

Personality as Predictor of Students' Science Achievement

K. S. MISRA*
STUTI SRIVASTAVA**

Abstract

The present paper is an attempt to explore science achievement in relation to personality. It was hypothesised that there is no significant relationship between science achievement and Twenty-two personality traits; personality traits do not significantly contribute to prediction of science achievement. Participants were 579 ninth grade students (289 boys and 290 girls) of Allahabad city. Self-constructed 'science achievement test' and 'neo- personality questionnaire' by K. S. Misra were used as tools for the study. The findings of the study revealed that science achievement is positively related to nine personality traits namely-self-sufficient, sociable, analytical, independent, perseverant, inquisitive, motivated, divergent and adaptable and negatively related to five personality traits-crooked, alienated, group-dependent, rest-loving and pessimist. Personality traits such as motivated, crooked, adaptable, pessimist, disturbed and dominant emerged as the best predictors of science achievement. Teachers should plan the diverse learning environment consciously, keeping in mind the development of those personality traits which positively influence science achievement and inhibition of traits which negatively influence science achievement among students.

INTRODUCTION

In high school, students plan to study science-oriented subjects

and choose science-related careers.

Personality traits have an important role in facilitating academic success

* Professor, Department of Education, University of Allahabad- UP 211002.

** Junior Project Fellow, Tata Institute of Social Sciences, Mumbai 400088.

in science. Previous researches have shown that high achievers were more intelligent, less excitable, tough-minded, self-reliant and realistic than low achievers in biological sciences. High achievers were more intelligent and tranquil, exhibit a high level of self-conflict, and are less excitable, undisciplined and un-frustrated than low achievers in natural science (Sonatkey, 1986). By using the international personality item pool (IPIP), Goldberg, Heaven and Ciarrochi (2012) attempted to study the relationship between achievement in science subject and big-five personality traits namely-openness to experience, conscientiousness, extroversion, agreeableness and neuroticism, and revealed that conscientiousness is one of the important predictors of achievement in science subject among high school students. According to Barton et. al. (1972), 'being socially bold' was found to be the predictor of performance in science as a subject. The aim of the present study is to find out the relationship between personality traits and achievement in science among secondary students. It is also attempted to examine the predictors of achievement in science.

Objectives

1. To study the relationship between IX grade students' science achievement and personality.
2. To find out the extent to which personality traits contribute to the prediction of scientific achievement.

HYPOTHESES

The null hypotheses for the present study are as follows:

1. There is no significant relationship between science achievement and personality traits.
2. Personality traits do not significantly contribute to prediction of science achievement.

These hypotheses have been tested with reference to twenty-two personality traits namely-planned, crooked, self-sufficient, reticent, egoist, sociable, disturbed, analysis, alienated, hesitant, independent, group-dependent, perseverant, rest-loving, dominant, inquisitive, motivated, pessimist, anxious, divergent, adaptable and tolerant.

METHOD

Sample: The population of this study comprises of male and female students studying in Class IX in U.P. Board schools of Allahabad city. Ten schools (five boys and five girls) were randomly selected from different regions of Allahabad city. The researcher then randomly selected two sections of Class IX from each school. 30 students studying in each section were randomly selected for inclusion in the sample. Thus, multistage random sampling was adopted to select the sample for the present study. The sample for the present study, thus, consisted of 600 students.

Tools Used: 'Science Achievement Test (Form A)' constructed by

S. Srivastava (2015) has been used to measure science achievement of students. It had 50 multiple choice questions which covered all the six chapters of the syllabus prescribed by the Madhyamik Shiksha Board. The reliability for SAT has been calculated by split-half method, and it was found to be 0.67 (N= 200) and parallel form reliability was found to be 0.59 (N= 50). Content and criterion related validity has been established.

Twenty-two personality traits namely- planned, crooked, self-sufficient, reticent, egoist, sociable, disturbed, analytical, alienated, hesitant, independent, group dependent, perseverant, rest-loving, dominant, inquisitive, motivated, pessimist, anxious, divergent, adaptable and tolerant have been measured by using 'neo-personality questionnaire' by K. S. Misra. All the items use a five point scale response format. A score of 5, 4, 3, 2 and 1 awarded to responses namely- 'nearly always, mostly, many times, sometimes, nearly never' respectively. Scores on each of the four questions belonging to each personality trait were added together to find a score for each dimension of the personality trait. Split half reliability was calculated for various personality traits. It was found to be 0.69 for planned, 0.78 for crooked, 0.48 for self-sufficient, 0.37 for reticent, 0.39 for egoist, 0.58 for sociable, 0.26 for disturbed, 0.53 for analytical, 0.51 for alienated, 0.66 for hesitant, 0.47

for independent, 0.63 for group-dependent, 0.64 for perseverant, 0.64 for rest-loving, 0.77 for dominant, 0.60 for inquisitive, 0.49 for motivated, 0.72 for pessimist, 0.52 for anxious, 0.65 for divergent, 0.27 for adaptable and 0.64 for tolerant. Factorial validity has been determined by using varimax rotated factor analysis. Percentile norms have been calculated. Product-moment correlation technique and step-wise multiple regression techniques were used for the analysis of data.

RESULTS

Table 1 shows that out of twenty-two values of correlation between science achievement and various personality traits, three values are significant at .05 level and eleven values are significant at 0.01 level. It means that science achievement is positively related to nine personality traits namely- self-sufficient (= 0.134), sociable (= 0.170), analytical (= 0.095), independent (= 0.096), perseverant (= 0.121), inquisitive (= 0.202), motivated (= 0.213), divergent (= 0.149) and adaptable (= 0.204) and negatively related to five personality traits namely- crooked (= -0.183), alienated (= -0.095), group-dependent (= -0.119), rest-loving (= -0.125) and pessimist (= -0.177) among students. Eight correlations are not significant at .05 levels. They point to existence of no relationship between science achievement and eight personality traits namely- planned, reticent, egoist, disturbed,

hesitant, dominant, anxious and tolerant.

Observation of table 2 shows that personality traits motivated, crooked,

adaptable, pessimist, disturbed and dominant emerged as the best predictors of science achievement.

R² value is 0.125. It means that

Table 1
Correlation between science achievement and various personality traits for students

S. No.	Personality Traits	Science Achievement
1	Planned	0.06
2	Crooked	-0.183**
3	Self-sufficient	0.134**
4	Reticent	-0.007
5	Egoist	-0.056
6	Sociable	0.170**
7	Disturbed	-0.024
8	Analytical	0.095*
9	Alienated	-0.095*
10	Hesitant	-0.081
11	Independent	0.096*
12	Group dependent	-0.119**
13	Perseverant	0.121**
14	Rest-loving	-0.125**
15	Dominant	-0.071
16	Inquisitive	0.202**
17	Motivated	0.213**
18	Pessimist	-0.177**
19	Anxious	0.024
20	Divergent	0.149**
21	Adaptable	0.204**
22	Tolerant	-0.001

*/**significant at .05/ 0.01 level

these variables explain 12.5 % of the variance in science achievement.

Science achievement = 17.31 + 0.30 motivated - 0.28 crooked + 0.36 adaptable - 0.34 pessimist - 0.20 disturbed - 0.18 dominant.

In this environment, students pay more attention to classroom tasks (Gilbert, 2003); consequently, more sociable students have a high level of science achievement. Findings of Barton et. al. (1972) supports

Table 2
Results of step-wise multiple regression analysis for predicting science achievement for students

S. No.	Independent variables	Un-standardized β coefficient	Constant	F-ratio	R-square
1.	Motivated	0.30	17.31	13.46	0.125
2.	Crooked	-0.28			
3.	Adaptable	0.36			
4.	Pessimist	-0.34			
5.	Disturbed	0.20			
6.	Dominant	-0.18			

DISCUSSION

The Personality trait, 'self-sufficient', is positively related to science achievement among students. This reflects that the tendency to feel no need of others may promote the level of science achievement among students. The trait, 'sociable' is positively related to science achievement among students. This means the students' inclination to maintain good relation with elders and friends and tendency to make socially appropriate actions increases their science achievement. Students are encouraged to follow parents' and teachers' direction at young age.

this finding. 'Analytical' personality trait is positively related to science achievement among students. This indicates that increase in the tendency to examine phenomena, problems, ideas or behaviours to know about them promote science achievement among students. 'Independent' is positively related to science achievement among students. It means that students' tendency to be self-governed and acting or thinking on their own lines positively influence their science achievement. 'Perseverant' is positively related to science achievement. This means that the tendency to make constant

efforts to achieve something promotes science achievement. The trait 'inquisitive' is positively related to science achievement. This indicates that inquisitiveness is crucial in order to promote science achievement among students. It can be said that if students are curious to know about a situation or solve the problem, they can achieve high in school science. Curiosity is positively related to science achievement (Alexander, 1995) supports this finding. The personality trait, 'motivated' is positively related to science achievement among students. It means that highly motivated students may exhibit science achievement. Due to this high motivation, students are encouraged to learn science to develop science achievement. Motivation for learning science positively influences achievement in science (Mehna, 1986). Personality trait, 'divergent' is positively related to students' science achievement. This means students' willingness to think of many different and novel situations for problems may positively influence science achievement. Personality trait, 'adaptable' is positively related to science achievement. This means that students' ability to make necessary interpersonal and intrapersonal adjustments increases the tendency to increase science achievement. This finding draws as indirect support from the finding that emotional maturity is positively related to science achievement (Sabapathy,

1986). The trait 'adaptability' seems to be related to emotional maturity.

'Crooked' personality trait is negatively related to science achievement in students. This means that the more students are crooked, less will they exhibit science achievement. A person who is not straight forward, and is willing to do harm to others in order to be successful, may not be honest towards his/ her study; this may negatively influence his/her achievement. 'Alienated' personality trait is negatively related to science achievement among students. It means that students' tendency to avoid company of others can adversely influence science achievement among them. 'Group-dependent' personality trait is negatively related to science achievement among students. This indicates that tendency to act or think, depending on other persons, might inhibit science achievement of students. 'Rest-loving' trait is negatively related to science achievement among students. This means the tendency of 'rest-loving' negatively influences the development of science achievement. 'Pessimist' personality trait is negatively related to science achievement among students. This reflects that science achievement increases as tendency to be distressed or disappointed decreases among students. A counsellor may test students' personality to identify the traits which may be responsible for their low science achievement, and then he can encourage them to increase their science achievement.

Personality traits — motivated, crooked, adaptable, pessimist, disturbed and dominant — emerged as the best predictors of science achievement. These variables explain 12.5 per cent of the variance in science achievement. Teacher should plan a diverse learning environment consciously, keeping in mind the development of personality traits, namely — self-sufficient, sociable,

analytical, independent, perseverant, inquisitive, motivated, divergent and adaptable — which positively influence science achievement and inhibit traits, namely — crooked, alienated, group-dependent, rest-loving and pessimist, disturbed and dominant — which negatively influence science achievement among students.

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