Chapter I

INTRODUCTION

"What a piece of work is man! How noble in reason
How infinite in faculties! In form, in moving, how expressive
and how like a God! The beauty of the world! The Paragon
of animals!" says Shakespeare (1957).

But this paragon is made up of millions of tiny cells,
each endowed with sufficient matter to enable it to do its
work with sufficient life to give it the energy it requires as
well as sufficient mind stuff to give it the degree of intelli-
gence with which to direct its work. This hidden dynamo has
the ability to take us to fame and fortune if kept under control.
If we describe the movement of human body or the motion
in human body, like in any machine, motion is brought about
by the force acting on levers. Same way in human body the
bone acts as levers, the muscles apply force on the bones for
movements and joints act as fulcra. But for all these movements
there is something else deep down which is responsible to make
us to move called "mind". If we don't have a mind to do it
it is very difficult to do it and achieve perfection.

Gupta (1982) states "Things in the world outside overselves
come via body (sense organs) into our mind and the things
in our mind reach the world outside through the body."
Thus attempts to treat body and mind as separate entities have now failed miserably. Even Descartes who could not pull out the wedge between the body and the mind, had to accept that there existed an inevitable interaction and interdependence between the two. Considering mind to be the 'master' and body the 'servant', Rousseau believed that in the process of education if we wish to cultivate mind, we must cultivate the parts which mind governs, namely 'physique'. Scientific inquiry into the body-mind relationship has clearly revealed that 'man' can not be partitioned: he can not be compartmentalized. Any other notion beyond 'the unity of man' is entirely erroneous arbitrary and unjustified (Kamlesh, 1988). Shererston (1940) observes "The muscle is the cradle of recognisable mind". He firmly believes, "recognisable mind seems to have arisen in connection with the motor act where motor integration progressed and where motor behaviour progressively evolved." The mind has no existence away from the existence of the body. The biological integration of the body and mind has been scientifically proved and universally accepted as an actuality.

Kane (1972) quotes organismic theory which emphasizes the interaction and interdependence of mind and body functioning. Physical Educationists are closely concerned with the body and the development of physical abilities but at the same time
they are also aware of the mental aspect which is associated with the physical aspect for the outcome of performance.

Today there is an increasing awareness among people from different fields regarding the sports performance and different sport sciences which play an equally vital role in the improvement of performance. The mind is sport science's last frontier. All other systems have been extensively used to improve athletic performance. For example, the physiology of muscle contraction, the anatomy of sports participants, the bone studies, the science of human movement have been brought to a drastic change by the systematic weight training programme, better nutrition and stress applied at levels above threshold values, overload training methods, kinesiological analysis respectively. Due to all these today's athlete seems to be much stronger, faster, more agile and graceful than the athletes of yester-years. Even athletes' blood has been sampled to chartered biorhythms, equipment designed and produced to aid a better performance. Only the mind seems to have been neglected, which of course, is the burning topic of modern research in the science of sport psychology wherein one of the most interesting and yet most challenging tasks has been the study of mental aspect of sportsman of the role of mind/mental training not only for the elite athlete but also for those acquiring skills
in games and sports. Most interesting because everyone who
wants to excel today asks a question to himself/herself that
having everything equal why am I not able to achieve better
than the other one and train well? Challenging because it
is exactly not determined or yet to be explored that everything
being equal why one succeeds but not the other one.

Nideffer (1985) expresses that in recent years a wide
variety of mental imagery techniques have been adopted in
sports. Worlds like mental rehearsal, positive thinking, success
utilization, visual motor behaviour rehearsal, cognitive behaviour
rehearsal, cognitive behaviour modification and imagery have
all been used to describe the procedure for altering thoughts,
feelings, attitudes and performance.

Shakspeare wrote, "Whats' in a name? That which
we call a rose by any other name would smell as Sweet."

And yet, without being bogged down in semantics it
is important here to define terms for the purpose of this paper
and clarity in communication.

Among the various psychological aspects of sport come
the 'cognitive' strategies which play an important role in sport
and also while learning a skill or executing a skill. The word
mental rehearsal which is used here for a better understanding
is one of the many cognitive strategies like mental practice, mental imagery, cognitive behaviour rehearsal etc. There is ample evidence regarding the sportsmen making use or preparing themselves mentally before executing in actuality. Also, there are researches where evidences suggest that mental rehearsal is an effective form of response preparation. And when the word mental depiction is used it means the response for which one is prepared. Successful depiction demonstrates an understanding of a phenomenon. It is the ability to generalize results by careful observation and thought process from one setting and to apply them in another setting. If the depiction is correct or generalization is correct, the result will also be better. Depiction is based on the attainment of the goals.

Coming back to motor learning or to the acquisition of motor skills Singer (1973) points out that all cognitive and motor functions are very much interrelated. Cerebral involvement in the form of perceptual process that enables appropriate cue isolation as well as disregard of meaningless and irrelevant stimuli, promotes effectively time behaviour. Cognitive processes interact with motor execution when tactics and strategies are required. But even more interesting is the realization that the athletic skills can be acquired and maintained, to some degree, under mental rehearsal conditions instead of overt physical practice. Research on mental practice concludes that such kinds
of practice benefit the acquisition of skill over no practice at all.

Further Syer and Connolly (1989) state that in sport, when one practices a skill, one is running signals to one's muscles from the brain and back, 'clearing' and 'widening' those nervous pathways, clearly making connections and intersections so that there will be minimum of delay in translating the signals and coordinating movement. They also believe that mental rehearsal can held shortcut the learning process and complement actual physical practice of skills. It allows one to travel the pathways and make the connections, emphasizing the specific aspects of the skill where necessary.

There also exists some misconception among athletes, non-athletes and experts in the field of games and sports regarding the concept of mental imagery and mental rehearsal. To make it clear it would be apt to quote Harris and Harris (1984) who have elaborated these two aspects and proved how they both are complementary to each other.

They observe that there are several terms used to explain what is basically the same process. The same view is also expressed by Magill (1989), Singer (1973), Oxendine (1984), Nideffer (1985), & Orlick (1980). According to Harris and Harris 'Imagery' is a process which involves recalling from memory.
pieces of information stored there from all types of experiences and reshaping them into a meaningful reverie via a thought process. In as much as experiences can be remembered through several sense organs, one may be able to see, to taste, to experience sound, to feel texture, speed and other sensory stimuli kinesthetically, depending upon what one is re-experiencing in one's mind's eye; many athletes do not 'see' as such in their minds' eye; their mental images are not visual. Instead, they may be experiencing kinesthetically muscular responses. They actually 'feel' themselves doing what they are imaging. Other dimensions of the re-experience may involve emotional reactions, sensations of touch, sound, or combination of any of these.

They have put imagery in three categories. One of these is called external imagery and is considered to be outside of you, like watching a movie or videotape of your performance. Internal imagery is from inside you and considered to be rehearsing what you actually see with your own eyes when you execute your skills. Yet a third type of mental imagery is that of not actually seeing anything in your minds eye but 'experiencing' it or 'feeling' it kinesthetically. In the final analysis they state that, it does not matter which of these you use if it works for you.
Imagery has been distinguished from mental practice or rehearsal in that imagery involves the ability to passively develop an image without going beyond that point. By comparison, rehearsal is being actively involved in an image or a series of images. Sports involve a series of dynamic and ever-changing images or situations. The better the development of your bodily sensations and awareness the more visual and kinesthetic cues you will have to incorporate in your mental rehearsal of the activity.

So it can be said that different types of mental rehearsals may be related to the degree to which you have learned a skill and mental imagery involves experiencing everything, all aspects, all dimensions in a holistic total experience. Whether you call it mental imagery, mental practice, mental rehearsal, visualization or whatever, the important thing to learn is to include all dimensions involved in the situation and to incorporate all your senses in experiencing performance in your mind's eye.

The truth is that in the physical performance of a task there is usually some degree of related mental activity, while in mental practice certain neural and muscular responses are evoked. There are enough studies cited in yogic as well as psychological literature about 'though power' as an adjunct of motor performance. Ulrich (1967) observes "when an action
is imagined, impulses are produced which travel the nervous patterns associated with that action." So only when corresponding neurological processes are appropriately stimulated motor processes come into play. Rushall (1979) concedes that mental rehearsal of a motor act is a sort of ergogenic aid to performance because it "........... does facilitate the neurological pattern which produce an increase in the efficiency of subsequent imaginations or actions if they are performed."

According to the cybernetic theory, the human nervous system is involved with elements such as input, transmission, processing, output and feedback. Motor learning is not a result of strengthening the stimulus-response process, but a result of such things as input, better processing of the information that comes from input and feedback. In the learning of motor skills, the type of input that is provided i.e. the methods, materials and procedure used in teaching the skills, will be transmitted to the nervous system where the processing of the input takes place and the output will reflect upon the input given.

Movement is a complex quality and is influenced by many factors. Physical performance factors underlie the action for all movement. These factors include speed, agility, balance, coordination, power, strength etc. which are manifested through fundamental skills of running, jumping, throwing, hanging etc.
These physical performance factors are the ones most influential in the field of physical education and sport. Among them certain factors that are basic to all performance and highly specialized movements are the result of training and experience which is found in games and sports of high calibre. These specialized movements like gymnastics, dance, athletics are adaptations of fundamental skills and are influenced by the factors that are basic to all performance.

Essential for successful performance in many motor activities is speed and it differs from situation to situation. Balance is an important aspect of efficient motor response and is one of the basic motor factors needed for many activities. Coordination is another factor that is basic to performance and especially to highly complex movements. Performing integrated patterns of movement with good coordination involves agility, balance, speed, and kinesthetic sense. Finally skillfulness in the different movements can be characterised by control, accuracy and steadiness (Barrow and McGee, 1979).

In this era of competition everybody is in a race to excel or to dominate others by employing any viable means which will help to improve their performance. Many research studies show that physical practice is better than only mental practice of a skill, mental practice is better than no practice
at all. There are also studies, although only a few wherein it has been proved that mental practice is equal to physical practice. However, there has been very less attention paid to this aspect of training, especially as applied to different age levels.

Hence, an effort has been made to empirically study the effect of only mental rehearsal and mental depiction on performance tasks of different motor skills such as accuracy, balance, coordination and speed in relation to different age levels (13-15 and 16-18 years).

**Statement of the Problem**

The purpose of the study was to determine if selected mental rehearsal and mental depiction programme has an effect on performance tasks involving accuracy, balance, coordination and speed in relation to different age levels.

The subordinate purpose of the study were:

1. To see and compare the effect of mental rehearsal and mental depiction on different types of performance tasks i.e., accuracy, balance, coordination and speed.

2. An attempt was made to compare the effect of mental rehearsal and mental depiction on accuracy, balance, coordination and speed at two different age levels (13-15 and 16-18 years).
3. The present study was an attempt to delve deep into the relationship between mental depiction and final score also.

4. Finally whether there was an influence on imagery ability by mental rehearsal programme.

**Delimitations**

1. The study was delimited to the students of Sainik School, Kazhakuttam, Trivandrum (Kerala) India.

2. The study was further delimited to two age groups i.e. 13-15 and 16-18 years.

3. The study was restricted to following test items:
   a) AAHPER's Softball Throw for Accuracy.
   b) Modified Bass Test for Dynamic Balance.
   c) Figure of 8 Duck Test for Coordination.
   d) 6-second Dash for Speed.

**Limitations**

1. Non-availability of sophisticated instruments was accepted as a limitation in this study.

2. Although possible attempts were made to control the thought process and to make them hear to the instruction by the experimenter during mental rehearsal programme but
the degree of involvement by subjects was not possible to access. So this uncontrollable factor which might have influenced the performance of the subjects on the selected test items could be recognised as another limitation of the study.

3. No specific motivational techniques were used.

**Hypothesis**

On the basis of the literature gone through, research findings and the scholar's understanding of the problem, following hypothesis were formulated with regard to the present investigation:

1. Imagery involving mental rehearsal and depiction will have significant effect on the improvement of performance involving accuracy, balance, coordination and speed.

2. A significant difference will be observed between the age groups of 13-15 years and 16-18 years on mental rehearsal and mental depiction on performance task involving accuracy, balance, coordination and speed.

3. There will be an improvement in imagery ability due to mental rehearsal programme.
Definition and Explanation of Terms

Mental Rehearsal

Mental practice has been defined as rehearsal of a physical task in the absence of observable movement (Corbin, 1972).

Mental rehearsal is the introspective or covert rehearsal that takes place within the individual (Oxendine, 1975).

The dictionary meaning of rehearsal is to practice or to go through or to train oneself; so when we say 'mental rehearsal' it is to do a task or performance by rehearsing mentally by means of mental imagination (Websters' Dictionary, 1961).

Mental Depiction

The dictionary meaning of depiction is to represent or portray in words; mental is of or pertaining to the mind; pertaining to the totality of an individual's intellectual and emotional process, it is more intellectual rather than emotional or physical; so when we say mental depiction, it is to portray or represent in words intellectually (Oxford Dictionary, 1973).

Accuracy

The dictionary meaning of accuracy is correctness or exactness (Oxford Dictionary, 1973).
In the context of the present study accuracy is the point of release or the point of impact on the object. This must be that point in the arc of arm or implement at which the ball is tangent to the target (Schurr, 1975).

**Balance**

Balance is the ability to assure and maintain control of the body while it is at rest (static balance), moving through a level plane (dynamic balance), or rotating (in flight) (Bucher & Blucker, 1979).

Balance may be defined as the ease in maintaining or controlling body position (Oxendine, 1975).

**Coordination**

Coordination may be defined as the ability of the performer to integrate types of movements into specific patterns (Barrow and McGee, 1979).

Coordination may be defined as the ability to perform a skilled movement pattern. This trait is essential in every movement and as the movements become more complex the importance of coordination is intensified (Phillips and Hornak, 1979).
Speed

Speed may be defined as:

1. The capacity of the individual to perform successive movements of the same pattern at a fast rate (Barrow and McGee, 1979).

2. The ability to execute motor actions, under given conditions, in minimum possible time (Singh, 1984).

Significance of the Study

The standard of sports in India is very low due to various reasons. The teaching method is definitely one of them. The routine drill with cursory verbal instruction is an outmoded method. The poor economic condition of our country does not permit the wide use of audio-visual aids in learning sport skills. Besides the obvious interest the sporting world has displayed in mental training, gives enough ground to employ such techniques for the general populace through physical education classes.

Probably more than anything else, the growing awareness among those dealing with human performance that the human organism consists of a mind and a body, and that paying attention to both in training would improve performance. Too, often it is seen that the physical educators and psychologists deal with only the physical nature of performance and psychological
aspect of the individual respectively. Man being a complex psychophysiological unity any training must consider the aspects.

In this light the present investigation may contribute in the following ways:

The findings of the study may add to the existing knowledge regarding mental rehearsal technique, so that physical education teachers, who work with an objective to improve the general well being of the students; coaches who provide specialized training to the athletes for higher accomplishments, may be benefitted to the extent of providing correct guidelines to the athletes in the matter of psychological training besides physical training.

2. This study may provide them with clues to adopt better methods and techniques to suit each individual athlete so that the potential in every athlete is exploited to the maximum. It may also help in the better acquisition of skills.

3. The most significant aspect of this study is that it has been conducted on young boys who belong to adolescent period but were divided in pre-adolescent and post-adolescent (13-15 years and 16-18 years) groups to find out at which level this training could be more effective.
4. It may also reveal the extent to which motor performance of an individual is influenced by mental rehearsal and mental depiction of the task.