

# EFFECTS OF IMAGERY ABILITY AND IMAGERY USE ON THE PERFORMANCE OF HOCKEY PLAYERS

Fozia Tabassum, Rabia Wali, Bilal Ahmed Baig

## Abstract:

*The concept of Sports Imagery Ability (SIA) and Sports Imagery Use (SIU) was considered to be the most important towards the player's performance. The main objectives of the present study are to provide better understanding of relationship among imagery ability, imagery use and performance of hockey players through a statistical model and to determine the impact of gender, playing level and experience on imagery ability, imagery use in sports. A sample of 58 hockey players (males=41, females=17) were selected from National Hockey Camp (NHC), Government College University (GCU), and Lahore College Women University (LCWU). The (adopted) Sports Imagery Ability Questionnaire (SIAQ), the Sports Imagery Questionnaire (SIQ) and Field Hockey Performance Measurement Scale (FHPMS) were used for data collection. Cronbach's Alpha, Descriptive statistics, correlation, regression and t-test statistics were applied for analysis. Data reliability was 0.87. SIA, SIU and performance levels of the participants were above moderate level. Male had higher SIA and SIU as compared to their counterpart. The SIA level of NHC players was at first, GCU players at second and LCWU players at third. SIA, SIU and performance of the players were significantly ( $p<0.01$ ) and positively correlated with each other. SIA and SIU had positive and significant ( $P<0.05$ ) impact on performance of players. Gender had no significant ( $P>0.05$ ) effect on SIA, SIU and performance. Age had no significant ( $p<0.05$ ) effect on SIA and performance but it had significant ( $p<0.05$ ) effect on SIU. University, club and national playing levels had no significant ( $p<0.05$ ) effect on SIA, SIU and performance, however, international explorer had significant ( $p<0.05$ ) effect on performance. Experience had non-significant ( $P>0.05$ ) effect on SIA and performance but it had significant ( $p<0.05$ ) effect on SIU. National hockey players reported that gender and age had no association with imagery ability. Imagery ability and imagery use had positive correlation with performance, but both these had no association with level of playing. This study will be helpful to identify the best types of mental practices that are very effective in enhancing the players' performances.*

**Keywords:** Imagery Ability, Imagery Use, Performance, Hockey players, mental visualization

## Introduction:

Motivation cause behind It also affects one's behavior, and one's actions, desires, and needs. the reason one wants to repeat a

behavior. Imagery is a useful technique of sport psychology that is widely used in the training of players in all sports for best performance [1]. Mental imagery is used by players in their competitions and training sessions to improve motivation, as well as emotional competitions [2]. It performs two functions, motivational and cognitive. Motivational function represents emotions and specific goals while the cognitive function involves the mental approach. It is reported that in examining the imagery ability variability exists in sport [3]. Studies in the field of sport psychology have concluded that there are individual differences in imagery skills [4].

Imagery is a natural way of thinking that involves our senses. Imagery is a type of thinking that has particularly strong effects on emotions and our physiology. Several terms are used to explain a player's mental training for coming competition. It involves mental practice and visualization. It's a kind of simulation, same sense of experience, even though the total experience takes place cognitively [5]. Images are made by recalling from memory seg-

ments of information stored through several types of experiences and convert them into significant representations [6].

The mental practice had been utilized since many decades and its impact was proven to improve players' performance [7]. It has been proved by various researches that imagery had large tendency to enhance performance, self-confidence and concentration and reduce anxiety. So, imagery is the most vital technique which is used to improve the sports performance of players in all competitive situations [8].

Mental rehearsals refer to in mind training for competition and it has been pooled with physical practice to perform the excellent performance effects [9]. Imagery rehearsal can be emotional, visual and kinesthetic. Imagery ability and imagery use have positive and significant correlation with each other and they have positive impact on performance.

#### **A. Imagery**

The term imagery has been used in various ways which have been overlapped [10]. However, in sports, imagery can be defined as:

- "the creation and re-creation of an experience generated from memorial information, involving quasi-sensorial, quasi-perceptual, and quasi-affective characteristics, that is under the volitional control of the imager, and which may occur in the absence of the real stimulus antecedents normally associated with the actual experience" [11, 12].

"Imagery can also be defined as visualization or mental rehearsal. Imagery means using all of your senses, for example feel, see, hear, smell and taste, to practice your sport in your mind. It is also called mental rehearsal to create or recreate an event or image in your mind" [13].

## **B. Types of Imagery**

Imagery can be divided into two types [14].

### **i. Internal Imagery**

It occurs when imaging the execution of specific skill from your own point of interest. In other words, it is a kind of imagery in which an individual will imagine what he would feel inside his own body by kinesthetic feedback if he performed a particular skill. Internal imagery is

an imagery that players visualize themselves as doing the activity.

### **ii. External Imagery**

It occurs when someone views one's self from the point of external observer. In another way it may be defined as this imagery occurs when the player watches the opposite player in a competition or in a video clip to see the match competitions. External imagery produces little mental responses as compared to internal imagery. So, it is not effective in developing muscle forces [15]. The correlation of internal imagery with sports performance is higher than the external imagery [16].

## **C. Imagery Ability**

"Imagery ability is a capability of an individual for making vivid, to control imagery and keeping hold for sufficient period of time to affect the desired practice". Imagery is a significant variable in sport context when employing it scientifically.

Imagery called task oriented gauges where the subject decides on three scenes related to sport and each image scene is for only 60 seconds. After imaging the scene, the subject answers to the

given statements that measure five following imagery dimensions, and these five items involve six senses during imagery and the experience of emotion [17]. There are senses as Visual, auditory, kinesthetic (muscles movement), olfactory (smell), gustatory (taste), and tactile (touch).

#### **D. Imagery Use**

Imagery use can be defined as: - "The use of imagery to attain a variety of cognitive, behavioral and affective changes". The world's best players such as Tiger Woods from golf, Yelena Isinbayeva from track & field, Roger Federer from tennis and Cristiano Ronaldo from football uses imagery to improve their skills and performance [18]. Imagery can be defined in the words as "an experience that imitates real experience". It is different from thoughts or dreams in which a person is conscious, when he creates an image" [19]. It means that imagery can occur in the absence of real stimulus. Research shows that imagery is simple and easy to use. It is very proficient for sports performance [20]. Imagery can be used to improve the following aspects of a player's performance [21].

1. To improve the technical skills
2. To learn new strategies and tactics
3. To develop mental processes
  - i. Confidence
  - ii. Anxiety
  - iii. Motivation
  - iv. Arousal levels

Reference described an analytical framework which is most useable and significant frameworks. It can be used to learn the functional roles through which imagery affects the players' performance. It is suggested that imagery had motivational and cognitive functions, which lead to four categories of imagery. These are motivational specific, cognitive specific, motivational general and cognitive general[22].

Different models have determined how imagery task has been developed in image processing in sports field. First approach is that how imagery tasks can be provided through the psycho neuromuscular theory [23]. This approach suggests that imaged actions produce parallel innervations in body muscles in contrast to real physical implementation of the movement. In second approach that is called a

symbolic learning theory [24], hypothesized that imagery works as a cognitive coding system that provokes players to attain movement patterns. In next model of imagery theory is called an information processing system [25] in which it is defined that how an injury in brain has effect on imagery ability. Some other theories define that imagery is a personalized experience [26, 27]

The image somatic meaning model defines three components:

1. Multisensory signals.
2. Physiological and emotional somatic factors to image.
3. The image meaning.

The theory of bio-informational defines that image has been stored in long run memory in an organized pattern of stimulus intent associated to response proposals, such as, the feelings of racquet in hand. The response goals describe reactions to the stimuli in the situation of imagery. For example, the muscle tension in the hand.

Several studies demonstrate the association between imagery ability, learning and performance

of motor skills [28]. The psychologists had attempted to determine the variations in imagery ability and its use, but un-luckily, they have not been completely succeeded to measure imagery ability. In general measurements of imagery ability consists of following categories [29]:

1. Self-Report
2. Projective
3. Behavioral
4. Physiological Measures

The more commonly used techniques are subjective testing, self-report procedures; these are based on individual's subjective experience and contain 4 to 7 point of Likert scales [30]. Some investigations suggest that subjective approaches have significant association, and these are more suitable.

## **II. TYPES OF IMAGERY USED IN SPORTS**

### **A. Cognitive Specific (CS)**

This technique is widely used to develop a specific skill by imagery. CS imagery facilitates to learn and performing of general motor skills. This type of imagery refers to the execution of specific skills in sports.

**B. Cognitive General (CG)**

This function of imagery is used to prepare the entire game plans and strategies.

For example, "I can image different strategies if my game plan fails" [31]. The player must imagine all possibilities of game results and plan ahead.

**C. Motivational Specific**

The MS imagery is used to enhance the motivation and goals. For example, "I imagine myself winning a medal". It is stated by reference that when motivation is enhanced then goals and imagery might be gone hand in hand.

**D. Motivational General-Mastery (MG-M)**

MG-M measures self-control, confidence and challenging situations and it can improve sport confidence especially in pressure.

**E. Motivational General Arousal (MG-A)**

MG-A is associated to competitive anxiety and arousal. For example, "I imagine stress and anxiety associated with competition". It is used by players to increase arousal levels and decrease competitive anxiety.

Studies about sport imagery have shown that the imagery ability and imagery use with respect to their sports may lead to differences in their imagery ability and imagery use [32]. The particular significant in the study is how hockey players have utilized their imagery ability. Reference studied first time on imagery use in football players that the cognitive and motivational functions of imagery[33]. Their study has indication that imagery can be used mostly in competition rather in training. The role and quantity of imagery used was dependent on skill level. The imagery used level of elite players was higher than the imagery of novice football athletes and they utilized imagery for both cognitive and motivational functions. On other hand, novice football players used less cognitive imagery than motivational imagery. Football players used visual and kinesthetic imagery equally. Another research has been done to examine the effect of imagery on football players. On the basis of past studies this research investigates the effect of imagery ability and imagery use on hockey players' performance.

The imagery system may be utilized to help an individual to meet some personal or professional performance. But it is most significant and beneficial when it is used for a specific purpose [34]. The imagery is used in several different tasks in sports. The sports imagery can be described as using of all human senses to create or recreate a sport experience in the mind with the goal of improving player's performance during competition or training [35]. It was explained that a human brain recalls and reconstructs the segments of information stored in human memory to create a meaningful image.

Previous researches suggest that imagery can facilitate learning and improve motivation levels of players [36], so it is important to know that imagery ability and its uses among young hockey players at college and club levels. Few studies have engaged with hockey players [37], which are useful for improving performance in adults [38]. Imagery intervention with youth athletes showed a positive impact on performance [39]. Some studies also suggest the positive effect of scientific imagery coaching of young athletes. Previous studies in-

dicating that imagery ability can be improved significantly between 7 and 17 years of age. A study conducted with 16 to 18 years of age players from different types of sports completions, it illustrates that youth athletes reported to use most frequently MG-M imagery, and after that CS, MS, CG and MG-A respectively. It is also reported that the imagery use is positively correlated with the practice volume. Furthermore, the young athletes stated that they had used imagery in training and in competition motivational and cognitive functions [40, 41]. It is noted that the strong correlation of imagery ability with its use has been found in the youth participants. However, the results are still rare about the interrelation between imagery ability, use and performance.

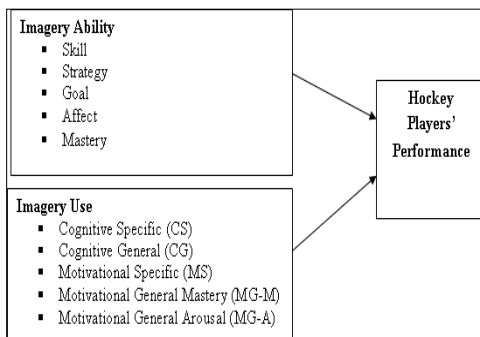
### **III. PROBLEM STATEMENT**

Mental imagery has significant effect on human health and plays a vital role for precise physical activities. The problem of the study is to examine the impact of kinesthetic and visual imagery ability and imagery use on hockey players' performance in relation with gender, playing level and experience of sports participation.

### A. Theoretical Framework

On the basis of models as defined in Table-1 & 2, this study suggests the following theoretical model which will be tested under some hypothesis through empirical data collected from the hockey players of different teams of colleges and clubs of Lahore. The independent variables are imagery ability which comprises of strategy, goal, affect, and mastery, and imagery use comprising of cognitive specific (CS), cognitive general (CG), motivational specific (MS), motivational general mastery (MG-M), motivational general arousal (MG-A).

**Fig.-1: Proposed model of imagery ability & imagery use in field hockey.**



### B. Rationale of the Study

The purpose of the study is to investigate the imagery ability and usage of imagery among

hockey players at college, university, club and national level. Furthermore, this study has also aimed to examine the impacts of different kinds of mental image-ries like that CS, CG, MS, MG-A, and motivational general mastery on hockey players' performance. This study will be helpful to indicate the most excellent categories of mental practices that are more efficient in enhancing the performance.

### IV. OBJECTIVES

Following are the major objectives of this article.

1. To determine the imagery ability and usage of imagery among hockey players.
2. To determine the association between imagery use, imagery ability, and hockey players' performance.
3. To examine imagery usages among hockey players from various ranking such as college/university, district and national levels of sports.
4. To examine the gender effect on imagery ability and imagery use

### V. HYPOTHESES

Following are the major assumptions to propose hypotheses of the research study.

- $H_0$  There is no use of mental imagery among hockey players.
- $H_0$  Imagery use, imagery ability, and hockey players' performance have no association.
- $H_0$  The level and time of sport participation have no effect on players with respect to imagery ability and its use.
- Gender has no effect on imagery ability and imagery use.

## **VI. METHODOLOGY**

### **A. Design of Study**

Research design for this study is descriptive and cross sectional in nature.

### **B. Population and Sample**

The total population was 68 elite players, 28 male elite players from National Hockey Camp, Lahore, 20 male hockey players from Government College University (GCU), Lahore and 20 female hockey players from Lahore College Women University (LCWU), Lahore. A sample size of 58 players were selected through stratified random sampling technique.

### **C. Procedure**

The players (n=58) had been personally approached through their respective college / univer-

sity management and coaches during the intercollegiate tournaments and at National Hockey camp in Lahore. All players responded well and received an intimation letter. After agreeing to participate in the study, all players are briefed about imagery ability and imagery use concepts and guidelines that how can they imagine and how can they utilize their mental imagery during training and competitions. They completed the SIAQ and SIQ questionnaires after one or two days of the competitions. The evaluation scores of each participant are obtained from their coaches / managers through SPMS and the official competition results are also collected for data accuracy. The data reliability of the scales SIAQ, SIQ were 0.75 and 0.82 respectively.

### **D. Data Analysis Tools**

The Cronbach's alpha reliability test for questionnaires is applied and level of significance  $\alpha=0.05$  is used for testing of hypothesis. Statistical Package for Social Sciences (SPSS) version 20 is used for data coding, compiling and analysis. Regression, t-test and Nova are used to analyze the data.

## VII. Results

**Table-1: Bio-Graphical Statistics of the Participants (n=58).**

Variable	Categories	Frequency	Percent
Gender	Male	41	70.7
	Female	17	29.3
Institute	NHC	24	41.4
	LCWU	17	29.3
	GCU	17	29.3
Level of Playing	University	24	41.4
	Club	7	12.1
	National	20	34.5
	International	7	12.1
Experience(Years)	1 – 5	38	65.5
	6 – 10	13	22.4
	11 – 15	7	12.1
Age(Years)	15 – 20	28	48.3
	21 – 25	26	44.8
	26 – 30	4	6.9

**Table-2: Gender wise Statistics of SIAQ, SIQ & FHSFM**

Variables	Female (n=17)		Male(n=41)		Total(n=58)	
	Mean	SD	Mean	SD	Mean	SD
SIAQ	3.51	1.21	3.68	1.05	3.63	1.10
SIQ	3.27	0.99	3.55	0.98	3.47	0.99
FHPMS	3.85	0.67	3.99	0.87	3.95	0.82

**Table-3: Correlation Coefficients of Score Variables.**

Variables	SIAS		SIUS		PS	
SIAS	1		0.48**		0.60**	
SIUS			1		0.61**	
PS					1	

### A. Regression Model

Performance = f (imagery ability, imagery use) + error term

$$PS = \beta_0 + \beta_1(SIAS) + \beta_2(SIUS) + ePS = 8.91 + 0.14 (SIAS) + 0.14 (SIUS)$$

## B. Model Summary

**Table- 4:  
Summary of Regression Model**

Items	R	R <sup>2</sup>	Adj R <sup>2</sup>	S.E	F	p
Values	0.71	0.50	0.48	1.92	27.35	0.000

**Table- 5:  
Regression Coefficients**

Variables	Coefficients	S.E	t	p-value	VIF
Constant	$\beta_0 = 8.91$	2.02	4.42	0.00	--
SIAS	$\beta_1 = 0.14$	0.04	3.69	0.00	1.30
SIUS	$\beta_2 = 0.14$	0.04	3.85	0.00	1.30

R=Correlation Coefficient, R<sup>2</sup>=Coefficient of Determination, SE=Standard Error of Estimate, F= F-statistic Value; Independent Variables= SIAS, SIUS, Dependent Variable=PS; level of significance= $\alpha=0.05$

## C. T-Test for Independent Sample

**Table-6:  
T-Test Results for Gender Group**

Variables	T	df	p	SE	95% CI	
					Lower	Upper
SIAS	-1.096	56	.278	2.27	-7.04	2.06
SIUS	-1.864	56	.068	2.23	-8.63	0.31
PS	-1.051	56	.298	0.77	-2.35	0.73

## **VIII. RESULTS AND DISCUSSION**

The data of 58 (male=41, female=17) hockey players from National Hockey Camp, Government College Women University and Government College University, Lahore is analyzed to identify the relationship between imagery ability, imagery use and performance of the players. The responses are collected through sports imagery ability questionnaire (SIAQ), sports imagery questionnaire (SIQ) and field hockey performance measurement (FHPM) scales.

The ratio of female participants is 29.3% and male players are 70.7%. The ratios of national and international player from Pakistan national hockey camp is 41.4% and the ratio of LCWU and GCU is 29.3% of each.

The ratios of international, national, club and university players are 12.1, 34.5, 12.1 and 41.4 percent respectively. Only seven players have more than 10 years' experience, while 65.5% of the players have 1 to 5 years' experience at their particular level. Only 6.9% of the participants are more than 25 years, 48.3% of the

players are 15 to 20 years old. The average age of the players is 20.83 years. Riberiro et al.(2015) studied the use of imagery by soccer goalkeepers. The results of this study described that athletes used imagery for cognitive and motivational purposes. The motivational function was slightly more used and up to 21 years old players used imagery significantly less than their elder counterparts.

Mean values of sports imagery ability and imagery use show that imagery ability and use level of the participants are above moderate level. The SIAQ level of NHC player is at first, GCU players at second and LCWU players at third place. Ville (2014) examined whether team sports and individual athletes differ in their imagery use and imagery ability, and to examine whether level and duration of sport involvement are variables which have effects on athletes on the basis of their levels of imagery ability and imagery use. He found that individual athletes had significantly ( $p < 0.001$ ) higher means in kinesthetic imagery ability.

All three variables, imagery ability, imagery use and perfor-

mance are significantly ( $p < 0.01$ ) and positively correlated with each other. Sports imagery use and performance are highly correlated ( $r = 0.61$ ). The independent variables, sports imagery ability and sports imagery use are positively and significantly correlated with performance, dependent variable. Parnabas et al. (2015) studied the cognitive function (CF) and motivational function (MF) of imagery. The main purpose of their study was to correlate the use of imagery and performance of swimmers. Correlation analysis was used to measure the relationship between sports performance and imagery. Their results showed that there was a positive correlation between sports performance and internal imagery ( $r = 0.77$ ;  $p < 0.01$ ), and external imagery ( $r = 0.74$ ;  $p < 0.01$ ).

The values of  $R^2$  and adjusted  $R^2$  are 0.50 and 0.48 respectively; show that 50% of the variability in performance can be explained by the regression model. Similarly, the results are indicating that over-all model (1) is significant ( $p < 0.01$ ). The regression coefficients  $\beta_1$  and  $\beta_2$  are positive. Therefore, sports imagery ability

and sports imagery use have positive impact on performance of hockey players, while  $t$  and  $p$  values show that both the said variables are significant ( $p < 0.05$ ). Gregg et al. (2015) investigated the relationship between cognitive specific (CS) imagery use and performance. They selected 100 (male = 53, female = 47) athletes volunteered to participate. Sport Imagery Questionnaire (SIQ) and the Movement Imagery Questionnaire (MIQ) were used. Their study showed that imagery ability explained 20 to 41% of the variability in the use of the functions of imagery can be explained by regression model.

Descriptive statistics with respect to gender show that the male hockey players have high imagery ability, imagery use and performance score as compare to their counterpart but  $t$ -test results for gender group show that gender has no significant ( $P > 0.05$ ) on SIA, SIU and performance of male and female players. Parker et al. (2015) investigated the frequency of imagery use among National Collegiate Athletic Association (NCAA) Division III collegiate athletes. He also examined the influence of athlete gen-

der and sport skill type. He used SIQ to assess the frequency of imagery use between males and females as well as between open-skill sports (such as basketball, hockey, etc) and closed-skill sports (such as golf, track, etc.). He applied multiple regression analyses. The results indicated that male athletes use imagery more frequently as compare to female players.

Similarly, sports imagery use, ability and performance of the players of age group 21-28 years have higher imagery use, ability and performance as compare to the imagery of 17-20 years old players. The t-test shows that age have no significant ( $P>0.05$ ) impact on imagery ability and performance but significant ( $p<0.05$ ) impact on imagery use.

The imagery ability, imagery use and performance levels of the hockey players with respect to university, club, national and international levels are above moderate level. There are non-significant ( $P>0.05$ ) differences between the mean scores of imagery ability and imagery use of the players with respect to university, club, national and international

al levels, while the players who play at international level have significantly ( $p<0.05$ ) high performance.

#### **A. Conclusion**

The main objectives of the study were to examine the relationship between imagery ability, imagery and performance of hockey players and to develop a regression model for prediction of performance based on SIA and SIU. Over-all imagery ability, imagery use and performance levels of the participants were above from moderate level. Male had higher SIA and SIU as compared to the imagery ability of female players. The sports imagery ability level of NHC players was high as compared to GCU and LCWU players. Sports imagery use level of NHC players was above moderate, while, LCWU and GCU players were at moderate level. Sport imagery ability, imagery use and performance were significantly ( $p<0.01$ ) and positively correlated with each other. Sports imagery ability and sports imagery use had positive and significant ( $P<0.05$ ) effect on performance of hockey players. Gender and age had no significant ( $P>0.05$ ) effect on imagery use,

ability and performance of the hockey players. University, club and national levels of playing had no significant effect on SIA, SIU and performance while international players were good performer. Experience had non-significant ( $P > 0.05$ ) effect on imagery ability and performance but significant ( $p < 0.05$ ) on imagery use.

### **B. Suggestions and Recommendations**

Several significant imagery types that affect the performance of hockey players such as internal and external imagery may be studied. The results of this investigation may be used to compare the performance of other games (football, basketball, cricket, tennis, etc.). This study includes only the players of National Hockey Camp, Government College University and Lahore College Women University, therefore, future research may include players from other clubs or universities or schools.

### **C. Limitations**

Only 58 hockey players are selected for this study. The results cannot be generalized for the players of all universities or

colleges in the Punjab or Pakistan. However, a study with large sample from all over the province or the country may verify the results of this investigation. Adopted scale are used; standardized questionnaires for local environment may be adapted for better comparison of imagery ability and imagery use. Marital status, social status, family environment, social culture, government sports policies and other weather conditions which may affect the imagery and performance of the players are not included in this study.

### **REFERENCES**

- V. Peltomäki: Imagery ability and imagery use in individual and team sports, Master Thesis, Department of Sport Sciences, Sport and Exercise Psychology, University of Jyväskylä, 2014.
- B. A. Simonsmeier and S. Buecker: Interrelations of imagery use, imagery ability, and performance in young athletes, *Journal of Applied Sport Psychology*, vol. 29, pp. 32-43, 2017.
- S. M. Murphy and D. P. Jowdy: Imagery and mental practice, 1992.
- P. R. Thomas, A. J. Furst, and G. J. Fogarty: Individual Differences in Cognitive Processes and Golf Performance, Routledge International Handbook of Golf Science, 2017.

- K. A. Martin, S. E. Moritz, and C. R. Hall: Imagery use in sport: A literature review and applied model, *The sport psychologist*, vol. 13, pp. 245-268, 1999.
- R. S. Weinberg and D. Gould: *Foundations of sport and exercise psychology*, 2018.
- S. Mousavi and A. Meshkini: The effect of mental imagery upon the reduction of athlete's anxiety during sport performance, *International Journal of Academic Research in Business and Social Sciences*, vol. 1, pp. 342-346, 2011.
- R. H. Cox and McGraw-hill: *Sport psychology, Concepts and applications*, 2011.
- S. M. Murphy and K. A. Martin: The use of imagery in sport in In T. S. Horn, *Advances in sport psychology* (p. 405-439), 2002.
- C. Collet, F. Di Rienzo, N. Hoyek, and A. Guillot: Autonomic nervous system correlates in movement observation and motor imagery, *Frontiers in human neuroscience*, vol. 7, p. 415, 2013.
- T. Morris, M. Spittle, A. Watt, and S. Fletcher: Technical aids to imagery, *Imagery in Sport*, pp. 237-266, 2005.
- T. Morris, M. Spittle, and A. P. Watt: *Imagery in sports*, 2005.
- S. E. Short, L. Ross-Stewart, and E. V. Monsma: Onwards with the evolution of imagery research in sport psychology, *Athletic Insight*, vol. 8, pp. 47-63, 2006.
- K. Ampofo-Boateng: *Understanding sport psychology*, Pusat Penerbitan Universiti, Universiti Teknologi, 2009.
- V. K. Ranganathan, V. Siemionow, J. Z. Liu, V. Sahgal, and G. H. Yue: From mental power to muscle power—gaining strength by using the mind, *Neuropsychologia*, vol. 42, pp. 944-956, 2004.
- V. Parnabas, J. Parnabas, and A. M. Parnabas: Internal and External Imagery on Sports Performance among Swimmers, *European Academic Research*, vol. 2, pp. 14735-14741, 2015.
- T. Elfving, D. Riches, T. Lintunen, T. Watt, and T. Morris: Reliability, factor structure, and criterion validity of the Sport Imagery Ability Measure (SIAM) in athletes from Finland, *Proceeding of the Xth World Congress of Sport Psychology*, pp. 49-51, 2001.
- A. Moran: *Sport and exercise psychology: A critical introduction*, 2004.
- A. White and L. Hardy: An in-depth analysis of the uses of imagery by high-level slalom canoeists and artistic gymnasts, *The Sport Psychologist*, vol. 12, pp. 387-403, 1998.
- M. Gregg, C. Hall, and E. Nederhof: The Imagery Ability, Imagery Use, and Performance Relationship, *Sport psychologist*, vol. 19, 2005.
- J. Cumming and S. E. Williams: The role of imagery in performance, *Handbook of sport and performance psychology*, pp. 213-232, 2012.

- A. Paivio: Cognitive and motivational functions of imagery in human performance, *Canadian journal of applied sport sciences. Journal canadien des sciences appliquées au sport*, vol. 10, pp. 22S-28S, 1985.
- E. Jacobson: Electrical measurements of neuromuscular states during mental activities: II. Imagination and recollection of various muscular acts, *American Journal of Physiology-Legacy Content*, vol. 94, pp. 22-34, 1930.
- R. S. Sackett: The influence of symbolic rehearsal upon the retention of a maze habit, *The Journal of General Psychology*, vol. 10, pp. 376-398, 1934.
- M. J. Farah: The neurological basis of mental imagery: A componential analysis, *Cognition*, vol. 18, pp. 245-272, 1984.
- A. Ahsen: ISM: The Triple Code Model for imagery and psychophysiology. *Journal of mental imagery*, 1984.
- P. J. Lang: Imagery in therapy: An information processing analysis of fear, *Behavior therapy*, vol. 8, pp. 862-886, 1977.
- S. Goss, C. Hall, E. Buckolz, and G. Fishburne: Imagery ability and the acquisition and retention of movements, *Memory & cognition*, vol. 14, pp. 469-477, 1986.
- R. B. Tower: Imagery measurement in clinical settings: Matching the method to the question in Concepts, Results, and Applications: Springer, 1981, pp. 79-92.
- R. S. Vealey and S. Walter: Imagery training for performance enhancement and personal development, *applied sport psychology: Personal growth to peak performance*, vol. 2, pp. 200-221, 1993.
- C. R. Hall, W. M. Rodgers, and K. A. Barr: The use of imagery by athletes in selected sports, *The Sport Psychologist*, vol. 4, pp. 1-10, 1990.
- E. Kizildag and M. Ş. Tiriyaki: Imagery use of athletes in individual and team sports that require open and closed skill, *Perceptual and motor skills*, vol. 114, pp. 748-756, 2012.
- J. Salmon, C. Hall, and I. Haslam: The use of imagery by soccer players, *Journal of Applied Sport Psychology*, vol. 6, pp. 116-133, 1994.
- M. B. Andersen: *Doing sport psychology*, 2000.
- B. Morel, D. M. Rouffet, D. J. Bishop, S. J. Rota, and C. A. Hautier: Fatigue induced by repeated maximal efforts is specific to the rugby task performed, *International Journal of Sports Science & Coaching*, vol. 10, pp. 11-20, 2015.
- R. Weinberg: Does imagery work? Effects on performance and mental skills, *Journal of Imagery Research in Sport and Physical Activity*, vol. 3, 2008.
- J. K. Parker, M. I. Jones, and G. P. Lovell: An investigation into athletes' intrusive visual imagery, *Sport and Exercise Psychology Review*, vol. 11, pp. 34-42, 2015.

- C. R. Hall: Imagery in sport and exercise, *Handbook of sport psychology*, vol. 2, pp. 529-49, 2001.
- K. J. Munroe-Chandler, C. R. Hall, G. J. Fishburne, L. Murphy, and N. D. Hall: Effects of a cognitive specific imagery intervention on the soccer skill performance of young athletes: Age group comparisons, *Psychology of Sport and Exercise*, vol. 13, pp. 324-331, 2012.
- K. J. Munroe-Chandler, C. R. Hall, G. J. Fishburne, J. O, and N. Hall: The content of imagery uses in youth sport, *International Journal of Sport and Exercise Psychology*, vol. 5, pp. 158-174, 2007.
- K. J. Munroe-Chandler, C. R. Hall, G. J. Fishburne, and L. Strachan: Where, when, and why young athletes use imagery: An examination of developmental differences, *Research quarterly for exercise and sport*, vol. 78, pp. 103-116, 2007.
- R. V. Krejcie and Morgan: Determining sample size for research activities, *Educational and Psychological*, 1970.
- J. Ribeiro, J. Madeira, C. Dias, and R. S. Stewart. The Use of Imagery by Portuguese Soccer Goalkeepers. *Res. Sport Phys.* 2015