CHAPTER - II

REVIEW OF THE RELATED LITERATURE
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The studies have been broadly classified into four categories, according to the variables studied. They are: (i) Pupil intelligence and achievement, (ii) Teacher behaviour and pupil achievement, (iii) Pupil personality and achievement and (iv) Interactive effects of teacher behaviour and pupil personality on pupil achievement (ATI studies).

2.1 Pupil Intelligence and Achievement

Out of a large number of factors affecting academic achievement, intelligence is considered to be the most important factor. It has generally been seen that the individual having more intelligence has more chances of success than the one having low intelligence. A very large number of research workers (Carey, 1978; Kaufman, 1980; Kaile, 1981; Kaur, 1982; Lennon, 1950; Lewis, 1967;
Mathur, and Huneal (1972; and Ramoji Rao, 1976) have found a significant positive relationship between intelligence and achievement. According to Emmett (1950) intelligence came to be the best predictor of achievement. Fleischere (1963), Klausmeir and Weismar (1964) and Edwards and Tyler (1965) also found that there was a high correlation between IQ and achievement.

The relationship of school marks with intelligence was studied by Bhargava (1957), Shivaramayya (1947), Sirivastava (1955), Richeria (1952) and Ramoji Rao (1976). All of them found a positive and significant correlation. The study of Hundal (1972) has also revealed that the correlation between measures of achievement and intelligence test scores is positive and moderately high.

A sample of six representative studies only are reviewed below as the relationship between intelligence test scores and academic achievement have been widely documented.

Edds and McCall (1960) employing a combination of average high school marks, Otis group intelligence test and gross English test scores obtained a multiple correlation of 0.87 with general scholarships.
Heston (1960) conducted a study which indicated that nonverbal tests contribute to some extent to the prediction of point hour ratio. He used performance tests along with O.S.U. psychological examination. For the combination of scores he had a multiple correlation of 0.63 with point hour ratio attained at the end of the first quarter of the college work.

Gakhar (1985) studied the relationship between Intelligence, Creativity and Achievement in Mathematics of high school students.

The objectives of the study were:

i. To study the relationship between intelligence and achievement of the students in mathematics.

ii. To study the relationship between creativity and achievement of the students in mathematics.

iii. To study the combined effect of intelligence and creativity on mathematical achievement of the students.

The sample of the study comprised of 270 students of IX class from seven high schools of Abūhār. The tools employed were (i) Jalota (1972) Group test of General Mental ability, (ii) Torrance Test of creative thinking verbal Form A,
and (iii) Achievement test in mathematics. The statistical techniques employed were correlation, partial correlation and regression analysis.

The results revealed that: (i) Intelligence is significantly and positively correlated with achievement ($r = 0.79$), (ii) when the effect of creativity is partialled out, there is significant positive correlation between intelligence and mathematical achievement, (iii) when the effect of intelligence has been partialled out there is significant positive correlation between creativity and mathematical achievement, (iv) It is also found that intelligence contributed 21.94 per cent of the variance and TVC contributed 14.35 per cent of the variance in the criterion. This means, 14.35 percent of the individual difference in the total sample in mathematical achievement are due to TVC and 21.94 per cent differences are due to variable of intelligence. The results also indicate that the conjoint effect of intelligence and creativity is higher as compared to their respective predictions in respect of mathematical achievement.

Rao D.G. (1962) conducted a study of relationship between intelligence, study habits, S.E.S. and certain attitudes towards the school with academic achievement.
The objective of the study was to find out the relationship of intelligence, study habits, S.E.S. and certain attitudes towards the school with academic achievement of grade VIII pupils of Delhi. Five hundred boys of 12 higher secondary schools of Delhi formed the sample. The scholastic achievement of the pupil was measured using Jamia achievement Test Battery, which included three important school subjects (social studies, general science and mathematics). C.I.E. group test of intelligence was used to measure intelligence. An inventory was developed on the pattern of Wrenn's study Habit Inventory to measure the study habits. Kupparswamy's Socio-Economic Status scale was used to measure the S.E.S. The following conclusions were drawn: the three independent variables intelligence, study habit and school attitude were significant predictor of scholastic achievement. The results revealed that, the multiple correlation between achievement scores, intelligence and study habits and attitude towards school was highly significant (0.81).

Rastogi (1963) conducted a study of relationship between intelligence, interest and achievement in English and Science of high school students.
The sample of the study consisted of 560 students. Intelligence was measured by Jalota's Test of Mental Ability and achievement was measured by marks obtained in the U.P. Board Examination. The statistical techniques used were: coefficient of correlation and t-test.

Results revealed that, the relationship between intelligence and interest in English and that between intelligence and achievement in Science were found to be significantly positive.

Interest and intelligence were found to be related more with achievement than between each other.

Arona and Naidu (1975) conducted a study of relationship between socio-economic status, intelligence and academic achievement. The main objective of the study was to find out the relationship between S.E.S., intelligence and academic achievement of school going students of IX grade.

The sample of the study was drawn from IX Std. students (300) of A.P. The tools used for the study were Kuppuswami's S.E.S. scale, Group intelligence test of Bhatia and an achievement test. The statistical techniques used were correlation and t-test. The results revealed that S.E.S.
does not have a major role to play as was suspected as far as academic achievement is concerned. The results also revealed that, the correlation between intelligence and achievement was found to be highly significant and positive.

Kailo and Bajwa (1982) conducted a study of intelligence as a correlate of achievement in science across different levels of socio-economic status. The major hypotheses were: (i) intelligence is positively and significantly correlated with achievement in science and (ii) the relationship between intelligence and achievement in science varies across different levels of socio-economic status.

The sample of the study comprised of 278 students of IX standard selected randomly. Tools used for the collection of data were: Jalota and Singh's group test of general Mental Ability (Punjabi version), Pareek and Trivedi's S.E.S. scale and Science test examination scores for achievement data. The statistical techniques used were Pearson's product moment correlation and critical ratio.

The results revealed that, the correlation between intelligence and achievement in science subject was found to be positive and significant. The correlation between intelligence and achievement was significant and positive.
for high S.E.S. students. The correlation between intelligence and achievement was not significant for average and low S.E.S. levels.

2.1.1 In conclusion it can be said that the above studies clearly indicate that there is a significant and positive relationship between pupils' intelligence and academic achievement.

2.2 Teacher Behaviour and Pupil Achievement

Research relating to teacher behaviour and pupil achievement increased during the 1960s and 70s. Flanders (1960) for the first time published findings based on his system of interaction analysis. He studied the relationship between classroom teacher behaviour and pupil achievement. The study of Flanders and others found that indirect teacher behaviour (which includes accepting feelings, praising or encouraging, accepting ideas and asking questions), is positively related to pupil achievement, and to favourable attitudes to the classroom.

Weber (1960) have reported teacher indirectness to be positively associated with pupil achievement.

2.2.1 Samph (1974) studied the relationship between teacher behaviour and reading performance of below average achievers.

The hypothesis of the study was that students taught through indirect influence will have greater language skill developments and more positive attitudes than those taught through direct teacher influence.

The study was conducted on a sample of 1065 school going students of below average achievement. The tools used were pupil attitude inventory, Flanders interaction analysis, metropolitan achievement test, pre and post test. The statistical techniques used were correlation, analysis of co-variance.

The results revealed that, below average achievers did have greater post achievement scores with indirect teacher influence than with direct teacher influence.

A similar process–product study was conducted by Beecher (1975) involving young children of 12+ years old. He tried to relate teacher behaviours to mathematical achievement of young children.
The main objective of the study was to know the relationship between teacher behavioural patterns and pupils' mathematical achievement.

The sample of the study consisted of 550 primary school children of 12+ years. Tools used for data collection were S.E.S. scale, observational system of instructional analysis (OSIA) and achievement test in mathematics. The statistical techniques used were analysis of co-variance.

The results revealed that, pupils with low socio-economic status achieved higher in mathematics when taught through indirect teacher influence than direct teacher influence.

2.2.1.1 In India also process-product studies were conducted (Lulla, 1974; Padma, 1976; Pavanasham, 1977; Rajiwal, 1976; Rokha, 1976; Shaida, 1976; Sharma, 1972; and Sheelavant and Deshpande, 1982) wherein teachers were first provided training in interaction analysis and later its effect on pupil achievement was studied. The studies revealed that teacher indirectness was positively related with pupil academic achievement in terms of instructional objectives like application and comprehension.
Sharma (1972) conducted a study to find out the relationship between patterns of teacher classroom behaviour and pupil attainment in terms of instructional objectives.

This was an experimental study. The major objective of the study was to find out the relative effects of four different patterns of classroom behaviour of teacher viz.,
(1) Narration, (2) Open questioning, (3) Narrow questioning,
(4) Narrow questioning with feedback upon pupil academic attainment in terms of instructional objectives like knowledge understanding, application and comprehension.

The hypotheses of the study were:
(1) There will be relatively low pupil attainment in terms of comprehension and application objective when the pupils are being taught through pattern 1 - Narration as compared to the other three patterns.

(2) There will be comparatively high pupil attainment in terms of application objective when the pupils are being taught through pattern 2 - Open questions when compared to the other three patterns.

(3) There will be no significant difference in pupil attainment in terms of knowledge and understanding objective when the pupils are being taught through the four patterns.
Tools used for the study were, Desai and Bhat Verbal Group Test of Intelligence, Flanders Interaction Analysis and the achievement test in History based on the instructional objectives viz., knowledge, understanding comprehension and application. The sample of the study was drawn from VIII grade Municipal schools of Baroda city. The sample consisted of 406 boys and 557 girls. The statistical techniques used were Mean, SD, correlation, three way analysis of co-variance and t-test. The results revealed that:

1) Pattern 3 (Narrow questioning) was found to be more effective as compared to other three patterns with respect to pupil attainment in terms of knowledge and understanding objective.

2) None of the patterns showed any differential effects on the pupil attainment in terms of comprehension objective.

3) Pattern 3 (Narrow questioning) was found to be the most effective pattern as regards the pupil attainment in terms of comprehension objective.

4) Pattern 2 (Open questions) did not show any effect upon pupil attainment in terms of
application objective. Further none of the patterns produced any differential effect in achieving this objective.

A similar study was conducted by Lulla (1974) on high school going students of 13+ to 15+ years. She studied the effect of teacher classroom behaviour upon pupil attainment. The objective of the study was to find out the effects of teacher classroom influence upon pupil achievement.

The sample of the study was 1800 pupils of high school going students between 12+ to 15+ years with similar cultural background. Thirty teachers were also selected for teaching the students using direct/indirect teacher influence. The tools used were Desai and Bhat group test of intelligence, Flanders interaction analysis and Achievement test in Geography. The statistical techniques used were Mean, SD, Correlation, analysis of co-variance and t-test.

The results revealed that pupils taught through indirect influence achieved significantly higher as compared to their counter parts.
Another process-product study was conducted by Padma (1976) on high school students. She studied the effects of teaching patterns upon pupil achievement in terms of the instructional objective of applicational ability.

The objectives of the study were:

(1) To find out the effectiveness of the
   pattern $P_1$ (lecturing, problem solving),
   pattern $P_2$ (questioning, answering, problem solving),
   pattern $P_3$ (questioning, answering, feedback),
   pattern $P_4$ (no problem solving)
   on the development of applicational ability in Science (Physics).

(2) To find out the effectiveness of pattern $P_1$, $P_2$, $P_3$ and $P_4$ on the retention of the applicational ability in Science (Physics).

The sample of the study was drawn from the pupils of VIII Std. of Baroda City Corporation High Schools. The tools employed were Shaha's non-verbal intelligence test, Flanders interaction analysis, achievement tests in Physics (pre and post) on applicational ability. The statistical techniques used were correlation, analysis of variance and t-test.
The results revealed that, the four teaching patterns had equal effects on the development of application ability when measured under surprise testing conditions. The four teaching patterns had also equal effects on the development of application ability when measured under planned testing conditions. The mean score for the pattern P3 (questioning, answering and feedback) significantly smaller than pattern P2 and P4. There was no evidence of significant variability within the set of patterns P2, P4 and P1.

2.2.1.2 Another type of study conducted was on providing training to teachers in interaction analysis and determining its effect on pupil academic achievement (Pavanasam, 1977; Rajiwal, 1976; Rokha, 1976 and Shaida, 1976).

Rajiwal (1976) conducted a study on changing teacher behaviour in teaching of science and its effects on pupils. The main objectives of the study were: (i) to study the effects of change in the behavioural patterns of teachers on the development of pupils, (ii) to study the relationship between teacher influence and pupil academic achievement, classroom trust and initiative.
The study was conducted on a sample of 400 VIII standard students of Municipal schools of Surat city. Seven teachers were also selected and they were provided intensive training in interaction analysis. Totally 7 classes were selected out of which 5 classes were experimental and 2 classes made up the control group. Tools employed were Flanders interaction analysis, Pareek's pre-adolescent adjustment scale and achievement test in science (pre and post tests). The statistical techniques used were Mean, SD, Analysis of variance and t-test.

The study revealed that:

1. Training in Flanders interaction analysis modified the teachers' attitude and they showed more indirectness.

2. Mean difference between pre and post observations on the i/d index was significant in case of experimental group.

3. The training in interaction analysis and feedback given to the teachers of the experimental group affected pupil adjustment, classroom trust and initiative level positively.
The training in interaction analysis and the feedback given to the teachers of the experimental group affected the academic achievement of pupils in science positively and significantly.

Rokhsa (1976) studied the relationship between verbal teaching behavioural patterns and students' achievement in terms of instructional objectives.

The main objective of the study was to ascertain whether some selected verbal teaching behavioural patterns affected student academic achievement.

The sample of the study was 360 VIII students of Ajmeer city. Nine teachers were randomly selected and provided training in interaction analysis and then assigned to teach three experimental groups of students. The three verbal teaching behavioural patterns were (1) providing confirmatory and corrective feedback, (2) asking cognitive memory, convergent, divergent and evaluate questions, and (3) general indirectness in teaching.

Tools used in the study were, Mehta's group intelligence test, Observational Category System (OCS) (modification of FIACS), Achievement test in General Science (Pre and post)
on the instructional objectives of knowledge, understanding and application. The statistical techniques used were median test and analysis of co-variance. Major findings were:

1. Limited training as was imparted to experimental Group-I (E₁) did not result in significant difference when a number of verbal teaching behaviours were to be changed.

2. Significant differences were not observed in favour of additional training as was given to experimental group 2 (E₂) with respect to asking cognitive memory and convergent questions and giving directions and command.

3. However significant differences were observed in experimental group 3 (E₃) where the teacher used indirect influence; pupils achieved higher in terms of applicational ability.

4. Asking more divergent and evaluative questions did not result in significant differences in achievement of pupils at understanding and application objective level.
Pavanasham's (1977) study also examined the effect of modified teacher behaviour on classroom dynamics and pupil achievement.

The objectives of the study were:

(1) to change the teacher verbal behaviour through proper training programme;

(2) to study the effects of changed teacher behaviour on variables such as achievement motivation, value orientation, dependency, classroom trust, initiative, adjustment and academic achievement of pupils, and

(3) to study effects of sustained changed teacher behaviour on pupil performance.

The study was conducted on 18 secondary school teachers assigned to 18 VIII standard classes. Out of them 12 teachers were assigned to experimental and the remaining control group. The 12 teachers in the experimental group were given training in interaction analysis. The pupils belonging to the above 18 VIII Std. classes served as pupil sample (N = 850). Tools employed were Pareek and Rao's pre-adolescent adjustment scale, pre-adolescent classroom trust scheme, pre-adolescent dependency scale form A and B,
pre-adolescent initiative questionnaire, achievement motivation inventory, value orientation inventory, achievement test in English and Flanders interaction analysis. The data was analysed using observation coding matrix and analysis of co-variance.

The study revealed that:

(1) The experimental group of teachers who were provided training in interaction analysis talked less and were more responsive to pupils. They encouraged more pupil participation and more pupil initiative than teachers in the control group.

(2) The teachers sustained their modified behaviour for more than 20 weeks after the training was completed.

(3) The pupils taught through indirect teacher influence showed higher on classroom trust, initiative, achievement motivation and value orientation as compared to their counterparts.

(4) Pupils in the experimental group achieved significantly higher than pupils in the control group.
Shaida (1976) conducted a study on teaching patterns involving questioning and feedback on pupil attainment in terms of instructional objectives like knowledge, comprehension, and application.

The objectives of the study were:

(1) To know the effects of four patterns of teaching viz., narrow questions with feedback $P_1$, narrow questions with no feedback $P_2$, broad questions with feedback $P_3$ and broad questions with no feedback $P_4$, upon the attainment of pupils in terms of instructional objectives like knowledge, comprehension, application.

(2) To study the effects of four patterns of teaching upon retention in terms of instructional objectives like knowledge, comprehension, application.

The study had a 4 x 4 Graeco-Latin square design. The sample of the study consisted of 300 VIII standard pupils of Govt. High School, Kaithal. The sample belonged to four classes of the school which also constituted the four groups for the treatment. The tools used were Jalota’s
group test of General Mental Ability, Kuppuswami's S.E.S. scale, Flanders interaction analysis, and achievement tests based on instructional objectives of knowledge comprehension and application. The statistical techniques used were Mean, SD, Analysis of Variance and t-test.

The main findings of the study were:

(1) The teaching pattern of narrow questions with feedback \( (P_1) \) produced significantly higher mean for the development of knowledge and its retention than all the other patterns.

(2) The teaching pattern of broad questions with feedback \( (P_3) \) produced significantly higher mean for application objective and its retention than other patterns.

(3) The teaching pattern of broad questions with feedback produced significantly higher mean than remaining other three patterns.

(4) The teaching pattern of narrow questions with no feedback and broad questions with no feedback did not produce significantly higher mean for total attainment in terms of institutional objectives than other two patterns.
2.2.1.3 Some of the investigators in the West have reported no relation or negative relationship with teacher indirectness and pupil attainment (Allen, 1970; Cook, 1967; Dunkin and Biddle, 1974; Flanders, 1968; Medley and Mitzel, 1959; Powell, 1968; Snider, 1968; Soar, 1968, 71; Thompson and Bowers, 1968; Torrance, 1968).

The findings of experimental studies have revealed that increased teacher indirectness was unrelated to academic achievement of average pupils (Amidon and Flanders, 1961; Carline, 1971; Cunnison, 1968; Herman, 1969; and Rain, 1969).

Rosenshine and Furst (1971) after reviewing studies in the area of teacher behaviour concluded that increased teacher indirectness is unrelated to pupil achievement, but added that criticism was found to be negatively associated with pupil achievement. Soar (1968) revealed that greater use of lecturing is associated with greater achievement of pupils with low socio-economic background.

2.2.1.4 In conclusion it can be said that the studies related to teacher behaviour and pupil achievement (process-product studies) have not yielded consistent result as the summary below reveals. Some of the researchers
have shown that teacher indirect influence is positively associated with pupil achievement. Some others have revealed no relationship or negative relationship between teacher indirectness and pupil achievement. Rosenshine and Furst's (1971) review for example found that teacher indirectness is not related to pupil achievement; on the other hand direct influence is found to be effective for teaching of mathematics and science. They also reported that teacher criticism of pupils is negatively related to achievement. Dunkin and Biddle (1974) in their extensive review have also added that teacher indirectness is unrelated to pupil achievement.

In Indian studies it is seen that some investigators, have reported positive and significant relationships between teacher indirectness and pupil achievement. But in the studies of Padma (1976), Shaida (1976) and Sharma (1972), it has been found that narrow questioning was positively associated with achievement in terms of knowledge and understanding objectives. Narrow questioning can be taken to be factor of direct teacher influence. Further it has also been reported that the pattern of questioning, answering and feedback was found to be positively associated with applicational ability. This pattern which is representative of indirect influence was found to be positively
associated with achievement in terms of applicational ability. It was also found that teachers trained in interaction analysis who used indirect influence had students who achieved higher.

2.3 Pupil Personality and Pupil Achievement

In the recent past attention has been directed towards the importance of personality variables of pupils in school achievement. Researchers in the past have studied a variety of plausible predictors of academic attainment but there exists no unique set of predictors. Among the non-intellectual predictors the effect of variables like Neuroticism and Extraversion have been explored extensively specially in the United Kingdom. Early studies of Eysenck (1957) revealed that personality variables of extraversion and neuroticism were found to be negatively associated to pupil achievement.

2.3.1 The studies of Child (1964), Entwistle and Cunningham (1968), Eysenck (1968), Eysenck and Cookson (1969), Entwistle and Entwistle (1971) and Honess and Kline (1974) also reported negative relationship between extraversion, neuroticism and pupil academic achievement.
In India also some of the studies revealed a negative relationship between extraversion, neuroticism and academic achievement (Basu, 1968; Mohan, 1976 and Shrivastav, 1980). A review of important studies is reported below.

Eysenck (1957) studied the relationship between extraversion/introversion, neuroticism and academic attainment of college students.

The main objective of the study was to know the relationship between extraversion and achievement and neuroticism and achievement. The sample of the study consisted of 600 students of London University. The results revealed that:

(1) Extraversion was found to be significantly and negatively associated to academic achievement.

(2) Neuroticism was also found to be significantly and negatively related to academic achievement.

A similar study was conducted by Eysenck S.G.B. and Gibson (1965) on school going children.

For this purpose they adopted the Eysenck Personality Inventory (EPI) and constructed Junior Eysenck Personality (JPI) and standardised the same.
The sample of the study consisted of 800 school going children of England between 11+ to 14+ years.

The results revealed that, Extraversion and Neuroticism were negatively associated with academic achievement.

Similar study was conducted by Child (1965) on High School children.

The study was conducted on a sample of 138 urban comprehensive school students and 140 public school students. The data were collected by using Junior Maudsly Personality Inventory, General Anxiety Scale for Children (Taylor), Reminisience Test and Terminal examination marks. The statistical techniques used were Mean, SD, Correlation and analysis of co-variance.

The results revealed that:

(1) Extraversion/Introversion, Neuroticism and IQ were found to be statistically unrelated.

(2) Positive and significant correlation was found between stable introversion and school attainment.
(3) The neuroticism/anxiety was found to be significantly and negatively related to school attainment.

(4) Introverted and low neurotic/low anxious pupils were found to be superior.

Similar study was conducted by Entwistle and Cunningham (1968) on High school going pupils.

The main objectives of the study were:

(1) To know the relationship between extraversion/introversion and school attainment among boys and girls of high school going.

(2) To know the relationship between neuroticism and school attainment of boys and girls.

(3) To know the combined effects of extraversion/introversion and neuroticism on school attainment of both boys and girls.

The hypotheses of the study were:

(1) Is school attainment negatively related to neuroticism and positively to introversion as measured by JMPI.
(2) But are the true relationships both non-linear? At the higher levels of attainment do the neurotic introverts form a superior group compared with other personality types irrespective of sex factor?

Sample of the study consisted of 3286 pupils of high schools age between 11+ to 13+ years. The tools used were Junior Personality Inventory, NFER non-verbal test Nos 1 and 2, Moray House Verbal Reasoning Test-72, Teacher estimates of English and Arithmetic achievement of students. The statistical techniques used were correlation and analysis of co-variance. The main findings of the study were:

(1) Neuroticism showed significant negative correlation with school attainment.

(2) Introverted boys and extraverted girls were found to be more successful in school performance.

(3) Girls who are stable extraverts and boys who are stable introverts showed the highest mean attainment.

(4) On the whole extraversion and neuroticism was found to be negatively associated with school attainment.
Another study was conducted by Eysenck and Cookson (1969) on school children.

The objective of the study was to know the relationship between extraversion-neuroticism on academic attainment of school children of age 14+ years. The study was conducted on a sample of 4000 school going children of age 14+ years. The tools used were Junior Eysenck Personality Inventory, Group test of intelligence and Achievement test. The statistical techniques used were Mean, SD, Correlation, analysis of Co-variance and t-test. The results revealed that:

(1) neuroticism was found to be negatively associated with school attainment.

(2) extraversion was also found to be negatively associated with school attainment.

(3) low neurotics/intraverted students achieved higher than other group of students.

A similar study was conducted by Honess and Kline (1974) on high school pupils of Uganda (Blacks). They studied extraversion, neuroticism and academic achievement of high school children. The objectives of the study were:
(1) to know the relationship between extraversion and academic achievement among boys and girls;

(2) to know the relationship between neuroticism and academic achievement among boys and girls; and

(3) to know the combined effect of extraversion/neuroticism on academic attainment of pupils' aged between 14 to 17 years.

The sample of the study consisted of 300 black Ugandas from High schools (both boys and girls) with age ranging from 14 to 17 years. The data was collected using Junior Personality Inventory, Group intelligence test and an achievement test. The statistical techniques used were, Mean, Correlation and t-test. Main findings of the study were:

(1) Extraversion was found to be negatively associated with academic achievement especially among girls. But it was not significant for boys.

(2) Neuroticism was also found to be negatively and significantly related to academic achievement for both boys and girls.
(3) Low extravert/low neurotic students achieved higher than rest of other students (for both boys and girls).

Entwistle and Entwistle (1971) studied the relationship between personality factors of extraversion, neuroticism, study methods and academic performance of college students.

The sample of the study was drawn from 20 colleges. Four hundred and fifty subjects studying in first year were randomly selected. Personality variables of extraversion and neuroticism was identified by administering Eysenck Personality Inventory (EPI). The attitude towards study methods was known through administering the student attitude questionnaire Form A and B. The performance (academic) of the students was known by administering achievement tests. The statistical techniques used were Mean, SD, correlation analysis of variance and t-test. The results revealed that:

(1) The successful students of the college tend to have below average scores on extraversion together with high scores on the study methods.
(2) It was also noted that there is a clear link between good study methods and stability of mind (low neuroticism) though some highly motivated students had higher scores on neuroticism.

(3) Stable minded introverts (low neurotics/low extraverts) have good study habits and are also the most successful students.

A similar study was conducted by Cowell and Entwistle (1971) on technical college students. They carried out a study to determine relationship between extraversion and neuroticism, study attitudes and academic performance in technical college students.

The objectives of the study were:

(1) To know the relationship between extraversion and neuroticism and academic performance of technical college students.

(2) To know the relationship between extraversion and neuroticism and study habits of technical college students. The sample of the study was 177 male students of technical college. The tools used were group test of intelligence,
Eysenck Personality Inventory, Brown Holtzman Survey of Study habits and attitudes and annual examination marks. The statistical techniques used were correlation and the $x^2$ test. Main findings of the study were:

i. stable minded students achieved better at the examination;

ii. extraversion was found to be negatively associated with academic achievement, and

iii. stable introverts had distinctly better study methods and achieved higher than other students.

Some investigators like Broadbent (1958), Cortic (1968), Furneaux (1956), Gale (1971) and Warburton (1968) found extraversion was negatively associated with academic achievement and study habits of the students. Davison (1956), Feber (1955), Korchin and Levin (1957), Ramond (1963), Sarason Palola (1960) and Taylor (1956) studied the relationship between manifest anxiety (neuroticism) and academic success and reported that low anxious students achieved higher than high anxious ones.
2.3.1.1 Coming to studies conducted in India some investigators have revealed negative relationship between extraversion/neuroticism and academic achievement. (Basu, 1968; Mohan, 1976 and Shrivastav, 1980).

Basu (1968) studied the relationship between personality factors and academic performance of second year commerce college students.

The hypotheses of the study were:

i. that higher the success of the student lower the extraversion score;

ii. higher the success of the student lower the neurotic scores; and

iii. curvilinear relationship between neuroticism and performance may be related to optimum drive level for a test of given difficulty.

The sample of the study was drawn from Commerce colleges of Calcutta. Totally 260 subjects were involved in the study. Tools used for study were Eysenck Personality Inventory (EPI) and annual examination scores. The statistical techniques used were mean, correlation, analysis of variance and t-test.
The results revealed that:

i. Neuroticism and academic performance were found to be negatively associated.

ii. Extraversion and academic success were also found to be negatively associated at this level.

iii. the mean neuroticism and extraversion scores for the sample chosen were found to be significantly higher than the English or American norms for the EPI, and comparable to those found by Lynn (1959) for English University students.

A similar study was conducted by Mohan (1973) on High school students, college students and University students of Punjab.

The main objectives of the study were:

(1) to know the relationship between extraversion and neuroticism on academic achievement of high school, college and University students;
(2) to know the relationship between the extraversion/neuroticism and vocabulary of pupils at various levels; and

(3) To know the relationship between extraversion/neuroticism and age and sex of the pupils.

Sample for the study consisted of 300 (boys and girls) taken from schools, colleges and University departments of Punjab. The youngest age group was between 11+ to 15 years, represented by 100 subjects from schools (both boys and girls), 100 subjects from colleges and 100 subjects from University of Punjab. Tools used for the study were Eysenck Personality Inventory (EPI), Junior Eysenck Personality Inventory (JEPI adapted Hindi version), standard Progressive Matrix (SPM), Vocabulary test-A, Vocabulary test-B for age group 15 to 20 years, and Vocabulary test-C for age group 10 to 15 years. The statistical techniques employed were Mean, SD, correlation, t-ratios, F-ratios and zone analysis. Main findings of the study were:

(1) Neuroticism was found to be negatively associated with academic achievement at all the three stages (school level, college level and University level);
(2) Extraversion was also found to be negatively associated with academic achievement;

(3) Low neurotic students tend to be better on vocabulary at all levels;

(4) Intelligence and extraversion were found to be unrelated. But intelligence and neuroticism were found to be negatively associated;

(5) It was also found that extraversion and neuroticism were unrelated to each other.

A similar study was undertaken by Shrivastava and Srivatsava (1978) on college students (Arts and Science). They conducted a study to predict academic achievement through personality traits. The main objectives of the study was to know the relationship between extraversion/neuroticism and academic achievement of arts and science college students.

The subjects of the study consisted of 250 science and 250 arts college students. The tools used were, Eysenck Personality Inventory, Group Intelligence Test and Achievement Test. The statistical techniques used were correlation, multiple regression analysis and t-test.
The results revealed that:

(1) Neuroticism was found to be negatively associated with academic achievement for both arts and science students;

(2) Extraversion was also found to be negatively associated with academic achievement;

(3) Low neuroticism/low extraversion favoured the academic success of the students both in arts and science faculty.

Deshpande and Lodhi (1980) conducted a study to determine the relationship between academic achievement and some psychological variables. The major hypotheses of the study were:

(1) High achievers (HA) would have high scores on intelligence test than the low achievers (LA).

(2) High achievers would have low anxiety than the low achievers.

(3) High achievers would be less extravert than than the low achievers.
The sample of the study was 120 XI class students of a higher secondary school in Poona. The student sample consisted of 60 high achievers (scoring between 75% to 92% of marks in S.S.C. examination) and 60 low achievers (scoring between 33% to 50% of marks in S.S.C. examination). Tools employed for the study were Kothurkar's Group Test of Mental Ability, Eysenck Personality Inventory (EPI), Prayag Mehetha's Achievement values and Anxiety Inventory (AV AI) and Marathi adaption of Taylor's M.A.S. The statistical techniques used were, Mean and SD and Analysis of variance.

The results revealed that:

1. High achievers were found to be more intelligent than low achievers;

2. High achievers were found to be less anxious/low neurotic than low achievers;

3. High achievers were found to be low extraverts.

2.3.2 Another set of investigators have reported neuroticism to be negatively associated with achievement whereas extraversion was positively associated with academic achievement. (Elliott, 1970; Orme, 1970 and Rushton, 1966).
In India, Vohra (1981) and Husain (1976) have reported negative relationship of neuroticism and positive relationship of extraversion with school attainment.

Rushton (1966) studied the relationship between personality characteristics and scholastic success in eleven year old children. The objectives of the study were:

(1) To investigate the relationship between personality variables of extraversion, neuroticism and cognitive ability of eleven year old pupils;

(2) To know the relationship between personality variables of extraversion, neuroticism on academic achievement of eleven year old pupils.

The study was conducted on a sample of 458 boys and girls of school going. Tools used for data collection were: Children's Personality questionnaire, Moray House Verbal Reasoning Test No.63, Moray House Arithmetic Test No.30 and Moray House Spatial Test No.2 and Teachers' rating scale of fourteen personality and ability traits. The statistical techniques used were Mean, SD, Correlation, analysis of variance and t-test. The results revealed that:
(1) The second order factor of anxiety clearly has a negative correlation with verbal reasoning, arithmetic ability, English and school academic records.

(2) It was also found that extraversion correlates positively with verbal reasoning, arithmetic, English and school examinations.

(3) At this young age extraversion was found to be favourable for academic success.

Another study was conducted by Elliott (1970) on school going children. He studied the effect of personality factors of extraversion and neuroticism on scholastic attainment of school going children.

The main objective of the study was to know the relationship between reading attainment, intelligence and extraversion/neuroticism in school going children of 13th years. Sample for the study was drawn from fourteen primary school (N = 900) and three groups were formed with the following characteristics: (a) Mental age restricted IQ; (b) Cronological age restricted (CI) and (c) Reading age restricted (Standard). The tools used for the study were:
(1) Shonell graded word reading test-1960, (2) Junior Eysenck Personality Inventory, (3) Moray House picture intelligence test and (4) Achievement test. The statistical techniques used were correlation, zone analysis and analysis of variance.

The following results were obtained:

(1) Neuroticism was found to be negatively associated with attainment and reading ability of the students.

(2) Extraversion and reading ability and attainment were found to be significantly and positively associated, when the mental age was held relatively constant.

(3) There was no significant correlation found between I.Q. and extraversion when the attainment mental level and CA of the sample were held relatively constant.

(4) Neuroticism and I.Q. were found to be negatively associated.

Orme (1970) conducted a similar study on primary school children. He studied the relationship between personality
factors of extraversion/neuroticism and ability and achievement in primary school children.

The objectives of the study were:

(1) to know the relationship between the neuroticism/extraversion and school attainment in primary school children.

(2) to know the relationship between intelligence and achievement in primary school children.

The sample of the study was 400 primary school children of age between 12 to 13 years. Tools used for the study were Junior Personality Inventory, Group intelligence test, Achievement test and S.E.S. scale. The statistical techniques employed were, Mean, SD, Correlation, Analysis of variance and t-test. The results revealed that:

(1) Intelligence and school attainment were found to be significantly and positively associated.

(2) Neuroticism was found to be negatively associated with school attainment.

(3) Extraversion was found to be positively associated with school attainment.
Vohra (1981) wanted to determine whether academic achievement was a function of neuroticism and extraversion. His study aimed to know:

(1) Whether the personality variables such as extraversion/neuroticism were related to the academic success of pupils studying in high schools;

(2) The unique contribution of neuroticism and extraversion towards variance of academic success.

The sample of the study consisted of 230 IX standard students with mean age group of 14+ years. Tools used for the study were Junior Personality Inventory and Classroom test in mathematics. The statistical techniques used were mean, S.D., correlation, t-test and analysis of variance. The results revealed that:

(1) Neuroticism was found to be negatively associated with academic achievement of pupils;

(2) Extraversion was found to be positively associated with academic achievement;

(3) Extraversion and neuroticism were two predictors, but they could not be thought of as the sole predictors.
Husain (1976) conducted a study of academic attainment in relation to level of aspiration and anxiety. The objective of the study was to know the relationship between anxiety and levels of aspiration on academic attainment. The sample of the study consisted of 250 undergraduate students (college students of Aligarh). The tools used were Sinha Anxiety Scale, Ansari's L.A. coding test and annual examination marks. The data was analysed using correlation, t-test, analysis of co-variance.

The results revealed that:

(1) Anxiety was found to be negatively associated with academic achievement.

(2) Level of aspiration was found to be positively associated with academic achievement.

2.3.3 Another set of investigators have reported negative association of neuroticism and academic attainment. At the same time they have also reported that extraversion was unrelated to achievement (Davidson, 1962; Eysenck, 1961; Levin, 1962).

Some Indian studies have also revealed similar results (Gupta, 1971; Mohan, 1968; Shankar and Brar, 1972).
Eysenck (1961) studied the relationship between extraversion/neuroticism and academic performance of school children. The objective of the study was to know the relationship between extraversion/neuroticism and academic achievement of school children of 13+ years. The sample of the study was 300 middle school children with an average age of 13+ years. The tools used were Junior Personality Inventory and school achievement test. The statistical techniques used were mean, SD, correlation, analysis of variance and t-test. The results revealed that:

1. Neuroticism was found to be negatively associated with school achievement.
2. Extraversion was found to be unrelated to achievement.

A similar study was conducted by Davidson (1962) on high school students. The aim of the study was to know the relationship between extraversion/neuroticism and academic attainment of high school pupils of 14+ years.

The sample of the study consisted of 250 pupils (both boys and girls) of Manchester Municipal Corporation schools of average age 14+ years. The tools used were Junior Personality Inventory and annual examination marks.
of the pupils. The statistical techniques used were correlation, analysis of variance and t-test. The results revealed that:

(1) Neuroticism was found to be negatively associated with academic achievement.

(2) Extraversion was found to be unrelated to academic achievement.

Levin (1962) studied the relationship between extraversion/neuroticism and academic achievement of high school going pupils.

The objective of the study was to know the relationship between extraversion/neuroticism on academic attainment of high school students of average age.

The sample of the study consisted of 350 school going pupils of average age 13 to 14 years. Tools used for the study were Junior Personality Inventory and school examination marks. The statistical techniques used were correlation, t-test and analysis of variance. The results revealed that:
(1) Neuroticism was found to be negatively associated with academic attainment.

(2) Extraversion was found to be unrelated to academic attainment.

Mohan (1968) conducted a study on relationship between extraversion/neuroticism and academic achievement of pupils. The objective of the study was to know the relationship between extraversion/neuroticism and academic achievement of high school pupils of age between 13 to 15 years. The sample of the study was 200 high school going pupils of Patiala district of Punjab. The tools used for the study were the Hindi version of Junior Personality Inventory and achievement test. The statistical techniques used were correlation, t-test and analysis of co-variance. The results revealed that:

(1) Extraversion was not found to be significantly related to academic attainment.

(2) Neuroticism was found to be negatively related to academic achievement.

A similar study was conducted by Gupta (1971) on college students. He conducted a study to determine the
relationship between extraversion, neuroticism and adjustment and achievement of college students.

The main objective of the study was to know the relationship between extraversion, neuroticism and adjustment as well as achievement of college students. The sample of the study was 250 college students of Dhuvaneswar, Orissa. Tools used were Eysenck Personality Inventory, Bells adjustment inventory and achievement test. The statistical techniques used were Mean, SD, correlation, analysis of co-variance and t-test.

The results revealed that:

(1) Neuroticism was found to be negatively associated with achievement.

(2) Extraversion was not found to be significantly related to achievement.

(3) There was positive relationship between extraversion and adjustment.

(4) No significant relation was found between neuroticism and adjustment.
2.3.4 Another set of investigators have reported neuroticism to be positively associated with academic achievement. Barton (1974) and Robinson (1966) showed that neuroticism facilitates academic success. Singh (1981) found that academic success of male ninth class students was positively correlated with neuroticism. Furneaux (1956) found a positive relationship between neuroticism and attainment for university students. Lynn and Gordon (1961) reported that neuroticism was advantageous to educational success at college level.

2.3.5 There have been a group of studies which failed to find any relation between neuroticism (anxiety) and academic achievement. Bending (1958, 1960) found no relation between neuroticism and attainment in American University students. Sarnoff (1959) also reported no association between anxiety and attainment in 11+ year old children.

2.3.6 The personality factors like extraversion and neuroticism play an important role in the academic achievement of the pupils at various stages (school, college, University). In some of the studies reviewed, investigators have reported neuroticism or anxiety of pupils to be negatively associated
with academic achievement. But some others have reported positive association of neuroticism or anxiety with academic achievement. A third set of investigators have reported no relationship between neuroticism/anxiety and academic attainment. Similarly for the extraversion variable some of the investigators have reported negative relationship with academic attainment. But some others have reported a positive relationship extraversion while some investigators have revealed no relationship with academic attainment. Hence, it can be concluded from the above review that consistent relationships between Extraversion, Neuroticism and achievement do not emerge.

2.4 Interactive effects of teacher behaviour and pupil personality on pupil achievement (ATI effects)

Some investigators have tried to study the interactions between aptitude and treatment (ATI) and the resultant effect on pupil achievement. The aptitude variables studied have been student personalities like extraversion/neuroticism (manifest anxiety) and achievement orientation. Aptitude is defined as any individual characteristics that is differentially related to two or more treatments. Treatment variable refers to teaching style of teachers like the following: Flanders' (1970) direct/indirect style of teaching;
Binds (1967) blame/praise teaching style, Domino's (1970) conforming manner and independent manner, Dowliby and Schumer's (1970) teacher centered and student centered manner. All the above mentioned teaching styles are closely related to one another (i.e. to direct/indirect teaching style of Flanders, 1970).

Domino (1970), Dowliby and Schumer (1970), Katharki and Deshpande (1984), Peterson (1976), Rim (1967) have tried to determine the interactive effects of aptitude measures and treatment on pupil achievement.

Rim (1967) conducted a study relating extraversion, neuroticism and the effects of praise or blame on performance.

The main objective of the study was to know the effect of praise or blame on extravert and neurotic students in terms of their performance.

The sample of the study consisted of 200 school going pupils of 12+ years from two comprehensive schools. The tools used for the study were Junior Personality Inventory, the performance test and the teaching strategies of praise/blame. The statistical techniques used were mean, SD,
correlation, analysis of variance and factor analysis.

The main findings of the study were:

(1) Blamed extraverts improved their performance more than blamed introverts.

(2) Praised introverts and blamed extraverts improved their performance more than blamed introverts and praised extraverts.

(3) Praised low neurotics and blamed high neurotics improved their performance than blamed low neurotics and praised high neurotics.

(4) Blamed extraverts and emotionally stable children whether blamed or praised improve their performance.

A similar ATI study was conducted by Domino (1970) involving University students. He conducted a study on the interactive effects of achievement orientation and teaching style on the academic achievement.

The main objective of the study was to know the effect of different types of teaching styles and achievement orientation on the academic performance of students.
The main hypothesis of the study was that there is an interaction between students' achievement orientation and the teaching style to which they are exposed and it affects both the amount of learning that takes place and the degree of expressed satisfaction with the scholastic environment.

The sample for the study was 900 students of entry classes of a large University. Tools used for the study were an achievement test consisting of 200 multiple choice items and six essay type questions which demanded both convergent and divergent thinking (Guilford, 1959); two 9 point rating scales, one scale rating amount of factual knowledge present and the other the degree of original thinking present, a seven point scale (rating) for evaluating both the course and the instructor, the teacher instruction evaluation of two styles, namely, conforming manner and independent manner using the criteria indicated by Domino (1968). The statistical techniques used were, correlation factor analysis and two way analysis of variance.

The study revealed that there was:

(a) a very definite interaction between students' achievement orientation and teaching style.
The teaching style had no effect on original thinking of students.

(b) Significant achievement orientation differences were obtained on original thinking ratings, teacher effectiveness ratings, introductory psychology grades and GPA with the high achievement students scoring higher. For both the original thinking ratings and GPA there were no significant interaction effects. Students high on achievement exhibit more original thinking and perform better academically than other students.

(c) There were no differences attributable solely to teaching style.

Another study on ATI was conducted by Dowliby and Schumer (1970) on college students. They conducted a study on teacher centered versus student centered mode of college classroom instruction as related to manifest anxiety.

The main aim of the study was to know the possibility of an aptitude x treatment interaction (ATI) between two modes of classroom instruction and manifest anxiety.
Sample of the study was 300 students enrolled in two separate sections of an introductory psychology course. Each section was treated as either student centered or teacher centered. Tools used for the study were Taylor's manifest anxiety scale, achievement test (orientation), teaching strategy of student centered and teacher centered. The statistical techniques used were correlation, analysis of variance and t-test.

Results revealed a disordinal interaction so that while the teacher centered mode optimised learning for high anxious students, the student centered approach resulted in superior examination performance for low anxious students.

Another study on ATI effects was conducted by Peterson (1976) involving high school students. She conducted a study of interactive effects of student anxiety, achievement orientation and teacher behaviour on student achievement and attitude. The study explored the effects of students' personality and teacher behaviour on student achievement and attitude.

The treatments were conceptualised to separate out the effects of structure and participation. It was
constructed with two levels of structure (high and low structure) and two levels of participation (high and low participation) so that four instructional treatments resulted: (1) High structured/High participation, (2) High structured/low participation, (3) Low structured/High participation, and (4) Low structured/low participation. Sample of the study was 203 students of 9th grade high school students of California. Totally four classes were chosen. Each class was randomly assigned to one of the above four instructional treatments. The teachers involved in the study were given intensive training prior to the treatment. Tools used for the study for the aptitude measures included (a) vocabulary test, (b) two sub scales from California Psychological Inventory to measure achievement orientation; two measures of manifest anxiety, Children's Manifest Anxiety Scale (CMAS) and trait anxiety inventory. A rating scale and an observational system developed to assess the fidelity of implementation of the four instructional treatment.

Procedure: Behavioural specifications for the instructional treatments came from ATI studies. Two weeks prior to beginning of the study, teachers were given intensive training in observation system designed. Then the treatment was implemented for 10 days and observation
was done (before that the students were administered anxiety test, vocabulary test, intelligence test and the subscales of CPI). After the treatment the students were administered achievement test. The statistical techniques used were mean, SD, Cronbach's alpha, reliability estimate and correlation.

The results revealed that:

(1) High anxiety/low ability students did better in the class in which, the teacher did not place frustrating demands on them through structuring and in which they were able to remain inconspicuous, as in the low structure/low participant classes.

(2) High anxious/high ability students were able to meet the demands of the high structure/high participation, high structure/low participation or low structure/high participation classes.

(3) The low anxious/low ability students seem to be benefitted from having demands placed upon them by the teacher.

(4) The low anxious/high ability students did not need structuring provided by the teacher because of their own ability.
(5) High anxious/low ability students were paralyzed and frustrated by situations like high structure/low participation class because the teacher tells them what they should do and learn (i.e., structuring) and the low ability students tend to think that they cannot do it.

Similar type of study was conducted by Tuckman and Dominick (1973). They studied personality structure, instructional outcomes, and instructional preference. Variables involved in the study were the dependent variables of preference for instructional method, study time and achievement of students; the independent variables of teacher instructional methods and personality variables. The sample consisted of 120 freshmen Business Majors who were attending a comprehensive community college. Tools used were: Nelson-Denny Reading Test-Form A, four instructional method developed by the investigators, Interpersonal topical Inventory developed by Tuckman and Achievement tests.

Data was analysed by employing two-way analysis of variance. It was found that abstract students preferred those treatments with less structure and more responsibility; however, abstract and concrete students showed similar achievement levels as a result of each treatment.
Katharki and Deshpande (1984) conducted a study on interactive effects of teacher behaviour and neuroticism on pupil achievement.

The objectives of the study were: (1) to know the relationship between the teacher behaviour and pupil achievement; (2) to know the relationship between the pupil personality and pupil achievement and (3) to know the interactive effects of teacher behaviour and neuroticism of pupils on their academic achievement.

Tools used for the study were: Junior Personality Inventory (adapted Kannada version), Flanders interaction analysis and pre and post achievement tests. The sample of the study was chosen through purposive sampling technique. The sample consisted of 68 students (22 boys and 46 girls) of IX standard of a high school of Dharwad city, with similar socio-economic status.

Procedure: Lesson plans of one unit in Science II (Biology) for IX standard were developed on the basis of Flanders' interaction analysis and intensive training to two teachers were given in acquiring skill in teaching either through direct or indirect behaviour. JPI was administered to subjects and accordingly two matched groups
(composed of both low neurotic and high neurotic pupils) were formed. These two groups were assigned randomly to direct and indirect teacher influence. After the treatment was over, post achievement test was administered. Statistical techniques used were mean, SD, analysis of variance and t-test.

The results revealed that:

(1) Pupils taught through indirect influence achieved higher than the students taught through direct teacher influence.

(2) Neuroticism was found to be significantly and negatively associated with pupil achievement.

(3) Students with low neuroticism under with indirect teacher influence achieved higher than under direct group.

(4) It was also concluded that students with high neuroticism would be benefitted under direct teacher behaviour also.

2.4.1 In these studies various styles of teaching have been employed. The teaching styles considered are praising
and blaming (Rim, 1967) student centered and teacher centered (Dowliby and Schumer, 1970), conforming manner and independent manner (Domino, 1970), low structuring/high structuring combined with high participation/low participation (Peterson, 1976) and direct/indirect (Flanders, 1970). These styles can be brought under the umbrella of indirect teaching of Flanders (praising, student centered, independent manner and low structuring/high participation) and direct teaching of Flanders (blaming teacher centered conforming manner and high structuring/low participation). The aptitude measures have been manifest anxiety, achievement orientation and neuroticism all of which excepting achievement orientation, may be considered to be syndromes of anxiety.

If the results of the above studies are examined from the above premise, it can be concluded that there is a strong support for a positive relationship between direct teacher behaviour and neuroticism, in the sense that high neurotic students taught by direct teacher influence would achieve better.