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Study on Mathematics Achievement in Relation to Rigidity among Students at Degree Level

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ABSTRACT

The growth of any country ripens on the soils of Mathematics. The discipline of mathematics and its applications have found importance since antiquity. The present study has been conducted on a sample of 800 degree students in Mathematics. Mathematics Achievement Test and Rigidity scale were used to collect data. Pearson's product moment correlation, ANOVA, Scheffe's method and 't' test were used to analyze the data. The results revealed a significant negative relationship between rigidity and mathematics achievement of students at degree level.

KEYWORDS Mathematics Achievement, Rigidity

INTRODUCTION

The Kothari Commission Report (1964-'66) rightly points out that the study of mathematics plays a prominent part in modern education. At the higher secondary and University stages, most of the physical and social sciences require the applications of mathematics. The function of mathematics is not giving new experience to a child, rather, it promotes the organization of ideas that have already been developed from perceptual experience. Although the concrete material may act as a stimulus, the mathematical response is a mental organization of relations. Exact and precise modes have to adopted to make this organization of ideas valuable. In view of this, the factors which play on important role in determining an individual's mathematics achievement need to be studied in detail.

The literature shows that the effects of personality variables that they make over mathematics achievement have been explained in one way or the other.

Rigidity is a highly interesting psychological construct because it refers to two aspects of individual differences personality and ability that are usually regarded as separate. Rigidity may be cognitive, especially, perceptual that is, it may be an ability to perceive things differently even when the objective conditions have changed. Rigidity may also be affective, or it may show itself in overt action. Despite the long history of research on rigidity, the construct continues to attract research from a variety of psychological disciplines (D'aunno & Sutton, 1992; Mckelvie, 1990). Systematic study of rigidity has produced a large body of research with some clear and established findings. Systematic research on rigidity can be traced back to the Gestralt psychologists of the late 19th and early 20th century (Cattell, 1946; Chown, 1959; Luhcins & Luchins, 1994; Spearman, 1927; Stewin, 1983). According to Piaget, affective and moral development is inseparable from cognitive development. Therefore, the rigid behavior found in intellectual tasks have their parallels in the lack of autonoumy, perseveration and rigid constructions of personal and interpersonal values found in social behaviour.

NEED AND SIGNIFICANCE

Mathematics has had a profound effect upon civilization. The sharp growth of technology and the extensive development of science in the last quarter of the twentieth century are without any doubt due to the true application of mathematics. Today everyone who intends to enter the infinite world of science must be familiar with the language of mathematics. Mathematics is the language in which, for the past four thousand years people have been communicating and recording their thoughts and findings about the world.

The subjects in this study consisted of eight hundred second year B.Sc. degree students in mathematics from 26 colleges, affiliated to the Mahatma Gandhi University, Kottayam. The present study is proposed to understand the nature of rigidity and mathematics achievement of students at degree level. The term rigidity continues to be commonly used by psychological researchers. The knowledge obtained from a study under Indian condition would be of much value in obtaining a theoretical understanding of the extent of the influence of non-intellectual factors which control the learning and achievement at college level. Further, it may also serve to design the instructional practices which are most suited and relevant to the varied learning situations.

OBJECTIVES

1. To compare the mean mathematics achievement scores of three groups based on rigidity (low, average, and high) for the degree students.
2. To assess the relationships between rigidity and mathematics achievement of students at degree level.

HYPOTHESES

1. There is significant difference in the mean mathematics achievement scores of three groups based on rigidity for the students at degree level.
2. There is significant relationship between rigidity and mathematics achievement of students at degree level.

METHODOLOGY

Normative survey method was used for the study. The sample consisted of 800 second year B.Sc. degree students selected from twenty six different colleges, affiliated to Mahatma Gandhi University, Kottayam. In the selection of the sample, due representation was given to sex of the subjects, urban-rural locale of the institutions of the subjects and type of management of college. The investigators used Mathematics Achievement Test and Rigidity Scale for the collection of data. Both tools were constructed and standardized by the investigators. The data was collected and statistically analysed using mean, standard deviation, ANOVA, Scheffe's Test and Pearson's Product moment Coefficient of Correlation.

ANALYSIS OF DATA AND FINDINGS

The major findings of the study are given below:-

1. Comparison of Mathematics Achievement among the groups based on rigidity using ANOVA

Three groups formed on the basis of the independent variable rigidity are compared with respect to the means scores obtained in Mathematics achievement test. The details are given in Table 1.

(i) Table : 1

Mathematics Achievement Scores of the Sample with regard to their Rigidity

Independent Variable	Groups	Mean	SD	N	F
Rigidity	Low	28.04	4.7	276	307.772**
	Average	24.02	4.4	286	
	High	18.20	4.2	238	

** Significant at .01level

Table 1 shows that mathematics achievement is high among students who have low rigidity followed by students who have average rigidity and it is low among students having high rigidity. The difference in the score is statistically significant as the F value obtained (307.772) shows significant at .01 level.

(ii). Comparison between low-average, low-high and average –high scores of rigidity with respect to mathematics achievement using Scheffe's method.

The details are given in Table 1.1.

Table 1.1 Comparison between low-average, low-high, and average-high scores of the independent variable-rigidity - Results of Test of significance of Difference in mean scores of Mathematics achievement

Independent Variable	Groups	N	Scheffe's Multiple Comparisons		
			Pair	Mean Difference	F
Rigidity	Low	276	Low-Average	4.02	56.3
	Average	286	Low-High	9.84	306.5
	High	238	Average - High	5.82	108.9

The obtained F values indicate that among the three paired groups compared, significant differences exist in all cases at .01 level. Among them, difference is high in the case of low-high group. Mathematics Achievement is significantly higher among students having low rigidity than that among students having average rigidity. Mathematics achievement of students having high rigidity is low compared to that of students having low and average rigidity.

2. Relation between rigidity and mathematics achievement for the students at degree level- Analysis using Pearson's Product-moment Coefficient of Correlation.

All the correlations worked out for the general sample and subsamples are presented in Table 2.

Table : 2

Relation between rigidity and mathematics achievement for the general sample and subsamples

Rigidity and mathematics achievement		r
General Sample		-71**
Sex	Male	-.76*
	Female	-.79**
Location of Institution	Urban	-.79**
	Rural	-.69**
Type of Management	Govt.	-.70**
	Private	-.75**

**Significant at .01 level

The r's obtained for the general sample and subsamples show that rigidity exhibit significant negative relationship with mathematics achievement.

The obtained coefficient of correlation 'r' between rigidity and mathematics achievement for the general sample (N=800) is -0.71. It is significant beyond .01 level of confidence. The sign of 'r' is negative. This shows that an increase in the score of one variables corresponds to a decrease in the score of the other and vice versa. In other words, the higher the rigidity, the lower will be the mathematics achievement. The value of 'r' denotes high relationship. The correlation between rigidity and mathematics achievement was found to be -.76 for males, -.79 for females, -.79 for urban college students, -.69 for rural college students, -.70 for government college students and -.75 for private college students. The above interpretation follows for the sub samples too.

DISCUSSION OF RESULTS

A growing body of literature suggests that rigidity and intelligence are negatively related. The strongest evidence supporting the rigidity - intelligence relationship comes from Schaie's longitudinal research (Schaie, 1994; & Schaie, et.al., 1989). His finding reveals positive relationship between intelligence and flexibility. Ho's (1976) study shows negative relationship of belief stereotype of individuals with academic performance, second language skills and verbal intelligence. The existence of a significant positive relationship between intelligence and mathematics achievement was confirmed by many earlier researchers such as Malini (1990); Fisher (1995); Lynn & Mikk (2007); and Deary Strand, Smith & Fernandes (2007). Results support the findings of the investigator which reveal that rigidity is negatively correlated with mathematics achievement.

CONCLUSION AND SUGGESTIONS

The present study revealed that there is a high negative relationship between rigidity and mathematics achievement for the general sample and subsamples. For every unit increase in the score of rigidity there will be corresponding decrease in the some of mathematics achievement and vice-versa. The study also shows that mathematics achievement is significantly higher among students having low rigidity than students having average rigidity. Mathematics achievement of students having low rigidity is significantly higher while comparing with the mathematics achievement of students having average and high rigidity. Mathematics lecturers should be trained in Psychology of learning mathematics and the learner's view point. Hence thereby translating stereotyped mathematical commands into day-to-day understandable language. Students with high scores of rigidity should be helped by the teachers to be able to lower their level of rigidity, because it is detrimental to their mathematical performance. Harsh punishment, sarcastic commands and negative attitudes are to be avoided by the parents to develop positive outlook among their children with a well-adjusted personality.

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