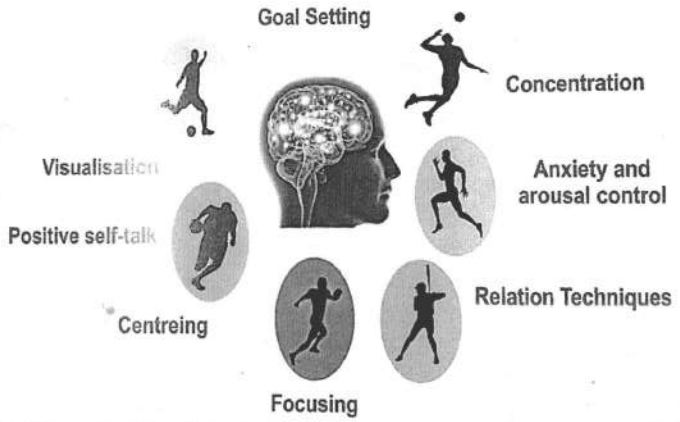
Sport Psychology

Advances in Technology, Training Methodology and Measurements



Edited by : Dr. Shaikh Ezaz

PROCEEDING

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Sport Psychology:
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Editor :
Dr. Ezaz Shaikh

Printed by :
Ajit Printing Press
Satara.

Published by
Department of Psychology,
Yashwantrao Chavan Mahavidyalaya,
Pachwad, Tal. Wai, Dist. Satara.

Email : ycmpachwad@yahoo.com

Website : www.ycmpachwad.ac.in

First Edition : Sept. 2016

ISBN No. 978-93-84309-17-6

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MRP Rs.

INDEX

ISBN No. 978-93-84309-17-6

IMAGERY IN SPORTS PSYCHOLOGY

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Abstract

Imagery is defined in sports psychology literature as, "the cognitive rehearsal of a task in the absence of overt physical movement." It is a mental skill that helps athletes for performance enhancement, skill learning, and covert behaviour modification which programs the mind and body to respond optimally. The mental practice of specific performance skills facilitates improvement in problem solving, performance review and analysis; preparation for performance. It positively affects psychological states such as self-efficacy, decreasing anxiety and enhancing self confidence and helps in developing pre-competition and competition strategies, coping with new situations without being surprised, focusing attention etc. Psycho neuromuscular Theory, Symbolic Learning Theory, Bio-informational Theory and Functional Equivalence Theory try to explain why Imagery is so effective.

Key words: Imagery, Sports Psychology, Performance Enhancement

Introduction:

Imagery, also referred to as mental rehearsal, guided imagery, mental practice, or visualization, is defined in sports psychology literature as, "the cognitive rehearsal of a task in the absence of overt physical movement." It is a part of sport psychology skill (mental skill), where it helps athletes to success in their tournament or game. Both athletes and exercisers use imagery to aid in their performances (Haunsenblas, Hall, Rodgers & Munroe, 1999) that could be used in sports for performance enhancement, skill learning, and covert behaviour modification. Many athletes and coaches today recognize the power of imagery in sport performance. In fact, athletes from most sport attribute at least part of their success to their use of imagery. Coaches normally consider imagery as an activity associated with competition preparation, that is, a performance enhancement function. Watt, Spittle and Morris (2002) defined imagery use as the manner in which peopleimagine themselves in ways that can lead to learning and developing skills and can facilitateperformance of those skills. It is normally assessed in terms of its cognitive and motivational attributes.

The concept of imagery is used in many different contexts (Khaled, 2004). Sport imagery is using all senses to re-create or create a sport experience in the mind with the goal of enhancing sport performance during training and competition (Morris, Spittle & Watt, 2005; Taylor & Wilson, 2005; Weinberg & Gould, 2007). This a mental technique programs the mind and body to respond optimally. By using mental imagery rehearsal as a mental training tool, athletes have the capacity to see and believe, which gives them the confidence and focus to perform successfully.

Fisher, (1986) clarifies that imagery is the language of the brain. The brain really cannot tell the difference between an actual physical event and the vivid visualization of the same event. Most Sport psychology researchers claim that the central nervous system cannot distinguish between actual physical movement and one that is vividly imagined. For this reason imagery can be used by the brain to provide repetition, elaboration, intensification and preservation of important athletic sequences and skills. Thus, practice occurs when the Sport person actually performs the action or when the Sport person vividly imagines performing the action because similar neural pathways to the muscles fire in either case.

ISBN No. 978-93-84309-17-6

In this cognitive process the mind is used to create an experience that is not unlike the physical event. The goal is to train mind to work on all aspects of performance. For example, recalling best performance, correcting technical errors and putting oneself in different situations under all sorts of conditions to help take away the element of surprise. The purpose is to achieve in mind exactly what a performer wants his body to do. It involves the Sport person imagining themselves in an environment performing a specific activity using all of their senses (sight, hear, feel and smell). The use of imagery is more than just a "visual" experience. Sport persons use many other modalities or senses when applying imagery, such as auditory and kinaesthetic, which may be even more important especially for kinaesthetic learners and performers. Imagery includes many senses, such as visual, auditory, kinaesthetic, olfactory, and touch. Performers or Sport persons can imagine or re-create all of their normal senses via mental imagery or imagination. The most important task for the mental game coach is to discover the person's dominant learning style or performance mode. The images should have the Sport person performing successfully and feeling satisfied with their performance. It should not focus on the outcome but on the actions to achieve the desired outcome.

Imagery can be used to:

- Familiarise the Sport person with a competition site, a complex play pattern or routine etc.
- Motivate the Sport person by recalling images of their goals for that session, or of success in a past competition or beating a competitor in competition
- Perfect skills or skill sequences the Sport person is learning or refining
- Reduce negative thoughts by focusing on positive outcomes
- Refocus the Sport person when the need arises e.g. if performance is feeling sluggish, imagery of a previous best performance or previous best event focus can help get things back on track
- See success where the Sport person sees themselves performing skills correctly and the desired outcomes
- Set the stage for performance with a complete mental run through of the key elements of their performance to set the Sport person's desired pre-competition feelings and focus.

The mental practice of specific performance skills helps improving problem solving, performance review and analysis, preparation for performance. It positively affects psychological states such as self-efficacy, decreasing anxiety and enhancing self confidence (Garza & Feltz, 1998; Post & Wrisberg, 2012) and helps in developing pre-competition and competition strategies, coping with new situations without being surprised, focusing attention etc. When combined with relaxation it is useful in the promotion of rest and recovery, removal of stress related reactions or muscular tension and in establishing an optimal level of arousal. It is also beneficial for use as a coping strategy, maintaining existing skills, and reviewing past performances (Thelwell & Maynard, 2002; White & Hardy, 1998).

Smith (1987) identified five basic principles of the application of imagery in sport. These five principles include:

- Imagery skills can be developed.
- The athlete must have a positive attitude relative to the effectiveness of imagery.
- Imagery is most effective when used by skilled athletes.
- Knowing how to relax is a necessary precursor to the effective use of imagery
- There are two kinds of imagery, internal and external.

There are many theories and body of literature that tried to explain how imagery works but the most popular amongst them are psycho neuromuscular, symbolic and informational theories.

1. Psycho neuromuscular Theory(Muscle Memory): This theory states that as athletes engage in sport movement, their brains are constantly transmitting impulse to the muscles for execution of the

ISBN No. 978-93-84309-17-6

movement. Similar impulses occur in the brain and muscles when athletes imagine the movements without actually performing them. Thus, the psycho neuromuscular theory asserts that vivid imagined events produce innervations in our muscles similar to that produced by the actual physical execution of the event. Coaches and athletes should know that mental imagery strengthens their muscle memories by having the muscle respond in the correct sequence without actually executing the movement. (William 2009).

2. Symbolic Learning Theory (Mental Blueprint): In this theory, imagery may function as a coding system to help athletes acquire or understand movement patterns. All movements that we make must first be encoded in our central narrow system; we must have a blue print or code their movement into symbolic components, thus making the movement more familiar and perhaps more automatic. For example, a gymnast can use imagery to cue himself, on the temporal and spatial elements involved in performing a balance beam routine (Smith 2009) (William 2009).
3. Bio-informational Theory: This theory assumes that a mental image is an organized set of propositions or characteristics stored in the brain's long-term memory; (Wrisberg 2000). When individuals engage in imagery, they activate stimulus characteristics that describe the content of the image for them and response characteristics that describe what their responses are to the stimuli in that situation. According to bio informational theory, for imagery to facilitate athletic performance, response characteristics must be activated so they can be modified, improved and strengthened. By repeatedly accessing response characteristics for a particular stimulus situation and modifying these responses to represent perfect control and execution of a skill, imagery is predicted to enhance performance, Smith (2000), and Hecker (2008).

Although there is an abundance of evidence highlighting imagery's effectiveness, the mechanisms behind its success has remained inconclusively answered. More traditional imagery theories are thought to provide vague or inadequate explanations and have therefore been criticized. However due to advancements in brain imaging techniques, the most recent theory emerging from neuroscience research is the theory of Functional Equivalence. This theory proposes that when a person images, they activate similar areas of the brain which also become active if the individual actually engages in the task. It is thought that this activation through imagery can strengthen the neural activity which would occur during execution of the movement and consequently improve motor output and sporting success. This activation of neural areas during imagery can also lead to other physiological responses which are reflective of the actual situation such as increases in heart rate and ventilation frequency, and muscle activity.

There are four factors that impact the quality of mental imagery: perspective, control, multiple sense, and speed.

1. **Imagery perspective:** Imagery perspective refers to where the "imagery camera" is when the athlete does imagery. The internal perspective involves seeing oneself from inside the body looking out, as if actually performing sport. The external perspective involves seeing oneself from outside body like on video. Research indicates that one perspective is not better than the other. Most people have a dominant perspective with which they're most comfortable.
2. **Control:** Imagery Control is how well an athlete able to imagine what he wants to imagine. It's not uncommon for Sport persons to perform poorly in their imagery and it often reflects a fundamental lack of confidence in their ability to perform successfully. If mistakes occur in imagery it's important to just not let them go by. If done so, an athlete further ingrains the negative image and feeling which will hurt performances. Instead, when performed poorly in imagery, it's vital to immediately rewind the "imagery video" and edit the imagery video until it is done correctly.
3. **Multiple senses:** Good imagery is more than just visual. The best imagery involves the multi-sensory reproduction of the actual sport experience. The duplication of the sights, sounds, physical sensations,

ISBN No. 978-93-84309-17-6

thoughts, and emotions that would be experienced in an actual competition is more effective. The most powerful part of mental imagery is feeling it body.

4. **Speed**: The ability to adjust the speed of imagery will enable to use imagery in improving different aspects of sports performance. Slow motion is effective for focusing on technique. When first starting to work on technique, slowing the imagery video down, frame by frame if necessary is helpful to see executing the skill correctly. Then, as see and feel oneself performing well in slow motion, increasing the speed of imagery until can perform well at "real-time" speed is effectual.

According to the purpose of use imagery can be classified into five main categories-

- **Cognitive Specific:** The purpose is to develop skills and techniques to improve performance
- **Cognitive General:** The reasons include strategy planning, development, and execution
- **Motivational Specific:** The purpose is to help athletes understand what it takes to achieve their goals
- **Motivational General Arousal:** It is using imagery to regulate emotions and arousal levels such as psyching up or relaxing
- **Motivational General Mastery:** When an athlete uses imagery for things such as staying focused, confident and mentally tough

The PETTLEP model of imagery

In 2001, Holmes and Collins proposed a model of imagery that highlights the link between physical and imagined movements. The model is based on work by Jeannerod (1994; 1997) which proposes that there are certain shared areas in the brain that are activated during both physical and imagined movements. This is defined as "functional equivalence" and is hypothesized as the means by which imagery can improve performance. It is suggested that if there is a greater similarity between the image and the physical movement (i.e. a greater degree of functional equivalence), it may help to add more detail to the image and enhance the vividness of the image.

PETTLEP is an acronym which stands for 7 key elements to include during imagery to create the most functionally equivalent image possible.

- Physical – Imaging the relevant physical characteristics.
- Environment – imaging the environment where the performance takes place.
- Task – trying to image details relevant to the task (e.g. attentional demands) and image at the appropriate level of expertise for the performer
- Timing – the most functionally equivalent approach is to image in 'real time', but 'slow motion'
- Imagery can be used to emphasise and perfect more difficult aspects of a skill (O & Hall, 2009).
- Learning – the imagery should be continually adapted and reviewed over time to match changing task demands and the experience level of the Sport person.
- Emotion – include the same images that would be felt in the physical situation however avoiding debilitative emotions (e.g. fear, panic).
- Perspective – the imagery perspective can be first person (through own eyes) or third person.

However, one perspective may be more advantageous depending on the task characteristics. A first person perspective (or internal visual imagery) may be more beneficial for tasks including open skills and with a focus on timing. On the other hand, a third person perspective (or external visual imagery) is preferred for tasks where form and positioning is important (Hardy & Callow, 1999).

The elements are a combination of traditional characteristics which have been employed in imagery studies for many years (e.g., task and perspective), and those which are relatively novel and can sometimes defy more traditional approaches (e.g., physical, timing). Since its creation the PETTLEP model has been incorporated into numerous studies and results have been supportive, indicating the more elements

ISBN No. 978-93-84309-17-6

incorporated, the more successful imagery tends to be on athletic performance. As a result the PETTLEP model has become a well established and popular tool used by maximise imagery's effectiveness.

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