

The Effects of Using Mental Imagery with Male College Lacrosse Players to Increase
Performance

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Abstract

The purpose of this study was to investigate the effects that mental imagery had on the performance of male college lacrosse players. This study utilized a quasi-experimental design with a pre-measure, then treatment and post-measure. The study includes 27 Caucasian-male college lacrosse players, in the age range of 18-23. Data regarding students' performance was collected and interpreted by the researcher. The study hypothesized that using a mental imagery technique before a practice and/or game will have no effect on the level of an athlete's focus. The null hypothesis was rejected. The results indicated that there was a positive relationship between using mental imagery and the performance of the participants. The results of this study help to support research involving the relationship between attention and athletic performance. Recommendations for future research include using a larger sample size, selecting participants using randomization, using proven instruments and using statistical tests.

CHAPTER I

INTRODUCTION

Overview

Lacrosse, along with many other sports, has grown in the number of participants over the last few decades. Sports have also increased in complexity during these years as new rules, coaching techniques and technology have improved. In lacrosse, a coach may have many different offensive and defensive strategies which complicate things for the athletes who must perform them. It is becoming a common viewpoint of researchers that sports are becoming or are already more mentally demanding than have been viewed in the past. Most sports, like lacrosse are including increasing amounts of mental techniques to outsmart the opponents.

The present-day male college athlete's life is filled with distractions. It is difficult to focus on doing homework or studying while at the same time thinking about an upcoming event or game. Attention can be divided between two things such as academics and athletics, though when attention is divided, the results yielded are comparably lower than when a person can give his full focus to one thing. It is difficult to focus during practice and/or competition because lacrosse is a larger team sport than others. The athlete needs to be able to cooperate with several other players on his or her team who also may play different positions in the sport. This makes it increasingly more complex because of different positions and the number of players on the field at the same time.

It becomes progressively more difficult for an athlete to focus his attention on one thing such as practice or competition, especially when he has several other areas of his life that need attention. In addition to having classes to attend, and studying, a college student athlete thinks

about family, social relationships, an upcoming test, having a part-time job, and anything else that may affect or distract his thought process.

Usually the college athlete has to make a quick thought process transition when classes end for the day and practice begins. Research has shown in the past that males generally learn effectively through visualization. A tool such as mental imagery may be used to enhance an athlete's performance. "Mental imagery is attracting increasing attention from sports psychologists. It may be used as a cognitive tool for improving athletic performance" (Moran, 1993, p. 156). It is important for athletes and coaches to develop the mental aspect of the game as well as the physical.

Statement of the Research Problem

The purpose of this research was to determine if using metacognitive training affected college lacrosse players' performance through their focus or attention.

Statement of the Hypothesis

Using a Mental imagery technique before a practice and/or game will have no effect on the level of an athlete's focus.

Operational Definitions

Metacognitive training: any mental exercise that uses visualization and/or imagery of a skill or technique, which focuses on the actual performing of each sequence of the given skill. In this study, the metacognitive training used included performing given lacrosse skills and techniques within the context of a college level lacrosse practice and game.

Attention: the focusing or narrowing of a train of thought on certain given stimuli to learn a skill or task. In this study, the task was focusing attention on a task at hand to learn it affectively.

CHAPTER II

A REVIEW OF THE LITERATURE

This literature review explores issues related to college level lacrosse players' lack of attention, concentration or focus, during competition, and a strategy that may enhance an athlete's performance. Section one defines and describes attention and what is primarily involved with attention. Section two provides an overview of the different levels of athletic proficiency such as expert and novice. In section three, the use of mental imagery to positively affect and enhance an athlete's attention is discussed. The terms concentration and focus are used interchangeably in this review.

Role of Attention in Athletics

Attention is a key component in an athlete's performance. Attention impacts an athlete's comprehension when it comes to how well a skill is learned. "It is easy to see whether or not a person has been paying attention by asking the pupil to 'play back' what the teacher has said, or to teach it to someone else" (Wilson, 1995, p.36). This may demonstrate if a person was paying attention to the skill being taught, or if his/her thoughts were wandering from the task at hand. The most famous and widely used definition of attention comes from James (1890) (as cited by Singer, Hausenblas & Janelle, 2001). James defines attention as "the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought" (p.53). "Focalization, concentration, of consciousness, are of its essence. It implies withdrawal from some things in order to deal effectively with others" (Singer et al., 2001, p.53).

It is common for a coach to tell an athlete to pay attention, focus or concentrate. "Athletes almost always answer with 'okay' or 'I am trying to,' as if they know exactly what the

coach is asking them to do” (Howland, 2006, p.49). Howland suggests that there may sometimes be a misunderstanding between the athlete and coach which may be caused by either the coach needing to clarify further what he/she is asking, or the athlete needing to increase the focus of his/her attention.

Posner and Boies (1971) (as cited by Singer et al., 2001, p.54) identified three major uses of the term attention in the psychology literature: they are attention as alertness, attention as a limited capacity or resource, and attention as selectivity. Attention as alertness involves the awareness and arousal of an athlete. Attention includes environmental stimuli that are taken in through the senses. Human brains can only process a limited amount of stimuli. Occasionally the senses overload with stimuli and the brain is unable to process it all. The brain acts similar to a processor on a computer. It can only do so many tasks or commands at a time. This leads the brain to accept only the stimuli that it deems important to the task. It selects which stimuli receive attention.

Gunthrie (2003) states that “the processes involved in arousal are achieving and maintaining an alert state sufficient to remain in contact with environmental stimuli” (p. 155). An alert state in this case can be the level at which an athlete’s energy level is measured. An athlete’s energy level needs to be above the state of consciousness, to where there is an awareness of his surroundings. Gould and Udry (1994) view arousal as a multidimensional construct that contains a physiological arousal component and a cognitive interpretation-appraisal component (as cited by Singer et al., 2001). The arousal component in this case can be how high or low an athlete’s heart rate is. Arousal is the physiological activation of oneself, while alertness is the attention given to environmental stimuli. Exercise raises an athlete’s heart rate. McMorris and Graydon (1997) concluded in a study using male college soccer players that

“exercise induces not only an improvement in a simple task, like speed of visual search, but also an overall increase in speed of information processing” (p.459).

An athlete needs to pay attention if he/she wants to learn the necessary skills involved with his/her sport. It then becomes increasingly complex when that player needs to split his/her attention between performing those skills, and interacting with teammates on the field. This can be referred to as the dual-task paradigm. The dual task paradigm states that “the task for which an assessment of attention demand is sought, is termed the primary task, while the secondary task provides the principal performance measure from which the implications regarding primary task demand are derived” (Singer et al., 2001, p.55). Athletes performing a single task can fully concentrate their attention on that single task. When a second task is added, the athlete may still perform the primary task successfully, though the secondary task may be performed poorly, depending on the task and difficulty of it.

Athletes need to choose what to give attention to and what can be ignored or given the least amount of attention. This idea is known as selective attention. “Selective attention refers to the processes involved in selecting information for consciousness, for immediate response, or for storing information in memory” (Gunthrie, 2003, p.155). Attention is divided further when it needs to be given to opposing players. The more a player needs to broaden his/her attention the less he/she may retain in the way of information. Like soccer, midfielders in lacrosse are “required to link both the defensive and the attacking units, while also acting in both a defensive and attacking manner” (Thelwell, Greenlees, & Weston, 2006, p. 256).

Attention is also seen as a limited capacity. Humans have limitations when it comes to the amount of information that they can process cognitively (Gunthrie, 2003). A common analogy to clarify this is that the human brain is like a computer processor: it is limited and can

only process a certain amount of information at a time. Attention in this context, therefore, is equated with notions of limited information processing space, capacity, or resources, such that difficult tasks are performed together are conceived to have cumulative processing requirements that may exceed the available space, capacity, or resources (Tenenbaum & Eklund, 2007).

Factors affecting attention

There are several key reasons why an athlete may not be able to focus properly. For example, an athlete's inability to focus his/her attention may be distractions. Distractions can come from within the athlete, and/or from the environment. Distractions may cause changes in attention within the athlete. Tenenbaum and Eklund (2007) write, "successful athletes focus more on task-relevant thoughts and are less likely to be distracted" (p.289). An athlete may be focused on playing defense while on the field, yet may hear the crowd cheering for him/her or a certain player. The athlete's attention is pulled away from playing defense on his/her opponent and is given over to identifying where and from whom the voice is coming in the crowd.

This change of attention may happen for only a second, yet it is enough to give the advantage to the opponent. An example of a distraction that happens from within can happen in the same situation. A player is in a defensive situation with his/her team and will miss the coach yelling out a defensive strategy, all the while thinking about all of the homework that he/she must do that night, or about the argument that he/she got into with a significant other earlier in the day. The home team members of a competition may experience greater distraction from the support of their audience. Wright, Voyer, Wright and Roney (1995) propose that a home team's supportive audience engenders a state of self-attention, which takes the player's focus from the task and places it on him/herself. Distractions take attention away from the task.

Fatigue is an additional reason for loss of focus during competition. Fatigue affects the arousal and alertness of an athlete. A lower level of arousal and alertness affects the cognitive functioning, which therefore is linked to the attention process (Singer et al., 2001). When an athlete is fatigued, he/she cannot function at peak levels. It would be difficult for the athlete to produce the amount of energy output needed to function at the needed level of performance. Based on non-intervention studies, it may be concluded that there is a link between physical fitness or physical activity, aerobic in most cases, and cognitive functioning in old age, specifically in complex tasks (Tenenbaum & Eklund, 2007). Researchers have clearly indicated a negative association between physical activity and risk of cognitive decline. As fatigue increases, concentration declines. A player may experience fatigue when he is overworked and low on energy, from a lack of rest and fuel. Fatigue contributes to a lack of motivation and a desire to continue.

Another explanation for the loss of focus during competition is that an athlete exceeds his/her limits (Vernacchia, McGuire, & Cook, 1996). The player may be experiencing mental workload overload of a task because he/she is trying to do too many things at once. A player may become confused when he/she is unsure of where to concentrate his/her attention. If this is not managed, the athlete may start to experience athletic burnout. An athlete may get overworked and give up, or is just unable to perform in his/her sport. During competition, there are many things that a player must focus on or block from his/her attention. After all explanations have been exhausted the only thing left to explain the lack of attention is that there is a lack of competence with the athlete. If there is a lack of competence, the person does not have the required cognitive capacity to process everything that is happening.

Performance Levels of Expert and Novice Athletes

Attention is a critical component of the successful performance of an athlete. College athletes often exhibit traits of expertise, novice or both, skill qualities throughout their college playing careers. As skills are acquired and practiced over time, they become easier for an athlete to execute. As an athlete's skill level increases, the amount of attention given to features and rules involved in skill execution decreases (Tenenbaum & Eklund, 2005). This suggests that an expert athlete, because of his/her higher skill level does not need to give his/her full amount of attention to the skill being performed, though can apply it elsewhere such as his/her surroundings and other players on the field. This has been illustrated by Walter Payton, one of the premiere running backs in the history of the National Football League. Payton, referring to being on the field, is quoted saying "People ask me about this move or that move, but I don't know why I did something, I just did it. I am able to focus out the negative things around me and just zero in on what I am doing out there" (Singer, et al., 2001, p.362). This demonstrates how an expert athlete is able to limit his thoughts so as to focus on task-relevant processes.

All athletes have an ability to concentrate on something. It is the focus of concentration that is the foundation of consistent and confident performance, which separates the novice from the expert player (Vernacchia et al., 1996). The expert player is able to focus his/her attention on the right cues compared to a less experienced athlete, who may be frequently misled when his/her attention is focused on the wrong cues. Knapp (1963) suggested that the unskilled performer may notice a number of stimuli but he will be unable to perceive which the important ones are or what the responses should be (as cited by Singer et al., 2001). He will tend not to perceive any pattern to the stimuli and since the capacity to take in information is limited, the number of stimuli to which he can pay attention will be relatively few. The skilled person on the

other hand possesses a mental framework, which takes into account a large number of the stimuli that have occurred before. He notices small changes from the expected display and is therefore able to react to them quickly (Singer et al., 2001).

Improving Performance using Mental Imagery

Although it is often asserted that practice leads to better performance, the type and quality of practice is more important than the amount of practice (Singer et al., 2001). Becoming a stronger and faster athlete has been the traditional way of increasing performance in athletes. Singer et al., also state that experts in a particular sport are better than novices, not merely at physical skills but also on the underlying perceptual, cognitive, and strategic components of sport. When an athlete gives his/her full attention to the sport being learned, it is likely that he/she will learn at a quicker and more effective rate. The athlete's performance in theory should increase as the focus of attention increases. Expert athletes are becoming increasingly intelligent within their sport by using mental techniques that can support their physical performance.

One common strategy many Olympic athletes use is performing mental imagery. A definition of imagery offered by White and Hardy (1998) states that imagery is an experience that mimics real experience (as cited by Singer et al., 2001). Imagery happens when an athlete imagines himself/herself performing a certain skill in his/her mind. The athlete is actually thinking about a skill or watching someone else perform it. Athletes use mental imagery prior to, during and even after competition. It is used in practice and it is used when the person is not practicing or competing. By consistently using mental imagery as a technique to enhance performance, the athlete can train himself to notice where improvement is needed with his/her

technique. This will encourage the athlete to pay attention to those areas where improvement is needed so that they are corrected.

Obviously the type of mental imagery an athlete uses will be task or sport specific. A football player will most likely not imagine himself performing a golf swing, nor will a lacrosse player think about kicking a soccer ball before he competes. The type of imagery used will depend on the specific sport and athlete. Lacrosse players should use images of throwing and catching a lacrosse ball using the correct form. Practicing mental imagery correctly will help a player's performance. Mental imagery is similar to using other skills. Just like practicing throwing a ball in lacrosse will improve performance, using mental imagery consistently will develop it into habit. Even expert athletes can have trouble using mental imagery if they are not focused on performing the correct task. Because of the experience that an expert athlete has, he/she may perceive an imagined movement as being easy to perform, whereas novice or intermediate level athletes may consider the same imagined movement difficult (Guillot & Collet, 2005). Using mental imagery successfully does not happen overnight. It needs to be practiced just like any other skill and given time to develop.

Summary

The ability to control and focus one's attention during athletic practice and competition is crucial to an athlete's successful performance. Attention is cognitively controlled. The amount of attention that something is given can also be controlled by the athlete. An athlete can increase or decrease his/her focus by using selective attention during training and competition. The successful use of selective attention can be a difference between expert and novice athletes. The level of attention that an athlete gives to learning a particular skill affects how well that skill is

learned. Athletic coaches can increase the learning rate of their athletes by specifying what skills and tasks require an increased focus of attention.

CHAPTER III

METHODS

The purpose of this research was to determine if using metacognitive training affected college lacrosse players' performance through their focus or attention. The researcher hypothesized that the athletes would have an increased level of concentration during a team practice and/or game after performing a sport specific mental imagery exercise, than if they did not perform the sport specific exercise.

Design

This study utilized a quasi-experimental design of a pre-measure, then treatment and post-measure. Performance was measured by participants rating their focus levels higher or lower on post treatment questionnaires.

Participants

The participants in this study attend a small private liberal arts college in northern Baltimore Maryland, with a student body of more than 1,350 undergraduates. Because the school is private it does not accept everyone who applies for enrollment. Goucher College has an annual tuition of over \$40,000.

The study includes twenty-seven Caucasian, male college lacrosse players, from twelve different states, in the age range of 18-23. The team is comprised of nine seniors, seven juniors, two sophomores, and nine freshmen. Two goalkeepers, nine defensemen, ten midfielders, and six attackmen make up the team of twenty-seven players.

The college lacrosse season runs from late February till late May with two to three weeks of preseason practice. The team practices six days a week while playing up to seventeen

games during the regular season. Practices typically run 2- 2.5 hours a day and regulation games last 2 hours.

Instruments

Three questionnaires were used as pre and post measurements. The pre measurement measured how focused a player felt before and during practice, using a likert scale of 1-5, 1 being a low level of focus and 5 being the highest level of focus. The name of this instrument will be referred to as Mental Imagery Questionnaire #1, or MIQ #1.

The post measurement measured how focused a player felt, before and during a practice and game, after performing a mental imagery exercise. The name of the post measurement questionnaire used before a practice will be referred to as Mental Imagery Questionnaire #2, or MIQ #2. The name of the second post measurement questionnaire used before a game will be referred to as Mental Imagery Questionnaire #3, or MIQ #3. There is no reliability or validity data for any of these three instruments used.

Procedure

This study was carried out over a four day period, which took place from Sunday, April 26, 2009 through Wednesday, April 29, 2009. During Sunday, Monday, and Tuesday, practice was held each afternoon at 4 pm. On Wednesday April 29, 2009 the team had a game, which was a conference championship game.

MIQ #1 was given before a 9 am practice on Sunday April 26. The questionnaire was given to each player on the team in the locker room. Coaches were not in attendance. The researcher told the participants that their answers will remain confidential and anonymous even to the researcher. Participants were to not put their names or any extra marks on the paper except their answers to the questions. The two questionnaires were used as pre and post

measurements. The researcher explained that participation in the study was voluntary and that any player may quit anytime during the research process. The researcher clarified that the study was about using mental imagery during sports practice and competition, to enhance performance by focusing an athlete's concentration. Each player filled out the questionnaire and returned it to an envelope specified by the researcher in no specific order.

On Monday April 27, 2009 the researcher administered the treatment, which is called the Mental Imagery Exercise or MIE. This took 5-8 minutes. The researcher administered the exercise 15 minutes before the 4 pm practice on Monday. Ten minutes after practice on Monday the researcher gave out MIQ #2 to participants. The same procedure as with MIE was followed. After filling out the questionnaires, participants returned the completed forms to an envelope specified by the researcher. It took participants an average of two minutes to complete MIQ #2.

On Tuesday April 28, 2009 the researcher repeated the same procedure for Monday. Two less players decided to participate in the study.

On Wednesday April 29, 2009 the researcher administered MIE to 9 participants 1 hour before the game. 60 minutes after the game the researcher administered MIQ #3. Participants returned the complete questionnaires to an envelope specified by the researcher.

CHAPTER IV

RESULTS

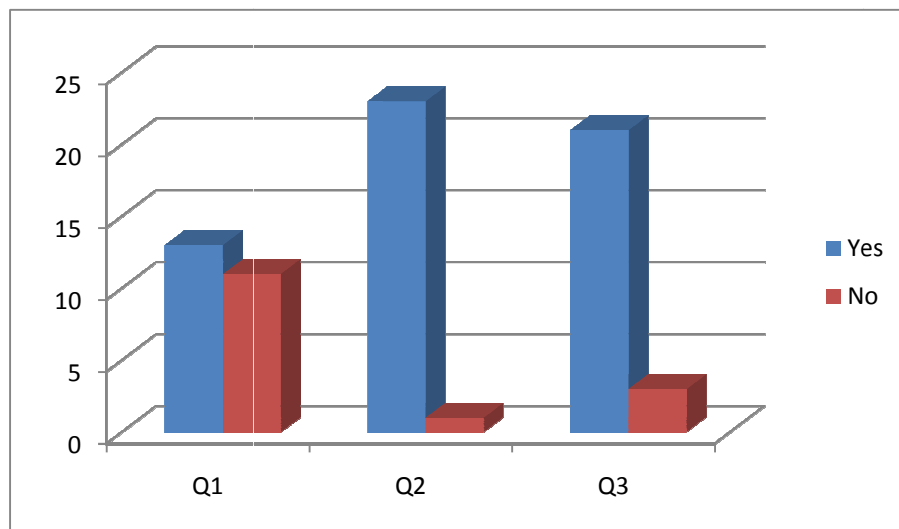
This study examines the impact of meta-cognition on the performance of male college lacrosse players in a small liberal arts college. The players were given four questionnaires spaced over four days. Questionnaire one was given prior to any training of the players on meta-cognition techniques. Questionnaires two and three were given after practices and after training on the technique. The fourth and final questionnaire was given after a game. Below is each questionnaire with the results graphed.

Questionnaire One – Prior to Training on Meta-cognition

The questions were:

- Q1. Do you know what mental imagery is?
- Q2. Do visual aids help stimulate your thought process?
- Q3. Do you feel that visual aids help you focus in practice?

Figure 1: Graphical Results of Questions 1-3 for Questionnaire 1



Q4. How focused do you feel 15 minutes before practice? 1 being the most focused and 5 being the least focused (Circle One)

(1) (2) (3) (4) (5)

Q5. How focused do you feel 15 minutes before a game? 1 being the most focused and 5 being the least focused (Circle One)

(1) (2) (3) (4) (5)

Q6. At what point during a game do you lose your focus? (Circle One)

(1)1st quarter (2)2nd quarter (3)3rd quarter (4)4th quarter

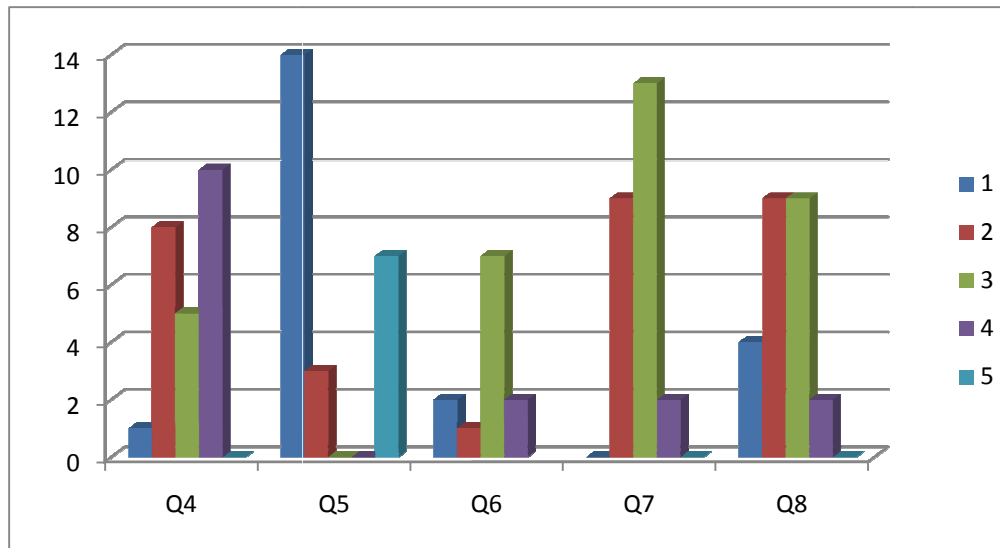
Q7. Do you lose your concentration and focus during a practice if you make a mistake? (Circle One)

(1)Never (2)Seldom (3)Sometimes (4)Often (5)Always

Q8. Do you lose your concentration and focus during a game if you make a mistake? (Circle One)

(1)Never (2)Seldom (3)Sometimes (4)Often (5)Always

Figure 2: Graphical Results of Questions 4 – 8 for Questionnaire 1



Questionnaire Two – after practice after Meta-Cognition Training

The questions were:

Q1. Did you feel that the mental imagery exercise increased your focus and concentration before practice? (Circle One)

(1)Strongly agree (2)Agree (3)Not Sure (4)Disagree (5)Strongly Disagree

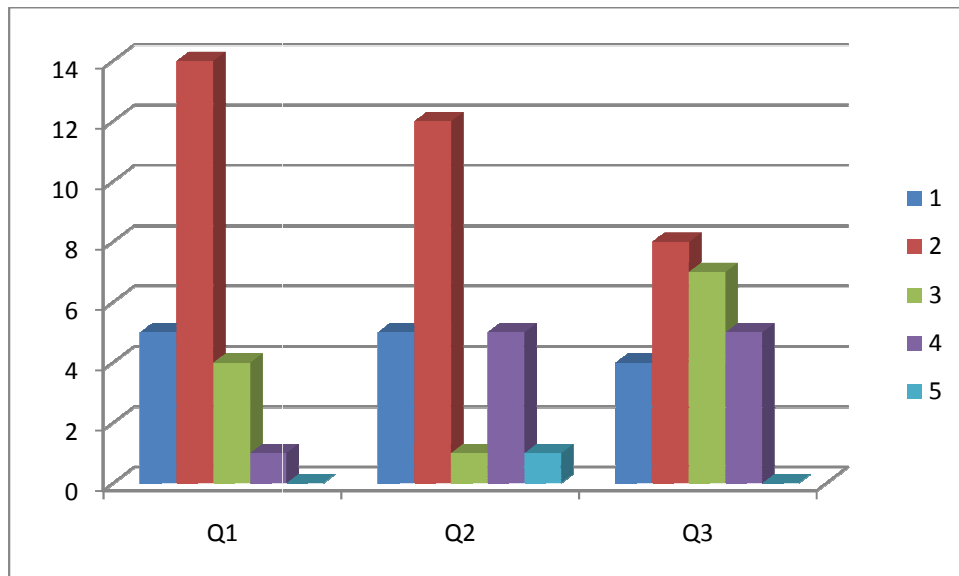
Q2. Rate your level of focus and concentration after doing the mental imagery exercise before Practice. (1 being the highest level of concentration and 5 being the lowest). (Circle One)

(1) (2) (3) (4) (5)

Q3. Rate your level of focus and concentration during practice. (1 being the highest level of concentration and 5 being the lowest). (Circle One)

(1) (2) (3) (4) (5)

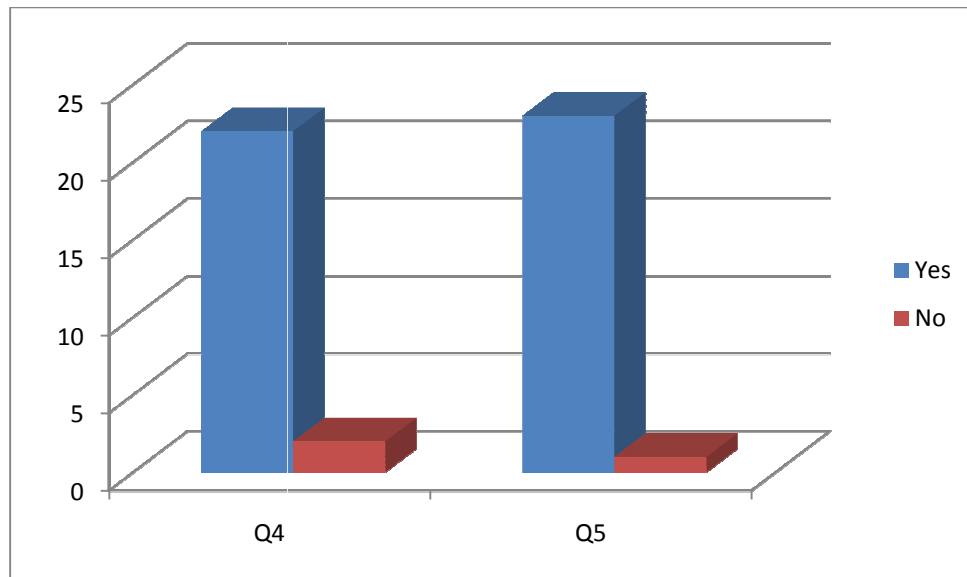
Figure 3: Graphical Results of Questions 1-3 for Questionnaire 2



Q4. Are you going to continue to use this exercise before practice?

Q5. Would you recommend an exercise like this to other Lacrosse players to use before practice?

Figure 4: Graphical Results of Questions 4 and 5 for Questionnaire 2



Questionnaire Three – after practice after Meta-Cognition Training

The questions were:

Q1. Did you feel that the mental imagery exercise increased your focus and concentration before practice? (Circle One)

(1)Strongly agree (2)Agree (3)Not Sure (4)Disagree (5)Strongly Disagree

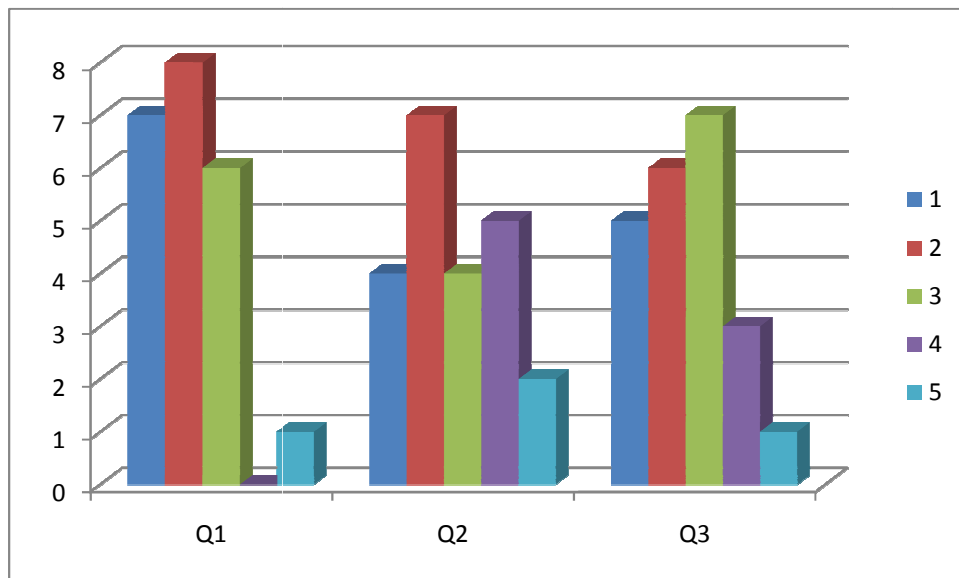
Q2. Rate your level of focus and concentration after doing the mental imagery exercise before practice. (1 being the highest level of concentration and 5 being the lowest). (Circle One)

(1) (2) (3) (4) (5)

Q3. Rate your level of focus and concentration during practice. (1 being the highest level of concentration and 5 being the lowest). (Circle One)

(1) (2) (3) (4) (5)

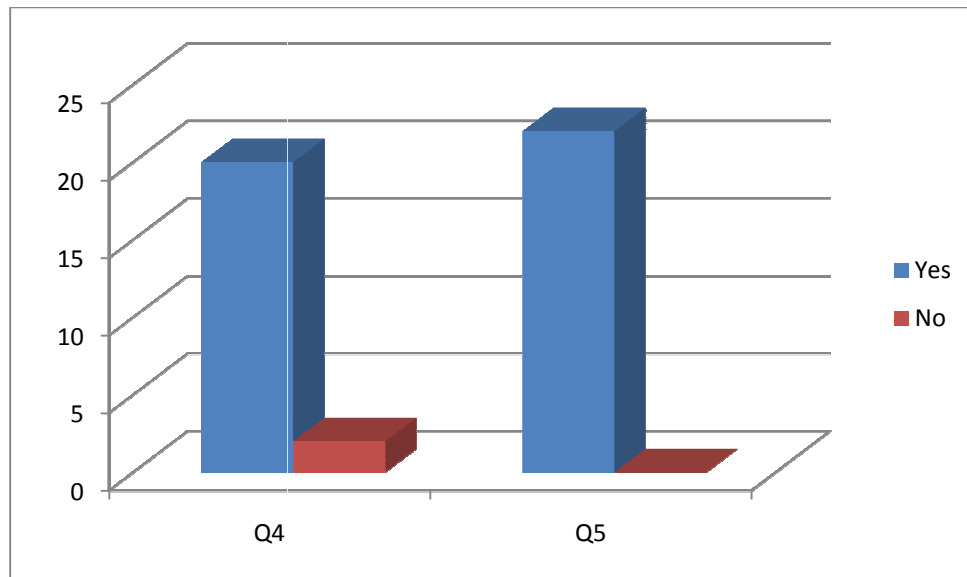
Figure 5: Graphical Results of Questions 1-3 for Questionnaire 3



Q4. Are you going to continue to use this exercise before practice?

Q5. Would you recommend an exercise like this to other Lacrosse players to use before practice?

Figure 6: Graphical Results of Questions 4 and 5 for Questionnaire 3



Questionnaire Four – after game after Meta-Cognition Training

The questions were:

Q1. Did you feel that the mental imagery exercise increased your focus and concentration before a game? (Circle One)

(1)Strongly Agree (2)Agree (3)Not Sure (4)Disagree (5)Strongly Disagree

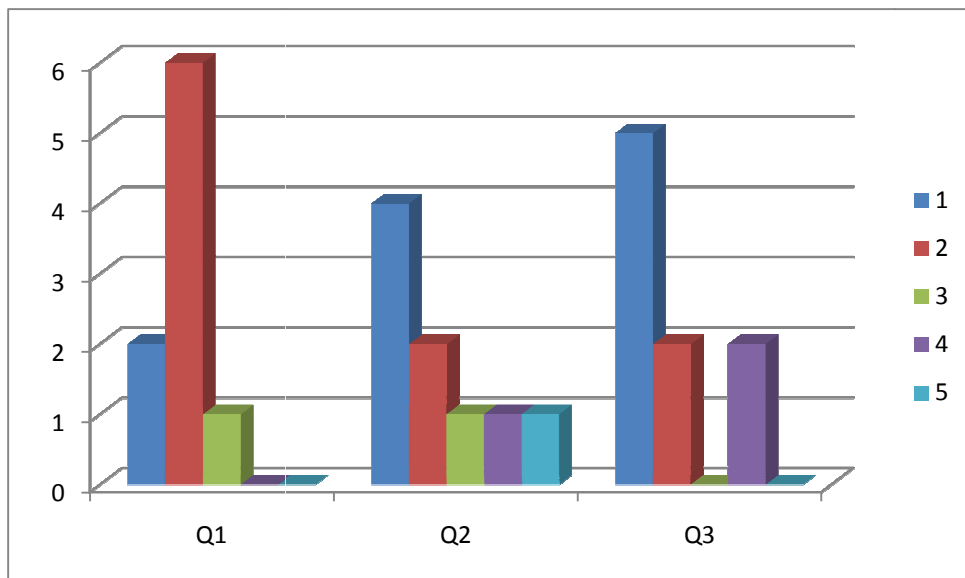
Q2. Rate your level of focus and concentration after doing the mental imagery exercise before a game. 1 being the highest level of concentration and 5 being the lowest. (Circle One)

(1) (2) (3) (4) (5)

Q3. Rate your level of focus and concentration after doing the mental imagery exercise during the game. 1 being the highest level of concentration and 5 being the lowest (Circle One)

(1) (2) (3) (4) (5)

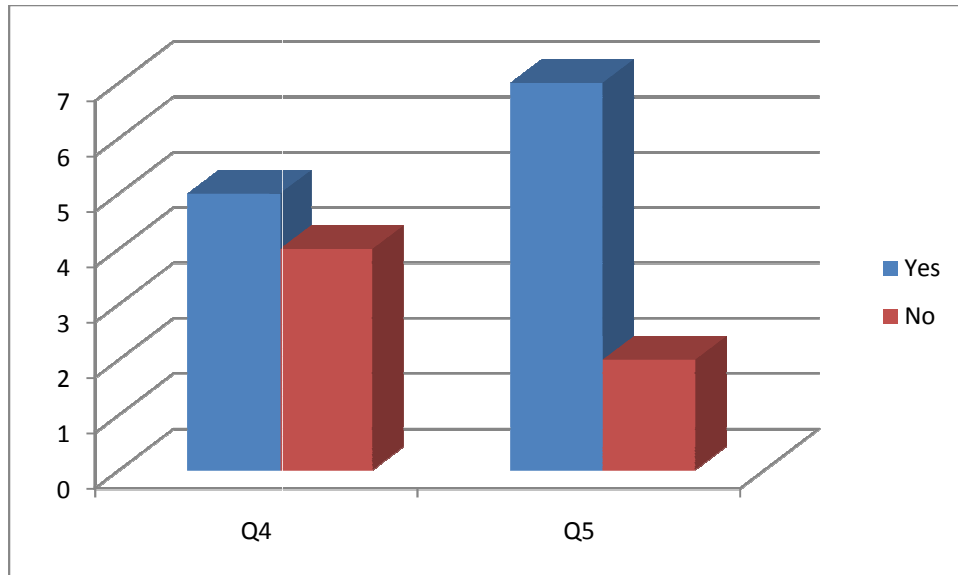
Figure 7: Graphical Results of Questions 1-3 for Questionnaire 4



Q4. Are you going to continue using this exercise before a game?

Q5. Would you recommend an exercise like this to other Lacrosse players to use before a game?

Figure 8: Graphical Results of Questions 4 and 5 for Questionnaire 4



CHAPTER V

DISCUSSION

The purpose of this research was to determine if using metacognitive training affected college lacrosse players' performance through their focus and attention.

The study hypothesized that using a mental imagery technique before a practice and/or game will have no effect on the level of an athlete's focus. The null hypothesis was rejected, providing support for the alternative hypothesis. This was seen in the results. During the first practice seventy-nine percent of participants answered they agreed that the mental imagery exercise increased their focus and concentration before practice. Seventy percent of participants answered a level one and two, with one being the highest and five being the lowest, level of focus and concentration after doing the mental imagery exercise. Fifty percent of participants answered levels of one, for question three on questionnaire two, with one being the highest level and five being the lowest level of concentration.

For questionnaire three sixty-eight percent of the participants answered question one with a level of one, or two, with one being the highest level of concentration and five being the lowest. Fifty percent of participants answered question two with a one or two, one being the highest level of concentration and five being the lowest. Fifty percent of participants answered one or two for question three also, with one being the highest level of concentration and five being the lowest. The number of participants decreased from twenty-four to twenty-two between questionnaire two and three respectively.

On questionnaire four, there were only nine total participants. Eighty-eight percent answered question one with a level of one and two, with one being the highest level of concentration and 5 being the lowest. Sixty-six percent answered question two with a level of 1

or two, one being the highest level of concentration and 5 being the lowest. Seventy-seven percent of the participant answered question three

Implications

The results of this study help to support previous research on the relationship between attention and athletic performance. This study can be valuable from a lacrosse coach's perspective and provides ideas of how to get his or her team to increase their level of focus for practice and competition. The results indicate how important having complete attention to the task at hand may be during practice or a game. The importance of a college athlete having the ability to control his or her focus and attention can prove to be valuable. Not only does this help during practice and competition, it may carry over to other parts of the athlete's life, such as academics. An athlete may be able to increase his/her focus during class and during his/her studies. He or she may also learn how to block out distractions that hinder concentration.

The results of the study appear to indicate that the participants benefited from doing a mental imagery exercise before practice. It could have calmed a player's nerves and actually helped him to transfer his focus from what he was doing before practice, to what he will be doing in practice. If an athlete's performance was found to improve because of the use of mental imagery, implications of such findings could affect how many coaches conduct the beginning of a practice or how the team warms up before a game.

Threats to Validity

Although the null hypothesis was rejected, there are issues of both external and internal validity. One major threat to internal validity is the small sample that was used. The study used a sample of twenty-seven participants. Aside from having a small sample size, this study has a mortality threat. Each time a questionnaire was given, there were fewer participants in the study. The study started with twenty-seven participants and ended with nine.

The study also has an instrumentation threat. This happens when there is a lack of consistency in measuring instruments that may result in an invalid assessment of performance. The instruments used were created for this study and not for any other. They have no reliability and validity with any other studies. In addition the results were left to the interpretation of the researcher, which creates even more bias. The instruments used were self reports done by the participants, which can decrease any validity.

A final major threat to internal validity is that the researcher was also a member of the lacrosse team studied. The researcher did not participate himself though because of the researcher being a fellow teammate could have skewed any results.

There is low external validity in this study. One reason is because the experimental setting was natural. The study took place in a low control setting. This makes it difficult to control for extraneous variables. This study can not be generalized to any other lacrosse program outside of the settings and demographics used in this study. A final major threat to external validity is that randomization was not used for the sample. The sample of this study was determined by it being a convenience sample. The lacrosse team participants used in this study happened to be available at the time.

Comparison with Other Research

The results show how important it is for a player to concentrate and focus his attention to increase performance, and how a coach can help with this process. In a recent study Tenenbaum and Eklund (2007) write, “successful athletes focus more on task-relevant thoughts and are less likely to be distracted” (p.289). This suggests that an athlete may become distracted by other events happening in his or her life. A coach may overcome this by teaching a mental imagery exercise, having athletes focus all of their attention on performing lacrosse skills, before a practice or game. An athlete may increase or decrease his or her level of focus by successfully selecting the right skills to give attention to. Setting the team a task such as focusing for a few moments on how they want to perform in practice, or in a game, may help.

Another way that a coach can increase an athlete’s attention level is by specifically telling the player what to focus his/her attention on and what not to focus as much attention on. This is referred to what is known as selective attention. Selective attention refers to the processes involved in “selecting information for consciousness, for immediate response, or for storing information in memory” (Gunthrie, 2003, p.155).

Lastly fatigue may also explain loss of attention and concentration. Researchers have clearly indicated a negative association between physical activity and risk of cognitive decline (Tenenbaum & Eklund, 2007). Fatigue affects the arousal and alertness of an athlete. A lower level of arousal and alertness affects the cognitive functioning, which therefore is linked to the attention process (Singer et al., 2001). This relationship could be used to measure when a team’s attention and concentration is decreasing in a practice and a game.

Recommendations for Future Research

If this study were repeated in the future, several recommendations seem to be equally important. One suggestion for future research includes using different instruments that have some validity. Second, selecting a larger sample size, including lacrosse teams from different schools, will allow for greater generalization of results. Third, having a researcher who is not affiliated with any of the teams conduct the research. This will largely decrease the bias of answers given. A fourth suggestion that may impact future research is to run statistical tests, whether it is an ANOVA or t-test.

An additional recommendation would be to lengthen the study over several weeks, or preferably an entire lacrosse season. This will show if there is consistency with results and the instruments. The researcher suggests using the exercise on random volunteers during the autumn practice season. This will eliminate anyone that is not interested in continuing through with the experiment when the spring season begins, so that there will be minimal or no mortality rate. This can also better condition the participants to the mental imagery exercise so that when the researcher begins measuring performance in the spring, he or she may begin at the beginning of the season.

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