3.1 A systematic discovery is Research, a systematic & scientific search for related and relevant data and information on typical topic or subject. Research is a skill of scientific investigation. To search new facts means ‘investigation’ systematic efforts to gain new knowledge is research as per Redman and Mory. Research is an activity with aims that is done with the help of already done research and the unknown is revealed before the world.

Human beings are inquisitive by Nature; when a human being faces the ‘Unknown’, he always tries to find out information about that ‘unknown’ on his own. The innate quality of human makes them do the topic on their mind. The quality of inquisitiveness is the mother of all knowledge generation as ‘necessity is the mother of all inventions’. The employed by a scholar to find out details of a topic is ‘research’.

Research methodology is a systematic way to solve a research problem. It is the way to acquire data on a given topic systematically. It helps a research methodology helps a research scholar to understand and study the various steps that are involved in his research and those are not reckless or rash but with logic behind them. It is not only necessary for a research scholar to know the various research techniques and research tools included his research but also the various steps and the research methodology.

Research scholars were supposed to know the mean, median, mode, average, standard deviation, Chi-square, t-tests, Pearson’s product moment ratio and all other statistics and statistical information; but nowadays this work of statistics is directly done on the computers by SPSS package software; so it has saved much time of research scholars who otherwise had to consume a lot of time on statistical calculations until recently. It the data is on small scale, the researchers can calculate easily on their own in lesser duration and get their scores needed.

The researchers must understand before they start the actual research the various assumptions, that are the bases of research techniques and they should therein apply the kind of technique relevant to their own investigation
at hand. It is true that some research techniques may not be applicable to their own research problem and other will apply. The researcher should not be ignorant regarding the research methods and research techniques they will apply to their research problem. It is necessary for the research to plan and design the way of his research. As an architect designs the map of a house, in the similar way a researcher has to plan and design his method of research.

Thus, methodology is not just a set of processes or methods but more than that: on the other hand, methodology means the philosophical, intellectual and psychological background that is the base of that typical research. Methodology is used to reason the properties of the domain under study. Properly planned and conceived methodology, provides a substantial, logical and fundamental approach to the reality of the research. It has to face so many peers and their critical analyses. Most of the sciences have their own systematic methodologies for research. They have their own scientific way of studies. There methodologies are even verified and proved valid for the sake of other reviewers satisfaction.

The scientific method comprises of certain techniques used for investigation and acquisition of newer knowledge and information or even for the correction or integration of the previous researches. That methodology is called as scientific if it is based upon empirical evidences and data that can be measured or proofs that can be collected observed or studied. The scientific method comprises of collecting data by observation and experimentation and also by formulating the hypotheses and testing them.

The methodology should be based upon objective processes so as to reduce prejudiced or biased analysis and interpretations of results. Methodology also comprises of proper documentation archives and also sharing the data; so that the findings of the research are also available to other researchers who conduct research on similar and related topics; its always good for researchers to allow others to verify their research and data and thus make their research available in the form of books or articles in journals of the subjects.

In view of the above, present study was carried out by using a quantitative method, which was clearly identified in view of the specific
objectives of the study. In view of the above, this chapter of the thesis presents details of the methodology followed in this study. Specifically, related with selection of subjects, selection of variables, collection of data, and procedure of administration of the tests.

In the present study, a careful collection of facts was undertaken by the researcher to ensure the validity of the facts. The present study was carried out in three steps involving reconnaissance, data generation and followed by interpretation of statistics. The present chapter deals with the methodology followed in this study.

3.2 Selection of Subjects

Players participating in State and National Level Wushu tournaments organized during the session 2016-2017 were considered as samples for the study. For the present study, Central India region, subjects were selected. A total of 300 (150 each who participated in State level and National level Wushu tournaments) subjects in the age group 21 to 30 years were selected. The area of research work was Central India (Vidarbha, Madhya Pradesh and Chhattisgarh). The samples were selected from different colleges and Wushu clubs of the study area. The subjects were selected using random sampling technique.

Criterion Measure

Based on physical and psychological aspects of the Wushu games, and the discussion with the experts the following variables were selected for the purpose of research.

Personality Factors

Physical Fitness Variables

i. Muscular Strength
ii. Muscular Endurance
iii. Speed
iv. Agility
v. Cardio Vascular Endurance

Sports performance
3.3 Research Design

A research design is an outline of research; a planning of research; a map of research. A research design means the strategies and techniques to integrate the various components of the research problem logically and coherently. A research is an assurance to get clear outline of the research beforehand. A research design constitutes of the blueprint for the collection of data, measurement of data and analysis of data.

In the present investigation a research design

- Exploratory
- Conclusive
  - Descriptive
  - Causal
  - Cross selection
  - Longitudinal

3.4 Primary Data Collection

The collection of the primary data can be done by a research through various ways like surveys, experiments, observations, interviews, visits to places related study and secondary data is collected through indirect information as in books, journals, research articles, papers and magazines etc. for the present investigation, primary data was collected with help of various related tests and measurement that are commonly utilized in the field of sports and physical education.

Instrument of Data Collection

i. The data was collected by using following standardized psychological test:

ii. Standing broad jump test was used to measure the muscular strength especially of the legs of the Wushu players.

iii. The pull-ups test was used to measure muscular endurance of the Wushu players.
iv. 50 yards dash sprint test was used to measure the speed of the Wushu players.

v. The shuttle run test was used to measure the agility of the Wushu players.

vi. 600mtrs run/walk test was used to measure the cardiovascular endurance of the Wushu players.

vii. For psychological testing the sixteen personality factor (16PF) test (Cattell) was administered on the Wushu players for collection of the primary data for the present study.

viii. Sports performance of the Wushu players was assessed using a structured questionnaire.

The primary data was collected from various cities of Central India. A written permission was taken from the authorized person of the College or Club prior to data collection. Prior to testing personality types and physical fitness of Wushu players were assessed manually. All the test items were conducted in two sessions (morning and evening). After the test of physical fitness the questionnaires for recording the personality type and sports performance were circulated amongst the Wushu players.

3.5. Personality

3.5.1 The Sixteen Personality Factor (16 PF) Test

Introduction of the test

Personality assessment has always been an area of interest to psychologists. In recent years, the study of the measurement of the personality traits of athletes has become a popular topic of sports psychology research. One of the goals of this research has been to ascertain the role of the athletes, personality in successful competition. So, the athlete’s personality has become important in athletic success. To know and understand the personality traits of players and athletes, the experts, researchers and psychologists proposed various kinds of personality development related measurement techniques. Most of the psychologist have studied individual traits, and contextual behavior of the individuals. An athlete with short temper and hot headed can get easily defeated at the hands of an intelligent and calm headed athlete in the boxing ring. The relationship between personality traits and various states that affect them are very much
studied topics in the field of sports and physical and physical education so as to set up standards for achievements of gold medals on every level and in excellent sports performance targets achievement.

During 1960s and 1970s more than 1000 sports personality studies were reported in various quarters of the globe but unfortunately with far from consistent results and conclusions. Some reviewers of sport personality research such as Martens (1975) came to the conclusion that general trait measures are worthless for the purpose of predicting relevant sport behavior. A contrasting viewpoint has been defended by Morgan (1980) who argues that existing research favorable to the hypothesis that traits are useful was excluded from those pessimistic reviews, and he presents optimistic evidence that, elite athletes display unique personality characteristics.

Research in personality offers several methods of assessing personality. Methods of measurement include (i) psychological inventories, (ii) observation, (iii) ratings, (iv) projective techniques, and (v) interviews etc. But the most frequently used method is that of psychological inventories in the field of sport psychology and athletic behavior. There are several inventories available today and many more are being developed. Many inventories seem, at least superficially, to measure the same traits. There are various personality tests and some sport specific personality tests available for measuring different personality tests available for measuring different personality traits of the sportspersons.

The sports psychology as a branch of education has originated from the subject of psychology. All the concerned tests and measurements of sports psychology are founded upon those of psychology. The sports psychology related tests and measurements are mainly due to various reasons like excellent sports performance of the highest and topmost level; the competitiveness that too a healthy perspective; to understand the opponents then and there; to maintain and conserve one’s own personality without hurting or injuring others. Sports field is no ‘war field’ it’s only ‘sports’ that are founded upon the global aims of sports of the UNICEF and not devoid of human values. Even in the field of research there are standards set up by the American psychological Association so as to avoid any unnecessary
conflict or friction since research is important above everything irrespective of caste, creed, religion or class.

The sports related psychological measurements especially the personality measurement supplies with more valid and reliable units of sports related data about the athletes of the study.

The 16PF (sixteen factor) questionnaire is an objectively score test device in psychological research to give the complete coverage of personality possible in a limited time. The sixteen factor test as made for the 16 and above age group individuals. Whose educational level is normal high school students and roughly equivalent to it. Form E is designed for individuals with marked educational and/or reading deficits. A separate manual for the 16PF, Form E, is available through IPAT.

The 16PF can be scored by hand or by computer, and various types of answer sheets are available for this reason.

Psychology of a person can be comprehended by measuring 16 PF dimensions. These 16 dimensions of personality were first published on commercial level in 1949. The dimensions are independent; select and significant psychological dimensions of personality are tested in it. The 16 personality factors have been administered in researches since more than sixty years in almost every field of education, medicine and engineering. The researchers who conduct the tests on their samples so as to collect primary data of their topic have to first practice them and get acquainted to them; yet it cannot be said everything they researched is 100% true. Since, it is just the possibility at that time and place that they found out to true; human life constantly changes by nature; understanding the behavior of their samples and foretelling about them will be best done since research on certain topics.

The 16 personality factors that are tested and measured by the 16PF are not distinct and unique to the test but they are true when it comes to study of personality in any situation. The test was developed after a ten years of thorough, in depth and analytical study and research. Since the time many changes were made in the 16PF scale and additions were done to it. The test was revised on majority level five times; supplementary scales of validity were incorporated into the 16PF.
For the sake of convenience, the dimensions of the 16PF are discussed briefly below. Each factor is described as per alphabetical order and its high low scores. Only one factor is measured in the scale at a time. The factors are not interdependent when the scale was developed at first. The correlations that are collected after measuring various personality factors on 16PF provide some kind of newer data about the samples being tested.

**The primary Source trains Covered by the 16PF Test**

The researchers must determine for themselves the applicability of any instrument to the solution of problems that they face. In evaluating the 16 PF, the essential elements professionals will wish to consider are:

i. That the test is embedded within the broader fabric or network of general psychological theory;

ii. That in its present form the test rests upon an empirical foundation of more than 36 factor-analytic investigations dealing with the 16PF primaries and at least 100 more analyses in which verification of the instrument structure occurred as a by-product of the main research thrust;

iii. That the psychometric properties of the scales (e.g., reliabilities, validities, etc.) have been explored and reported for a variety of samples and conditions; and

iv. That research findings involving the test (reported in numerous books and articles) provide the test user with a rich base of criterion, social, and educational psychology.

Some of these issues are treated briefly in this Manual. More comprehensive discussions of these and other important issues will be found in the Hanbook, in Cattell (1973), and in Cattell and Krug (1986). It is hoped that test users will consult these additional sources so that the decision to use the test in a particular situation will be based upon an informed, individual evaluation of the evidence presented. If, at first glance, this seems an unreasonable demand upon test users, they are reminded that this is one of the main reasons why psychological tests are restricted in use to qualified professionals. No test can be applied uncritically to the wide variety of behavioral experiences that have intrigued psychologists over the years.
It is very complex to understand a person from his outside appearance or his facial expressions. The feelings are such that many people show them and many other people just hide them. Other unknown people are ever unknown to strangers since feelings are not revealed easily; but many researchers just ask subjects to answer some introspection related questions; if the answers are truly given then only the people can be studied with the help of emotions. If answers given by the subjects are bookish then they may not be their real answers but only the answers influenced due to their studies. The feelings of people can be inferred by observing their outward behavior with other people around them.

There are many people who give real answers to the questions asked; if a person goes to the doctor and won’t tell the real answers, he won’t get any true medicine for his disease; the patient on the other hand may get a wrong medicine for a wrong disease. Is it the doctor’s fault? The true answers to the questions asked by doctors can only help him to prescribe a true medicine. This is with respect to physical pain or any other pain. If the person is a police officer it may be a different situation. In human beings society to extract the truth is the most difficult of all the things. Strangers are indifferent to the problems of strangers. A third person asking a question won’t easily get real answers. Emotions can’t be hidden; they find their way anyhow.

Emotions are raised if a person has felt the same kind in his past life. If an employee in an institute is faced with a threatening or dangerous situation, he may either handle it bravely and courageously if he feels self confidence enough that he can defeat his enemies and then proves his own capability. Thus situations should be studied quickly emotions must be kept stable to take firm decisions that are beneficial for most of the people and first of all to ourselves.

Emotions of players are aroused during a match and as per the spectators’ feelings but the true players have to concentrate more on their game than upon the audience its very much true that the audience motivates the players to won but over aggression and excitement and consequent rashness only makes the players get out of the playfield this is easily done by the minutely observant referees who keep a close watch on the players game
and any of the rules and regulations of the competition. The outward situation of the athlete creates excitement and emotions but it is only how the athletes face them is what's important.

The process which helps to read out or understand the potential or strength that motivates is known as emotion the process of emotion begins with a stimulus. A stimulus is activated and one gives a quick response emotion. Thus emotions are ‘the read out’ mechanics that carry on information’s about systems of motivation. In the Latin language emotions were known as ‘motus anima’ and the meaning of ‘motus anima’ was ‘the spirit that made one move’. Emotions are regarded as ‘deep’ and very much powerful. It was a traditional and conventional view that emotions are either negative or positive but this view is not anymore valid. On the opposite emotions are considered neither negative nor positive; emotions are the only powerful source of energy of many people.

The information provided by emotions every day is very much beneficial and vital. The knowledge and understanding of emotions ignites the minds of creative people and the result are put before the world in the form of their art. Emotions are helpful for social health and fitness of individuals, improves relations and maintains trusting relations; emotions are as inner mirror of one’s life; emotions can be helpful to develop and grow a career; they are an assistance to guide unknown things and ventures. Emotions are so powerful as save from disaster and ruin.

Expressing one’s feelings is very easy and simple. To understand where to express before whom and when to express one’s emotions are very important points related to emotions to become successful in one’s career and life. How to manage feeling and emotions to become a successful person? The answer to this question has given birth to the term Emotional Intelligence.

3.5.2 Emotional Intelligence

Motivates people to achieve their aims and objectives of life, Emotional Intelligence helps people to find out the potentials that they inherit; emotional intelligence helps people to activate their latent potential talents; helps people to understand their own innate strengths and think about those so as to grow up their own career or future. The knowledge of emotional intelligence helps
people to understand their own feelings and the feelings of their co-workers or colleagues whom they work with. The main aim is properly understand and answer the other people to get going in the institute. The energy generated due to emotions shouldn’t be misused but the people who can effectively use emotions for success in work are very rare so many people are tension and stressful at home and also at their office or work.

Emotional Intelligence consists of the ability to appraise emotions; to express one’s emotions clearly; to perceive and know one’s feelings correctly; the capability to generate emotions and feelings while they assist in clarifying one’s view and thoughts; emotional Intelligence is the capability to know and understand emotions; intellectual growth and emotional knowledge.

3.5.2.1 Emotional Quotient Vs. Intelligence Quotient

Intelligence generally means adjusting to various situations of life. Intelligence comprises of concepts like knowledge acquisition, reasoning and thinking ability, adapting to variegated environments and work atmospheres. It is traditionally viewed that intelligence means an ability to gather learning and knowledge. Nowadays, the traditional concept of intelligence means not just a collection of information and knowledge but manage emotions and feelings beneficially for the sake of best performance. Emotional Quotient is nowadays more popular in the management sciences academies and institutes. Emotions are very much necessary and the foundations of organization of thoughts and actions and its oddly true that they are indispensable and inevitable in reasonable and rational decision makings. Many complex and significant issues and problems were solved not only with the assistance of intelligence quotient but also emotional quotients. Very much important problems are solved in an excellent way and systematically with the help of Emotional Quotient and Intelligence Quotient and in lesser duration of time than in the olden ways. Players on the playfield are very much aggressive sometimes if the opposite side player defeats them when the match is still remaining; if a player is intelligent he uses his intelligence to recover points to win but he has to keep his emotions stable and remain peaceful in the face of defeat at first. it cannot waste hours and hours to make decisions. In the meetings the delegates go on hours to discuss important issues; there’s a
nonstop and continuous consecutive thinking and discussions that may take still more duration. Herein IQ along with EQ are of very much value to reach the final conclusions. It is only emotions that generate inquisitiveness and curiosity in the individuals; curiosity in turn helps to plan before hand a wonderful future and map plans of implementations accordingly.

In reality emotional intelligence helps to activate and enhance the intelligence quotient. The IQ and EQ have interrelationships with one another; this creates a kinetic tension; people may hang from one to another like a swing. Clever people make use of both with stability and constant decisions. There’s a competition amongst employees with relation to intelligence quotient. Some people may be more intelligent than others in the same work place. The IQ helps some people to work with speed and accuracy whereas for the same work others may take own time whole few others may get the work delayed and a good criticism from their boss. There’s emotional intelligence that gets work done quickly or many more times emotions may become hurdles in the completion of a work. It is a fact that employees should first of all understand and assert their own feelings and emotions which may be the most difficult thing to do by a person; if a person accepts that he’s angry in a typical situation then only he can try to overcome the feeling of anger and intelligently give importance to the completion of his work. But this requires a training and guidance.

Many times people have the same IQs yet some of them show better performance in work than many others; then what may be the reason? The obvious answer is their EQ was more than the remaining others. EQ helped them to score more. Emotions must be first of all acknowledged at the work; that there are feelings to be managed at the work place; then only an employee can manage them; through the help of emotional intelligence, better performance is always expected; what’s expected is a constructive and beneficial view point for many of the team and other related people.

IQ cannot be developed after a certain period of time in life but EQ can be developed on the other hand at any point of life. Many researchers were done only on the topic that who determines a person’s personality: his heredity or his environment? Personality is simply the sum of the physical and
mental traits of an individual that reveals him as unique or distinct from other people. Emotional Intelligence can be developed with training, learning and guidance. On the contrary intelligence quotient cannot be developed after a certain age.

EQ develops through day to day experiences too; people get all the more better through handling their emotions, influencing other people or group members, and become with the emotional intelligence. It is revealed by many earlier researcher of various scholars that people get better day by day emotionally and performance level improves since they can manage and handle their own emotions and those of others at their work place.

Goleman (1995) point out five characteristics features of ‘emotional intelligence’:

**Self Awareness**

To become emotionally literate is necessary nowadays to work at unknown work places. Knowledge of one’s own emotions and those of others may help to get the work completed faster. Emotions occur continuously if a person can understand the emotion on work on his mind, and also find out which it is out of the many means the person is emotionally literate; To understand the emotions of other people who may your colleagues at work or your team mates or the opposite side team members in fact very much significant for winning the match and excellent expression of the talents. Emotional intelligence comprises of clear expression of feelings to others; it comprises of the ability to inspire, motivate and encourage others to work or get an activity done; its also being compassionate, kind, sympathetic towards totally unknown and troubled people; who may get relaxed by words of kindness; emotional intelligence is the ability to take the responsibility of one’s own happiness or sorrow or any other feelings needs real courage but that is also emotional intelligence. Self motivation in the toughest situations of life is a real difficult context. To know and understand emotions, name emotions raised, causes of emotions and to realize the distinction between emotions and actions.
Mood Management

It’s real tough task to handle the feelings of defeat on the playground for players but they must anyhow do it for better sports performance and also to win the competition. The player should react properly in spite of the feelings of anger and excitement inside them. Anger and frustration, irritation and annoyance, hatred and resentment anyhow find their way outwards verbally or actions. A player may abuse use improper language if he is defeated and that won’t allow him to get entry into semi-finals even for that breaks the rules and regulations of games; Abusive language to expression the emotions of anger hatred and resentment on the playfield won’t help to solve any problem or recover the lost score; it will on the other hand become hurdle into intelligent decision making during that match; Quarrels and fights are ways to express the anger, hatred or resentment; but that may hurt and injure not only that player but other players too and the happiness of the match gets obstacle. The emotional management is a necessary prerequisite for reaching the world level matches; its always good to manage anger and hatred; avoid any sort of violence on the playfield since it’s not any war field. There are extreme feelings of hatred, repulsion, disgust yet one cannot stay with that kind of feeling for more duration since it’s not health and beneficial for even one single person. On the other hand, one single person hurts many others and brings hurdles in their daily routines and schedules. Hence management of one’s mood is positively profitable to the other family members, to the team mates, coaches and guides and colleagues. Being positive about one’s own potentials never lets a person down in any difficult situation.

Self Motivation

Its very difficult for athletes to get up, make up their minds and go to the playfield to practice their game and too in continuation. All the more difficult when it comes to kick boxing wherein the bruises, wounds and scars and soft injuries only make their minds say rest for a day more. Its always tough to keep mind on the planned goal. If there is doubt, laziness and inertia, and impulsive behavior, its real tough to get on becoming more responsible and dutiful since the athletes have to tolerate and endure more. It’s always better to pay heed to the tasks in hand that is to say, the athletes need to
practice the planned activities as per their schedules each and every day without lesser number of gaps and breaks in them. The PF scores will then only be of better self control and improves scores could be seen of performance and achievement.

If a person is very much sad he has to make himself forcefully happy; to make the mind happy he has to remember compulsorily or forcibly the happiest events of life that he has to motivate and encourage himself since there’s no one to praise him! If a player wins a point in a match of volleyball, he gets immediate applause from the audience; later his friends, parents, relatives, elders, teachers, guides.

**Empathy**

It’s hard and difficult for novice players to understand and recognize feelings of strangers players, if they are not social upto the average level or experienced. It’s real tough to transform the feelings and emotions of others into words or actions. Empathy is a potential talent in athletes since they can easily recognize other people’s perspective, they are sensitive to the problems of others or even their feelings at that time. The players with empathy can better listen to others so as to understand them. Players who are by nature amiable, sociable, friendly, helpful, openly in expression of feelings, pleasant and agreeable to others, good colleagues and companions. Other members of the team like them and they are popular and problem solving by nature. In other words, the persons with empathy have superior emotional and social fitness in dealing with members of their team or society or even strangers. Their interpersonal development is just rewarding, gratifying and beneficial to them. It’s also a source of joy and happiness as well as financial gains to them.

**Managing Relationship**

The coaches and trainers have to manage relations everyday of their job. Hence, they have to be well trained in managing a inter personal relations resolve situations of quarrels and conflicts; and negotiate; when there are frictions and disagreements over some issues; the referees and umpires have debates over following or disobeying of rules of games by athletes; they also have to give point; thus, they need to be problems solving by nature; they are
talkative and experts at communication wherein problems are solved quickly. To manage relations the necessary qualities are to be outspoken, outgoing, helping and friendly by nature, smiling, having friend circles, humorous nature, considerate, caring, kind, by nature; co-operating and sharing; peaceful and harmonious; understanding people as they are and democratic.

Barratt, propounded that impulsive behavior of persons is a personality trait. There are numerous and variegated diverse factors responsible for impulsive behavior of people and analytical researches on the same have proved this fact. As per Twain, four factors are responsible for impulsive behavior: tenacious self control, flexible motor control, self action orientation and positive ideas of progress and development. Twain’s research was proved by life experiences, measurement done in laboratory on behavioral aspects of persons and measurements of physiological variables.

In the year, 1965, Barratt identified six factors responsible for impulsive behavior in persons. There are six factors are represented in the form of subsets of Barrett impulsiveness scale. The six impulsiveness factors of Barrett constitute of motor control, risk taking, intra-individual (variability) impulse interests, cognitive impulsiveness control and impulsive interpersonal relationships. Barrett point out that the factors that he invented were similar to factors of Twain.

They include motor control, intra-individual, (variability) impulse interests, risk taking, impulsive interpersonal relationships and cognitive impulsiveness control.

It was long felt need that no appropriate personality measure was available in English and Hindi language which may assess the personality characteristics of the Indian people for 12+ years in simple spoken and understandable Hindi or English language. Therefore, many foreign tests were being blindly used for assessing various personality traits on the basis of different personality conceptualization and dispositions in this country. In India, Sen (1966) and Joshi & Malik (1982) had developed their personality measures on the lines of M.M.P.I. Sen (1966) had developed his ‘Personality Trait Inventory’ in English language with 120 items representing eight areas and this has been used in a number of researches, notably by Prasad et al.
(1974), Rastogi et. al. (1976), Verma et al., (1990a), however, the Hindi translation of this PTI was made by Mohle (1966) and Verma et al., (1990b).

With this theoretical background, it was self necessary to construct a personality measure on the basis of dimensions and items are very much suited to a common person. The test is devised with this uniqueness that it is applicable to normal person aging from 12+ to any age limit of either sexes.

Several traits together constitute a dimension of personality which helps us in making distinction among persons, considering this assumption, Singh and Singh (2002) have developed 'Singh’s Differential Personality Inventory which measures ten dimensions of personality- selfconcept and dominance, egostrength, friendliness, emotional stability, decisiveness, etc.

Dhar and Jain (2001) have also devised a personality measure namely Type A/B Behavioural Pattern Scale (ABBPS) where type A measures factors like tenseness, impatience, restlessness, achievement, domineering and work alcoholic and type B assesses factors like complacement, easy going, non-assertive, relaxed and patience.

The general theory of personality from which the 16PF was developed, however, anticipated their demands along certain major dimensions. Thus, for example, related scales are available to measure primary source traits below the adult age range for which the 16PF is intended. Special – purpose tests have been devised to measure only one secondary trait, such as anxiety or extraversion, when the psychologist wishes to focus and intensify his measurement in this fashion. Similarly, the Clinical Analysis Questionnaire was developed to augment the power of the 16PF in clinical usage by adding 12 scales, substantially pathological in nature, to the 16 normal scales. Translations of the 16PF into more than 40 languages and adaptations for five other English-speaking cultures are also available to facilitate international comparisons.

Most people think of an extravert as being the life of the party and the introvert as the quiet book worm. These descriptions are far too simplistic and don’t really help us to understand ourselves. Here’s how I like to think about extraversion and introversion.
People who are high in extraversion tend to seek out social stimulation and opportunities to engage with others. These individuals are often described as being full of life, energy and positivity. In group situations, extraverts are likely to talk often and assert themselves. Introverts, on the other hand, are people who are low in extraversion. They tend to be quiet, reserved and less involved in social situations. It is important to note that introversion and shyness is not the same thing. People low in extraversion are not afraid of social situations, they simply prefer to spend more time alone and do not need as much social stimulation.

**Common Extraversion Traits**

Extraversion is often marked by a number of different sub-traits. Some of these include:

i. Warmth  
ii. Seeking novelty and excitement  
iii. Gregariousness  
iv. Assertive  
v. Cheerful  
vi. Talkative  
vii. Enjoys being the center of attention  
viii. Action oriented

**Extraversion and Behavior**

How does extraversion impact our behavior? Researchers have found that being high in this personality trait is linked to a number of different tendencies. In addition to contributing to our personalities, this trait may also play a role in the type of career that we end up choosing. According to researchers, extraversion is associated with leadership behavior. Since extraverts are more likely to assert themselves in groups, it makes sense that these individuals often take on leadership roles when working with other people.

Research has also shown that extraverts are less likely to experience anxiety over negative feedback. Those high in extraversion are often described as having a very positive outlook on life as well as being friendly, energetic and highly adaptable. All of these tendencies can serve a person
well, particularly in certain social situations. As one might imagine, high levels of extraversion can be particularly well suited to jobs that require a great deal of interaction with other people. Teaching, sales, marketing, public relations, and politics are all jobs in which an extravert might to well. Introverts prefer less social interaction so jobs that require lots of independent work are often ideal. Writing, computer programming, engineering and accounting are all jobs that might appeal to a person low in extraversion.

With this brief statement of design and purpose as a background, the test user can proceed to the remaining sections of this Manual that deal directly with administration, scoring, and interpretation of test results.

(i) Activity-Passivity Trait – The individual is energetic, active, enthusiastic, alert, regular, persevering, constant, busy, attentive for longer duration, concentrating on the one hand but inactive, dull, lazy, slow, indolent, inert, dominant, passive, delaying, irregular, deviating from work, unwilling, unstable on the other hand. Higher score on this dimension shows Activity trait of one’s personality whereas lower score tends the passiveness of an individual.

(ii) Enthusiastic and Non-Enthusiastic Trait – Enthusiastic trait represents, “the tendency to be happy – go – lucky, warm hearted person, social outgoing, enjoying life, witty, open hearted, fond of being in company of others, loves enthusiastic and courageous work, ability to move persons for various functions”. This is indicated the cyclothymic temperament and higher score indicates the greater tendency. On the other hand, lower score indicates i.e., non – enthusiastic trait expressing, “shyness, cold, slow spoken, inhibited, reversedness, keeping aloof, non-participation in various functions, feeling difficulty to contact other people, and it is known as Schizothymic personality”.

(iii) Assertive-Submissive- Individuals with assertive submissive traits are bold, straight forward, independent by nature, dominant, have leadership qualities, convincing main persons in tough times, whereas submissive persons aren’t always bold and brave but keep their own views and ideas to themselves due to fearfulness and inferior feelings; that may be hampering to the progress since if their ideas were problem solving they were opened up before their leaders whom they regarded as always right. If the leader had taken a wrong decision on a certain date these people had kept more even
when they knew the true solutions, there are only losses on both sides and nothing to gain. Subordinates and under officers would never grow up to be leaders if they kept forever in-front of their officers. It’s only time, experiences that helps to transform subordinates into officers.

(iv) Suspicious-Trusting-High score shows the paranoid tendency of the individual which is reflected in his suspicious nature about others, apprehensive, having no faith in others, blaming others for his failures and non achievement, feeling misconception of people about himself and feels that others are jealous of him and want to harm him, whereas low score tends to trusting trait of personality which does not have any such paranoid tendency. This positive dimension of personality is characterized by accepting conditions easy to get on, free of jealous tendency with others, adaptable, cheerful, uncompetitive, a good team members, realizing own weaknesses and faults.

(v) Depressive-Non-Depressive-High score on this personality trait indicates feeling of helpless, hopeless, depressed, unwanted, feeling of inferiority, worthless, unloved, highly frustrated, lack of self confidence, sad on misdeeds and mistakes done in the past, jealous about others happiness, restless and full of tense; Whereas, low score tends to be non-depressive characterized by relaxedness, unfrustrated, composed and satisfied.

(vi) Emotional Instability and Emotional Stability - The high score on this personality trait indicates Emotional Instability where individual is emotionally less stable, easily annoyed and upset, low frustration tolerance, high anxious and worrying, fearful, sensitive, touchy, given to mood swings, depressed and sad whenever confronted with stressful situations, having neurotic symptoms like phobias, sleep disturbances and psychotic disorders. The low score is indicative of emotionally stable trait of the personality where person is with full control over his emotional expressions, stable, mature, realistic life situation, ego strength, high level of adjustment with unsolved emotional problems.

The answers of three alternatives are provided for each questions, since the two-alternative “forced-choice” situation, forbidding any “middle – of – the – road” compromise, tends to force a distorted distribution and may produce aversion to the test on the part of the examinee. This is particularly
the case with adults of average or higher intelligence for whom Forms A, B, C, and D are designed. With children, or with less intelligent, less competent, or culturally deprived adults, a two-choice design appears better, and such a design is used in the “low – literate” scales of the 16PF constructed for use with such populations.

To the layman, the Intelligence Quotient is not identified with a particular type of score on a particular test, but is often a shorthand designation for intelligence. However, a more precise approach to the context yields a number of definitions for the term.

One group of definitions lays emphasis upon ecology that is how an individual’s adapts to his new environment. As per ecological definition of intelligence, it is mental adaptation ability of individuals to newer situations or problems of his life. It is the ability of individuals to understand and recognize their own behavioral patterns and behave more behavior to act more influentially in newer situations of their life. Thus, intelligent persons easily change their behavioral patterns as per the demands, needs, or conditions of their life; overall the intelligence means easier and effective ways to improve upon one’s behavior as per novel contexts; thus, the intelligent individual gets varied and numerous responses from other peoples of newer areas and they are also able to express this in creative way for their own benefit, and that of others benefit.

Another kind of definition of intelligence is the capacity and ability to learn newer things. A person’s intelligence is his readiness to learn and get himself educated. An intelligent individual readily learn and also extends the same; hence his experiences are extensive and vast. Many researchers define intelligence to the ability to think abstractly. That is to say individuals can utilize the abstract concepts in dealing with reality or real life situations. In simple words, they can make use of subject knowledge in real life for their own benefit. It is obvious that these definitions are mutually interchangeable and exclusive.

‘The capacity to form concepts and grasps their significance’. ‘All-round thinking capacity’ or ‘mental efficiency’ (Vernon), innate, general cognitive ability, (Binet); ‘grasping the essentials in a situation and responding
appropriately to them’ (Helm); ‘adaptation to the physical and social environment’ (Piaget).

An operational definition proposed is that intelligence is what intelligence tests measure. Vernon (1960) and Guilford (1967) discussed the biological, experimental and psychological, developmental and operational approaches to the study of intelligence. Many argue that intelligence is not the same as other psychological terms like ‘learning’, ‘thinking’, ‘problem solving’, ‘attainment’, or ‘achievement’ (e.g., Turner, 1977). Some feel that these terms are not qualitatively different and to great extent overlap (e.g. Humphreys, 1971; McFarland, 1971).

E.L. Thorndike has divided intelligent activity into three types:
a) Social Intelligence, or ability to understand and deal with persons;
b) Concrete intelligence, or ability to understand and deal with things as in skilled trades and scientific appliances;
c) Abstract intelligence, or ability to understand and deal with verbal and mathematical symbols.

The merit of this classification of types of intelligent activity, for psychological testing, is that it indicates several realms in which persons might be functioning and implies that separate and sufficiently specialized tests might be devised to measure how effectively persons are functioning in each.

An interesting aspect of intelligence which has been a focus of a great deal of attention is the ‘structure’ of intelligence. Various theories have been proposed.

Thorndike’s multifactor theory of intelligence is at one extreme of the interpretations regarding the nature of mental organization. According to this intelligence is said to be constituted of a multitude of separate factors, or elements, each one being a minute element of ability. Any mental act, according to this theory, involves a number of these minute elements operating together. Other mental act involves a number of the element in combination. Thorndike’s theory has been said to be an “atomistic” theory of mental ability. (Freeman, 1965).

Opposed to Thorndike’s theory of the nature of intelligence is
Spearman’s two factor theory, which stands at the other extreme of interpretations. Spearman called this factor as mental energy. According to Spearman, all the intellectual activities are primarily dependent upon mental activities; intelligence is an expression in common of mind. They concluded that the principal distinguishing characteristic of tests highly “loded” with general factor (g) is that they require insight into relationships—what he called “the education of relations and correlates.”

Thurstone concludes that mental actions in general have a common factor which is responsible for their functional as well as psychological unity; the common factor also distinguishes various mental operations from one another. These mental actions are commonly called as a group.

The two factor theory has been criticized by statistical psychologists, notably G.H. Thomson and L.L. Thurstone. Thomson offers a sampling theory to explain the same tables of inter-correlations. Briefly, his view is that the coefficients of correlation are the results of common samplings and combinations of independent factors. The number of common independent factors utilized by two tests will determine the coefficient of correlation between these two.

Over the years a growing interest has been manifested in the concept of social intelligence. It has been highlighted that in various fields today the capacity of the individual to interact emphasis placed on interpersonal relationships in various work environment is itself a reflection of the importance of social intelligence.

The problem of understanding the behaviour of people in “face-to-face contacts”, of “empathy”, of “person perception”, and of “social sensitivity”, and problems of influencing or managing the behaviour of others have been recognized for a long time, but little systematic work has been done on basic understanding of those phenomena. E.L. Thorndike (1920) had pointed out that there is an aspect of personality that can be called “social intelligence”, distinct from “concrete” and “abstract” intelligences. Guilford (1958) suggested that social intelligence could be accounted for as a fourth category of information. It carries the implication that there are 30 abilities involved in social intelligence as specified by structure of Intellect (SI) theory, six abilities
for dealing with different products of information within each of the five operation categories.

There are some persons who actually seem to thrive on stress instead of letting the stress wear them down. Such persons are called hardy personality, a term first coined by Suzanne Kobasa (1979). Hardiness is a style of personality. It has characteristics features of control, commitment and perceiving problems as challenges. Hardiness is not alienation from group members or powerlessness or viewing problems as threats (Santrock, 2006). Psychological hardiness constitutes of three important features:-

a) Sense of commitment:- the inclination to get involved truly in whatever one faces at work place. Hardy people have commitment towards their, values and beliefs, work, family, duty and life.

b) The second characteristic is the belief in control; it’s the sense that ‘I can make events happen in my life’, e.g. ‘I can win a gold medal in the next Olympic games’. ‘I have power over the environment and atmosphere of my home, work place or anywhere I go’. For a household woman would like to say ‘I want my homely environment to be loving, caring and full of warmth amongst the family members’. For a coach, ‘I want my environment to be peaceful and harmonious as to get maximum output from the players in every session of training’ and so on. Thus, hardy people always feel that they can make things happen as per their own personal aims and objectives in their lives.

c) The third important component of Hardiness is challenge. It’s the preparedness, readiness, willingness to undertake control over newer environments and newer change at work in life or in family or in society; to avail all the opportunities that provide for and add to economic growth and economic progress along with progress in other aspects of life. The hardy minded people are unique and different from no hardy people altogether. Wherever any problem crops up, hardy people won’t look it as any threat or difficult but as a challenge to be faced and won ever. Inspite of unpredictable or unknown things, yet the hardy minded people interpret the situations different way and don’t get frightened easily but the challenge gets answered easily but the challenge gets answered through them.
Kobasa (1979) conducted her initial study in which she studied 670 male executives who had identified stressful life events as well as symptoms of illness they had suffered in the preceding three years. Subsequently, she administered personality questionnaires to 200 executives who had ranked high on both stress and illness as well as to 126 who had equally stressful life events but few symptoms of illness. Her results revealed that high stress / low illness male subjects were more immersed in their work and had a better performance. Not only his such people enjoyed challenge and demonstrated a greater sense of control over events than the high stress / high illness executives. About two years later, Kobasa et al. (1982) observed again the same executives. The high stress/low-illness group remained healthier and retained their characteristics of commitment, challenge and control, which were jointly named as psychological hardiness.

Since Kobasa’s initial study many researchers have reported that good physical health and good mental health is related to hardiness (Nowack, 1989; Wiebe & McCallum, 1986). Hardiness may also help mute cardiovascular responses to stress (Contrada, 1994).

Thus, there are two important ways by which a hardy individual may avoid the illness that potentially stressful events can cause: One way is by transmitting these events into less stressful ones and second, by selecting successful coping strategies for dealing with stress.

Avoidance of Motivational Distortion Effects

Questionnaires are often, justifiably, considered susceptible to distortion and deliberate faking. Test construction is aimed to minimize this; but it is also the responsibility of the examiner to neutralize such tendencies as far as possible. It is important to develop good rapport, and to let clients see that the test can best contribute to their own benefit if they cooperate with frank reports. Actually, items have been chosen to be as “neutral” in value as possible to emphasize both desirable and undesirable aspects at both ends of each factor scale. Furthermore, items which are not “face valid,” i.e., which do not obviously refer to the trait but which correlationally are known to measure it, have been chosen wherever possible, as a “built-in” protection against distortion. In any case this questionnaire problem is probably not so serious
as its frequent discussion might seem to indicate, since the psychologist or
counselor is most likely to use the test in those situations where clients fully
realize that accurate results will contribute to their own welfare. If time is taken
to make sure that the people tested understand the importance of careful and
truthful response, a long step toward achieving good measures has been
taken.

**Identifying Distortion with the 16PF**

Additional safeguards have been built into Forms A, C, and D of the 16
PF. At the present time, three supplementary validity scales for Form A, 1968
Edition, of the 16PF have been developed and sufficiently well established to
be of clear benefit in identifying the most common distortion patterns among
clients. The three scales are Motivational Distortion and Random responses.

The nature of the “faking good & faking bad” scales of 16PF, are
discussed in “A Goal use of the 16PF” by Karson and O’Dell in 1976.
Basically, faking good refers to an attempt on the part of the test taker to
make him/herself look as socially favourable as possible. Faking bad implies
the opposite tendency. These two scales have been fully normed and are
included as a part of the interpretive reports that are available from the IPAT
Test Services Division. For individuals using the hand-scoring answer sheet
for Form A, IPAT has also developed a special handscoring stencil that
includes the norms and appropriate profile correction patterns to be applied
when distortion is evident. Complete information on the norms and corrections
for distortion may be found in “Further Evidence on 16PF Distortion Scales,”

The Random Scale, which is slightly more difficult to score, consists of
a series of items that were infrequently chosen in response to the standard
16PF, Form A, questions. A Complete description of the items comprising the
scale and the research involved in their selection is reported in the Karson
and O’Dell book mentioned above. In addition to using this Random scale,
obvious response patterning or sabotage can often be detected by simply
examining each answer sheet prior to scoring.

Form C & D of the 16PF, which are frequently used in occupational
selection work contain a single motivational distortion (MD) scale. The nature
of this scale and its applications are discussed fully in the Handbook for the 16PF and in Tabular Supplement #2 to the 16PF Handbook, which contains the norms for Forms C and D.

**Reliability**

Reliability is a general term that describes a class of statistical techniques addressing the precision of a scale. While there are many ways to estimate reliability, the test-retest method seems especially appropriate. With this method, the 16PF is administered to a sample of people on two separate occasions; the correlations between the sets of scores from the two administrations are the reliability estimates. It is useful to make a further distinction in test-retest reliability, based on the time interval between test and retest. If the interval is short, from an immediate retest to a delay of two weeks, the dependability of the scale is being evaluated. Since personality traits are not expected to change (i.e. assuming no intervention) in such a brief interval, departures from perfect reliability reflect inconsistencies in the scale as well as in the individuals under study. Should the interval between administrations be long, from several weeks to several weeks to several years, the reliability is called the stability of the scale. Here, the test-retest reliability not only reflects errors in measurement, but also real changes that occur in the trait being measured. As a consequence, there will be less agreement between test and retest.

The short-interval reliabilities are mentioned in the test manual; the long-interval reliabilities of the second-order and selected composite scales. These values were estimated using the procedure. Overall, the average of short interval reliability for Forms (A+B) is 80. Similarly, the average long-interval reliability is 78. For Form A alone, the averaged short interval reliability is 80; the long-interval reliability is 52.

Another way of looking at the precision of the 16PF scales is to calculate the SEM i.e. Standard Error of Measurement. This provided an indication of the error made when an actual (i.e., observed score) is substituted for the theoretically meaningful (but unobservable) “true” score. Thus, the SEM defines a theoretical range of scores within which the person’s “true” score lies. As a practical matter, the higher the scale’s reliability, the
narrower this range of scores will be. Making use of the average short interval reliability of .89 (from A+B), the SEM equals .89 (the range of SEMs is from .63 to 1.34).

The manual contains the equivalence coefficients between various forms of the 16PF. These values indicate the extent to which there is agreement between the different forms. The forms of the 16 PF should not be thought of as alternate or parallel forms. Rather, they are better thought of as extension forms. That is, the four forms, A through D, comprise the extended 16PF assessment. Each form by itself is a component of this extension. This format enables greater flexibility in administration, allowing the professional to determine what form (s) to administer that maximize(s) the reliability and validity of that particular assessment. One major benefit to this design is that one can balance the critical factors of assessment time and reliability/validity. As a practical matter, if an assessment employs a retest component, the same form(s) used in the first administration should be used as the retest.

Validity

As the Standards (AERA/APA/NCME, 1985) point out, test validation is the process by which evidence is accumulated to support inferences that may be drawn from a test score. Various types of evidence may be produced, depending on the type of test and the purposes to which the test scores may be put.

In the case of the 16PF, there are two important classes of evidence that need to be considered. The first validity known as construct validity focuses on the degree up to which the scores of the test correctly measure the underlying traits which were developed for measurement whereas the second relates the external outcomes such as success in a job, performance in school or response to treatment. This is a type of validity related to certain criterion.

It’s a real difficult task to set up the construct validity of the administration of test and measurement in the sports field. Relationships between the test score and other measures of the same construct must be examined to see whether they show the hypothesized structure.
The 16PF was developed to measure a core set of factorially independent personality traits. These factors represented primary dimensions of the universe of words available in the English language to describe personality. The first issue, related to the construct validity of the 16PF, is the extent to which the test itself is faithful to the original factor model.

Cattell and Krug (1986) provide a comprehensive review of studies that have attempted to verify or cross validate the structure of the test. The verdict of dozens of studies involving many thousands of people sampled across many different demographic parameters and cultures is the test is valid with respect to its constitution and base. A series of empirical tests and exam of the 16PF (and related tests in the 16PF series) show that the number and nature of the elementary dimensions of personality tapped are consistent with the original model.

In terms of criterion-related validity, it is important to note that the test has already been widely utilized in variegated of research. These results have been reported in several thousand different publications in the professional literature. There is not a convenient summary of this literature because of its sheer volume and because new articles appear constantly. However, the Handbook is an important reference that summarizes many of the findings, especially those that appeared during the first 20 years the test was in use. The 16PF research Bibliography is a second important reference work that provides an index to much of the research between 1970 and 1975. And, the bibliographies included in this Manual guide the reader to other original sources in which the criterion-related validities are presented for the 16 PF scales.

From an information point of view, a multidimensional questionnaire, such as the 16PF, should measure its construct without a great deal of overlap among its other scales. In the case of the 16PF, correlations among the primary scales are explained on the second level order wherein the primary measurement scales are combined and connected to draft broader traits of personality, such as Extraversion, Anxiety, etc. However, to the extent that each scale provides information that is non redundant with the other scales, that questionnaire is likely to be more “efficient.”
C. G. Jung observed two kinds of individual differences as per human psychology some persons are introverts where some of them are extroverts. Introverts are those who can be called as mindfuls always in their own world of fantasy and imagination and own thoughts; they are thoughtful; extraordinarily talented scientists and scholars who are always engrossed in their research work are introverts; the extroverts are those individuals who appear to be talkative more social and always surrounded by friends; extrovert can’t live without friends for even a second; leaders, teachers, professors, whose jobs compel them to be talkative are extroverts. In many sports, introverts persons are talented wherein teams aren’t needed. Introverts are meritorious chess players, swimmers, cyclists, athletes, badminton players but extroverts are found to more successful players of football, hockey, volleyball, basketball, cricket etc. wherein co-ordination among team members is very much important. Introverts don’t seem to participate actively in the outside world but lead their own inner life. The extroverts on contrary are ruled by objective information and data. These traits may be termed as socially introverts persons who are shy by nature and don’t easily mix up with others. He avoids social situations, excitement and strong stimulation. The extrovert people who ponder meditate or think and always engrossed in one thought or another is responsive rather than reflective. He is more sociable, more out-going and more active. Thus introversion involves a focus upon the self degree; extroversion, a focus upon objects and individuals external to the self. Factorial studies have pinpointed five traits characterizing introversion. People who have omitted mistakes and feel guilty for the same may tend to become introverts. People who are happy go lucky may be introverts. They are carefree tempered.

Research studies reveal that personality of individuals switches between introversion and extroversion people are not forever introverts nor always introverts. It’s always best for the coaches to establish a harmonious relation with the examinees or athletes.

Jung, however, did not assert that human beings could be divided into these two types. No person is wholly introverted or wholly extroverted, rather he carries both possibilities within him. Some are dominated more by one
tendency than the other. Some people who face ups and downs in life may have to face mood changes they become introverts. The present inventory, therefore, aims at studying whether an individual is predominantly extroverted or predominantly introverted or falls somewhere in the middle of the continuum. The inventory has been designed for application to Hindi knowing adults.

Although the test can be virtually self-administering, examinees, whether tested individually or in groups. Further, it is good to reinforce the instructions by orally reiterating that the examinees will, in the long run, be doing themselves most good by being frank and honest in describing themselves.

To the trained psychologist, the importance of this brief but intimate talk with the client cannot be easily exaggerated, for the creation of a favorable test-taking attitude is worth as much as or possibly more in the production of accurate data than any number of “lie” or “correction” scales. If there is serious doubt of the client’s correctness of response, it may be well to reconsider the program in terms of introducing objective tests as in the O-A Battery. Some demonstration of the degree to which distortion can be reduced in a potentially uncooperative group by appropriate instruction has been demonstrated by some significant lowering of average scores of a large client group upon the “MD” (motivational distortion) scale of the 16PF, after good rapport was obtained.

**Detailed Instructions**

Answers should always be made on a separate answer sheet, never in the reusable test booklet. Two types of answer sheets are available for use with the 16PF: machine – or hand-scorable. Machine-scorable answer sheets are most frequently used by individuals who wish to send the completed answer sheet to IPAT for one of the many interpretive reports that are available. Hand scorable answer sheets are used most frequently when the examiner wishes to do the scoring and interpretation independently, or where there is a need for immediate score feedback.

In either case, begin by having the examinee provide name, sex, age, and form in the appropriate spaces provided on the answer sheet. The
The examinee should read all the instructions given on the cover of test booklet and respond to the examples in the appropriate area on the answer sheet. It may be desirable to read the instructions aloud with the client or to discuss certain points. The examiner must be the judge of the best way to get across the instruction to the examinees in each particular situation. About five minutes should be allowed for reading the instructions and working the examples, or less if less time seems sufficient. Then say, “Turn the page and begin.”

The test is untimed, but it is good to remind examinees of the typical testing times and that they should not dally, but should give immediate answers and move along. In group tests, if one wishes to avoid a long wait for stragglers, it may be helpful to interrupt after about 10 minutes. It is not at all necessary to spend time in pondering too much over one particular question since there are too many to answer within first natural response that comes to the mind of the subject should be recorded. It is also good to look around and correct early any improper ways of indicating answers that might later cause difficulty in scoring. Make sure that names, sex, age, and form have been filled in before collecting answer sheets, and especially that one, and only one, answer is given for each question on the test.

**Principles and Mechanics of Scoring**

The 16PF can be either computer scored or hand scored with a set of scoring stencils. A more detailed discussion of computer scoring and interpretation services for the test may be found in Section 6 of this Manual. Regardless of which method is used, each answer sheet should be checked to make sure that there are no odd, unscorable responses, e.g., marking two out of three alternatives, making in-complete erasures, or entirely omitting a response to an item. If such misunderstanding of instructions has occurred, the examinee must go back and do the affected items correctly.

The score of every answer was 0, 1, or 2 point except the factor B (conceptual ability) answers. The factor B score was either 0 or 1. 0 for incorrect and 1 for correct. The score of one question contributed to only one factor at a time.
Hand scoring the 16PF

A complete set of scoring materials for the 16PF hand-scorable answer sheet consists of a set of scoring keys, norm tables for the appropriate test form(s), and a profile sheet for each answer sheet to be scored. In addition, use of a special worksheet for calculating second-order factors and selected criterion scores is strongly recommended. A discussion of the use of this special work-sheet and the scores obtained can be found in Section 8 of this Manual.

Detailed instructions for obtaining raw scores for the 16PF are provided on the scoring keys. Each of two stencil keys scores half the 16 primary scales. Depending on which form is used, the availability of distortion scales will be discussed on one of the keys. Scoring begins by fitting and aligning the first stencil key over the answer sheet and counting these score that is visible through the holes meant for factor A allowing either 2 or 1, as is indicated by the marks adjacent to the holes. Add the scores and enter the sum in the space that indicated by arrow on the stencil for Factor a (raw score); but note that Factor B (intelligence) is peculiar in that each correct mark visible in a hole gives a score of 1 only. Continue scoring each factor on each scoring key until all raw scores are entered in answer sheet at extreme right hand side. The raw scores are now ready to be converted to standard scores (sten scores) and the results profiled for easier review and interpretation.

Converting Raw Scores to Sten Scores

The meaning of raw scores from any form or combination of forms of the 16 PF depends, of course upon the particular forms used. Consequently, before these raw scores interpreted and evaluated they convert into a system. The standardization tables convert raw scores to what are called stens, a practice consistent with best modern usage, aiming at a good, but not unrealistically refined degree of accuracy in expression of results.

Standard Scores

Sten score the term derived from ‘Standard Ten’ are distributed over ten equal interval standard score point, assuming normal distribution, from one to ten. The population average or mean for a sten distribution is fixed at 5.5 and standard deviation is 2.0 sten scores. The exact limits of sten 5 and 6
i.e 4.5 – 6.5 extend, respectively, a half standard deviation below and above the mean, constituting the solid center of the population, while the outer limits of sten one and ten are two and half standard deviations below and above the mean. One would normally consider sten score of four through seven to be average, since they fall within one standard deviation of the population mean and therefore represent approximately two-thirds of all the obtained scores. Sten scores of one, two, three and eight nine ten are generally considered to be of greater importance for profile interpretation since they are more extreme and occur far less frequently in a normal population.

Validity Scales

The fact that virtually all individuals bring with them certain test-taking attitudes or concepts to a testing situation is well established. As discussed in Section 2 of this Manual, distortion scales have been developed and standardized for the 16 PF. Before proceeding to the conversion of the raw scores, it is necessary to determine if the scores for the distortion scales indicate the presence of any significant distortion. Normative information for the distortion scales and suggested corrections are provided in the norm tables for the 16PF. The sten scores for the distortion scales should be recorded on the 16PF profile sheet along with any appropriate corrections to be applied to the primary factor (A through Q) sten scores. Having completed this procedure, the psychologist may proceed to select the relevant norm table(s) for the 16PF.

Profiling the 16PF Sten Scores

In the process of converting raw scores to sten scores by hand, the psychologist will find it convenient to use the 16PF profile sheet to record all the relevant information. When all scores have been converted to stens, the psychologist will find it useful to create a graphic, called a profile. Simply mark the appropriate sten score for every factor on the 16PF profile grid and connect the scores with a series of short straight lines. This profile presentation of 16PF data is considered by most to be extremely helpful in interpreting the scores.
Norm Tables

The available selection of norm tables permits the conversion of any given raw score (as obtained from the application of the scoring key) for any of the 16 personality factors to stens. The tables cover the general adult population and various subsamples, with various tables for individual forms and for frequently encountered combinations of forms. Selection of the most appropriate norm group is usually based on the age of the examinee or current membership in the specific norm group.

Design and Description of the Standardization Sample

Test constructors realize that general adult standardizations are the most difficult to obtain; but in this case, a substantial attempt was made to obtain a stratified representation of various educational levels, geographical areas, ages, and occupations as they occur in the U.S.A. No cultural periods trends in personality factors have yet been demonstrated to upset the present norms. The standardizations of the most recent revisions of the four forms of the test rest upon more than 15,000 individual cases. So that the final table would be properly representative of the populations indicated, several important criteria were employed in selecting data for inclusion in the final sample.

Stratification that was based upon gender was not regarded as significant since separate tables have already been given for each male/female gender. Similarly, age based stratification was also not regarded important since corrections on the basis of age were made in the final draft tables. Nevertheless, an attempt was made to sample broadly across the age range, and the final norm group included individuals from 15 to 70 years old.

Personality factor scores have slight age trends (not so strongly as intelligence in children, nor necessarily in one direction). Researchers, and those doing very exact analyses, may wish to allow for these, in which case they should consult the full tables and discussions in the Tabular Supplements. However, the majority of users will not have the time for these fine modifications, and moreover, in most situations are more concerned with comparing people, as they stand today, not Jim Smith 10 years hence with Harry Jones when he was a boy. The norms given for the general adult
population are centered upon and corrected to 30 years of age. The high school population centered upon and corrected to 17 years of age, and the college population centered upon and corrected to 20 years of age. To repeat, age corrections are sometimes of critical importance in research, but of negligible significance in routine use of the test, and for this reason their extensive discussion is related to the Handbook and to the Tabular Supplements.

**Interpretation of the Primary Factors**

Predicting scores based upon variegated criteria, assigning individuals to various diagnosis; can be implemented actuarially using various methods and processes already discussed in the earlier researches handbook. If there are no correlations in criteria, then the information about psychological factors cannot be predicted unless empirical evidences are collected. Moreover, actuarial evidences are not enough statistical analysis are also necessary to add to the psychological judgments to allow for changes of life with respect to learning and intellectual growth.

It is inappropriate to build a pyramid at the top without having built a base first; similarly specialization in a brunch of knowledge cannot be possible if the general concepts in the discipline are not clearly understood. This is very much practical so in case of physical education program where skills and techniques of any sports or game should be basically understood and mastered in the first instant. Psychology has its own significance in the field of sports since sports performance is the aim, psychological foundations have to be studied and trainings have to be inclusive of psychological too with other factors coaches can guide more effectively and players can exhibit more excellent sports performance with it understanding of psychology. Sports administrators have laid much emphasis upon psychological aspects. Sports competitions have assumed an extremely important place in the human society these days. With the beginning of the Modern Olympic Games in 1986, tremendous changes have been taken place in the methods and methodologies of training for athletic competitions at the National as well as International levels. The insatiable quest for pursuit of excellence has given rise to interdisciplinary approach to the understanding applied to the
preparation of athletes for intense competition as it is being done today. Hence, the data pertaining personality types of Wushu players and their sports performance has been studied.

**Sixteen Primary Personality Factor**

**FACTOR – A**

Reserved, impersonal, cool, aloof, formal

Individuals who score low in factor A personality traits appear to be cool, aloof and formal. They seem to like work than people. They work alone and avoid promises. They are precise and even rigid in their method of doing work. Even personally they tend to be impersonal and reserved. At times they are too criticizing, hard or rigid.

Vs.

Outgoing, kind, warm, easy going, like to be with people, socially active

People who score high in factor A trait are kind and considerate; warm and easy going; they are social like to be in group and work easily with team. They like to participate in various events of groups. They are attentive to other people, helping by nature; soft hearted and kind; then nature makes them help other people. They can easily adjust wherein work in groups is needed. They have large number of friends and even remember them; in personal relations they are responsible. They adjust anywhere with their nature except when they are alone or people are not of the same nature. They can get their work done easily with the help of other people. They are not afraid to help other nor are they afraid of taking other peoples help.

**FACTOR – B**

Less intelligent, concrete

Individuals who score lower in factor B traits are slow learners and can’t easily understand or grasp. They are dull in studied and complex interpretation in difficult for them. They are dull due to their lack of interest in certain topic or they may feel bored in the class; the subject may not of their interest or related to their own life; or their may not have been clearing a competitive exam for a job; so they never paid attention to their studies; they may not have got any punishment from their teachers for not doing home work or lesser score in
assessments; the priorities in their mind may have been different rather than studies.

Vs.

More intelligent, brilliant, bright, abstract thinker

Individuals who score higher on factor B traits are quick in grasping, fast learners, brilliant, intelligent, merit students; some researcher have shown family backing round and culture as well as social background responsible for development of intellectual individuals whereas other researcher have proved just the opposite to be true. Alertness is very important in intelligent people. Extremely highest scorers may become social deviants they may have mental functions and no one could ever understand them due to their higher level of intelligence.

**FACTOR - C**

Emotionally less stable, affected by feelings, easily annoyed

The individual with lower score in factor C personality traits are easily irritated and annoyed. They are changeable often avoiding and evading necessary things or demands of the duties, they are fatigued, exhausted, less sleep with sleep disturbances, psychosomatic complains etc. emotionally dissatisfied; low score in factor C is common in neurotic persons and same patients with psychotic disorders.

Vs.

Emotionally stable, calm, face reality, mature

Persons with high score in factor C personality traits are stable, balanced and controlled in matters of feelings and emotions. They are realistic; then aims are realistic, dependent on facts of their life and own talent; they are persons with ego; mature and calm; they are able to maintain then groups solidarity and morale. They may escape some unsolved emotional issues for the benefit of their own group. Shrewd psychologist have revealed that sometimes may have some psychological adjustment related problem but it does not appear to the people, since he is so responsible and working; yet when given an opportunity the unsolved emotional adjustment issue may crop up to the surface to get solved.

Emotional intelligence refers to the mental processes involved in the
recognition, use, understanding, and management of one’s and others’ emotional state required in solving problems and regulating behavior (Ciccarelli & Meyer, 2006). Emotional intelligence comprises of social alertness, procrastination ability to gratify personal wishes or desires, self-consciousness and awareness, optimism in the face of adverse and difficult situations, the ability to channelize powerful emotions and empathy for other people of team and societies.

The term Emotional Intelligence appeared in a series of academic articles authored by Mayer and Salovey (1990, 1993, and 1995). Their first article presented the first model of emotional intelligence. As a result of the growing acknowledgement by professionals of the importance and relevance of emotions to work outcomes, the research on the topic continued to gain momentum, but it wasn’t until the publication of Goleman’s (1995) best seller “Emotional Intelligence: Why It Can Matter More Than IQ” that the term became widely popularized and entered the mainstream. He argues in his book that IQ contributes only about 20% to success in life, and other forces contribute to the rest.

After extensive review of literature, following four dimensions were finally included in constructing this scale. Their brief description is given below:

a) **Understanding emotions**- to recognize feelings and emotions of one’s own and those of others; their thoughts and feelings too.

b) **Understanding motivation**- A high achievement drive together with the tendency to be optimistic and take initiative.

c) **Empathy**-Ability to identify oneself mentally with others and to understand a person or thing accurately and read how other people feel, understand their perspectives, develop others, leverage diversity, read the mood of a group, discern political realities and a tendency to take an interest in the lives of others.

d) **Handling relations** - To be able to manage and handle relations with others in a better way.

**FACTOR – E**

Humble, mild, submissive, obeying, adjusting, easily led

Individuals who score lower in factor E traits of personality are docile,
conforming, submissive and led easily by others. They are always dependent upon intelligent people for decision making they are open minded and confessing anxious for correcting their errors. Their passive nature may lead to many mental illnesses related to stress and tension due to faulty work and their mistakes.

Vs.

Dominant, aggressive, bossy, stubborn, competitive, assertive

Individuals who score higher in factor E traits of personality are dominant and assertive; as if they are always right; they are highly competitive and trying to win gold medals and come first every time; they are aggressive if they get defeated. They are rules, regulations and laws themselves due to their habit of winning every time they are authoritarian, having many enemies when they have defeated. They are disregarding of others due their high merit or talent. The excellent performers or winners may tend to be stubborn with others due to their constant excellent sports performance. They can’t leave their class.

**FACTOR – F**

Restrained, sober, taciturn, sober, serious

Low scorers of factor F traits of personality are taciturn, reticent, lesser social, restrained and controlled, more of introspective and reflective. They are in times of difficulties pessimistic, overtly deliberate; considered to be smug by others. They tend to be sober, serious and trustworthy by others.

Vs.

Enthusiastic, cheerful, heedless, spontaneous, expressive

The high scorers of factor F personality traits appear to be energetic, enthusiastic, cheerful, active, talkative and expressive, frank and open minded, carefree and spontaneous. They are the popular leaders. They may become mercurial or even impulsive in extreme points.

**FACTOR – G**

Self-engrossed, disregarding rules and regulations

Lower scorers of factor G appear to be indifferent and exhibit disregard for rules and regulations. They are often casual in attitude and never obey to group demands or cultural or traditions strictly. No group influence or pressure may lead them astray for lack of guidance or co-operation in times of need.
But they are more free and more influential and powerful as well as effective many times. They aren’t easily upset due to disregard for rules or laws. Free from stress or tension. Whereas in urgent or times of difficult from even a single member and thus they get trapped and believe their own talents to get free from difficulties.

Vs.

Conscientious, moral, rules bound, conforming
People who score higher on factor G traits always try to be perfect, correct, accurate, they are dutiful, honest, responsible, dedicated, devoted employees, players who regular and disciplined; they try to see in other ties that are inside them and become all the more strict and severe on lazy employee. They like hard working employees more than intelligent and witty friends or colleagues. Their time tables are already planned. The leaders of this group traits are superb with essential ego and they may not be popular get work done anyhow and then subordinates who may not be open before them won’t always like them except in front of them and not at their back. It is true that lazy workers won’t like them but in human affairs it’s not always the superb leaders who may be successful everywhere since everyone else may not be similar to them.

FACTOR – H
Timid, hesitant, shy, afraid of threats
The low scorers of this group exhibit shyness, timidity, fear, hesitant, afraid of threats and sometimes victims of bullies in-spite of being innocent. Then nature is retiring and withdrawing. They tend to be inferior; slow in speech; they don’t like personal contacts at work. They don’t have many friends but prefer a few friends only. They are not aware of what’s going on around them.

Vs.

Venturesome, brave, bold, courageous fearless, not afraid of threats
Individuals with higher score in factor H group of traits are bold, brave and venturesome. They are social and can make friends easily. They are courageous and brave and hence liked by people many times to get work done. Their nature helps them to face difficulties easily and without get emotionally disturbed is an assisting trait wherein many others won’t shine.
However, they may careless of details, indifferent to danger zones. They make friends easily with opposite gender, may waste much time in no significant work.

**FACTOR – I**
Self reliant, tough minded, rough, clever, realistic
Individuals with lower score in factor I traits of personality are down to earth by temper, responsible, tough minded, rough and clever too; but doubt the culture or traditions sometimes, they may appear cynical, unmoved and hard. Then group seem to be down to earth and practical. No nonsense or gossip mongers.

Vs.
Tender minded, intuitive, sensitive, refined, over protected
People who score higher in this group of traits appear to be emotional, sensitive, feeling for even animals, tender-minder, delicate, refined in manners, they may be fall of imaginations and fanciers of their own that may be unreal. They may have clasher with the down to earth people with regards to their dreams and may have to face a good criticism over then imaginations and impossible dreams.

They may sometimes intrude upon the time and routine of other members of their family and may be just worthless fools since they don’t have any co-operation either from the society or their own family. They may need held; they may become temperamental and dependent. They don’t like rough, crude or roguish people. They join similar occupations that may tend to fulfill their dreams. They may become hurdles in team work and team performance due to their nature.

Those who are strong minded are not hard to spot. True mental toughness, however is sometimes hard to find. There are many characteristics that a person may possess that may mimic the characteristics of a mentally strong person. If someone is stubborn, opinionated, outspoken, bossy, or demanding some might see them as strong minded and may confuse that with toughness. Toughness is not usually seen in the actions of a person, rather in the reaction of that person.
Mentally tough person seems to know what they want and know how to get it. Not only that, they have an answer to every question, an opinion for every topic, and an idea for every circumstance. That may seem to be the formula for success in the mind, but what happens when something goes wrong? Or a plan or project fails over and over and over again? This is where those who are mentally tough strive and excel. There are few major characteristics of mental toughness, which are as follows.

We know many persons who seem to have a rock mentally. This person seems to know what they want and know how to get it. Not only that, they have an answer to every question, an opinion for every topic, and an idea for every circumstance. That may seem to be the formula for success in the mind, but what happens when something goes wrong? Or a plan or project fails over and over and over again? This is where those who are mentally tough strive and excel. There are six major characteristics of mental toughness:

a) Confidence
b) Focus
c) Motivation
d) Courage
e) Resiliency

**FACTOR – L**

**Trust, Accept, Conditions, Easy to Get on with**

The person who scores low on Factor L tends to be free of jealous tendencies, adaptable, cheerful, uncompetitive, and concerned about others, a good team worker. They are open and tolerant and usually willing to take a chance with people.

**Vs**

Suspicious, Hard to fool, Distrustful, Skeptical

People who score high on Factor L tend to be mistrusting and doubtful, they are often involved in their own egos and are self-opinionated and interested in internal, mental life. Usually they are deliberate in their actions, unconcerned about, other people, and poor team members.
FACTOR – M
Practical, steady, ‘down-to-earth’
Low scorers of factor – M are always inclined to get anxious about doing things right and accurately. The low scores of factor – M pay attention to ‘down-to-earth’ matters and always interested in what is possible. These individuals can keep their heads calm even in the time of difficulties or emergencies. They are much interested in the details of matters. They are occasionally unimaginative in brief, they are ‘outer bound’ more interested in the outside world.

Vs.
Imaginative, impractical, Engrossed, absent minded, absorbed in own thoughts
High scores of M factor are inclined to be unconventional, unconcerned, indifferent over everyday activities; they appear to be self motivated; creative and imaginative; they often look engrossed in their own thoughts; they seem to be oblivious about physical truths and realities; and also people. Their imaginations and imaginative life may sometimes lead to unrealistic situation along with powerful outbursts of emotions and feelings. Their own innate and inborn imaginative temper may make them a ‘social deviant’ that is they may not be social up to the average level.

FACTOR – N
Forthright, open, genuine, unpretentious, artless
The low-scorers of factor N are warm, loving, caring by nature; they like people genuinely. They are simple, uncomplicated, full of emotions, feelings and sentiments and artless when the talk to other people. They don’t act or pretend while in the presence of other people.

Vs.
Shrewd, diplomatic, polished, calculating and manipulating
Individuals who are high-scorers of factor N appear to be cunning as a fox; profit makers; they are experienced and never get cheated easily by sweet words of others, their approach to problems in intelligent, and calculated. They try to understand the whole and complete aspects of problems and
intelligently problem solving. They are not sentimental. Highest scores may tend to skeptics or cynics.

**FACTOR- O**

Self-assured, Secure, self satisfied, untroubled, guiltless, feeling free
The low scorers of factor O are peaceful, calm, balanced in face of difficulties and tough situations of life. They are not shaken easily by complexities of life. They are mature, self confident; they trust in their own capacities. They appear sometimes to be un-sensitive to the responses of others.

Vs.

Apprehensive, insecure, self blaming, worrying, guilty feeling
Individual with higher scorers of factor O are responsible about their duties, and obligations; they have higher aims and expectations about their own-selves in life. If they can’t achieve their own set aims, they feel guilty about the same; they can blame themselves over their own failures. They worry about their work and activities; they are anxious about their faults in failings in their duties. They may feel sorry for the mistakes they had committed; often they feel rejected in a group or can’t freely participate in lively discussions; high scores of factor O are very common.

**FACTOR – Q₁**

Conservative, traditional, respecting
Low scorers on factor Q₁ are traditional, orthodox, customs following; they trust in what they were taught even in the face of something better. They are very much careful and cautious new ideas. They are inclined by nature oppose reforms and never ideas; they are conservatives with respect to religion and politics. They are not at all interested in intelligence or intellectual development or decision making.

Vs.

Experimenting, open to change, critical liberal
Higher scorers of factor Q₁ are more interested in intelligent decisions and intellectual issues. They doubt and question; inquire into issues to get answers. They are skeptical about new ideas and never accept those without intellectual analysis and evaluation; usually they are knowledgeable and well informed; they are high scorers since their primary education; they experiment
in life. They are intelligence based; less moralizing. They have endurance and tolerance in the force of changes and inconveniences of life.

**FACTOR – Q₂**

Group-oriented, best follower, groupist, good listener

Individuals who scorers low on factor Q₂ depend upon the group for praise, admiration, encouragement an any work they do; they ask groups about certain issues and take decisions with the help of others. They always like to work in a group. They may sometimes lack in individual decision making ability; they do what others of the group do. They are gregarious but out of compulsion; they may need co-operation of others and won’t feel shy to take help of others in times of difficulties or even where benefits are concerned.

Vs.

Self-sufficient, self-decisions, resourceful

Individuals who are high scorers on factor Q₂ are by nature independent habituated to go their own way, make their own decisions, and can take actions on their own. They tend to be self sufficient. They are resourceful. They listen to other people’s opinions but take their own final decisions. They are not at all dominating over others. They may hesitate to ask for help to others. They incline to be self sufficient so they never appear take the co-operation of others. They don’t hate others nor do they agree with others.

**FACTOR – Q₃**

Careless of rules and regulations, lax, rash, indiscipline, self-conflicting

People who score lower in factor Q₃ are lax about societal rules and regulations, customs and traditions, not conservative but modern and accepting newer ideas easily; always willing to change and reform; enjoy newer environments. They are least troubled or bothered about others in decision making; their decisions are instaneous as per situations. They appear a little careless or even never hard working, sometimes indiscipline. They are impulsive, impetuous or inconsiderate. They sometimes feel not better adjusted with others.

Vs.

Compulsive, socially fit, having self image
People who score higher on factor Q₃ have strong control upon their own feelings and emotions; and their manners as well as behavior too. They are socially aware and group loving people. Their self respect and high consideration for their social status and societal position is very important for them. They are very much vigilant of their self image. Extremely higher scorers tend to be perfectionist obstinate, strict etc. the most influential leaders come under this factor Q₃.

**FACTOR – Q₄**

Tranquil, peaceful, relaxed, un-frustrated, composed

Individuals who score lower on factor Q₄ are always tranquil, peaceful, composed, relaxed, un-frustrated in the face of the most troubling, difficult and complex situations of life that may arouse anger or hatred in others otherwise. Since they are satisfied. Many times they appear lazy to others and without any work in hand. Their performance sometimes may not be up to the mark.

Low motivation may produce unsatisfactory scores.

Vs.

Frustrated, over-worked, highly driven or motivated, tense

Individual with high score of factor Q₄ are highly motivated and go on working ceaselessly yet they won’t take care of themselves that they spend much time in working and never get sufficient sleep or rest so that they appear tense always. They are over worked and due to over work tired, exhausted and fatigued and always trying to recover themselves by taking rest whenever they get a chance so as to get fresh and complete newer tasks. Due to incomplete work or fault in completion of the tasks, they may feel frustrated over; they may get a good criticism from their boss so that they’ve to complete work blameless yet what interrupts them is their higher level of motivation and excitement that won’t allow them to take balanced and intelligent decisions. Their frustration is the symbol of their unexpressed energy; their unrevealed talent of completion of the task; extremely high level of tension may interrupt or disturb other people working at the work place who would have to leave their own jobs and look after the fully excited novices.
Photo No. 1. Distribution of Questionnaires to Subjects

Photo No. 2: Filling up Questionnaires
3.6 Physical Fitness Tests

3.6.1. Standing Broad Jump Test

Objective:
To measure the explosive power of the legs

Equipment required:
Tape measure to measure distance jumped, non-slip floor for takeoff, and soft landing area preferred. Commercial Long jump Landing Mats was also used. The take off line was clearly marked.

Description of test:
The athlete stood behind a line marked on the ground with feet slightly apart. A two foot take-off and landing was used, with swinging of the arms and bending of the knees to provide forward drive. The subject made an attempt to jump as far as possible, landing on both feet without falling backwards. Three attempts were allowed.

Scoring:
The measurement was taken from take-off line to the nearest point of contact on the landing (back of the heels). Recorded the longest distance jumped, the best of three attempts.
Photo No. 3. Standing Broad Jump Test

Photo No. 4.
3.6.2. Pull ups

**Purpose:**
Pull ups test is used to measure the muscular strength of shoulder.

**Equipment required:**
A wooden or metal bar approximately 1.5 inches in diameter.

**Description of test:**
The height of the bar should be such that when the subject hangs from it with fully extended arms; his feet do not touch the ground. The subjects were asked to use an overhand grasp with the palms facing away from the body. From the hanging position the pupil raises the body by the arms until the chain can be placed over the bar and then lowers the body to a full extension hang and repeats the pull ups as many times as possible.

**Scoring:**
The maximum number of completed pull-ups was the score of the subject.
Photo No. 6. Pull ups
3.6.3. 50 meter dash

Objective:
The object of the test to determine speed and acceleration.

Equipments needed:
Measuring tape, stopwatch, marked track, flag, cone makers, clear and flat surface of 70mtrs.

Administration of test:
The 50 meter dash involves a single maximum sprint and time was recorded. Research scholar was given thorough warm up to subjects for the 50 meter dash. The 50 meters dash was start in a standing start position. The front foot of the subjects was behind the starting line. Then starter gives the instructions “Set and Go”. The tester was encouraged the subject to run fast before crossing the finish line and also recorded the time.

Scoring:
Two trials were allowed to the subjects the best time was recorded the nearest two decimal places. The timing was start at the signal “Go” or when the timing system is triggered and finished when the chest crosses the finish line and the finishing timing gate is triggered.
Photo No. 7. 50 meter dash

Photo No. 8.
3.6.4. Shuttle run

Purpose:
This test item is used to measure the speed and coordinative ability.

Equipment:
Two blocks of wood (2" x 2" x 4") stop watch and marking powder.

Procedure:
Two parallel lines were marked on the floor 10 yards or parts. The subject was asked to start from behind one line. On the single go the stop watch was started. The subject was asked run towards the blocks and asked to pickup one of the block and come back to the starting line. And placed the block behind the starting line, runs back and pick up the second block to be carried back across the starting line. As soon as the subject cross the starting line the timer was stops the watch and record the time.

Scoring:
Two trails were given to each subject. The time of the better of the two trials is recorded to the nearest 10th of a second.
Photo No. 9. Shuttle run

Photo No. 10.
3.6.5. 600 Yards Run & Walk

Purpose:

The purpose of the 600 yards Run & Walk test is to measure the Cardiovascular endurance of the subjects.

Equipment:

Track or marked area and stopwatch.

Procedure:

The subjects were asked to take their positions on the starting line. At the signal Go the subject starts running the 600 yards distance. The test is usually performed on 6-8 subjects together by paring off before start of the event. Walking is permitted but the performance is to cover the distance in the shortest period of time.

Scoring: the time taken to complete the 600 yards by the athletes was recorded on scoring sheets.
Photo No.11. 600 Yards run and walk
3.7. Reliability and Validity of Data

The reliability of data was confirmed by establishing the instruments reliability tester’s competency and reliability of the test.

3.7.1. Tester’s Reliability and Reliability of Test (Test – Retest method)

It was ensured that the research scholar was well skilled with the techniques of conducting the test. Under the supervision of supervisors the research scholar along with his assistant had taken practices a number of repetitions of testing procedure. The reliability of tester was evaluated and reliability of test also evaluated. To determine the reliability of the tests the performance of twenty subjects selected at random on selected parameters were recorded twice under identical condition by the research scholar. A person’s product movement co-relation was computed between the two measures of each variable. The results of this test indicated that the correlation coefficients were above 0.880, which indicated adequate level of reliability.

3.7.2. Instrument’s Reliability and Validity

In the present study, data was collected with the help of standard methods and instruments. The research instrument’s reliability and validity was determined prior to actual data collection.

3.8. Secondary Data Collection

A secondary source is a document created at a later time than the event being researched, by someone who did not experience the said event. These documents have no direct connection with the events or people being researched. Sources of secondary data collection they are, previous research done, official statistic, mass media products, letters, diaries, govt. reports, internet information, historical information.

The data pertaining to the human psychology, physical fitness, sports performance as well as other issues concerning the study objectives was collected from the research articles, books, internet and other relevant sources.

3.9. Statistical Analysis of Data & Level of Significance

The data was collected in this study was analyzed using various statistical methods.
In the present research work the collected data was determined from the descriptive statistics that is mean, mode, standard deviation, frequency, percentage, minimum and maximum etc. the relative assessment was prepared by using various graphs and the relationships were determined by using Pearson Product Moment Correlation Coefficient Determination method. The level of significance was considered to be 0.05 level by keeping in view the consequences of an such an error. The data generated in this study was analyzed with the aid of SPSS i.e. statistical package for social sciences 18.0 software.