CHAPTER – III

METHOD AND PROCEDURE

The present study was a survey type study in which athletes from two different regions i.e. Northern and Southern regions belonging to the two performance groups i.e. successful and unsuccessful and the two gender groups i.e. male and female were investigated with regard to the three selected psychological variables i.e. Anxiety (State-trait and sports competition anxiety), Mental Imagery and Self-esteem. In this chapter, the selection of subjects to comprise the sample, selection of the variables, selection of the tests, description of the tests, administration of the tests, statistical design and other procedure followed for the present study have been described.

SAMPLE

In the present study for the collection of data, the athletes from Northern and Southern regions who had represented their respective universities in various events of track and field (i.e. sprints, jumps and throws) at All India Inter-University level were selected as the subjects. The sample consisted of 150 male and 136 female athletes. Similarly, there were 144 athletes from successful group and 142 from unsuccessful category. In all 122 were from northern region and 164 from southern region. The whole sample consisted of 286 subjects in the age group of 18 to 25 years studying at the college and university levels. The descriptive break up of the sample has been shown below:
SELECTION OF THE VARIABLES

Keeping in view their significance for athletic performance and in development of the individual athletes, three psychological variables were selected for the purpose of this study. Primarily, these variables belonged to the three basic areas:

1. Anxiety
   (i) State & Trait Anxiety
   (ii) Sports Competition Anxiety

2. Mental Imagery, and

3. Self-Esteem

SELECTION OF THE TESTS

Keeping in view the availability and suitability of the tests, the following tests were used to measure the selected variables.
1. To measure State and Trait Anxiety, Sinha’s Comprehensive Anxiety Test (SCAT) developed by Sinha and Sinha (1995) was used.

2. To measure Sports Competition Anxiety, Marten’s Inventory (1977) was used.

3. To measure the different aspects of mental imagery i.e. sensation of seeing, hearing, taste, smell, touch and bodily experience in movements, the Mental Imagery Questionnaire (M.I.Q.) constructed by Rajamanickam (1999) was administered.

4. To measure the variable of self-esteem, Self-Esteem Inventory constructed by Prasad and Thakur (1988) was used.

**DESCRIPTION OF TESTS**

**STATE AND TRAIT ANXIETY**

For the present study, Sinha’s Comprehensive Anxiety Test (SCAT) developed by Sinha and Sinha (1995) was administered to the athletes to measure the level of their state and trait anxiety. The test is a self-evaluation check-list and comprises ninety items which are related to state anxiety and trait anxiety. Against each question two alternate responses are provided in the form of ‘Yes’ and ‘No’. Athletes were required to read each question and put their first response by making tick mark (√) in space provided for their responses.

**Reliability**

The coefficient of reliability had been determined by using the following two methods:-
1. The test-retest method (N=100) was employed to determine the temporal stability of the test. The product moment correlation between the test and retest scores was 0.85.

2. The internal consistency reliability was ascertained by adopting odd-even procedure (N=100). Using the Spearman Brown formula, the reliability coefficient of the test was found to be 0.92. Both the values ensure a high reliability of the test.

Validity

The coefficient of validity was determined by computing the coefficient of correlation between scores on Comprehensive Anxiety Test and on Taylor’s Manifest Anxiety Scale. It was .62, which was significant beyond .001 level of confidence.

Method of Scoring

The procedure for scoring SCAT was as follows:

For each item one of the two responses is possible i.e. ‘Yes’ or ‘No’. The athlete who tick marked on ‘yes’ scored one point. But for tick mark on ‘No’, zero was awarded i.e. the items were scored according to following key:

Yes = 1 (One)
No = 0 (Zero)

If a person deleted one of the ninety items, his prorated full scale score was obtained by computing the mean score for the rest of the
items answered. For the subjects who responded in both the cells i.e. Yes and No, that item was invalidated. The range of scores on SCAT was from 0 to 90.

**SPORTS COMPETITION ANXIETY**

Sports Competition Anxiety Inventory, the tool used was adult form of Sports Competition Anxiety Test (SCAT) developed by Martens (1977) to measure an athlete's level of competitive anxiety. The test consists of 15 statements related to competitive situation, which the athlete answers by making a tick mark (✓) corresponding the ‘hardly ever’, ‘sometimes’ or ‘often’ for each item. Five items are spurious. Therefore, only ten items were scored to yield a competitive anxiety measures. Before giving them the test, the investigator instructed them as follows; Below are some statements about how persons feel when they compete in sports and games. Read each statement and decide if you ‘hardly ever’ or ‘sometimes’ or ‘often’ feel this way when you compete in sports, games or in athletics. According to your choice tick mark (✓) the statement. There are no right or wrong answers. Do not spend too much time on any one statement. Remember to choose the word that describes how you usually feel when competing in sports and games or in athletic events. The levels of anxiety recommended for Adult athletes are as follows:-

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Range of Scores</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1 – 10</td>
<td>Low Anxiety level</td>
</tr>
<tr>
<td>2.</td>
<td>11 – 20</td>
<td>Optimum Anxiety Level</td>
</tr>
<tr>
<td>3.</td>
<td>21 – 25</td>
<td>Above average anxiety level</td>
</tr>
<tr>
<td>4.</td>
<td>Above 25</td>
<td>Extreme Anxiety level</td>
</tr>
</tbody>
</table>
Reliability and Validity

Marten (1977) reports that test-retest reliability was .77 across age, sex, and time. The internal consistency for the form A (Adult) was found to be .96.

Method of Scoring

The procedure for scoring SCAT was as follows:

For each item one of three responses are possible: (a) Hardly ever, (b) sometimes, and (c) often. The 10 test items awarded scores were 2, 3, 5, 6, 8, 9, 11, 12, 14, 15. The spurious items 1, 4, 7, 10 and 13, were not scored. Items 2, 3, 5, 8, 9, 12, 14 and 15 are worded so that they were scored according to the following key:

1 = Hardly ever
2 = Sometimes
3 = Often

Items 6 and 11 were scored according to the following key:

1 = Often
2 = Sometimes
3 = Hardly ever

If a person deleted 1 of the 10 items, his prorated full scale score was obtained by computing the mean score for the 9 items answered, multiplying this value by 10. If two or more items were omitted, the respondent’s questionnaire was invalidated. The range of scores on SCAT is from 10 (low competitive A-trait) to 30 (high competitive A-trait).
MENTAL IMAGERY

Mental Imagery Questionnaire had been designed to assess the sensory experiences of the individuals. The mental imagery questionnaire consists of six sub-tests referring to six areas of sensory experiences. The areas of sensory experiences are (1) visual, (2) auditory, (3) gustatory, (4) olfactory, (5) tactual, and (6) organic. Each one is itself a test. On determining the reliability and validity of each test by the method of item discrimination analysis 15 items in each area which were highly reliable were selected. Thus on the whole (15x6) 90 items were retained on this basis and high discriminatory power of the statements. The rest of them were dropped. Therefore, the final form of each sensory areas has 15 items which constitute a sub-test. All the six areas have uniformly 15 items. In each test, all the 15 items are referring to an event of the experience which every one might have had in his / her life.

In every item one phrase referring to some event or characteristics or quality, features of a person, name of some object and its nature and characteristics, type of experience one can have from an object is given. Each item is not a complete sentence. The participant is required to respond suitably for each item by making tick (✓) on anyone of the cells of six alternatives.

The participant on reading each item in a test should close his / her eyes for few seconds and search for such experience he / she had in his / her life and form an image or the mental picture of the past experience and judge it clearly and vividly. On the quality of the mental picture of the sensory experience the person must decide how far it is clear and should make out the range clarity of the image of the sensory experience.
Before administering the test, the investigator instructed the subjects as follows: Below are some statements about how person have experience of his /her past. Imagination in his / her mind and decide if you very clear or vivid image, fairly clear image, just clear image, some what clear image, dim image or no image, for his experience according to your image tick mark (✓) the statement. There are no right or wrong answers. Do not spend too much time on any one statement. Remember to chose the response that which you image make in your mind.

Method of Scoring

In the mental imagery questionnaire test the weights for the responses are six, ranging from 5 to 0, i.e. 5, 4, 3, 2, 1 and 0. If the image is very clear and vivid the person rates it with a point of 5, and for fairly vivid gives 4 and so on. When the image is dim he / she rates with 1 and for no image he / she gives 0. In this type of rating we cannot expect that a person will have always very clear vivid image or fairly vivid image or always dim image or no image. For some object the person may have clear very vivid image and for some may have fairly vivid image, for some dim image and for some no image. Similarly the person who has no image of one object, may have clear and vivid image of another object or fairly vivid image. Therefore in this type tests and response categories a person however acute in his sensory perception will not have the chance of responding to all the 15 items of a test with a weight 5 or 4. Nor there can be a person however weak in his sensory perception will not be always responding to all the 15 items of a test with a weight of 0 or 1. The reverse also is possible in some items. Therefore, the score of a person will never reach the highest
point of 75 in case of the person who had very acute sensory perception in the past. Similarly the score of a person will not go as low as 0 level however a person's sensory perception was weak in the past.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Range of Scores</th>
<th>Degree of Mental Imagery</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>67.6 – 75.0</td>
<td>Very clear and vivid image</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>52.6 – 67.5</td>
<td>Fairly vivid image</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>37.6 – 52.5</td>
<td>Just clear image</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>22.6 – 37.5</td>
<td>Somewhat clear image</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>7.6 – 22.5</td>
<td>Dim image</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>0 – 7.5</td>
<td>No image</td>
<td>0</td>
</tr>
</tbody>
</table>

**Reliability**

The internal consistency procedure was adopted to spot out the inconsistent items in each sub-test. The item discrimination analysis was used to eliminate the inconsistent items. The individual scores in each test may range from the lowest 0 (30 x 0) to the highest 150 (30x5). The scores were arranged from highest to the lowest in the rank order. The top 25 percent of the scores were separated, leaving the middle 50 percent of the scores. This means the top 10 persons' scores and the bottom 10 persons' scores for all the 30 items were totalled for each item and the lower quartile scores were deducted from the upper quartile scores and divided by the N(10). The result of this calculation becomes the difference between the upper and lower quartile scores which is the discriminatory power of the statement. It was decided to select those items which had the discriminatory power of 2 and above and drop those which had less than 2. It is presumed that those items
with the discriminatory power 2 and above may assess the quality in the person. In this case the item discrimination analysis yielded 15 items in each area. Though in certain areas there were more statements yielded the discriminatory power 2 and above, only 15 in each area were selected on the basis of those statements which had the highest 15 discriminatory powers. Secondly to have a uniformity of the statements in all the areas only 15 in each area were selected.

The item discrimination analysis of determining reliability has certain advantage. Tests of this type could be tested with discrimination analysis method as it helps the researcher to eliminate the inconsistent item in the test. This is more objectively done on the basis of the discriminatory power of the statement. This procedure ensures that the test is valid and also reliable.

Validity

The six sub-tests were validated with content validity since the content validity or the face validity is considered to be exclusively a logical type of validity for any type of instrument. The important point behind the logical argument of this validity is that the instrument is designed and developed pertaining to only one variable. The test measures only a particular quality or trait in a person and no other variable is included in this instrument. The authors of the test were fully satisfied with the items of the instrument that each item is referring to only a specific quality.

In the case of the mental imagery questionnaire, there are six-sub tests and each sub-test is treated as a separate test and each test is independent of other tests in this series. For example in the case of visual area, the items of the sub-test are referring to only visual sensory
experience and not even a single item differently designed. All the 15 items are pertaining to visual sensation. Similarly, the other sub-test referring to the auditory area, is having the items pertaining to only auditory sensory experiences. So also the other sub-tests of the gustatory area, olfactory area, tactual area and bodily movements have items pertaining to only the respective area. Each sub-test measures only the respective quality in a person. Therefore all the sub-tests are determined with content validity method and all the six tests are highly valid.

**SELF-ESTEEM**

To measure the level of self-esteem of athletes for the present study, the Self-Esteem Inventory (SEI) developed by Prasad and Thakur (1988) was administered to the subjects. The test is a self-evaluation questionnaire and comprises of two forms. In the first part of Inventory the athletes respond to items regarding as to what they think of themselves and in the second part of inventory responded to items concerning as to what the people who know them think about them. The test consists of 29 items of first part which were relating to personally perceived self esteem and 30 items of second part which were related to socially perceived self-esteem. Against every item options were given in seven point scale which ranged from ‘totally correct’, to ‘totally wrong’. Athletes making responses were awarded in such a way that for socially desirable items they were given 7 to 1 scores for totally correct to totally wrong. For socially undesirable items, reverse pattern was followed.

Before administering the test, first of all the investigator instructed them as follows: below are some statements in Part-I about how a
person thinks, about him self and in Part-II the statements relate to your opinion as to how the other persons think about you. Read each statement and decide your response in one of the following seven options totally correct, correct to a large extent, partially correct, uncertain, partially wrong, wrong to a large extent, totally wrong.

**Method of Scoring**

For each item one of seven responses are possible (a) totally correct (b) correct to a large extent (c) partially correct (d) uncertain (e) partially wrong (f) wrong to a large extent (g) totally wrong. The statement which were socially undesirable were scored according to following key:

1 = Totally correct.
2 = Correct to large extent.
3 = Partially Correct.
4 = Uncertain
5 = Partially Wrong.
6 = Wrong to large extent.
7 = Totally wrong.

All other statements were scored according to the following key:

1 = Totally wrong
2 = Wrong to large extent
3 = Partially wrong
4 = Uncertain
5 = Partially correct
6 = Correct to large extent
7 = Totally correct

For Part-I, the scores ranged from 29 to 203 and for Part-II scores ranged from 30 to 210.
Reliability

The two sets of the inventory were administered to a sample of 400 students. Split-half reliability coefficients were calculated for both the sets of the inventory which came out to be .82 and .78 for personally-perceived self and socially-perceived self respectively. Of the 400 students, 150 students were administered the two sets of the inventory again after a gap of six weeks for evaluating re-test reliability coefficients. Re-test reliability coefficients were found for both the tests were .69 and .66 respectively for personally-perceived self and socially-perceived self.

ADMINISTRATION OF TESTS

For the purpose of getting genuine responses and for the collection of data from the athletes who represented their universities in the 63rd All India Inter University Athletic Championship which was held at Gulbarga University, Gulbarga, Karnataka from 16th to 21st January 2003, the researcher had to seek permission and cooperation from various quarters. He requested the Managers and Coaches of various teams from Northern and Southern Regions for permitting him to administer the tests to the athletes. With their consent and cooperation, the researcher decided the timing and venue for this purpose so that their daily schedule was not unduly disturbed. The tests were administered one after the other except the Sports Competition Anxiety Inventory which was administered prior to the competition as per the requirements of the Inventory. The researcher took all precautions to ensure that there was no distraction or minimum distraction to the subjects while attempting the tests. The test
instructions were clearly read out and explained to them and they were permitted to ask questions, if any. The subjects were asked to record their first response and hand over the test response sheets as soon as the same were filled up.

**STATISTICAL DESIGN**

The basic statistics, such as the mean and SD were calculated for the groups based on region, performance, gender and types of the events. Analysis of variance (2x2x2 factorial design) was used to find out the significance of differences and the interaction effect of region, performance and gender. This was followed by 't' test to find out the direction of differences between athletes from selected athletic events i.e. sprints, jumps and throws.