CHAPTER THREE

PRELIMINARY DRAFT OF TESTS OF CREATIVITY
3.1. Introduction

In the absence of measures of creativity standardized for use in the Indian conditions, it became essential to first develop the Tests of Creativity in order to conduct the present investigation. Some of the creativity tests developed and reported by Guilford et al. (1951, 1962), Torrance (1962) and Getzels and Jackson (1962) could not be used because those were not available in India. Moreover, even if those could be obtained from the original source, it was not possible to use them in the original form as the tests are not exclusively culture free. The literature on the tests, however, was found to be very valuable in providing the rationale and outline for the development of some of the Tests of Creativity, namely, (i) the Seeing Problem Test, (ii) the Unusual Uses Test, and (iii) the Consequences Test.

3.2. Choice of Subtests for the Tests of Creativity

Tests of different types have been used to assess creativity as has already been reported earlier under caption 1.4., p.13) pertaining to the measurement of creativity. It was thought appropriate to make a choice of tests out of a
large number of different tests to ensure their usability in the local conditions.

To begin with, seven commonly used tests namely, the Seeing Problems, the Unusual Uses, the Consequences, the Plot Titles, the Number Association, the Word Association and the Apparatus Test were considered for use in the preliminary screening at the pilot stage. Relevant to each of these seven tests, a few representative items were prepared with a view to ascertain their workability and to understand the mechanism of administration (see Appendix A). The items were administered as a tryout to a sample of fifty students of IX, X and XI grades of an average school as has been reported earlier (vide Table 2.1, p. 35). A scrutiny of the responses revealed that the items relating to the Unusual Uses, the Seeing Problems and the Consequences tests had wider dispersions than those of other tests. Consequently, the remaining four tests were dropped out, and only the tests concerning the Seeing Problems, the Unusual Uses and the Consequences were developed at the later stage. These three tests represented verbal creativity. To measure nonverbal aspects involved in creativity three other tests, namely, the Test of Inquisitiveness, the Square Pussle Test and the Blocks Test of Creativity were intended to be included for measuring inquisitiveness, persistency and nonverbal creativity respectively. The choice for developing the different Tests
of Creativity was partly governed by the nature of responses of students and partly by the operational definition of creativity as spelt out earlier under section 1.3, p. 5.

For estimating creativity with the help of verbal statements, Torrance's (1962) checklist on the Things-Done-On-Your-Own was proposed to be adapted to use it further as an external criterion for establishing the concurrent validity of the Tests of Creativity. All the items in Torrance's original checklist were not applicable for local use simply because of cultural differences and consequently, the checklist needed adaptations.

3.3. General Description of the Preliminary Draft of the Tests of Creativity

3.3.1. Nature of the Tests of Creativity

The Tests of Creativity finally selected for developing may be classified on the lines of Torrance (1962) as follows:

a) Tests consisting of verbal tasks, namely, the Seeing Problems Test, the Unusual Uses Test and the Consequences Test;

b) Test with verbal tasks using mostly nonverbal stimuli namely, the Test of Inquisitiveness;

c) Tests consisting of nonverbal tasks comprising the Square Puzzle Test and the Blocks Test of Creativity.

The nature of the Tests of Creativity permitted freedom of responses both qualitative and quantitative within
specified time limits, thus ensuring suitability of the tools for measuring divergent thinking. Instructions and practice items were provided before the actual commencement of the administration of the different tests. The subjects were supposed to write their responses in the specific responsesheets provided for the purpose. All the tests were made available in Hindi and English both. Responses were acceptable in any of the languages - English, Hindi, Panjabi and Urdu. Scoring procedure was devised for each test separately as will be evident in the next chapter IV on item analysis. A brief and specific outline of all the six Tests of Creativity and of the checklist is given in the following sections. The preliminary draft of the tests has been appended in Appendix 'C'.

3.3.2. The Seeing Problems Test

The Seeing Problems Test was developed by adopting the pattern of Guilford et al. (1952). It was designed to measure a factor of sensitivity to problems which is a component dimension of creativity as described by Guilford (1951, 1952). The test was proposed to measure the ability to comprehend problems concerning the working of simple and handy articles of common use.

To start with, thirty students (vide subsample of Table 2.2, p. 36) were given a brief questionnaire (vide Appendix 'B') to select the most commonly used handy articles on the basis of their responses. The choice of articles was governed by the greater frequency of responses.
Care was taken to select only those articles which fulfilled the criterion of potentiality of defects and problems. This procedure led to the selection of eight articles, namely, Bicycle, Shoes, Chair, Pair of Scissors, Timepiece, Pen, Postcard and Umbrella, so as to be included in the preliminary draft of the Seeing Problems Test (vide Appendix 'C'). The maximum time limit for the test was kept sixteen minutes so that two minutes could be devoted to each of the items. Instructions to this effect were specifically mentioned in the test booklet and students were reminded of this in actual administration.

3.3.3. The Unusual Uses Test

Designed on the lines of the Brick Uses Test by Guilford et al. (1952) and Torrance's (1962) the Unusual Uses Test, this test included the names of things which could be used for numerous purposes. It was intended to include only those items which had proximity with the psychological and physical environment of the subjects. The choice of articles to be included in the test was made with the help of the responses of thirty students (vide subsample in Table 2.2, p.36). Only those articles were included which had higher frequency of responses of the subjects. The six selected articles were: Match-box, Piece of Cloth, Pencil, Bottle, Thread and Books which formed the basis of the test items. The dimensions of fluency, flexibility, originality and creativity (creativity
is the sum of the scores of fluency, flexibility and originality) as suggested by Guilford et al. (1952) and Torrance (1962) were intended to be measured by this test. The subjects were expected to write down as many interesting and unusual responses to each stimulus article (item) as they could. Since the test had six items, a time limit of twelve minutes was earmarked for the completion of the test so that two minutes could be given for each item. In actual administration the subjects were instructed accordingly.

3.3.4. The Consequences Test

It was a verbal and a group-administered test. The procedure, similar to that of the Seeing Problems Test, and the Unusual Uses Test, was adopted for the preparation of test items. The pattern of the test was based on the Tests of Guilford et al. (1952) and Torrance (1962). The test measured the dimensions of fluency, originality and creativity (creativity score was the sum of the scores of fluency and originality). It consisted of six items to be completed in twelve minutes. The items represented certain impossible situations such as "If all of a sudden human beings start flying like birds" vide Appendix 'C'. The subjects were expected to think and report as many consequences of this situation as they could within the given time. Instructions and practice item were added to the test.
3.3.5. The Test of Inquisitiveness

Inquisitiveness, according to Torrance (1962), is the essence of creative scientific thinking and involves the process of asking and guessing - guessing particularly about the causes and consequences. This plea suggested the inclusion of inquisitiveness as one of the dimensions of creativity. The rationale to measure inquisitiveness was followed, in general, according to the methodology employed by Ausubel (1958) and Torrance (1962). The Ask and Guess Test of Torrance could not be used in its original form due to the cultural bias in the contents of the test. Consequently, some other pictures were taken from the magazines and were tried out on the sample of thirty students, which was throughout used in the process of developing the preliminary draft. The subjects were required to ask questions about those pictures but strangely enough only very few responses could be elicited. While trying the experiment of measuring inquisitiveness with numerous other objects, it was found that the mechanical objects, especially those which produced sound and movement, were more stimulating and attractive to students for asking a variety of questions. Another observable interesting feature of trying with such things was that relatively unfamiliar objects, such as, metronome could elicit greater number of responses than a familiar object such as timepiece. It was thus finally decided to include a relatively less familiar object providing sound and movement as the test
content and thus the choice rested in favour of metronome.
In order to provide a situation for greater inquisitiveness
a placard bearing in capital letters "A FEW CHILDREN CANNOT
TOUCH IT", was displayed along with the metronome in a
working condition.

The subjects were expected to write as many questions
as possible within six minutes. They were told that the
questions should be mutually exclusive to one another in
contents and meaning. The test, thus, presented the nonverbal
stimuli but the responses were to be accepted in writing
in any of the languages - English, Hindi, Panjabi and Urdu.

3.3.6. The Square Puzzle Test (Test of Persistency)

The rationale, for including the dimension of persistency
in creativity, was firstly based on the comments made by
Eysenck (1947) about the significance of persistency for the
effective use of a person's ability and secondly on the plea
of Fernald (1912) that "The success or failure of individuals
depends largely on the ability to endure and continue to
strive for the sake of achievement in spite of fatigue and
discouragement". It was in this context that the investigator
felt the justification for including a test of persistency
along with other tests of creativity. It strengthened the
plea that without possessing a required level of persistency
it would be futile to think of a creative person in spite of
his other capacities.
Fernald (1912) measured persistency with the help of physical activities. Hartshorne and May (1928) developed paper-pencil and performance tests to measure the attribute. Crutcher (1934) made use of the situational tests for this purpose while Thornton (1940) developed a few tests in order to measure persistency. Bhattacharya (1963) developed four tests, namely, Dotting and Pricking; Crossing Vowels and Writing Natural Numbers, Separating the Odd Numbers from the Even by distinctive marks; and drawing as many figures as possible out of the dots given on a sheet of paper. He also reported the use of rating scales and questionnaire for measuring persistency.

In the present investigation, the persistency was intended to be measured with the help of a performance test. A very difficult test situation was proposed to be set up so that the subjects having low persistency might leave the task unfinished at an early stage, whereas the subjects with high persistency would continue for a longer duration in spite of the complexity of the task, fatigue and boredom.

At the initial planning stage some mechanical puzzles such as the Heart and Bow, the Mazes, the Pyramid Puzzle I, the Pyramid Puzzle II, the T-puzzle, and the Square Puzzle were tried on the sample of thirty students used for the purpose of developing the tests. It was observed that except one, none of the thirty subjects could solve the Square Puzzle, whereas the other puzzles and the tests could be solved successfully.
by many. Surprisingly enough, all of the subjects persisted in solving the square puzzle by taking different amount of time. As many as two subjects continued to solve the puzzle for forty minutes, while the remaining subjects withdrew showing a differential level of persistency. The Square Puzzle was thus found to be the best for discriminating various pupils on persistency. This situation finally led to employ the Square Puzzle Test as a tool for measuring persistency.

The Square Puzzle Test consisted of five identical right-angled triangles and five identical quadrilaterals originally made of plastic, but later on for more sets, cardboard pieces had to be made. Instructions were clearly laid down for constructing a square by using all the ten given cardboard pieces without leaving any gap in between the pieces and without any overlap. The square could be constructed in more than one way so that if any subject happened to construct the square before the maximum time of forty minutes, he was asked to take a chance to rearrange the pieces in different combinations to get a square again. The score of persistency was taken as the time taken in complete minutes on the task.

3.3.7. The Blocks Test of Creativity

For measuring nonverbal creativity, it was thought to give due weightage to concrete test contents so as to arouse interest among subjects, seek their cooperation and give
freedom for spontaneous responses concerning meaningful designs and structures. To this effect, an individual test was intended to be designed which could give the freedom to the investigator to have close and analytical observations of individuals through their test performances. Further consideration for involving concrete test contents to measure nonverbal creativity was generated by Torrance's (1962) statement in which he pointed out the successful use of the Tests of Incomplete Figures, Picture Construction, Circles and Squares and Creative Designs in the Minnesota Studies of Creativity.

The present test chiefly followed the pattern of the Lowenfeld Mosaic Test (LMT) (1952) which was described by Ames and Frances (1962) as useful tool for providing greater opportunity to observe individuals engaged in performing dynamic designs. Lowenfeld (1954) herself emphasized that the test was useful for indicating the manner in which the child behaved in ordinary and extraordinary circumstances as also to assess the ability of different individuals to make a creative use of standardized material and to respond to new situations. Ames and Frances (1962) further remarked that the performance on LMT involved intellectual, motivational and organisational factors. Pisichelli and Welch (1947) tried to measure the ability to recombine ideas in creative thinking with the help of a test involving five series of ten blocks to be presented to the subjects who were required to make as
many recognisable pieces of furniture as one could think of in two minutes' period allotted for each series.

Guided by the above mentioned evidence in favour of the use of nonverbal material to measure creativity, efforts were made to design the Blocks Test of Creativity. At the stage of experimentation, blocks of Kohs Block-Design Test and Alexander's Passalong Test were tried on a sample of thirty subjects (vide subsample in Table 2.2, p.36). They were required to make different meaningful models, designs and structures of objects, ideas and situations. Besides, they were asked to furnish their comments about the requirements of shape, size, colour and number of blocks in order to ensure a variety of responses. A scrutiny of responses along with the suggestions given by the subjects led to the determination of appropriate shape, size, colour and number of blocks.

The Blocks Test of Creativity at its preliminary stage consisted of nineteen identical cubes (1"x1"x1") and twelve diagonally cut semicubes (cut from six cubes of 1"x1"x1" dimensions). The material thus, provided two types of blocks and three types of surfaces, namely, squares, rectangles and right-angled triangles. The six surfaces of the cubes were painted in red, blue, black, white, yellow and green. The twelve diagonally cut semicubes had in all twenty four right-angled-triangular surfaces, twenty four squared surfaces and twelve rectangular surfaces. These twelve semicubes
resulted from six cubes which were already painted in the same way as the nineteen cubes mentioned earlier. These cubes were so cut that the four triangular faces of each colour could be obtained. The rectangular faces obtained as a result of cutting the cubes diagonally were painted in brown colour. In this way the test material employed a colour scheme consisting of seven different colours and the subjects had the option of using two types of blocks, three types of surfaces, and seven types of colours in different combinations simultaneously. Besides this a 10" x 10" cardboard covered with a white paper was also provided to be used as a base for assembling the blocks to make designs or structures. Instructions and practice items were laid down.

Subjects had to produce as many interesting and unusual designs as could be possible in fifteen minutes' time. They were further required to write down the headings of designs. While students were busy in constructing designs, the investigator was simultaneously drawing the figures of these designs, so that this record may be used for scoring and analysis of the responses at a later stage. The scores of fluency, flexibility, originality and creativity (creativity score was the sum of the score of fluency, flexibility and originality) were proposed to be scored from the designs and structures developed by the students.
3.3.8. The Things-Done-On-Your-Own Checklist

Torrance (1962) reported a checklist measuring creativity. It comprised 100 items relating to the creative productions and actions in the fields of language, arts, science, social studies etc. The investigator thought of adapting this checklist for using it as an external criterion to validate the Tests of Creativity. Some of the items which had no pertinence with the local conditions as also those which showed overlapping in contents were eliminated from the list with the help of preliminary experimentation with a sample of thirty students described earlier. Finally, the checklist on Things-Done-On-Your-Own was reduced to fifty items (vide Appendix 'D'). Like other tests the checklist was also prepared in English and Hindi.

The six tests, namely, (i) the Seeing Problems Test, (ii) the Unusual Uses Test, (iii) the Consequences Test, (iv) the Test of Inquisitiveness, (v) the Square Puzzle Test, and (vi) the Blocks Test of Creativity, as described in this chapter, formed the preliminary draft of the Tests of Creativity which was taken as a basis for developing the final form.