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## **REVIEW ARTICLE**

# **COGNITIVE STYLE OF ADOLESCENT STUDENTS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT**

# Cognitive Style of Adolescent Students In Relation To Their Academic Achievement

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In recent years, research in teaching-learning process has increasingly shifted its emphasis from predictive studies of success and failure in performance to the understanding of cognitive processes that underlie the performance. Prediction of success and failure in academic performance could be of secondary importance to the insight into the basic cognitive processes that account for either of these terminal behaviours.

## NATURE AND DEFINITION OF COGNITIVE STYLE

Cognitive style is a hypothetical construct that has been developed to explain the process of mediation between stimuli and responses. This term in fact has been defined by various authors in their own ways. Some of the definitions are given below:

Harvey's (1963) holds that cognitive style refers to the way an individual filters and processes stimulus so that the environment takes on psychological meaning is representative of this use of the term.

Bieri (1971) too noted that a process of information, transformation is a basic assumption of the cognitive theorists. He maintained that individuals learn, "strategies, programmes, or other transformation operations" to translate

objective stimuli into meaningful dimensions. Bieri termed these strategies "Cognitive Structures".

## DESIGN OF THE STUDY

The study was designed to study the cognitive style of adolescent students in relation to their intelligence and academic achievement. Cognitive style of adolescents was also studied in relation to their sex. Thus the present study was conducted within ex-post-facto research design.

Ex-post-facto research is a systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable. Inferences about

relations among variables are made, without direct intervention, from the concomitant variation of independent and dependent variables.

## RESEARCH METHOD

The study was conducted through descriptive survey method of research. The descriptive research method has undoubtedly been the most popular and most widely used research method in education. It helps to explain educational phenomena in terms of the conditions or relationships that exist, opinion that are held by the students, teachers, parents, experts; processes that are ongoing; effects that are evident; or trends that are developing.

In the present study, the main objective was to collect the detailed information of existing phenomenon i.e. cognitive styles of adolescent students in relation to intelligence, achievement and sex so that more intelligent plans may be made for improving them.

## VARIABLES OF THE STUDY

In the present investigation, intelligence, academic achievement and sex were regarded as independent variables and cognitive style in terms of field dependence-independence as dependent variable.

## POPULATION

A population is usually defined as all the members of any well defined class of people, events or objects. It represents a census of complete enumeration method in which all the units (persons, household, classroom, classes, schools, methods or strategies, text-books, tests, documents, as the case may be) are reached or at least theoretically conceived to have been reached. In the present research, population includes all adolescents studying in XI class in all the higher secondary schools of Pathankote district of Punjab.

## SAMPLE

A sample is a portion of population which is selected for the purpose of study or investigation. Since in educational research or other disciplines of behavioural sciences it is neither practically expedient nor scientifically desirable to approach to the total population, the technique of sampling is employed in which instead of every unit of population is being tapped, only a part of the population is drawn and studied. Thus a sample is a sub-set of the population consists of three elements: the members or the units selected, the data collected and generalizations or inferences made.

The initial sample of the study consisted of 210 adolescent students studying in class 11th in four higher secondary schools of Pathankot. The subjects were selected through random sampling technique. The structure of the initial sample is given in Table 1

**TABLE 1****Structure of the Initial Sample**

S.No.	Name of the Institution	Sex	Class	N
1.	S.G.T.B. Govt. Sr. Sec. School Jandwal	F	PUG	35
2.	Govt. Sen. Sec. School Hara	F	PUG	70
3.	K.F.C. Pathankot	M	EUG	55
4.	S.Sc. School Ghiyala	M	PUG	50
<b>TOTAL</b>				<b>210</b>

Thus it is clear from the Table 1 that the initial sample comprised both the sexes of adolescent students.

**TOOLS USED**

The selection of suitable tools is of paramount significance in any investigation. The success of research is largely dependent upon the instruments which are used for the data collection. Different tools are used for collecting various kinds of information serving the stipulated goal of research study. The investigator gave due weight age to the following criteria in selection of the tools for the present study:

**STATISTICAL TECHNIQUES**

In the present study, two statistical techniques namely Analysis of Variance (ANOVA) and 't' test were used to analyse the data pertaining to cognitive style of various groups of adolescent students.

## COGNITIVE STYLE OF ADOLESCENT STUDENTS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT

In order to study the difference in cognitive style of adolescent students belonging to high, average and low academic achievement, F-ratio was calculated and the same has been reported alongwith other statistics in Table 2

**TABLE 4.5**

### Summary of Analysis of Variance with respect to Cognitive Style Scores of Adolescent Students Belonging to High, Average and Low Academic Achievement Groups

Source of Variation	df	Sum of Squares	Mean Square	F-ratio
Variance				
Among Means	2	242.39	121.19	8.59 *
Within Mens	90	1269.13	14.10	
<b>TOTAL</b>	<b>92</b>	<b>1511.52</b>		

\* Significant at 0.05 level of confidence

Table 4.5 shows that the obtained F-ratio (8.59) is significant at 0.05 level of confidence with 2/90 degrees of freedom as it exceeds the critical 'F'-value. This means that adolescent students belonging to high, average and low academic achievement groups differ significantly with regard to their cognitive style.

In order to find out the loci of differences in cognitive style of adolescent students belonging to various levels of academic achievement, 't' test was applied. The obtained statistics in this context has been presented in Table 4.6.

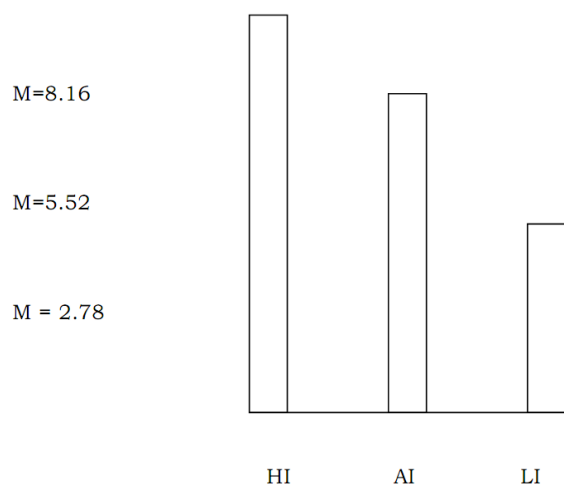
**TABLE 4.6**

### Comparison of Means of Cognitive Style Scores of High, Ave-rage and Low Academic Achievement Groups

Group	N	Mean	S.D.	Comparison Groups	F-ratio
HAA	31	7.47	4.71	HAA - AAA	1.11 NS
AAA	31	6.35	3.00	HAA - LAA	3.59 **
LAA	31	4.03	2.50	AAA - LAA	3.30 **

\*\* Significant at 0.01 level of confidence

**FIGURE**



**Bar diagram showing means of cognitive style scores of adolescent students belonging to high, average and low academic achievements groups.**

HI = High Intelligence

AI = Average Intelligence

LI = Low Intelligence

The 't' value (1.11) calculated for finding out the significance of difference in the mean scores of cognitive style of adolescent students of high and average achievement groups did not come out to be significant even at 0.05 level of significance. It implies that there is no significant difference in the cognitive style of high and low average achieving adolescent students. In other words, adolescent students belonging to both the groups do possess similar cognitive style. Table 4.6 further shows that there is significant difference in the cognitive style of high and low achieving adolescent students as the obtained 't' value (3.59) came out to be significant at 0.01 level. It is also evident from the table that the mean value of cognitive style (7.47) of adolescent students belonging to high academic achievement group is higher than the mean value (4.03) of cognitive style scores of low academic achievement group. From this it may be inferred that high achieving students are more field independent than their counterpart low achieving students in their cognitive style.

The third 't' value (3.30) also came out to be significant at 0.01 level of confidence. It lead to the inference that average and low achieving adolescent students differ significantly from each other in their cognitive style. The mean difference with regard to cognitive style is in favour of average academic achievement group. Therefore, it may be stated that adolescent students belonging to average academic achievement group have more field independence than adolescent students of low academic achievement group.

A glance at the three means of cognitive style vis-a-vis three achievement groups shows the positive relationship between cognitive style and achievement scores of the adolescent students. The research hypothesis standing accepted.

The afore mentioned findings with regard to cognitive style and academic achievement are in consonance with a number of studies conducted in western countries as well as in India. For instance; Vaidya and Chansky (1980); Wilson (1981); Wolfe (1982); Randolf (1983); Grosnell (1983); Letschh (1984); Kelly (1985); Anderson (1986); Rupert (1987); and McCorkle (1987) found significant positive correlation between field independence cognitive style and academic achievement of the adolescent students. Furthermore; Murphy (1982); Chatterjea and Paul (1984); Harrison (1984); Banks (1985); Tottle (1986); Hassan (1988) Stoeltji (1988); and Verma and Swain (1990) also noted significant difference in the academic achievement of field independent and field dependent students, confirming the positive significant relationship between academic achievement and field independence. One plausible explanation which can be offered in support of the findings pertains to the cognitive style of various academic achievement groups is that field independence and academic achievement-both are closely related with general intelligence.

## SEX DIFFERENCE IN COGNITIVE STYLE OF ADOLESCENT STUDENTS

In addition to three major objectives, one secondary objective was formulated with regard to study of the sex differences in cognitive style of adolescent students so to find out the significance of difference in the mean cognitive style scores of male and female adolescent students, 't' test was performed. The obtained statistics in this regard have been presented in Table 4.7.

**TABLE 4.7**

### Comparison of Means of Cognitive Style Scores of Male and Female Adolescent Students

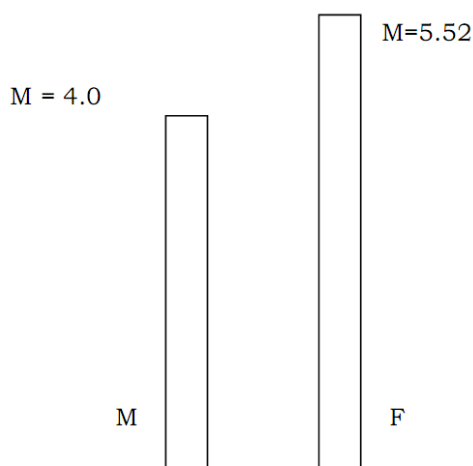
Group	N	Mean	S.D.	't' value
Male	87	4.00	2.89	4.816 **
Female	98	6.40	3.93	

*\*\* Significant at 0.01 level of confidence*

Table 4.7 shows that there is a significant difference between the mean scores of cognitive style of male and female adolescent students as the obtained 't' value (4.816) is highly significant ( $p < 0.01$ ). Thus the

research hypothesis in this regard is accepted. Since the mean cognitive style score of female adolescent students is greater than the mean cognitive style score of male adolescent students, it may be stated that female adolescent students are more field independent than the male adolescent students. ( $M=6.408 > M=4.00$ ).

**FIGURE**



**Bar diagram showing means of cognitive style scores of male and female adolescent students.**

M = Male

F = Female

The above findings seems to -be in contradiction of the findings of many studies Vernon, 1970; Pande, 1970; Hilda, 1971; Parlee and Rajagopal, 1974; Roodin et al., 1974; Perney, 1976; Hulfish 1978; Sinha, 1980; Gibson, 1981; Teshler, 1981; Sharma and Ahuja, 1982; Cagly, 1983; Tharakn, 1987; Ellis, 1988; Prakash and Srivastava, 1989; and Srivastava, 1989). These researchers found that males are more prone towards field independence than females in their cognitive style.

The findings with regard to sex difference in FD-I cognitive style of adolescent students get support only from five studies conducted by Buttery and Grey, 1972; Coates, 1974, Constantinople, 1974; Pargman, 1977; Abrams-Goidel, 1982. In these studies females have been found to be more field independent than males in their cognitive style.

The findings with regard to sex differences FD-I cognitive style of adolescent students may be justified on the ground that females hailed from urban areas while most of the males were from rural area and urbanization is conducive for the growth of field independence cognitive style.

The prime purpose of the study was to investigate the cognitive style of adolescent students in relation to their intelligence, creativity and academic

achievement. One secondary objective was also formulated to study the sex difference in cognitive style of adolescent students.

In order to realize the objectives of the study, the study was conducted within ex-post-facto research design by using descriptive survey method of research. The sample of the study was drawn randomly from four higher secondary institutions of Jammu Province. It consisted of 210 subjects (both males and females) studying in PUC. Due to cancella-tion of incomplete tests of some subjects, the sample remained confined to only 185 subjects. The subjects were classified into high, average and low intelligence, academic achievements groups on the basis of  $M \pm 1SD$  formula. Then the subjects were kept in equal number in various groups of intelligence, creativity and academic achievement.

The data were collected by employing the following tools:

- i) The Group Embedded Figures Test (GEFT), Witkin et al.
- ii) The Standard Progressive (SPM): Raven.

Academic Achievement was taken in terms of percentage of aggregate marks as obtained by the subjects in examination of class X.

The scores of cognitive style were tabulated and organized in the form as required by the objectives of the study. Analysis of the data pertaining to cognitive style of various groups and academic achievement was done by one-way analysis of variance and post-hoc analysis was done by 't' test. The sex difference in means of cognitive style scores of adolescent students was ascertained by 't' test.

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