RELATIONSHIP BETWEEN ACADEMIC SELF-CONCEPT IN SCIENCE AND COGNITIVE PREFERENCE STYLES

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The study aims at finding the relationship between Cognitive Preference Styles (CPS) and Academic Self-concept in Science (ASCSc) of the secondary school students. The sample consisted of 200 Class IX students. The study reveals that 'Application' style is positively and significantly related to ASCSc. Students differ in their CPS with high and low ASCSc; and gender differences are absent in CPS.

Introduction

Cognitive preference of Heath (1964) provided a new line of thought to many researchers like Kempa and Dube (1978) and Tamir (1974). Cognitive preference testing helps in determining the livelihood of students using the information intellectually. The construct is regarded as the variant of cognitive style. Congnitive styles are related to the vocational preferences, the choice of specialisation and relative preference within the fields. These predict the direction of achievement and hence provide a potentially powerful basis for career development and guidance.

In India, sporadic researches have been started on Cognitive Preference Styles in various science subjects. But in Israel, America and Britain, Heath, Atood, Tamir (1974, 75, 76), Kempa (1978), Rogal (1979), Brown (1970) and Hofstein *et. al.* (1973) have done a lot of work in this area. In their researches, they have constructed and validated different cognitive preference styles with achievement, intelligence and some background variables like curriculum, teacher bias, teachers' cognitive style and sex. So far, no attempt has been made to study the relationship between Academic Self-concept in Science (ASCSc) and the Cognitive Preference Styles (CPS) of the school students. Therefore, the investigator has attempted the following study:

"The relationship between Academic Self-concept in Science (ASCSc) and Cognitive Preference Styles."

Hypotheses

The following hypotheses were tested:

(i) There is no significant relationship between ASCSc and Cognitive Preference Styles of students.

(ii) The students having low and high ASCSc do not differ in cognitive preference styles.

(iii) There is no significant difference in cognitive preference styles between boys and girls.

Sample

The sample constituted 200 students (102 boys and 98 girls) studying in Class IX in four different schools of Bhopal district.

Tools

The investigator used two instruments. The descriptions are as under :

(i) Academic Self-concept Scale in Science (ASCSSc): A Linkert type scale was developed by the investigator (1988) for his study. The scale consists of 50 items (25 pairs bipolar items) arranged in cyclic order according to dimension in the scale. The reliability coefficient as calculated by test-retest method was found to be 0.84. Internal consistency coefficients were calculated by using Cronbach procedure. The coefficients for the five dimensions of the scale ranged between 0.71 and 0.82. Intercorrelation coefficients between various dimensions were also calculated.

(ii) Cognitive Preference Style (CPS): The Cognitive Preference Style prepared by Atwood (1971) measures three modes of preferences such as Memory (M), Questioning (Q) and Application (A). Out of thirty items, twenty-seven are functional and others are distractors. The items are almost equally distributed between physical and biological sciences.

Results

(1) Relationship between ASCSc and Cognitive Preference Style: Assuming normality in distribution of scores in Memory (M), Questioning(Q), Application (A) and ASCSc, product-moment coefficient has been calculated. The r values are shown in Table 1.

a) Table 1 reveals that the correlation coefficient between ASCSc and M-scores (M) for the sample of boys, girls and the total are found to be negative. For the boys and total sample, they are significant at .01 level whereas non-significant for the girls.

b) The correlation coefficient between ASCSc and Q-score (Q), for the boys group is low positive (r=0.12). For the girls group it is negative and significant at .05 level (r=–20) but for the total sample it is low negative or negligible.

c) The correlation coefficient between ASCSc and A-score (A) is found to be positive for the boys, girls and total sample, and significant for the girls group and total sample at 0.05 level and 0.01 level, respectively.

(2) Comparison of Cognitive Preference Styles of High and Low ASCSc: The groups of students having high and low ASCSc were formed by taking into consideration the mean and standard deviation of scores. The mean and standard deviation of the scores of 200 students were found to be 189.11 and 25.76, respectively. Students having ASCSc scores (M+ISD=189.11+25.76=214.87) 215 were assigned to the group of students having high ASC. Similarly, students having ASCSs scores less than (M–ISD= 189.11-25.76=163.35) 163 were assigned to the group of students having low ASCSc. In a sample comprising of 200 students, 33 fell into high ASCSc and 30 into

low ASCSc group. Mean and SD of M-scores, Q-scores and A -scores are summarised in Table 2. The t values were also calculated to test the significance of difference in the means of M-scores, Q-scores and A-scores of the two groups of students.

Table 1

Correlation Coefficient between Cognitive Preference Styles and Academic Self-concept in Science (ASCSc)

Pair	Boys (N=102)	Girls (N=98)	Total (N=200)
M and ASCSc	– 0.30**	– 0.11	– 0.29**
Q and ASCSc	0.12	– 0.20**	– 0.04**
A and ASCSc	0.18	0.22*	0.20**
*P ← 0.05 ** P ← 0.01			

High ASCSc group and low ASCSc group of students were found to have some cognitive preference styles desired on the basis of their mean scores in Memory, Questioning and Application modes. Both groups had first preference for 'Application', second preference for 'Memory', and third preference for 'Questioning'. So their cognitive preference style was found to be: *Application Memory Questioning*.

As is clear from Table 2, high and low ASCSc groups differed significantly in their M-scores and A-scores. Therefore, hypothesis of no difference in means of M-scores and A-scores of both the groups is rejected in favour of low ASCSc group for 'Memory' and high ASCSc group for 'Application'. No significant difference was found between the means of Q-scores of high and low ASCSc groups. Hence the null hypothesis is retained in this case.

(3) *Gender Differences in CPS and ASCSc:* In order to study the gender difference in CPS, mean and SD were computed for M-scores, Q-scores and A-scores for boys and girls separately. They are summarised along with t values in Tables 3.

Table 2
Mean, SD and t Values of Scores on Three Dimensions of CPS of High and Low ASCSc of Students

Dimension	High M	Group SD	Low M	Group SD	t-value	Significance at .05 level
Memory (M)	7.94	1.89	9.16	2.76	2.04 *	S
Questioning (Q)	7.48	2.17	8.03	2.98	0.84	NS
Application (A)	11.66	2.21	10.10	2.90	2.41*	S

Table 3

Mean, SD and t Values for Boys and Girls for M, Q and A Preference Styles

Dimension	Boys		Girls		t-value	Significance at .05 level
	M	SD	M	SD		
Memory (M)	8.66	2.52	8.43	2.56	0.64	NS
Questioning (Q)	8.08	2.60	8.11	2.44	0.08	NS
Application (A)	10.30	2.71	10.59	2.80	0.74	NS

It is clear from Table 3 that all the three t values are non-significant at 0.5 level. Therefore, the null hypothesis of no sex difference in means of M-scores, Q-scores and A-scores is retained.

Summary

'Memory' is negatively and significantly correlated with ASCSc whereas 'Questioning' to a less extent. These two cognitive preferences are not to be encouraged for enhancement of ASCSc. 'Application' is associated positively and significantly with ASCSc. Thus their preference must be emphasised for development of ASCSc among the students in our teaching-learning process.

Cognitive preference style of both high and low ASCSc groups of students was found to be the same, that is, A-M-Q. It reflects the highest preference for 'Application' and the lowest preference for 'Questioning' mode of cognitive reference styles. This result partially supports the views of Saxena (1989). Significant difference was found in the means of 'Memory' and 'Application' scores of both high and low ASCS groups. No significant difference was found in the means of 'Questioning' scores of both high and low ASCSc groups.

There is no gender difference in cognitive preference style of the student as all the three t-values are non-significant.

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