative thinking abilities and Academic achievement. Independent t-test was done to study the gender differences. Spearman's correlation coefficient was used to see the correlation between the parameters under study.

The above Table 1 shows the mean and standard deviation of intelligence, creative thinking abilities and academic achievement in males and females. And by observing the scores in the present study, it can be inferred that in Creative thinking abilities, Academic achievement and in Intelligence, females scored higher than males but it is not statistically significant. The following Table 2 shows results of independent t-test. Independent t-test was administered to study the differences between males and females in intelligence, creative thinking abilities and academic achievement. It revealed no significant differences between males and females.

This is supported by Pandey & Pandey (1984) reporting that there were no consistent gender differences in respect of various factors of creativity.

The following Table 3 shows the mean and standard deviation of Academic Achievement and creative thinking abilities in relation to Intelligence. Figure 1 shows the relationship between Intelligence, Creative thinking abilities and Academic Achievement

The results of the present study revealed interesting findings and discussions. First, it reveals that the calculated correlation coefficient between intelligence and elaboration dimension of creative thinking ability is  $r = -0.123$  and intelligence and originality dimension of creative thinking ability is  $r = -0.161$ . These values are not significant at 0.05 level. Hence there is no significant relationship between Intelligence and Creative thinking abilities (*elaboration and originality*).

This finding is in consonance with the study done by Kaltsounis (1970) where he compared the creative thinking abilities of deaf students and hearing students by using Torrance Tests of Creative Thinking – Figural. He founded that deaf subjects surpassed

hearing age-mates on measures of non-verbal fluency and originality, whereas hearing subjects were superior in Non-verbal flexibility. Kitano & Kirby

(1986) state “an individual can be extremely bright but uncreative or highly creative but not necessarily intellectually gifted”.

Parameters	Group	N	Mean	SD
Intelligence	Male	24	34.58	9.62
	Female	26	35.04	6.57
Academic Achievement	Group	N	Mean	SD
Previous class exam marks	Male	24	69.75	18.52
	Female	26	72.44	11.55
Present class exam marks	Male	24	71.93	16.54
	Female	26	70.88	14.95
Creative thinking abilities	Group	N	Mean	SD
Elaboration	Male	24	33.54	11.16
	Female	26	35.62	8.88
Originality	Male	24	78.25	21.87
	Female	26	75.19	28.59

Table 1: The mean and standard deviation of Intelligence, Creative thinking abilities and Academic Achievement in males and females.

Parameters	t(48)	P
Intelligence	0.197	> 0.05
Creative thinking abilities		
Elaboration	0.730	>0.05
Originality	0.422	>0.05
Academic achievement		
Previous class exam marks	0.622	>0.05
Present class exam marks	0.189	>0.05

Table 2: The results of t-test for Intelligence, Creative thinking abilities and Academic Achievement in males and females.

Intelligence Grade	Parameters	N	Mean	Std. Deviation
III	% of previous class exam marks	41	75.41	12.66
	% of present class exam marks	41	73.42	15.08
	elaboration	41	66.93	19.22
	originality	41	58.95	20.32
IV	% of previous class exam marks	7	54.90	8.16
	% of present class exam marks	7	66.49	14.15
	elaboration	7	61.26	20.52
	originality	7	55.27	16.64
V	% of previous class exam marks	2	40.60	6.50
	% of present class exam marks	2	49.60	17.57
	elaboration	2	77.88	17.68
	originality	2	72.30	6.53
Total	% of previous class exam marks	50	71.15	15.19
	% of present class exam marks	50	71.50	15.58
	elaboration	50	66.58	19.21
	originality	50	58.97	19.52

Table 3: The mean and standard deviation of Academic Achievement and creative thinking abilities in relation to Intelligence

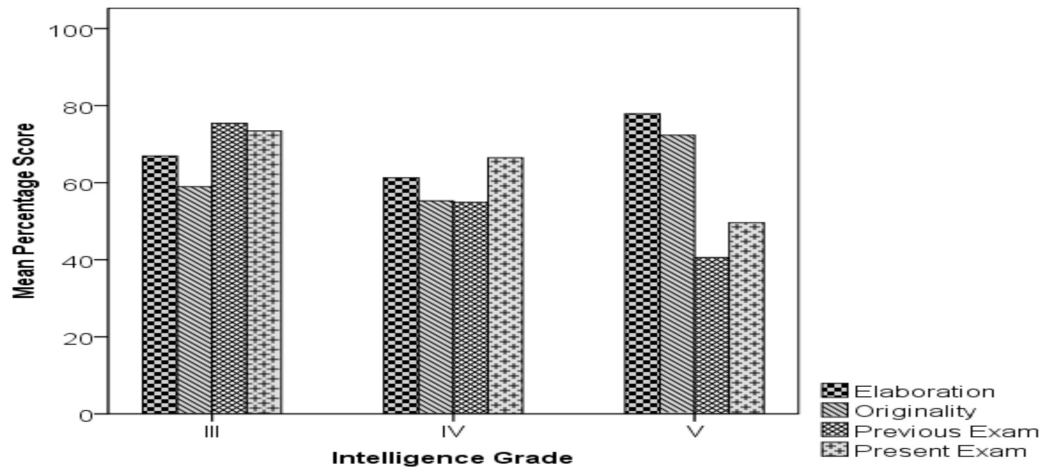


Figure 1: Graph showing the relationship between Intelligence, Creative thinking abilities and Academic achievement.

Second, the calculated correlation coefficient between intelligence and previous class exam marks is  $r = 0.711$  and intelligence and present class exam marks is  $r = 0.413$ . These values are significant at 0.001 level. Hence there is significant relationship between Intelligence and Academic achievement (*previous class exam marks and present class exam marks*). This finding is supported by Alam (2001) stating that there is a positive and significant correlation between academic achievement and intelligence. This finding is also supported by Meadow (1980), McCall (1977) revealing that intelligence tests predict academic achievement.

Third, the calculated correlation coefficient between elaboration dimension of creativity and previous class exam marks is  $r = -0.028$  and elaboration dimension of creativity and present class exam marks is  $r = -0.043$ . These values are not significant at 0.05 level. It means that there is no significant relationship between elaboration dimension of creativity and previous and present class exam marks. It also revealed that the calculated correlation coefficient between originality dimension of creativity and previous class exam marks is  $r = -0.159$  and originality dimension of creativity and present class exam marks is  $r = -0.062$ . These values are also not significant at 0.05 level. It means that there is no significant relationship between originality dimension and previous and present class exam marks. Hence there is no significant relationship between Creative thinking abilities (*elaboration and originality*) and Academic achievement (*previous class exam marks and present class exam marks*) and it is supported by Marschark (2003) stating deaf children frequently have different experiences;

different language backgrounds and different cognitive skills and do not mean that deaf students are in any way deficient.

Another major finding depicted in Figure 2 above revealed that children scoring Intelligence Grade V indicating “intellectually impaired” outperformed in creative thinking abilities compared to children scoring Grade III “intellectually average” and Grade IV “below average in intellectual capacity” respectively. In this study, Creative thinking of children with hearing impairment became apparent even though their academic performance and Intelligence scores are found below average. But this has to be supported by more concrete evidence based research. As reported by Whitmore & Maker (1985) deaf children have been less likely than their hearing peers to be screened, identified and served by special programs to assess and develop their creativity.

Therefore it is important to take up some special programs based on the abilities of children with hearing impairment to nurture their hidden talents rather than concentrating on what they are lacking. The fact that they are “differently able” must be accepted positively. As rightly pointed out by Johnson, Karnes & Carr (1977), failure to identify and serve deaf children with creative thinking abilities is an indictment against the society and a problem that should not be tolerated.

As there are no gender differences in Intelligence, Creative thinking abilities and Academic achievement, all the boys and girls can be trained for special programs for fostering creative thinking abilities.

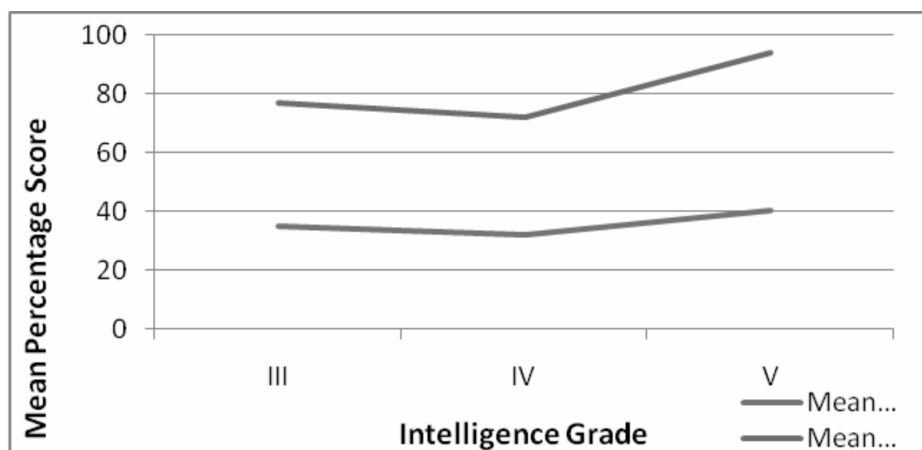


Figure 2: Graph showing children scoring intelligence Grade V outperformed in creative thinking abilities compared to children scoring Grade III and Grade IV.

**Limitations**

There were few limitations that should be considered due to paucity of time, limited availability of resources and several other aspects that could not be covered in this present study due to practical constraints.

1. The study was limited only to fifty children with hearing impairment and they were selected on the basis of convenience sampling.
2. The study was confined to selected three Residential special schools in Mysore for children with hearing impairment.
3. For Academic achievement, no test was administered but previous and present class exam marks of children were obtained from the school records.

**Summary**

The present study summarized that there exists no significant relationship among *Intelligence and creative thinking abilities, Academic achievement and creative thinking abilities of children with hearing impairment*. It also highlighted the need for planning of special programs to foster creative thinking abilities of children with hearing impairment based on abilities and talents rather than Intelligence and school exam marks. Future research can be carried out such as a comparative study in creative thinking abilities of children with hearing impairment and children with hearing. A study to find out the relative effectiveness of Baqer Mehdi’s verbal and Non-verbal tests of creativity may be taken up with reference to children

with hearing impairment studying in regular schools.

More specifically, a special curriculum for children with hearing impairment may be designed to foster their creative thinking abilities and thereby prepare them for appropriate and productive vocations. Thus, the present study contributed significant educational implications on its findings.

**References**

Alam, M.A (2001). Comparative study of academic achievement. Self concept and alienation of hearing impairment and *normal students*, New Delhi, Jamia Millia Islamic University.

Buch, M. B. (1991). Fourth survey of Research in Education, New Delhi: NCERT.

Census of India: Disabled Population (2001). Retrieved on April 10<sup>th</sup>, 2009 from [http://censusindia.gov.in/Census\\_And\\_You/disabled\\_population.aspx](http://censusindia.gov.in/Census_And_You/disabled_population.aspx).

Johnson, L. J., Karnes, M. B., & Carr, V. W. (1997). Providing services to children with gifts and disabilities: A critical need. In Colangelo, N., & Davis, G. (Eds.). *Handbook of gifted education* (pp. 516–527). Needham Heights, MA: Allyn & Bacon.

Kaltsounis, B. (1970). Differences in verbal creative thinking abilities between deaf and hearing children. *Psychological Reports*, p.26.

Kitano, M. K. & Kirby, D. E., (1986) *Gifted Education: A comprehensive view*, Boston: Little Brown, p.192.

Marschark, M. (2003). Interactions of Language and

- Cognition in Deaf Learners: From Research to Practice. National Institute for the Deaf, Rochester Institute of Technology, Rochester: New York.
- McCall, R., & McGhee, P. (1977). The Discrepancy hypothesis of Attention and Affect in Fwezmann. The Structuring of Experience. In Perk, E. L. (1994). *Child Development*, (3<sup>rd</sup> Ed). Boston: Allyn & Bacon. pp.308-346.
- Meadow, K. P. (1980). *Deafness and Child Development*. Berkeley, CA: University of California Press.
- Mehdi, B. (1989). Manual for Non-verbal Tests of Creative Thinking. Agra: National Psychological Corporation.
- Pandey, R. C. & Pandey, R. N. (1984). A study of creativity in relation to sex of high school students. *Indian Psychological Review*, pp.53-57.
- Raven, J., Raven, J. C., & Court, J. H. (1998). Manual for Raven's Progressive Matrices and Vocabulary Scales. *Section 3, The Standard Progressive Matrices*. Oxford, England: Oxford Psychologists Press/San Antonio, TX: The Psychological Corporation.
- Schein, J., & Delk, M. (1974). The deaf population of the United States. In *Special adaptations necessitated by Hearing Impairments*. National Associated of the Deaf. Silver Spring, Md.
- Shanker, U. (1968). Research Needs in the Education of Exceptional children. In U. Shanker & S.P. Ahluwalia (Eds.), Kuruksheetra. Research Needs in the study of Education. (pp. 175). Kuruksheetra University.
- Status of Disability (2000). Retrieved on 01 April, 2009. RCI. , Noida: Gaspson papers Ltd., pp.97-107.
- Whittmore, J. R., & Maker, C.J. (1985). *Intellectual Giftedness in disabled persons*. Rockville, Maryland: Aspen System Corporation.

#### Acknowledgement

This study was conducted as a partial fulfillment for degree of M.Phil (Education), Sri Venkateshwara University, Tirupati under the guidance of Dr. C. Jangaiah, Associate Professor, English and Foreign Languages University, Hyderabad.

1. Ms. P. Vijetha, Lecturer, Department of Special Education, AIISH, Mysore &
2. Dr. C. Jangaiah, Associate Professor, English and Foreign Languages University, Hyderabad.