Method

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Chapter 3

Method
This chapter describes the various steps followed by the investigator to conduct the research. The method devised for the same consists mainly of the following four sections.

3.1 Sample

In this section, the procedure used for selection of a sample, and properties of the sample for the present investigation are described.

3.2 Measures

This section gives an account of nature and statistical properties of the measures used to collect the required information for the present study.

3.3 Procedure

This section deals with a discussion of the data collection procedures, details of administration and scoring of the different measures.

3.4 Statistical analysis

This section describes the different statistical methods used for analyzing the data collected in order to realize the objectives of the study.

3.1 Sample

Sample can be defined as “a small proportion of a population selected for observation and analysis” (Best & Kahn, 1995). Cluster sampling method has been used to select the sample for the present investigation.

One of the forms of probability sampling is cluster sampling (Kerlinger, 1996). If the total area of interest happens to be a big one, a convenient way in which a sample can be taken is to divide the area into a number of smaller non-overlapping areas and then to randomly select these smaller areas (usually called clusters), with the ultimate sample consisting of all (or samples of) units in these small areas or clusters. Thus in cluster sampling the total population is divided
into a number of relatively small sub-divisions which are themselves clusters of still smaller units and then some of these clusters are randomly selected for inclusion in the overall sample. If the clusters happen to be some geographic sub-divisions, in that case cluster sampling better known as area sampling (Kothari, 1999).

The population for the present investigation is defined as sport persons in South India. As shown in figure 3.1. different clusters were identified based on geographic subdivisions such as Andra Pradesh, Karnataka, Kerala, Tamil Nadu (states) and Pondichery (Union Territory)

The only national agency with a broad networking, and infra-structure which promote sports development in the region, is Sports Authority of India (SAI). Different locations of sports promotional schemes of SAI in southern region are shown in figure 3.2.

From these clusters Kerala state was randomly selected by lottery method and the data were collected from all the centers in Kerala (figure 3.3)

The final sample consisted of 304 sport persons. The mean age of the sample is 17.51 years and it ranges from 15 to 25 years.
Fig. 3.1
Map of India: Defined population, geographical sub-divisions, and the selected area.
Fig. 3.2

Locations of sports promotional schemes of SAI in South India

- **SPORTS PROMOTIONAL SCHEMES OF SAI**
  - **KARNATAKA**
    - STC: Bangalore, Madikeri, Dharwad
  - **ANDHRA PRADESH**
    - ABSC: Secunderabad, Eluru, Medak, Vishakapatnam
    - ASC: Bangalore, MEG
  - **TAMILNADU**
    - STC: Chennai, Salem
    - ABSC: Golkonda
    - SAG: Nagercoil
  - **KERALA**
    - STC: Calicut
    - SAG: Alleppy, Kollam
    - STC: Tellicherry, Trichur
  - **PONDICHERRY**
    - STC: Pondicherry

**Abbreviations**
- STC: SAI Training Centres
- ABSC: Army Boys Sports Company
- SAG: Special Area Games
Fig. 3.3

Map of Kerala: Locations of sports training centres in Kerala
3.1.1 Sample break up based on sex

The sample comprises of both sexes. The break up of the sample based on sex is given in table 3.1.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Sex</th>
<th>Number of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>161</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>143</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

Table 3.1
Distribution of subjects based on sex.

3.1.2 Sample break up based on nature of sport

The total sample consists of sport persons belong to different sport categories. All movement (sport) are performed in some environment, whether it is a tennis court, an open field, or with, or without other people or equipment. The simplest skill, in terms of environmental constraints imposed on the performer is a closed skill. A closed skill is one that is done in a predictable environment, or one in which the performer is free to execute a skill without having to make quick decisions that would be required if unexpected changes occurred. Examples of closed skill include a javelin throw, a high jump, a springboard diving, and weight lifting. When a skill is performed in response to an unpredictable, changing environment, it is called an open skill. Examples of open skills include those done in response to the unpredictable action of an opponent or situation as encountered in wrestling or in responding to a foot ball free kick. In situations such as these, the perception and quick decision-making abilities of the performer may well be more important for success than the
isolated biomechanical features of the skill performance. On the basis of the predominance of the types of skills, various sport disciplines were categorized into two different skill categories such as 'open skill category' and 'closed skill category'. Thus open skill category includes disciplines like football, basketball, baseball, badminton, boxing, hockey, kho-kho, kabady etc whereas disciplines like athletics, weight lifting, gymnastics, rowing, swimming etc are categorized as closed skill category. The breakup of the sample based on nature of sport is presented in table 3.2.

**Table 3.2.**
Distribution of subjects based on nature of sport: Open and closed skill category

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Skill category</th>
<th>Number of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open</td>
<td>165</td>
</tr>
<tr>
<td>2</td>
<td>Closed</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

3.1.3 Sample break up based on Levels of Participation (LOP)

The International participation is considered as the highest level participation followed by national level and state level participation. Same can be considered as the indicator of the level of performance of the particular sport person. This information is taken for granted to classify sport persons into three groups such as: 1.international level, 2.national level, and 3.state level performers(table 3.3).
Table 3.3
Distribution of subjects based on levels of participation (LOP).

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Levels of participation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>State</td>
<td>94</td>
</tr>
<tr>
<td>2</td>
<td>National</td>
<td>178</td>
</tr>
<tr>
<td>3</td>
<td>International</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

3.1.4 Sample break up based on Levels of Experience in sport (LOE)

The Background Information Schedule provides with a room for indicating the total years of sport experience of the subjects. The period of experience ranges from 1 to 15 years. Based on the mean and standard deviation the whole sample was divided into three: novice sport persons, sport persons with moderate experience, and sport persons with high experience; Mean -1 SD as novice, Mean + 1 SD as high experience, and in between these two standard deviations as moderate(table 3.4)

Table 3.4
Distribution of subjects based on levels of experience in sport (LOE)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Levels of experience.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Novice</td>
<td>78</td>
</tr>
<tr>
<td>2</td>
<td>Moderately experienced</td>
<td>58</td>
</tr>
<tr>
<td>3</td>
<td>Highly experienced</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

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3.1.5 Sample break up based on Family Sport Status (FSS)

It was found that the subjects are having father, mother, brother, sister, uncle, aunt, grandfather etc involved in sport. Those sport persons having close relatives (father, mother, brother and, sister) were grouped as sound FSS; those having distant relatives (uncle, aunt, grand-father etc-all relatives other than close relatives )as moderate FSS; and the persons having neither close relatives nor distant relatives as poor FSS. Sample break up based on family sport status is given in table 3.5.

**Table 3.5**

Distribution of subjects based on family sport status (FSS)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Family Sport status</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poor family sport status</td>
<td>172</td>
</tr>
<tr>
<td>2</td>
<td>Moderate family sport status</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>Sound family sport status</td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

3.1.6 Sample break up based on Punctuality

The sample was divided into three groups based on the response of the subjects on a self rating scale where they evaluated themselves as highpunctual, moderate punctual, and low punctual. The sample break up based on various levels of punctuality is given in table 3.6

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Table 3.6
Distribution of subjects based on levels of punctuality

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Punctuality</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low punctual</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>Moderate punctual</td>
<td>82</td>
</tr>
<tr>
<td>3</td>
<td>High punctual</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

3.1.7 Sample break up based on Self-practice

Self-practice is initiated by the person himself or herself apart from the compulsory training by the coaches or any other significant persons. The sample was divided into three groups based on the response of the subjects on a self-rating scale where they evaluated themselves as doing high in self-practice, moderate in self-practice, and low in self-practice. The sample break up based on various levels of self-practice is given in table 3.7

Table 3.7
Distribution of subjects based on levels of self-practice

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Self practice</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low self practice</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>Moderate self practice</td>
<td>37</td>
</tr>
<tr>
<td>3</td>
<td>High self practice</td>
<td>236</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>
3.1.8 Sample break up based on Perceived Self-Competence

All the subjects evaluated themselves on their perceived competence as highly competent, moderately competent, and less competent. Based on the response of this rating the sample was divided into three as highly competent, moderate competent and less competent. The sample break up based on this variable is presented in table 3.8

Table 3.8
Distribution of subjects based on levels of perceived self-competence

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Competent</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low Competent</td>
<td>38</td>
</tr>
<tr>
<td>2</td>
<td>Moderate Competent</td>
<td>180</td>
</tr>
<tr>
<td>3</td>
<td>High Competent</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

3.1.9 Sample break up based on Personality Type

Employing 'A scale of Type -A personality Pattern', some of the individuals were identified as Type-A individuals. The rest of the subjects were non-Type-A individuals, these individuals are denoted as Type-B individuals for the present investigation. The sample break up based on this variable is presented in table 3.9.
Table 3.9
Distribution of subjects based on personality type

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Personality type</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type –A sport persons</td>
<td>225</td>
</tr>
<tr>
<td>2</td>
<td>Type –B sport persons</td>
<td>79</td>
</tr>
<tr>
<td>3</td>
<td>Total</td>
<td>304</td>
</tr>
</tbody>
</table>

3.2. Measures

The present investigation involves many variables like mental health, personality, emotional intelligence, and intelligence and hence different measures are needed. According to the nature of attributes to be measured, different techniques were used. The measures used included those which had been developed and standardized by experts in the field and by the investigator herself. The measures employed were:

1. Background Information Schedule
2. Self rating scales
3. Mental Health Status Scale (Gireesan and Sam sanandaraj, 1988)
4. A scale of Type –A personality Pattern (Robert et al, 1998)
5. Emotional Intelligence Scale For Sport Persons (Rajitha, and Jayan, 2003)
6. Advanced Progressive Matrices (Raven, 1989)

A brief description of the tools used is given below.

3.2.1 Background Information Schedule

Since the present investigation intends an in-depth analysis, other relevant information besides the major psychological variables, were collected. This
background information schedule was formulated based on the suggestions of experts in the field of psychology and sport.

Along with the basic information of name, age, sex and particular sport discipline the sport person is engaged in and the following information were also collected.

1. Levels of participation (LOP)
2. Levels of experience in sport (LOE) and
3. Family sport status (FSS)

A copy of Background Information Schedule is given as appendix I

3.2.2 Self-rating scales

Three 3-point self-rating scales viz. punctuality, self-practice and perceived self-competence were developed for assessing corresponding attributes. Description of each term is as follows.

3.2.2.1 Punctuality

Punctuality as a personal characteristic has greater demand in sport. The sport persons evaluate them selves as highly punctual, moderate punctual, and low punctual.

3.2.2.2 Self-practice

Tremendous practice makes the sport person perfect but the willingness to do the same may vary from person to person. The subjects responded on this variable as doing more voluntary practice compared to others, moderate voluntary practice, and less voluntary practice. Self-practice is initiated by the person himself or herself rather than the compulsory training by the coaches or any other significant persons.
3.2.2.3 Perceived self-competence

All the subjects evaluated themselves as highly competent, moderately competent, and less competent.

A copy of Self-rating scales is given as appendix II

3.2.3 Mental Health Status Scale

This scale has been developed by Gireesan and Sam Sananda Raj (1988) for measuring the positive mental health status of the individuals. This refers to behaviour, attitudes and feelings that represent an individual's level of personal effectiveness, success and satisfaction. This test has six sub scales and each sub section has twelve statements. The following are the six sub scales:

1. Attitudes toward the self
2. Self actualisation
3. Integration
4. Autonomy
5. Perception of reality and

Reliability and Validity

As per the report of the scale developers, the scale is reliable with good coefficients. The split-half reliability of each sub scales vary between 0.73 to 0.89 and the test retest reliability is also found to be significant and varied between 0.63 to 0.76 respectively. All these coefficients are found to be highly significant.

Validity of the scale has been established by validating against another scale, measuring the same variable. The validity coefficient of each sub scale is
greater than 0.7, and hence the scale has fairly good validity. (A copy of the scale is given as appendix III).

3.2.3.1 Re-standardisation of Mental Health Status Scale

Mental Health Status Scale consists of 72 items. The statements from the original scale were included in the revised one. The response categories are the same as the original one viz. strongly agree, agree, undecided, disagree, strongly disagree. A numerical weight of 5 to 1 is given to a positive statement and 1 to 4 to a negative statement.

Sample

For standardization the draft scale was given to a sample of 478 sport persons. The sample of subject was randomly selected from different sport disciplines. According to the nature of skills involved all the disciplines were divided into two: open skill category, and closed skill category. Thus the included 126 males and 88 females in closed skill category, and 167 males and 97 females in open skill category.

The draft scale was administered to a sample 478 subjects. All the 478 subjects were rank ordered according to the total score in the inventory. Then the top 100 and bottom 100 subjects were selected to represent the high and low mentally healthy groups separately. The performance of the high and low groups in each item was compared using t-test. According to the t-values the discriminating power of the items were identified. The higher the t-value, the higher is the discriminating power. The results of the t-test for seven domains (twelve items each) of mental health are given in the table 3.10.
Table 3.10
Mental health status scale: The t-values in the draft scale

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Attitude towards self</th>
<th>Self-Actualisation</th>
<th>Integration</th>
<th>Autonomy</th>
<th>Perception of reality</th>
<th>Environmental mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t-value</td>
<td>t-value</td>
<td>t-value</td>
<td>t-value</td>
<td>t-value</td>
<td>t-value</td>
</tr>
<tr>
<td>1</td>
<td>2.90</td>
<td>4.5</td>
<td>5.25</td>
<td>6.01</td>
<td>6.79</td>
<td>3.15</td>
</tr>
<tr>
<td>2</td>
<td>2.72</td>
<td>7.32</td>
<td>6.13</td>
<td>6.79</td>
<td>2.65</td>
<td>6.95</td>
</tr>
<tr>
<td>3</td>
<td>4.46</td>
<td>6.33</td>
<td>5.76</td>
<td>9.21</td>
<td>7.83</td>
<td>3.76</td>
</tr>
<tr>
<td>4</td>
<td>8.36</td>
<td>5.49</td>
<td>6.54</td>
<td>7.14</td>
<td>5.50</td>
<td>9.92</td>
</tr>
<tr>
<td>5</td>
<td>9.39</td>
<td>5.97</td>
<td>6.48</td>
<td>2.59</td>
<td>5.30</td>
<td>7.18</td>
</tr>
<tr>
<td>6</td>
<td>6.20</td>
<td>8.38</td>
<td>3.15</td>
<td>4.03</td>
<td>5.63</td>
<td>9.13</td>
</tr>
<tr>
<td>7</td>
<td>5.83</td>
<td>5.90</td>
<td>4.80</td>
<td>3.75</td>
<td>7.40</td>
<td>7.99</td>
</tr>
<tr>
<td>8</td>
<td>5.68</td>
<td>5.87</td>
<td>7.53</td>
<td>4.37</td>
<td>5.41</td>
<td>7.41</td>
</tr>
<tr>
<td>9</td>
<td>7.57</td>
<td>4.88</td>
<td>8.53</td>
<td>6.68</td>
<td>5.16</td>
<td>3.93</td>
</tr>
<tr>
<td>10</td>
<td>9.50</td>
<td>4.54</td>
<td>6.54</td>
<td>5.27</td>
<td>5.94</td>
<td>8.08</td>
</tr>
<tr>
<td>11</td>
<td>3.51</td>
<td>8.48</td>
<td>7.23</td>
<td>5.90</td>
<td>7.62</td>
<td>8.09</td>
</tr>
<tr>
<td>12</td>
<td>3.10</td>
<td>5.15</td>
<td>8.01</td>
<td>8.55</td>
<td>4.45</td>
<td>6.21</td>
</tr>
</tbody>
</table>

All the t-values are significant at 0.05 level.

The t-values obtained are greater than table value (2.58), indicating that 72 items in the scale are able to discriminate the individuals having high and low mental health. Hence these 72 items were selected for the final scale.

Reliability and Validity

The reliability of the test has been established by the method of Cronbach Alpha, and the Alpha coefficient obtained for the entire scale is 0.94 and that of the subscales are attitude toward self 0.55, self-actualisation 0.60, integration
0.68, autonomy 0.58, perception of reality 0.58, and environmental mastery 0.67. So the scale could be reasonably reliable. Since the test is based on a standardized scale and all the items were selected from that scale, the present scale can be said to have construct validity.

3.2.4 A scale of Type–A personality Pattern (Robert et al., 1980)

Type- A and Type- B represent two ends of a continuous temperamental pattern of individuals. The Type- A personality pattern is found to show behavioral dispositions such as ambitiousness, aggressiveness, competitiveness, impatience, sense of time urgency, goal directedness with out proper planning, and polyphasic behavior.

1. An intense sense of time urgency

‘An intense sense of time urgency’ is a tendency to race against the clock, even when there is little reason to the person feels a need to hurry for hurry’s sake alone, And this tendency has appropriately been called ‘hurry sickness’. Time urgency is measured by items 1,2,8,12,13, and 14 in the scale.

2. Inappropriate aggression/ hostility

‘Inappropriate aggression’ reveals itself in a person who is excessively competitive and who cannot do anything for fun. This inappropriately aggressive behavior easily evolves into frequent displays of hostility, usually at the slightest provocation or frustration. Competitiveness and hostility is measured by items 3, 4, 9, and 10.

3. Polyphasic behaviour

‘Polyphasic behaviour’ refers to the tendency to overtake two or more tasks simultaneously at inappropriate times. It usually results in wasted time due to inability to complete the tasks. This behaviour is measured by items 6 and 11.
4. Goal directedness with out proper planning

'Goal directedness without proper planning' refers to the tendency of an individual to rush into work without really knowing how to accomplish the desired result. This usually results in incomplete work or work with many errors, which in turn lead to wasted time, energy and money. Lack of planning is measured by item 5 and 7.

A copy of the scale is given as appendix IV

3.2.5 Emotional intelligence scale for sport persons

Emotional Intelligence Scale for sport persons was developed and standardised for measuring emotional intelligence. The measure consists of five domains based on Goleman's (1995) theory of "emotional intelligence" as follows:

1. Self awareness
2. Self regulation
3. Motivation
4. Empathy
5. Social skills.

Reliability and Validity

Reliability of the Emotional Intelligence Scale for Sport Persons is calculated by test – retest method and is found to be 0.82 (N=61), for the total scale and reliability for each sub test are reported as self-awareness (0.50), self-regulation (0.66), motivation (0.74), empathy (0.65), and social skills (0.63).

For the present scale split half reliability coefficients were estimated. The scale was administered to a sample of 61. Reliability coefficients were
calculated for all the five dimensions separately. The split-half reliability coefficients of the scale for different domains estimated are self-awareness (0.76), self-regulation (0.68), motivation (0.71), empathy (0.97), social skills (0.97), and that of the entire scale is 0.87 (N=61).

Since the scale measures comprehensively the factors of Emotional Intelligence, it has content validity. Construct validity of the scale was estimated by correlating the emotional intelligence scores with the scores of Mental Health Status Scale (Giresan and Sam Sananda Raj, 1988). It was found that the Pearson Product Moment Correlation between these two scores is 0.49 (N=304). Since, emotional intelligence is conceptualized as a construct highly related with mental health, the computed value of correlation is statistically significant (P<0.01) to be considered as a criterion for construct validity of the present scale.

Being an indicator of unhealthy behavior pattern, the scores on a scale of Type – A personality Pattern (Robert et. al, 1980) were correlated with the scores of Emotional Intelligence Scale for Sport Persons. As predicted a statistically significant negative correlation (-0.19, P<0.01, N=304) was calculated. This value seems to be a clear indication of the construct validity of the newly developed scale.

Emotional intelligence is slightly and positively correlated with intelligence measured by Advanced Progressive Matrices (Raven, 1989), 0.05; which is too small to be significant, for these two constructs are largely independent entities. The trend of the relationship between emotional intelligence and intelligence is positive but insignificant. Exactly the same idea has been put forward by the proponent of emotional intelligence, Goleman (1995). Altogether, it can be said that Emotional Intelligence Scale for Sport Persons has met the criteria for construct validity. A copy of the scale is given as appendix V.
3.2.6 Advanced Progressive Matrices

The progressive matrices developed in Great Britain by J.C. Raven. This test is considered by most British psychologists as the best available measure of 'g' factor as in the case of Spearman.

There are three types of progressive matrices, such as the Standard Progressive Matrices (SPM), Coloured Progressive Matrices (CPM) and Advanced Progressive Matrices (APM). Ravens Progressive Matrices is a test of observations, capacity for clear thinking and accurate intellectual work. It involves two sets – set I and set II. Set I can be considered as a preliminary test for the set II, which consists of 36 problems while set I consists of 12 problems.

Reliability

Numerous reliability coefficients have been reported by Raven that vary from the low 0.80's to the high 0.90's. It has high test – retest reliability of 0.91.

Validity

Validity of the test has been studied in various ways. The progressive matrices correlated against verbal and other non-verbal group scales. Using the former the resulting coefficients varied rather markedly from 0.40 to 0.67. one copy of the response sheet of APM is given as appendix VI.

3.3 Procedure

The required data were collected from different SAI, STC centers situated in Districts of Kerala state. The in-charges of all the 5 centers were contacted by prior appointment and had a discussion about the purpose of the study as well as the importance, nature, application and nature of information required for the study. Then the in-charges introduced the investigator to the coaches of the
various sport disciplines through proper way. The coaches then introduced corresponding sport persons to the investigator. The nature and purpose of the study were again explained to the coaches and the subjects. They were told that, since it was a research work their responses should have been too sincere and intimate, and assurance was given to each subjects that the information gathered from them would be used only for research purpose and that everything including their identity would be kept confidential.

The researcher started data collection from the southern SAI center i.e. Kollam followed by other centres, Alappuzha, Thrissure, and Calicut to finish at the Northern Center Thalassery. Group Administration of the tests was performed on small groups of 20 to 30 sport persons. For ensuring subject’s interest and involvement and to avoid fatigue all the six measures were grouped into two. The first group of measures Background Information Schedule, Self-Rating Scale and Mental Health Status Scale were administered in one session followed second group of measures, Type-A personality pattern, Emotional Intelligence Scale for Sport Persons and Advanced Progressive Matrices on the next session. Fifteen minutes of intervals were provided in between two consecutive tests. This method of data collection was found to be of great advantage in many ways.

1. The effect of fatigue due to frequent administration of inventories was minimized by dividing the total administration time into two.

2. The rapport between the investigator and the subject provided a better understanding of the subjects and discipline, which also helped the final interpretation.

3. The subjects were relaxed and could clarify any doubt regarding the measures.

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3.3.1 Administration of Tools

The tools used for the present study viz., Background Information Schedule, Self-Rating Scale, Mental Health Status Scale A scale Type-A personality pattern, Emotional Intelligence Scale for Sport Persons, and Advanced Progressive Matrices were administered in a uniform sequence. The procedure followed and the coding/tabulation of data were done as follows.

The various tests along with Background Information Schedule were distributed to the subjects followed by an oral instruction of the way to respond to each tests. The style of responding varied from one test to the other. The following were the instructions given to subjects.

3.3.1.1. Background Information Schedule

The relevant information related to the subject and their sporting experience gathered through Background Information Schedule.

3.3.1.2 Self-Rating Scale

Here, after reading the instructions you have to mark your opinion in the scale by putting a circle around any one number. There are three scales given. First one is the self-rating scale for punctuality. You have to evaluate yourself how punctual you are in your sports life. The scale is designed in such a way that there are 3 points. ‘1’ stands for least punctuality, ‘3’ stands for high punctuality. You are free to mark any number from one to three in order to indicate the level of punctuality. The same method is to be followed for the second scale also, but the difference lies in the fact that you have to evaluate yourself on self-practice. Self-practice refers to the practice initiated by yourself without compulsion from the part of coaches, parents and others. The same method is to be followed for the third scale also; the difference lies in the fact...
that you have to evaluate yourself as a sport person. The scale is designed in such a way that there are ‘3’ points, ‘1’ stands for low competence and ‘3’ stands for high competence. You are free to choose any of the three”.

3.3.1.3 Mental Health Status Scale

“Some statements related to certain problems that we face in our daily life are given below. Indicate how far you agree or disagree with each statement with a ‘✓’ mark. In the response sheet against the item number of each statement, five choices A, B, C, D and E are given. A denotes ‘Strongly Agree’, B for ‘Agree’, C for ‘Undecided’, D for ‘Disagree’ and E for ‘Strongly disagree’. Give the first response comes to your mind using a tick mark”.

3.3.1.4 A Scale of Type-A Personality Pattern

“This questionnaire contains 14 statements which describe certain characteristics of our behavior. Indicate whether it is true to yourself. There are two options such as ‘Yes’ or ‘No’. Give the first response comes to your mind using a tick ‘✓’ mark”.

3.3.1.5 Emotional Intelligence Scale for Sport Persons

“Some statements related to your sport life are given below. Read each statement carefully and indicate how far you agree or disagree with each statement. In the questionnaire against each statement, five choices such as ‘Strongly Agree’, ‘Agree’, ‘Undecided’, ‘Disagree’ and ‘Strongly disagree’ are given. Give the first response comes to your mind using a tick ‘✓’ mark”.

3.3.1.6 Advanced Progressive Matrices

The test was administered following the standard procedure described in the manual for AlPM as given below.

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The investigator gave the following instructions in Malayalam language

For this test you will be given an Answer Sheet, on which to mark all your answers, and two Test Booklets. No marks are to be made in the booklets. Look at your Answer Sheet.

Fill in the particulars at the top of the page. Remember, all your answers will be made on the answer sheet. Don’t mark the green booklet in any way. Take the green booklet but -

Don’t Open it.

Put your answer sheet in front of the book.

This is a test of observation and clear thinking. There are two parts to it. The second part, Set II, is the important part. The first part Set I, which you have in front of you, is quite short. It is intended to show you the method of working, or if you have seen tests of this sort before, to remind you how they work. Open your green book at the first page. You see this is No.1, and that under the heading Set I, on your record form there is a column of numbers 1,2,3,4 to 12.

Along with the instructions the investigator demonstrated the following

Held up Answer Sheet

Held up copy Set I.

Held up answer sheet and point to Column 1.
The top part of problem 1 is a pattern with a bit cut out of it. Look at the pattern, think what the missing bit must be like to complete the pattern correctly, both along and down, and then find the right bit out of the eight bits shown below. Only one of these bits is perfectly correct No. 1 completes the pattern correctly downwards, but is wrong the other way. No. 4 is correct along, but is wrong downwards. Put your finger on the bit which is correct both ways. No. 8, is the right bit, isn’t it? So the solution is No.8, and you write the figure “8” against No.1 under Set I, on your scoring form. Do that. Write the figure “8” at the side of No. 1 in the first column of your scoring form. Don’t mark the green booklet.

Now turn over and do No. 2 by yourselves.

The answer of course is No. 4. See that you have put the figure “4” against No.2, (blacked in box 4) in the first column of your record form. Have you all done that?

You will find the problems in this set soon get difficult. Whether the problems are easy or difficult, you notice that to solve them you have to use the same method of working all the time.
This is a practice set. It is not important to get them all done. The important thing is to notice how the problems develop, and learn the method of solving them. Go on with the rest by yourselves.

Stop now. Close the green booklet and place it at the side of the desk.

Take the grey booklet, Set II, but do not open it. Have you all got Set II in front of you? Don’t open it yet. This is the real test. The problems in it are exactly like those you have just been doing, except that there are more of them, and they get difficult more slowly. In every problem you use the same method of working. You look along each row and decide what the missing figure is like. You look down each column and decide again, and you choose the figure you find is right both ways. When you have found it you enter it against the number of the problem under Set II, on your scoring form. Don’t mark the grey booklet.

You will be allowed 40 minutes. Remember it is the accuracy of your work that matters. Attempt each problem in turn and be sure to find the correct figure to complete it before
going on to the next problem which in every case becomes more difficult to solve and requires longer to check accurately. Are there any questions? A short pause.

Open your books at the first problem.

Begin now. Started stop watch or clock. Allowed 40 minutes.

Everyone stop working, please.

Close your books.

3.3.2 Scoring

The collected answer sheets were first checked for incomplete responses, which were excluded from the data set. The responses which were complete in every sense were scored according to the scale as described below.

3.3.2.1 Background Information Schedule

The relevant information related to subjects and other variables gathered through Background Information Schedule were properly categorized and assigned number codes to variables such as age, sex, sport, discipline, level of participation, experience in sport, and family sport status.

3.3.2.2 Self-Rating Scale

Self-rating scales included 3 aspects viz., punctuality, self-practice and perceived self-competence. These three aspects were scored separately. The first
scale was a 3-point scale on punctuality, ranging from least punctuality to high punctuality. Hence a score of 1 was given to response ‘1’ that is least punctual, a score of 2 to ‘moderate punctual’(2), and a score of 3 to ‘high punctual’(3).

Self-practice, the second scale in its kind, was also a 3-point scale ranging from 1(least self-practice), 2(moderate self-practice), and to 3(high self-practice). A score of 1, 2, or 3 was given to each of the response 1, 2, and 3 respectively.

Perceived self-competence, the third self-rating scale was a 3-point scale ranging from 1(least competent), 2(moderate competent), and to 3(high competent). A score of 1, 2, or 3 was given to each of the response 1, 2, and 3 respectively.

3.3.2.3 Mental Health Status Scale

The scoring of Mental Health Status Scale was performed as follows. A score of 5, 4, 3, 2, or 1 was given to the category Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree respectively for the items which were positively worded and for the negative items scoring procedure was in the reverse order. A total of 72 items explaining ‘attitude towards self’, ‘self-actualization’, ‘integration’, ‘autonomy’, ‘perception of reality’, and ‘environmental mastery’ included 12 items in each domain. Maximum Score 360 and the minimum score 72.

3.3.2.4 A Scale for Type-A Personality Pattern

A score of ‘1’ each was given to the response ‘Yes’ and ‘0’ each to the response ‘No’. The total of 14 items include 4 domains such as ‘time urgency’, ‘polyphasic behaviour’, ‘inappropriate aggression’, ‘goal directions without proper planning’ and it included 6, 2, 4, 2 items related to each domain.
respectively. A subject having a total score of 5 and above considered as Type-A person whereas 4 and below as Type-B person.

3.3.2.5 Emotional Intelligence Scale for Sport Persons

The responses to the items of Emotional Intelligence Scale for Sport Persons had 5 point category in which a score of 5, 4, 3, 2, 1 was given to Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree respectively for the items which were positively worded and for the negative items scoring procedure was in the reverse order. A total of 30 items include 5 domains of emotional intelligence such as self-awareness, self-regulation, motivation, empathy, and social skills; and it included six items in each domain. The maximum possible total score was 150 and the minimum was 30.

3.3.2.6 Advanced Progressive Matrices

To score the obtained data, subjects’ responses were checked whether it is correct or not, with the aid of scoring key. The total number of correct responses was recorded in the respective columns of the two sets. The score of SET II was considered to find out the percentile point and corresponding IQ of the subject with the help of manual.

3.3.3 Consolidation of data

The raw scores of different variables under investigation and other independent variables of each subject collected through Background Information Schedule, other inventories and tests were organized in a systematic order. Then the data were fed into a spread sheet for verification and for further statistical analysis.

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3.4 Statistical analysis

The statistical techniques selected were based on the objectives set forth and hypotheses formulated for the study. The statistical techniques used are presented below:

3.4.1. Correlational analysis

The extent of relation between two variables (interval or ratio type) is described by the Pearson Product Moment Correlation Co-efficient, “r”. Generally the value of “r” ranges from -1 to +1. A negative value indicates a negative relation i.e. X decreases as Y increases. A positive value indicates a positive relation; X increases as Y increases. The statistical technique of correlation can be applied when one wants to study the relationship of one variable to another. If two variables correlate with each other, there is reason to believe in the existence of a common relationship. It may be noted, however, that cause-effect relationship can not be inferred from this information alone; additional criteria would be required (Kothari, 1999).

A coefficient of correlation is a single number that tells us to what extent two things are related, or, in other words, to what extent variations in go with variation in other. In different situations it can vary from a value of +1.00 which indicates perfect positive relationship through ‘zero’ which indicate complete independence or no correlation whatever, down to -1.00, which means perfect negative correlation. In the present investigation, Pearson Product Moment Correlation (r) was used for estimating the extent of relationship existing among different variables.

3.4.2 Step wise regression analysis

Step wise regression analysis may be useful in situations were the investigator has to investigate the relative importance of a number of independent variables in determining a dependent variable.
The main objective in using this technique is to predict the value of the dependent variable \( y \) when the value of the independent variable \( x \) is given. In the present study, the technique was used to find out the combinations of variables, which best predicted mental health. The step wise method was used as it enabled the estimation of the sequential contribution of independent variables in the prediction of variance in the dependent variable.

### 3.4.3 Tests of Significance of mean difference

The ratio of deviation of scores from the mean or other parameter in a distribution of sample statistics, to the standard error of that distribution is designated as ‘t’. Usually the t-test is used to compare the difference between means of two groups. In this study t-tests were employed to find whether there is significant difference between males and females, and open and closed skill category sport persons on different variables like mental health, personality, emotional intelligence, and intelligence.

### 3.4.4 Three-way analysis of variance(Three-way ANOVA)

The three-way ANOVA combines seven separate hypotheses tests, each evaluating specific mean differences: the A effect, the B effect, the C effect, A\( \times \)B interaction, B\( \times \)C interaction, A\( \times \)C interaction, and A\( \times \)B\( \times \)C interaction. Each of these seven tests will be based on its own F-ratio computed from the data. The seven F-ratios will all have the same basic structure. This technique consists in breaking down the total amount of variation in set of data into two components, viz: the amount which can be attributed specified causes and that amount which can be attributed to chance. It is possible to investigate any number of factors said to influence the dependent variable. The principle consists in estimating two population variances, one is based on between samples variance called the mean sum of squares between sample (MSS\(_B\)) and the other is based on within samples

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variance called mean sum of squares with in sample (MSSw). The two estimates are compared with the F-ratio. The critical ratio is the ratio of MSS_B to MSSw. In the present investigation sex, personality and various sport related variables were analysed for main and interaction effects on mental health, Type-a personality pattern, emotional intelligence and intelligence.

3.4.5 Multivariate analysis of variance (MANOVA)

Multivariate analysis of variance is an extension of bivariate analysis of variance in which the ratio of among-groups variance to within-groups variance is calculated on a set of variables instead of a single variable. This technique is considered appropriate when several metric dependent variables are involved in a research study along with many non-metric explanatory variables. In the present investigation the dependent variable includes mental health, Type-A personality pattern, emotional intelligence, and intelligence, whereas independent variables include levels of participation, experience, family sport status, levels of punctuality, levels of self-practice and perceived self-competence.