Procedure of the Study
Chapter : 3

PROCEDURE OF THE STUDY

3.1 DESIGN OF THE STUDY-

The investigator has tried to study the motivation, learning style and achievement of creative and non-creative, high school students. The present study was carried out under the broad framework of descriptive method of research. The procedure of data collection and related aspects necessary for under the following sub-heads:

(I) The sample
(II) Tools
(III) Data collection
(IV) Data analysins

3.2 The Sample

The Sample for the main study was selected through “Incidental Purposive sampling technique” (Guilford 1978).

The term incidental sampling is applied when groups are selected because they are easily or readily obtainable (Garrett, 1971). Incidental purposive sampling is always resorted to when the objectives of the study are served even without taking random sample. Moreover, it does not studies in west have been based on data obtained from samples selected by this method (Garret,
1971). This type of sample was also found to yield normal distribution resulting in the yielding of generalizable result by number of Indian researches also (Joshi, 1960; Kapoor, 1963; Bhattacharya, 1978; Giri, 1987).

A population of class IX students studying in recognized schools of Allahabad city was taken into consideration for the present study. It was assumed that this city being district head quarter has students from all sections of society and truly represents the Junior high school population.

In the present study the sample was drawn in two stages. In the first stage a frame of all recognized high and intermediate schools of Allahabad City was prepared. From which a sample of 5 schools, affiliated to U.P. Board of High Schools and Intermediate Education was randomly drawn. These schools were recognized and the students were from different socioeconomic status group of the society. In the second stage all the students of class IX from each of these schools were drawn out for this study. This technique has been common used in education researches and found to be practical, economical, yielding generalizable results.

Thus, a total sample of 400 Junior high school students studying in class IX and having a range of 14 to 17 years was drawn from 5 randomly selected schools. It was assumed that such a sample of students would fairly represent the population on the basis of the sample size which normally include subject representing the full
range of socio-economic environment. Schoolwise break-up of the sample for the main study has been given in

**Table 3.1-**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the Institution</th>
<th>No. of students selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>K.P. I. C. Colonelganj, Allahabad</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>C.A.V. Inter College Allahabad</td>
<td>85</td>
</tr>
<tr>
<td>3.</td>
<td>Saraju Parin I.C. Bahadurganj Alld.</td>
<td>90</td>
</tr>
<tr>
<td>4.</td>
<td>Anglo Bangali I.C. Allahabad</td>
<td>70</td>
</tr>
<tr>
<td>5.</td>
<td>Tula Sikshan Sansthan, Allahabad</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

This sample of students was utilized for final study to obtain data on creativity, learning style, motivation and academic achievement.

### 3.3 Tools-

In order to quantify the variables under study, different tools were selected on the basis of scientific and practical considerations. The following tools have been used in the present study to collect data:

1. Torrance Test of Creative Thinking (Verbal form, Hindi version)
2. Learning Style Inventory (LSI)
(III) School Motivation Analysis Test (SMAT)

A brief description of these tools have been presented here:

3.3.1 **Description of Torrance Test of Creative Thinking (TTCT)**

The Torrance Tests of Creative Thinking (Torrance, 1996) consist of two forms-verbal and figure (non-verbal). The research has used only the verbal form adapted in Hindi by the investigator himself for the purpose of creativity.


The types of tasks or activities chosen for the tests were those that could be most easily and economically administered and scored, and that had stood best the tests of reliability and validity, while at the same time sampling as many as different kinds of manifestations of creative thinking ability as possible. The seven tasks are believed to bring into play somewhat different mental processes, yet all or them require the subjects to think in divergent direction, in terms of possibility.

(I) **Rationale and description of the test activity**

The development of the Torrance Test of Creative Thinking has, in general been guided by the definition of creative give by the author of the tests. According to Torrance (1966), creative is “a
process of becoming sensitive to problems, deficiencies, gaps in knowledge missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them; and finally communication the results”. The author claims that he has tried to assemble batteries of figural and verbal activates that required kinds of thinking analogous to the thinking involved in recognized creative achievements.

An Attempts will be made now to briefly describe and sketch the psychological rationale of the activities or test tasks contained in verbal from A (April, 1968, Revision).

**Ask-and-Guess activities-**

The first three activites, Ask, Guess Causes, and Gues Consequences Activities are based on a drawing which the subjects are required to look at. The Ask Activity requires the subjects to write out all the questions they would need to ask to know for sure what is happening in the picture. In the Guess Causes Activity, the subjects are to enlist as many possible causes as they can think of the action shown in the picture, and in the Guess Consequence Activity, they are to enlist as many possibilities as they can of what might happen as result of what is taking place in the picture. Time allowed for each activity is five minutes.
As for rationale behind these activities, the Ask Activity is designed to reveal the individual's ability to sense what he cannot find out from looking at the picture and to ask questions that will enable him to fill in the gaps in his knowledge. The Guess Cause and Guess Consequences Activities are designed to reveal the subject's ability to formulate hypotheses concerning cause and effects.

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Three types of scores are derived. The number of relevant responses produced by a subject yields one measure of ideational fluency. The number of shift in thinking or number of different categories of questions causes, or consequences, give one measure of flexibility. The statistical the extent to which the response represents a mental leap or departure from the obvious and common place gives one measure of originality.

**Product improvement activity**-

A sketch, as well as a standard model, of a stuffed toy elephant is exhibited to the subjects. They are required to give within 10 minutes the cleverest, most interesting and unusual ways they can
think of for changing this toy elephant so that children will have more fun playing with it.

This activity permits most subjects at all age levels to “regress in the service of the ego” and enables them to play with ideas that they would not dare express in a more serious task.

There scores—fluency, flexibility and originality are derived. The fluency score for this activity is the number of relevant responses produced. The flexibility score is the number of different approaches used in producing ideas for improvement. The originality score is based on the statistical infrequency and appropriateness of the ideas produced.

**Unusual uses activity—**

This activity require the subjects to list within 10 minutes as many of interesting and unusual uses as they can think of the empty card board boxes.

The author of the tests recognized that card board boxes create in many individuals rigid sets that are difficult to overcome. It is to define a card board box as a “Container” and then to think of all the different things that can be put into card board boxes, making it difficult to produce other types of responses. Thus, the task is in part a test of ability to free one’s mind of a well-established set. The activity yields scores for fluency, flexibility and originality determined in a manner similar to that described for the Ask-and-Guess Activity.
Unusual question activity-

The subjects are required to think of, within five minutes, as many question as they can without card board boxes. These questions should lead to a variety of different answers and might arose interest and curiosity concerning boxes in others.

This activity was from a technique devised by Burkhart (1963) to measure what Burkhart term as “Divergent Power” – a factor essential for high degree of creative achievement and considered to be of critical importance for creativity in the determined for time being. Fluency is scored as in all other activity, but originality score is accomplished according to Torrance(1966b) Directions, Manual and Scoring Guide for Verbal Tests-A.

Just Suppose Activity-

An importance situation – Just suppose clouds had strings attached to them which hang down to earth-is presents to the subjects. They are required to test the consequences of this situation within five minutes.

This activity, a variation of the Guess Consequences Activity of the Ask-and-Guess series, was designed in an attempt to elicit a higher degree of spontaneity. In order to respond productively to this task, the subject must would happen as consequence. Scoring is similar to that descried for Ask-and Guess Activities.
Reliability:

Mainly two kinds of reliability of the Torrance Tests of Creative Thinking have been studied—interscorer reliability and test-retest reliability:

(I) **Test-retest reliability**

Yammamoto (1963a) studied the interscorer reliability of the Test of Imaging and the Ask-and-Guess Test for three scores (fluency, flexibility and originality) derived from the Test of Imagination and three scores derived from the Ask-and-Guess Test. He reported that the reliability coefficients based upon 64 protocols scored by two experienced scorers ranged from 0.84 to 1.00 for the various sub-scores and 0.99 for the total creativity score.

(II) **Interscorer reliability**

The extent to which unselected and untrained classroom teachers could reliably score the test has been reported for six teachers ranging from 0.86 to 0.99 for fluency, flexibility and originality.

The reported reliabilities of the Torrance Tests of Creative Thinking indicate that the test is fairly reliable measure for appraising creativity.

Validity:

A large variety of content, concurrent and construct validity data have been reported by Torrance in the manual of the test.
(I) **Content Validity**

To ensure content validity, a consistent and deliberate attempt has been made by Torrance to base the test stimuli, the test task, instructions, and scoring procedures on the best theory and research presently available.

(II) **Construct Validity**

After quoting several studies in his manual for the test, Torrance has remarked, "It was become clear that tests of creative thinking identify gifted children and adolescents who behave in ways which may be regarded as creative".

(III) **Concurrent Validity**

Employing the technique of nominated group, the test could significantly differentiate between the pupils nominated by teacher as most fluent, flexible, original and elaborate in their thinking and lowest on these dimensions by appropriate scores on the test of the creative thinking.

(IV) **Predictive Validity**

Reviewing several researches on predictive validity of the test in his manual. Torrance has given two types of predictive validity: (a) short range and (b) long range predictive validities.

Short range predictive validity studies have revealed that creativity test scores have predicted such creative behavior of elementary and high school pupils and also of teachers as the production of creative
ideas, humor and fantasy, originality in imaginative stories, creative science question, creative teaching behavior, superior performance on subject matter test of productive thinking or creative applications in a mental health course, and inventiveness of ideas in mental health.

Long range predictive validity studies, spread over a period ranging from 5 to 12 years, have demonstrated acceptable range of predictive validity creative achievement out of school of seventh graders \((r = 0.51)\); in quantity and quality of creative achievement of VII to XII graders \((r = 0.50)\) in highest creative achievement \((r = 0.50)\); in creative aspirations of XII grades \((r = 0.51)\); in creative teaching behavior \((r = 0.62)\) for originality and \((r = 0.57)\) for total creativity.

As the present investigator has used the Indian adaptation provided by Jayaswal (1977) has been utilized. Jayaswal has reported the reliability of the test to be ranging from 0.84 to 0.96 for different samples of students. As such the suitability of the aforesaid Indian adaptation for the use of the present investigation is self-evident.

**Administration of the Creative Test**

The Torrance Test of Creative Thinking (TTCT) verbal form was administered to Xth graders in the batches of 25-30 students each. Proper care was taken to keep the testing situation free from anxiety and conductive environment was created for free play of imagination among the testees. Best efforts were made to reduce hindrances in the production of novel ideas. Instructions printed in test booklet were read loudly and explained. Answer-sheets were
distributed containing sufficient space (7 pages) for recording in the administration of creativity tests by different researchers (Fleischer, 1963; verson, 1964; Middents, 1968) were kept in mind and possible measures were taken to overcome them. Time allotted was announced separately under each activity and examples were thoroughly explained. Total time consumed by each group in test administration including instructions, distribution and collection of test booklets and answer-sheets, clarification of examples, was approximately 80-minutes.

Scoring of Answer-sheets (Creative Test) –

Scoring of answer-sheets of (TTCT) were accomplished as per instructions in the manual. On the verbal test of creativity, the three scores, viz., fluency, flexibility and originality were derived as per instructions given in the manual, but the total creativity score was obtained by using the method of weight scoring as suggested by Guilford(1956).

Composite Creativity Score-

For obtaining a composite creativity score without converting the total raw (fluency, flexibility and originality) scores to standard scores could not be considered appropriate. Hence, a rational weighting method that was of applying to each one a weight inversely proportional to its standard deviation was used as suggested by Guilford to its standard (1956) and Brown (1970). Various steps involved in determining weights have been depicted in Table 3.2.
First, means and standard deviations of three component tests were calculated, individual standard deviations were divided into the largest on among them and the quotients were rounded to the nearest integer which are shown in the fourth lone. For the sake of convenience the maximum and minimum marks in individual test were also noted. Totals after applying weights have also been indicated the integral number so obtained were taken to be the corresponding weights to be applied to the three tests, to arrive at a composite creativity score (Table 3.2).

Table 3.2-

Showing the process of weighting components of creativity test inversely as their dispersions

<table>
<thead>
<tr>
<th>Variables</th>
<th>Fluency</th>
<th>Flexibility</th>
<th>Originality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>35.68</td>
<td>20.67</td>
<td>26.18</td>
</tr>
<tr>
<td>S.D.</td>
<td>11.99</td>
<td>6.09</td>
<td>12.22</td>
</tr>
<tr>
<td>Integral weight (W)</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

3.3.2 Description of Learning Style Inventory (LSI)-

The learning style inventory constructed and standardized by Agarwal (1983) has been used for measuring learning style of students.
The learning style inventory comprises of seven dimensions of learning style and nine items for each learning style. Which are arranged in a sequence as following in the Table 3.3.

**Table 3.3**

<table>
<thead>
<tr>
<th>No.</th>
<th>Learning style</th>
<th>Items Serial No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Flexibility vs Non-flexibility</td>
<td>1, 8, 15, 22, 29, 36, 43, 50, 57</td>
</tr>
<tr>
<td>2.</td>
<td>Individualistic vs Non-individualistic</td>
<td>2, 9, 16, 23, 30, 37, 44, 51, 58</td>
</tr>
<tr>
<td>3.</td>
<td>Visual vs Aural</td>
<td>3, 10, 17, 24, 32, 38, 45, 52, 59</td>
</tr>
<tr>
<td>4.</td>
<td>Field-independ vs Field-dependent</td>
<td>4, 11, 18, 25, 32, 39, 46, 53, 60</td>
</tr>
<tr>
<td>5.</td>
<td>Short-attention-span vs Long-attention-span</td>
<td>5, 12, 19, 26, 33, 40, 47, 54, 61</td>
</tr>
<tr>
<td>6.</td>
<td>Environmental-oriented vs Environmental-free</td>
<td>6, 13, 20, 27, 34, 41, 48, 55, 62</td>
</tr>
<tr>
<td>7.</td>
<td>Motivation centered vs Motivation non-centered</td>
<td>7, 14, 21, 28, 35, 42, 49, 56, 63</td>
</tr>
</tbody>
</table>
A brief description of these seven dimensions of learning style is evident as follows:

**Flexibility vs flexibility**-

Students who are not satisfied with the traditionally accepted solution to an educational task/problem and always try to arrive at unique responses, solutions etc., will be identified as having flexibility learning style. Students' responses, will be classified as having non-flexibility.

**Individualistic vs non-individualistic**-

Students, who enjoy working themselves at best on some educational task/assignment will be named as having individualistic learning style. Whereas others, who prefer carrying out any educational task with group or in a team will be characterized as having non-individualistic learning style.

**Visual vs aural (modality preference)**-

Short-attention-span vs Long-attention-span

Modality preference refers to students' ability to learn and retain information more efficiently when certain channels of communication are employed. Students, who rely upon, 'eyes' than 'ear' for learning i.e. word symbols that are printed, written on observation and the like, will be classified as having visual learning style. Similarly other students, who rely upon 'ear' for learning i.e. when they hear human voice directly or indirectly will be named as having aural learning.
Field-independent vs field-dependent-

Students, who do not enjoy working structured learning situation, will be called as having field-independent learning style. On contrary, students who prefer to work in structured learning situations will be classified as having field-

Short-attention-span vs long-attention-span-

Students, who are not able to concentrate on some learning task for a longer period of time and may some time need some intake like (water, juice, tea etc.) to continue that task, will be taken as having short attention-span learning style. Similarly students, who can give long continuous sitting on doing some assignment without any intake, will be characterized as having long attention-span learning style.

Motivation centred vs motivation non-centred-

Students, who are eager to learn more and more, are enthusiastic about exploiting the learning situations: are more conscious about demonstration their best to get high grade, praise etc., for their performance/achievement, will be characterized as having motivation-centred learning style. Contrary to it will be taken as having motivation non-centred learning style.

Environmental-orientation vs environmental-free-

A students while studying, if affected by environmental variables like heat, sound, light, will be identified as having
environmental-orientation learning style. Likewise, one whose learning is not interfered by any kind of environmental variables will be identified as having environmental-free learning style.

**Reliability-**

The reliability coefficient of Learning Style Inventory ranged from 0.84 to 0.91. The test is highly reliable.

**Validity-**

Objective validity was estimated of this tool due to unavailability of Indian tools which could serves as a criterion for determining its area. Experts were requested to the purposiceness of the items. The ratings of these 5 experts on five point scale about suitability of the items in each learning style sub-set indicted that there is close agreement between the ratings of the experts on each item. Hence, LSI, has high validity.

**Administration-**

After entering the classroom, the investigator told the students about the purpose of inventory that he just want to know their preferences for learning. He then told them that for knowing their preferences, he will give them a booklet consisting of 63 items. He further told them that every item is biopolar in nature. Their agreement with an item will exhibit the preference for one learning style. So they have to respond every item. In case they found undecided on certain items, they were told to respond either favourably or disfavourably towards which they feel more inclined.
Thereafter, the investigator gave the booklets and asked them to fill in the identification of data i.e. name, name of institution, class and section. Instructions were read loudly and enquired about the students whether they had understood the instruction. The queries made by students were replied to their satisfaction. The investigator, then asked students to open their booklets. They were instructed not to consult or copy others and to finish it as early as they can. Most of the students finished it in 20 minutes. Thus, the data was obtained.

**Scoring**

Seven learning styles were considered in this inventory. Every style was measured by nine items and every items was bipolar in nature. If an individual showed agreement with an item, he was identified as having the first learning style in every type of learning style (e.g. flexibility learning style) and the disagreement with an item showed that he has preferred the second learning style in the same type of learning style (e.g. non-flexibility learning style). To be more specific if an individual showed agreement with an item-2 i.e. he had put on ‘Yes’ (✓) he had been identified as having individualistic learning style and if he disagrees with item-2 i.e. he had put (✗) on ‘No’ he had been identified as having non-individualistic learning style. Then his preference for particular learning style has been identified on the basis of total score on that learning has been identified on the basis of total score on that learning style. The maximum score possible for every type of learning style is ‘9’ and the minimum score as per scoring key of the LSI, which
has been given in Appendix VIII. By comparing the individual responses by the scoring key, his total responses on all the seven learning styles were calculated. Thus, if a student responded '7' out of '9' responses of first type of learning style in a manner given in scoring key, his score for that learning style is '7' in favour of flexibility learning style. Likewise, a student who has given 3 responses out of '9' on second type of learning style, it will be counted as score of 3 in favour of individualistic learning style.

In the same way, the scores on every learning style for each student have been recorded. Thus, if an individual responded 5 or more responses on any learning style in a manner given in scoring key, his score, in favour of one learning style would be 5 or more; score of 5 more would classify him having preference for that learning style e.g. a student who has a score of in favour of learning style-1 (flexibility-non-flexibility) has been identified as having more inclination towards flexibility learning style, he has been identified as having preference for the other learning style e.g. a student who has obtained for the other 3 on second type of learning style (individualistic-non-individualistic) showed lesser inclination for individualistic learning style, thus demonstrating his preference for non-individualistic learning style.

This procedure of scoring has been followed in scoring the LSI to get students scores on all seven types of learning styles. Thus, for every student 7 scores were found out (each score representing a separate learning style). Composite score on LSI was not calculated,
3.3.3 Description of the School Motivation Analysis Test (SMAT)

Objective tests of abilities and personality traits, of good validity, have been in use for many years, objective tests of motivation and interest have become variable only in the past decade. Yet common sense, now supported by adequate research tells us that motivational dynamic traits in understanding predicting all kinds of child behavior.

The present test, school motivation Analysis Test: SMAT (1970 edition) is prepared and standardized by Sweny, cattell and kurg. It is used in schools, guidance, centres, and institutions, with examinees aged 12 to 17 years. It is called school motivation analysis test, not because it is confined to school interests alone, but to distinguish it from the adult Motivation Analysis test (MAT) for individuals above 17 years, and from the children’s Motivation Analysis Test (CMAT) planned for 8-12 years range.

The SMAT is a standardized test that can be given within a class period, to single individuals or in groups, to yield a general assessment of motivational development. The SMAT measures ten distinct dimensions or factors or dynamic source traits of motivation which has been found by psychologists to come near to covering the total motivation. Table 3.4 identifies ten dynamics source traits along with principal attitudes which are covered in SMAT.
### Table 3.4

**Showing dynamic source traits**

<table>
<thead>
<tr>
<th>Dynamic traits</th>
<th>Attitude involved</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Drives:</strong></td>
<td>I want to part in adventures and read adventure stories.</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>I want to seek class office and positions of importance.</td>
</tr>
<tr>
<td>Matting(sex)</td>
<td>I want to spend time with friends of the opposite sex.</td>
</tr>
<tr>
<td>Matting(sex)</td>
<td>I want to go to parties and dances where we go in couples.</td>
</tr>
<tr>
<td>Fear</td>
<td>I want to avoid painful injuries and frightful diseases.</td>
</tr>
<tr>
<td>Narcism</td>
<td>I do not want my parents to reject me as a failure and a disappointment.</td>
</tr>
<tr>
<td>Pugnacity (Sadism)</td>
<td>I want to dress well and have people think how handsome I look.</td>
</tr>
<tr>
<td>Pugnacity (Sadism)</td>
<td>I want to look after myself and give myself a good time.</td>
</tr>
<tr>
<td>Pugnacity (Sadism)</td>
<td>I want to smash people who have caused me trouble.</td>
</tr>
<tr>
<td>Pugnacity (Sadism)</td>
<td>I want my country to beat its enemies.</td>
</tr>
</tbody>
</table>
Protectiveness (Pity)

I want to protect and take care of my younger siblings. I want to have pets to take care of.

Acquired Interest Patterns:

Self-sentiment

I want to be the kind of person most people like. I want to have a good reputation for honest and strength of character.

School

I want to work for reputation of my school, in scholarship and athletics. I want to take part fully in classroom work, with my teacher and the other students.

Home

I want to preserve the ties to my home and parents. I want more time to enjoy the things I can do at home with siblings and friends.

Theoretical Meaning of the Dynamic Traits-

The wide arrays of attitudes covering most that are studied in various social, clinical, and educational researches, have been systematically factor-analyses, and found to yield unitary dynamic traits which are recognizable either as primary drives as acquired attitude patterns. The former are technically termed ergs. The latter
are termed sentiments. These terms will be used in following
discussion. The most important of these traits, from a variety of
considerations, including continuity with the adult MAT traits
(Cattell, Horn, Sweney and Radcliffe, 1964), have been chosen for
SMAT. These dynamic traits broad, major structures which
determines the individual’s specific interests, but which are not
themselves specific interests. The strength of great variety of specific
interests can, however, be economically estimated from these ten
major traits, as described below:

(1) **Assertiveness (self-assertion) As-**

This is sometimes popularly called “need achievement” but
actually there are two distinct major factors in need to achieve. They
are present purely instinctual, ergic need, and the acquired self-
sentiment described below. These are quite important differences of
quality and origin between them, which, together with the fact that
these strength are practically uncorrelated, make it doubly desirable
to take these measures separately when dealing with any kind of
striving for achievement.

The self-assertive erg is a natural striving for preminece. It will
show itself in competitiveness, in pride, and since eminence is
relative, in envy and some pleasure in the downfall of others.
However, it is not merely social in reference, but exhibits itself also
in mastry of nature, and therefore in science, adventure, constructive
achievement, and the pursuit of glory.
The chief surrounding concepts to which it must be related are pugnacity, aggression, inferiority compensation, the need for abasement, the need for self-display as a part of covering behavior, the personality trait of dominance, and, of course, the major sentiments with which it becomes involved, such as the self-sentiment and the carrier sentiment.

Aggression is a confusing term and the writers have long protested that it be left to journalism, and that psychology distinguish pugnacity and assertiveness, as all the factorial entirely different goals (see pugnacity below). Assertiveness contains no goal to destroy, though it may, in its pursuit of admiration from others, seek to dominate them.

The relation to self-display—such as being smartly and correctly dressed—are highly correlated with assertiveness, but probably some secondary source of display as exhibition lies in the mating erg. The relation to self-abasement has not been cleared up. Indications of a self-abasement erg have found (Cattell, 1957) and conceivably both could be strong in the same person, though not operating together. Religion, especially has given joint expression to these in awe and abasement before a diety, alternating with pride and identification with the diety's power and with missionary efforts to supersede other deities. Probably they are distinct but substantially negatively correlated, ergs, and possibly some negative abasement has got included in the major self-assertive erg measure. The role of the self-assertive erg in seeking power positions, in driving
exploration, in motivating interest in politics (but not much in school achievement) will be completely understood only when stable criterion correlations, based on sufficiently large samples, are satisfactorily replicated.

(2) **Mating (sex drive) Ma:**

This factor needs little description for social reasons, it has to be, measured here partly through semisublimited expressions, e.g. interests in dances. As the predominantly heterosexual drive, it has to be distinguished from certain autocratic components in narcism, below.

(3) **Fear, escape (security-seeking) Fe-**

This also needs little description. It shows itself in fear of death, disease, accidents, war, and of loss of parental affection and other vital satisfactions. The only problem is to distinguish it from relations of this score to the IPAT anxiety scales, that the uninterested fear component is essentially anxiety. Cattell et al. (1966), while largely agreeing with this, has put forward a somewhat more complex model deriving anxiety from general ergic-tension level interacting with the fear erg.

(4) **Narcism-Na-**

The evidence points to what we are considering here as being a drive rather than a personality trait or sentiment structure. In adults, it clearly remifies into the fairly distinct areas of: (I) Seeking comfort and care; (II) Linking sensual satisfaction (some satisfactions
extending into the area of autoerotic sexual interest); and (III) Egoistic, self-centered concern for “number one” it is substantially negatively correlated (0.32 in adult sample) with super-ego strength. In teen-agers, the general meaning is the same, but emphasis appears also in being attractively dressed (girls) and in general grooming. There may thus be some real difference of expression between earlier and later life stages.

(5) Pugnacity-sadism Pgs

The general theoretical position is adopted here that the pugnacity erg takes its energy from degree of frustration of any other erg whatsoever. It would on this basis be largely situational, and support is lent to this by, for example, the higher pugnacity scores obtained by boys who are failing school, than by those who are successful. There are, however, also indications of some inherent “need to be sadistic” such as appears in items revealing “need to be sadistic”, such as appears in items revealing interest in sadistic movies and in fighting and quarrels for their own sake. In any case, the goal seems to be essentially the defeat, obliteration, and destruction of dislike entities.

(6) Protectiveness- Pn

This erg is that seen in most species, exhibiting itself primarily in maternal (or paternal) care for the young. It expresses itself in humans, in general kindness and altruism. In teen-agers, particularly, it is shown partly in case of younger siblings and pets, partly in idealistic expressions.
This is actually one of the most complex sentiments, in that it is directed to an abstract object—the self concept. The ergs which enter into this acquired structure appear to be principally fear for the security of the self, some narcism, and a good deal of self-assertion connected with maintaining the social status of the self. There is some subsidization also toward satisfying the superego demands for a worthy self-concept. However, the self-sentiment needs to be clearly distinguished from the superego, which can be done partly by recognizing that the self-sentiment is more concerned with social reputation and security than with fundamental morals.

The growth of interests and attitudes around the self-concept is connected with maintaining self control in a way which will make one liked by others, in preserving the image of an honest, dependable person, and so on. As would be expected, the strength of total interest in this sentiment correlates with most forms of social achievement, school achievement, freedom from delinquency, and with low anxiety.

In contrast with self sentiment, the roots of superego development are probably more unconscious, as psychoanalysis has argued. In the adult, it is expressed in an uncompromising attachment to moral goals, and a tendency to drive the self to positive services and moral achievement. Among teen-agers, pleasing the father, in
particular, has substantial loading and this suggests that the early roots are found in parental attachment. It is only moderately corrected with strength of the self-sentiment and then only in its integrated expression. Indeed, the self-sentiment and superego strengths and structures remain independent also at the higher strata of factor analysis (Cattell, 1957).

(9) **Sentiment to schools -Sc-**

This represents the totality of the teen-agre's of behaviors (attitude actions) has had to be brief. Consequently, if the individual's pattern is unusual, e.g. all sport and no academic interest, assessment will lack some accuracy. Although the attitudes here include classroom activities, athletics, attachment to the teacher, interest in peers, and school reputation, the emphasis is on scholarship and classroom interests, since prediction is more frequently needed in this area.

(10) **Sentiment to home-Ho-**

To complete, within a list of four, the sentiments of greatest importance in prediction, that to the parental home has been included. (hobbies would have claim to be a fifth, but the diversity of hobbies makes measurement as common trait difficult). The pattern found for the home interest attachment to the parents. It includes also attachment to the physical home, to activities with siblings and friends who visit the home, and to the home values (including retreat from an excessively demanding environment).
Table 3.5

SMAT validities: correlations of primary scales and pure factors

<table>
<thead>
<tr>
<th>Trait</th>
<th>Primary Scales</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unitegrated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integrated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assertiveness</td>
<td>0.90</td>
<td></td>
<td>0.78</td>
</tr>
<tr>
<td>Mating</td>
<td>0.72</td>
<td></td>
<td>0.81</td>
</tr>
<tr>
<td>Fear</td>
<td>0.76</td>
<td></td>
<td>0.91</td>
</tr>
<tr>
<td>Narcism</td>
<td>0.92</td>
<td></td>
<td>0.73</td>
</tr>
<tr>
<td>Pugnacity</td>
<td>0.90</td>
<td></td>
<td>0.89</td>
</tr>
<tr>
<td>Protectiveness</td>
<td>0.88</td>
<td></td>
<td>0.70</td>
</tr>
<tr>
<td>Self-sentiment</td>
<td>0.87</td>
<td></td>
<td>0.81</td>
</tr>
<tr>
<td>Super-ego</td>
<td>0.85</td>
<td></td>
<td>0.92</td>
</tr>
<tr>
<td>School</td>
<td>0.80</td>
<td></td>
<td>0.42</td>
</tr>
<tr>
<td>Home</td>
<td>0.83</td>
<td></td>
<td>0.85</td>
</tr>
</tbody>
</table>

Regarding the test validity with respect to important concrete criteria, as contrasted with factor validity, the area in which we have accumulated the most information so far is that of school achievement. A coordination series of researches (Barton, Dielman and Cattell, 1972; Bartsch, Barton and Cattell, 1973) have effectively demonstrated that SMAT is an important predictor of school success.
For the purposes of the present study Hindi adaptation of SMAT by Giri and Srivastava (1987) has been used.

This Hindi adaptation of SMAT provides a sten norm table on sample of 266 boys and 314 girls studying in high and higher secondary schools of U.P.

Reliability of Hindi Version of SMAT-

Reliabilities of the Hindi version of SMAT have been calculated on a reasonably homogenous group of 112 nineth grade students on re-administration of SMAT after one week. The results have been shown in Table 3.6.

Table 3.6

Test-retest reliabilities of SMAT scales

<table>
<thead>
<tr>
<th>Dynamic trait</th>
<th>Reliability coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assertiveness</td>
<td>0.52</td>
</tr>
<tr>
<td>Mating</td>
<td>0.68</td>
</tr>
<tr>
<td>Fear</td>
<td>0.51</td>
</tr>
<tr>
<td>Narcism</td>
<td>0.71</td>
</tr>
<tr>
<td>Pugnacity</td>
<td>0.63</td>
</tr>
<tr>
<td>Protectiveness</td>
<td>0.55</td>
</tr>
<tr>
<td>Self-sentiment</td>
<td>0.40</td>
</tr>
<tr>
<td>Super-ego</td>
<td>0.61</td>
</tr>
<tr>
<td>School</td>
<td>0.63</td>
</tr>
<tr>
<td>Home</td>
<td>0.64</td>
</tr>
</tbody>
</table>
The reliability coefficient values in Table 3.6 can reasonably be thought of as lower bound estimate of the reliability of SMAT scales. It should be noted that, in general, motivation scores are inherently less stable than personality or ability scores. Thus, the obtained coefficient can be taken as good estimates of reliability of Hindi version of the SMAT.

**Validity of the Hindi Version of SMAT**

SMAT was constructed to measure ten factorially independent dynamic traits. The appropriate place to begin inevaluating the validity of SMAT is to determine how well each item is related to the factor it measure. The item analysis data speaks the truth about the validity of each item selected for the test (Giri, 1987).

The intrinsic validity indicating the extent to which the obtained scores measure the true components of the test was evident from the high reliability coefficient observed for index of reliability. In order to determine validity through cross validation procedure, the mean scores of try out sample of SMAT were compared with the SMAT scores of the final form main study sample. The assumption was that two groups represent two distinct sample of the same population. Significance of difference between ten sets of mean were calculated to ascertain cross validity of SMAT. The two groups show that there is no significant difference in any set of the means. This established the cross validity of the Hindi version of SMAT.
Thus, in the light of fairly high degree of reliability and validity, it may be concluded that Hindi version of SMAT is an effective instrument for measuring the respective motives of school going students.

**Evaluation of SMAT**

The test measures the main dynamic motivation system found by basic research. It offers theoretical and conceptual advantages added with predictive information and psychological loss. It is an objective test in paper and pencil format and it is generally used to complement ability and personality measures. Any one who needs the complete picture for understanding why a child no behaves and performs in school the way he does, it shall no be possible to omit measures of these drive strength, attitudes, interests, attachments, and specific motivations. SMAT scores are useful not only in understanding the child’s behavior and clinical personality problems. SMAT has been used fruitfully for special diagnosis and guidance purposes.

Thus, it was decided to make use of this comprehensive and structured test in present study for fulfilling the main objectives of the study.

**Administration of SMAT**

The SMAT is planner for administration with equal appropriateness either in group situations, as in classroom, or for individual testing, as in the clinic and in individual counseling. A
hand-scorable answer-sheet is used. The administration of SMAT requires no special equipment. Each student should have a test booklet, answer-sheet, and a pencil with eraser. Student should be instructed to make clean, dark mark on the answer sheet and to erase any changes completely. The time required for administration is about 45 to 55 minutes. Although the test can be virtually self-administering, it is always important to established good “rapport” with the examinees, instructions are printed for the examinee on the cover page of the each part of the test booklet. Further, it is good to reinforce the instructions by orally reiterating that the examinee will, in the long run, be doing himself must good by being frank and honest in describing himself. When the test is administered individually, the examinee may mark the responses on the answer sheet himself, or the examiner may mark them for him.

The SMAT test booklet contains three parts. There is no rigid time for any of these test, but their approximate time are given in Table 3.7 as a guide to the administrator.
Table 3.7

Title, order and approximate times required in administering sub-tests

<table>
<thead>
<tr>
<th>Sub-test</th>
<th>Order in test booklet</th>
<th>Examinee’s title</th>
<th>Approximate time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>Uses</td>
<td>12-15 minutes</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>Paired choice</td>
<td>10 minutes</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>Knowledge</td>
<td>25-30 minutes</td>
</tr>
</tbody>
</table>

The instructions in the test booklet will be sufficient to administer, the test properly. In general, the administrator should; (A) read the directions aloud, while the students read them (B) go-over the examples with students; and (C) answer any question that might arise in regard to the directions. The administrator should check frequently to see that the students are using the correct solution of the answer-sheet for each selection of the test.

When a student is finished with any section of the test he should stop and not proceed until the entire group is ready to go ahead (when one or two slow students are holding up the entire class, the administrator can ask them to finish later and proceed to the next section). The administrator can then proceed to parts a2 and 3 of the booklet in the same manner.

When about half of the estimated time interval for a subtest has elapsed, the administrator should say something: “you should be about half-way through this part by now”. This helps slower
student to pace themselves properly through the test. When the estimated time interval has elapsed the administrator may mention that: "you should be just about finished with this part now.

Question concerning the instructions should be answered by the administrator. However, questions regarding the meaning of specific words in the test should, in general not be answered. This is particularly true in the knowledge subtest where the meaning of specific words is often an integral part of the test.

The following detailed, verbatim-instructions are intended to kept beside the examiner to guide in the actual test situations.

**Detailed Procedure for Group Testing**

When the test booklet and separate answer-sheet have been passed out to each student, pick up both and say. This is called the booklet and contains the questions you are to answer. The separate sheet is called answer-sheet.

In this booklet there are questions about what you think and the kinds of things you are interested in. This booklet has three different parts. For each part, the examiner will read the directions and go over the examples with you. You will also be told when to start and stop.

Please write only on the answer-sheet, and not on the booklet. When you answer a question make sure the number of the question and number of the answer match.
Now fill in the top lines on the answer-sheet with your name, today's date, class, and so on. After you have finished, wait for instructions before going on.

**Part I- Uses-**

Turn to page 2 in your booklet and read the instructions along with me.

In this part you are asked what seems to you to be better way to use a given amount of money, time education, and so on.

Be sure you put your answer on the answer-sheet in the section marked **Part-I.** Make the answer in the left-hand: (A) box if the first answer seems better to you, and the right-hand, and (B) box if the second answer seems better to you look at example.

**A: Example A. HINDI MAI LIKHNA HAI**

Here the left-hand box has been marked because "go on an ocean voyage"

Seemed better to the person who answered it. Now you can pick the choice as you think is better and mark it on the answer-sheet, in the Part-I after Example A. Let's try one more example.

**Example B. HINDI MAI LIKHNA HAI**

Here, the right-hand box has been marked, because this seemed better way of spending the weekended to the person answering. Again
you can mark the choice you think is better is one of the boxes for Example B.

Some question may be harder to decide than others. But in each question, be sure to choose one or the other answer. Make all your marks on the answer sheet unless told, otherwise by the examiner. When you have finished all the question in this section, close your booklet and wait for further instructions. Are there any question about what for are to do in this part? (wait a moment and answer any question that may arise. Check again to see all examinees are using the right section of the answer sheet). You may begin.

Part —II : Pried Choice-

Now open your booklet to page 7. In this part of booklet, you will find a number of groups of words. Each numbered word in the centre is a 'key' word and I followed by two words which might match the key word. For each key-word you should choose the word which seems to go most easily and naturally with it.

Look at the two examples-

Example A

The statement answered by filling in the left-hand (a) box for A, because he thought 'stop' went better with 'short'

Example B.

(a) (b)
Again he filled in the right-hand (b) box for B, because ‘money’ seemed to go with ‘collect’ more naturally for him. Remember, there are no correct answers. Choose the word more natural for you. Give your first reaction. Make one choice on each key word and go quickly onto the next. Make one your marks on the answer-sheet in section marked Part 2 (unless told otherwise by the examiner). When you have finished all the question in this section, close your booklet and wait for further instructions. Are there any question? (wait a moment for any question). Turn the page and start.

Part 3 knowledge?

Open your booklet to page 9.

The purpose of this section of the booklet is to see what you know about different things. Every question must be answered. If you are not sure of answer, mark one any way, even if you have to guess.

Mark your answer on the answer sheet by filling in the box marked a, b, c or d, depending on which answer you choose. Make sure you write the answers to Part 3 of the booklet on Part 3 of the answer-sheet.

Example A.

(a) (b) (c) (d)
Both these question are hard to answer, but good guesses might be ‘c’ for the first one, and ‘d’ for the second. These would be marked by filling in the third box ‘c’ on the answer-sheet for question A, and the fourth box (d) for question B. You should select one answer for each question. When you have finished all the questions, close your booklet and wait for further instruction. Are there any question? (wait a moment for any question). Turn the page and start.

**Scoring of the SMAT-**

In the uses part of the test each keyed answered counts 3 points. In the paired choices part of the test each answer count 1 point. Answers for autism questions (found in part 3 of the test) count 6, 4 or 2 points, as indicated by the number printed above each alternative. Information items (also found in part 3) count 1 point each. Scoring key has been provided in Appendix-VII

3.4 **DATA COLLECTION-**

The final data for the present study was collected in two sessions by the researcher personally, so as to keep the testing situation constant and to ensure collection of valid and reliable data under the exiting circumstances. In the first session, after contacting the respective schools, the SMAT was administered to the students in batches of 25-30 each. The student were requested to participate sincerely in the study which was expected to reveal many important points concerning their behavior and achievement. Each student was then given SMAT test and asked to fill the relevant information about themselves in the answer-sheet. They
were told that the information given by them will be kept strictly confidential and is being used for the research purpose only.

The students were then requested to fill all the three parts by the SMAT one by one strictly according to the instructions printed on the first page of every part of the test booklet, which was read out loudly by the researcher and explained. After completion the answer-sheets and booklets were collected from all the students.

In order to avoid fatigue in the students 30 minutes rest was given to them. In the second session, Torrance Tests same students and instructions were given to them according to the manual of the test. Separate answer-sheets were given to each students, and were told to fill and write the correct answers. After an hour the answer-sheets were collected. After 10 minutes interval the final test of learning style inventory was administered to each student and instructions were explained as printed on the first page of the test booklet. After 40 minutes the booklet were collected from the students.

Total marks obtained in class VIIIth of every student was noted separately. Which represent the academic achievement of student.

3.5 **SCORING AND TABULATION**

All the answer-sheet were scored with the help of hand-made punched keys, except the answer-sheets of creativity test which was scored by “Differential Weight Scoring” method by the investigator himself. The scoring was rechecked for the mistakes, if any.
Before tabulation of the master-chart for statistical analysis. The entire sample was categorized into creative and non-creative groups on the basis of their scores of TTCT. For this purpose top 100 and to bottom 100 on the TTCT were kept in ‘High creative’ and ‘Low-creative’ groups respectively. From these master-charts requisite tables were then prepared for different statistical analyses as when necessary.

3.5 **DATA ANALYSIS**

In addition to the general descriptive statistics, following statistical techniques were utilized in this study for analyzing the obtained data and arriving at generalizable conclusions.

1. 2x2 Contingency tables were and Chi-square values were calculated for comparing the learning style preferences of high creative and low-creative students.

2. The ‘t’ test was applied to determine the significance of difference between achievement and motivation factors in the sample.

3. The statistical significance of all the results were considered at 0.05 and 0.01 levels of confidence. The learning styles were considered at 0.10 level also in order to show the sharp difference between the high creative and low creative group of students.

4. To find out the composite creativity scores, integral weights were determined by using the method of “Differential Weigh Scoring” by weighting measures inversely as their standard deviations as suggested by Guilford (1956).