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EFFECTS OF IMAGERY USE IN BASKETBALL FREE THROW  
SHOOTING

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A Project  
Presented to the  
Faculty of  
California State University,  
San Bernardino

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts  
in  
Education:  
Kinesiology

---

by  
Jamaal Edward Cannon  
June 2008

EFFECTS OF IMAGERY USE IN BASKETBALL FREE THROW  
SHOOTING

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Jamaal Edward Cannon

June 2008

Approved by:

  
Hosung So, First Reader

  
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May 27, 2008  
Date

## ABSTRACT

Imagery is a very useful tool to use in order to improve performance. This project examines imagery use and its effect on basketball free throw shooting. It analyzes the literature on imagery and free throw shooting, in order to understand the actual effects that imagery has when used with free throw shooting. This study focused on three factors that included player skill, use of VMBR, and consistent use of imagery for improvement of free throw shooting and sustaining that improvement. Results included improvements in free throw shooting percentages after consistent use of imagery. There were also found to be improvements in winning percentages of teams that used imagery with free throw shooting with their players. Further study was suggested in order to find out more about the effects of imagery over a longer period of time.

## ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to certain professors at California State University San Bernardino for all of their help and support in the completion of this project. Thanks to Dr. Sarah Boeh for helping in me get started, to Dr. Aaron Moffett my second reader input and special thanks to Dr. Hosung So, my first reader, for his support and guidance throughout.

I also wish to thank my mother for paying rent all those years so I would have a place to live while in school. Special thanks are due to my sister, Maisha, and grandmother, Grace Lang, their encouraging words meant more than they know, and to my wife Adrienne for her patience and love. My family's love, understanding and prayer helped make the completion of this project possible. Finally, I want to give GOD the glory, for he is my strength through trials and tribulations. THANK YOU JESUS!!! I AM DONE WITH SCHOOL!!!

## DEDICATION

This work goes out to all the people who helped me make this a complete project. To my wife, who is in it with me till death do us part, and to my future kid's, because they are definitely why I strived for a higher education. To my mother, sister, grandmother, Uncle Bobby, and the rest of the people good and bad that made this happen. Thank you all for your support and encouragement, and criticism.

TABLE OF CONTENTS

ABSTRACT . . . . . iii

ACKNOWLEDGEMENTS . . . . . iv

CHAPTER ONE: INTRODUCTION

    Statement of the Project . . . . . 1

    Purpose of the Project . . . . . 3

    Scope of the Project . . . . . 3

    Limitations of the Project . . . . . 4

    Definition of Terms . . . . . 4

CHAPTER TWO: LITERATURE REVIEW . . . . . 7

    Hypothesis . . . . . 16

CHAPTER THREE: METHODOLOGY . . . . . 17

CHAPTER FOUR: FINDINGS AND RESULTS . . . . . 19

CHAPTER FIVE: CONCLUSIONS . . . . . 23

APPENDIX: IMAGERY SCRIPT . . . . . 26

REFERENCES . . . . . 30

## CHAPTER ONE

### INTRODUCTION

#### Statement of the Project

To date one of the most popular sports in the United States is basketball. There are various skills in basketball, including the free throw. The free throw shot is such an important skill, affected by many factors, such as crowd noise, attention, focus, arousal, and skill level. Physical educators and coaches from high school to college level teach free throw shooting as a part of the game of basketball. However, their emphasis on free throw shooting is more on technique than imagery. A few journals published in the Journal of Sport and Exercise Psychology (JSEP), Journal of General Psychology (JGP), Journal of Sport Behavior (JSB), Journal of Mental Imagery (JMI), Canadian Journal of Experimental Psychology and the International Journal of Sport Psychology (IJSP) show why imagery is important. Why is imagery use in free throw shooting important? Teachers and coaches would like to find out how imagery works and how use of imagery can help improve free throw shooting.

According to Kendall, Hrycaiko, Martin and Kendall (1990), imagery intervention was clearly effective in enhancing a basketball skill during games (p. 161). If imagery can enhance basketball skills then using imagery when free throw shooting should help in making successful attempts at the free throw line.

In addition, research findings from primary journals such as the Journal of Sport and Exercise Psychology (JSEP), Journal of General Psychology (JGP), Journal of Sport Behavior (JSB), and the International Journal of Sport Psychology (IJSP) have reported that use of imagery during practice of the free throw and during basketball games, has a positive effect on improving free throw shooting overall, both with and without external distractions.

According to Mackenzie (1997), mental imagery can be used to develop self confidence, pre-competition and competition strategies which train athletes to handle new situations before they encounter them, and help the athlete to focus their attention or center their train of thought on a particular skill the athlete is trying to learn or develop. This can take place both in or away from the training session and the competition situation.

### Purpose of the Project

The purpose of this study was to examine the effects of the use of the imagery on the performance of free throw shooting among high school and college athletes.

### Scope of the Project

This project was intended for all coaches from high school to college level. Therefore, the journals that focused on middle or elementary schools were excluded. Information was gathered from 13 scholarly journals, such as the Journal of Sport and Exercise Psychology (JSEP), Journal of General Psychology (JGP), Journal of Sport Behavior (JSB), Journal of Mental Imagery (JMI), Canadian Journal of Experimental Psychology, the International Journal of Sport Psychology (IJSP) and three textbooks. Journal articles specifically describing about the effect of the use of imagery on free throw shooting, using high school and college athletes as primary subjects, were only selected and included in this study in order to better understand imagery and how beneficial it can be to high school and college level athletes.

## Limitations of the Project

Some of the limitations of this study are the selection of studies, focused primarily on high school to intercollegiate level basketball. This project excludes middle school or elementary school basketball. Other limitations include the scope of scholarly journals. Only 13 scholarly journals, and four published textbooks were selected and included for this study.

## Definition of Terms

A. Imagery is defined as "a product of your memory, experienced internally by recalling and reconstructing previous events. Imagery is actually a form of simulation" (Weinberg and Gould, 2003).

B. VMBR is defined as "Visual Motor Behavior Rehearsal" developed by Suinn (1976) "a covert activity whereby a person experiences sensory motor sensations that reintegrate reality experiences, and which include neuromuscular, physiological, and emotional involvement" (Suinn, 1993).

C. Psychoneuromuscular theory is "imagery that facilitates the learning of motor skills because of the nature of the neuromuscular activity patterns activated during the

imaginal process. That is, vividly imagined events that innervate the muscles somewhat like physically practicing the movement" (Carpenter, 1894).

D.MS is defined as "Motivational-Specific" that is seeing yourself winning an event, receiving a trophy or medal and being congratulated by other athletes. MS may boost motivation and effort during training and facilitate goal-setting but is unlikely on its own to lead directly to performance benefits. (Mackenzie, 1997)

E.MG-M is defined as "Motivational General-Mastery" which is seeing yourself coping in difficult circumstances and mastering challenging situations. MG-M might include maintaining a positive focus while behind, then coming back to win. (Mackenzie, 1997)

F.MG-A is defined as "Motivational General-Arousal". This reflects feelings of relaxation, stress, anxiety or arousal in relation to sports competitions.

G.CS is defined as "Cognitive Specific" it involves seeing yourself perform specific skills, such as tennis serves, golf puts, or free-throw shooting.

H.CG is defined as "Cognitive General", which involves images of strategy and game plans related to a competitive event. (Mackenzie, 1997)

I.VM is defined as "Videotaped Modeling" and is learning skills from watching videotaped examples (Mackenzie, 1997)

J.FITT is defined as F is for Frequency - Aim to incorporate imagery into every day of a training schedule. For busy people, just before you sleep could be a good time and it helps if you are in a relaxed and tranquil state. I is for Intensity - Try to create an all-sensory experience that is as vivid and clear as possible. Initially, practicing in a quiet environment can help to minimize distractions and facilitate clear images. T is for Time - Imagery should make big demands on attention, so short (5-10 minutes) frequent quality sessions are preferable to long ones. T is for Type - Remember to decide on desired outcome and select the type of imagery to match. (Mac, 2008)

## CHAPTER TWO

### LITERATURE REVIEW

According to Suinn's (1993) psychoneuromuscular theory, imagery rehearsal duplicates the actual motor pattern being rehearsed, although the neuromuscular innervations with imagery are of a smaller magnitude than in physical practice. Even though the neuromuscular innervations were of small magnitude, using imagery does affect physical practice of a skill. In addition Suinn (p. 41) described that imagery of visuomotor behavior apparently is more than imagination. Visuomotor behavior is a well-controlled copy of an experience, a sort of body thinking similar to the powerful illusion of certain dreams at night (p. 42). The major difference between such dreams and VMBR is that the imagery rehearsal is subject to conscious control.

According to Mackenzie (1997) there are five main categories of imagery. These categories are motivational-specific, motivational general-mastery, motivational general-arousal, cognitive specific, and cognitive general. Some of these types of imagery may overlap, but research suggests that if a person chose the wrong imagery, they may

not achieve any benefits. It is important "to decide what it is you want to achieve, then make the imagery content match your goals." (Mackenzie, 1997).

An article by Tatek (2004) reviewed the positives and negatives of imagery. Tatek found that imagery along with physical practice, could potentially improve motor skills.

Féry (2003) conducted a study on the usefulness of the visual and kinesthetic imagery in mental practice. In his study he found that when initially trying to acquire a task, visual and kinesthetic imagery use would be helpful in basketball free throw shooting.

Similarly, Vergeer and Roberts (2006) conducted a study on imagery and its effects on athletic performance. 30 volunteers took part in a four week program, which used imagery as the main catalyst to increase performance. Results reported significant increases in performance for groups that used imagery. Results also concluded that imagery had stronger psychological than physiological effects, but that there is potential for enhancing physiological effects by maximizing imagery vividness, particularly for movement imagery (p. 201).

Gibbs and Berg (2002) conducted research on imagery and its importance. They concluded that seeing imagery put

in to action is a major step in understanding the underlying importance of imagery. They believed that once one saw the benefits of using imagery, it would become more acceptable and more regularly used.

Lerner, Ostrow, Yura, and Etzel (1996) conducted a study to investigate imagery program's effects on the free throw performance of female collegiate basketball players over the course of an entire season. Free throw data was collected during practice settings, and data was examined by way of changes in the mean, level, trend, latency, and variability between a control group and an intervention group, then between intervention and a second control group (p. 382). There was an increase in free throw performance from intervention to the second control group and participants mentioned at the conclusion of the study that imagery was now a part of their free throw shooting routine (p. 393).

Suinn (1993) refers to Murphy, Jowdy, and Dutsch (1989) which conducted a study and obtained responses using a questionnaire from 87 elite athletes and 34 coaches of such athletes. A little over half (56%) of the athletes indicated that they used internal imagery as they became more skilled in their sport. The study also reported 55%

indicated that internal imagery was more effective in helping their performance than external imagery (19% disagreed) (p. 497). 62% of the coaches believed that internal imagery perspective was more effective than an external perspective, while 7% suggested that the external perspective was better. Of the athletes, a larger percentage agreed that the use of internal imagery made the imagery clearer (50%), enhanced ability to feel body movements in the imagery (62%), and enhanced ability to become more emotionally involved in the imagery (64%). This contrasted with 31% who believed an external perspective led to clearer imagery, 12% who believed that external perspective improved on one's being able to feel body movements, and 23% who felt that external perspective enabled one to become more emotionally involved in the imagery (p. 498).

Suinn (1993) also refers Schleser, Meyers, and Montgomery (1980) who used a combination of VMBR and cognitive techniques to help correct performances in two women collegiate basketball players. One was a center who needed help with her free throw shooting, while the other was a forward who wanted help on her field goal shooting. The program used relaxation training and imagery first to

practice accurate free throws and field goals (p. 501). The two subjects were then helped to use imagery rehearsal to visualize an unsuccessful scene, followed by rehearsing stress inoculation and self-instructional statements. Later the athletes used relaxation, imagery rehearsal, and self-instructional statements just prior to physical practice.

Two types of comparative data became available. For the center, her free throw accuracy improved from a baseline of 41.3% to 54.8% (p. 501). In contrast, her field goal accuracy, which was untreated, was relatively unchanged, at 48.9% and 47.8% respectively. On free throw accuracy the three percentage accuracy figures were 41.3%, 54.8%, and 28.6% (p. 501); this showed the expected improvement during intervention and decline during reversal on the treated behavior.

According to Clark (1960), a study examining free throw shooting with imagery use, showed that not all subjects were able to control their imagery in practicing basketball free throws. One subject reported that his basketball would not bounce, but stuck to the floor in his imagery rehearsal. Clark also stated that as subjects reported gains in their ability to visualize and control

their imagery, they experienced gains in self-confidence and in the ability to identify errors in their behaviors.

Suinn (1993) refers to Kolonay (1977) who used VMBR with 72 basketball players from eight college basketball teams. The players were separated into four groups, with one group using relaxation training, another group using VMBR training, another using imagery rehearsal without relaxation, and the last group using no training. During a 6-week period the players received training before 15 basketball practices. The VMBR athletes were able to increase their foul shooting accuracy by 7%, which was a significant improvement statistically and coaches reported that the improvement meant the difference of 8 more winning games in the season (p. 502).

Suinn (1993) refers to Lane (1980) who worked with 16 members of a high school basketball team and divided them into two groups matched on free-throw-percentage accuracy. One group was assigned to VMBR training, while the other to relaxation training only. The training was six sessions across three weeks (p. 502). Lane reported a trend "in favor of the VMBR group" (p. 9). Direct comparison between the VMBR group and the control groups on improvement in free throw accuracy from the previous season to the current

season showed a trend favoring the VMBR group. The results did not have any statistical significance, but the VMBR group showed increase in free throw accuracy when their previous year's performances was compared with the current year's effort using VMBR. There was a 12% increase in free throws made for the VMBR athletes, while the control group showed a decrease over the same amount of time (p. 502). Athletes that used VMBR showed greater increase in accuracy on away games than on home games. Lane concluded that "under the most extreme conditions of competition (of away games)... the advantages of VMBR training become most clearly evident" (pp.3-6).

Similarly, Hall and Erffmeyer (1983) tested the effect of videotape modeling added to VMBR by having one group of basketball varsity team members view a videotape of foul shooting. A second group was trained with VMBR only. Results indicated that the videotape and the VMBR group had significantly higher foul shooting scores than the VMBR group only at post-testing. Results stated the use of imagery requires practice and can be used effectively. In addition, the videotape modeling can facilitate the development of skill in using imagery (p. 346).

Gray and Fernandez (1989) replicated the Hall and Erffmeyer (1983) study, with the revision of having both the VMBR and the modeling on the same videotape. In order to simulate game conditions the subjects ran up and down the court between free throws, the subjects were also members of the varsity basketball team. Results supported that of Hall and Erffmeyer (1983) in that free throw shooting performance improved significantly when measured under game conditions following VMBR plus modeling.

Suinn (2003) refers to Winning Associates (1978) who developed a program including relaxation training, desensitization, mental coping, and imagery rehearsal. In their study they had a college basketball player who improved from shooting 38% from the floor to 50%, and from 61% from the free throw line to 90% (p. 500).

Weinberg and Gould (1995) refer to Felt and Landers (1983) which found that subjects using imagery, or some other form of mental practice, performed consistently better on tasks that were primarily cognitive (mental) in nature than on those that were more purely motoric (p. 284).

Weinberg and Gould (2003) also reported that the skill level of the performer affected how imagery would enhance

performance. Their research also showed that beginners and highly skilled performers who use imagery on cognitive tasks showed the most positive effects.

In a study conducted by Peynircioglu, Thompson, and Tanielian (2000), participants performed a free throw shooting task, a grip-strength task before and after imagery, nonspecific arousal, or no instructions. A total of 120 students from American University participated in this study. Results concluded that imagery improved performance in free throw shooting tasks (p. 149). There was an improvement after the imagery manipulation, but no improvement before.

In a study by Carboni, Burke, Joyner, Hardy and Blom (2002) they tried to determine if brief sessions of imagery had an effect upon concentration style and free throw shooting performance of intercollegiate basketball players. Results from the study showed a high self-efficacy in estimating free throw attempts. All the participants that used imagery reported that the imagery helped them, and two participants reported that they would continue to use the imagery (p. 60).

Onestak (1997) used imagery to examine the effects of VMBR and VM on free throw accuracy of male intercollegiate

basketball players. Results indicated that across levels of condition and ability, there was a significant improvement in free throw shooting from pre to post-assessment. Overall, 35 of the 48 subjects improved their performance, while the performance of the other 13 remained the same or declined (p. 189). Subjects' free throw shooting accuracy improved from 53.6% at pre-assessment to 59.7% at post-assessment, an improvement of 6.1% (p. 191).

#### Hypothesis

The hypothesis for this study was that the use of imagery techniques for both during game situations and in practice, both with and without outside distractions will help basketball players improve their free throw shooting.

## CHAPTER THREE

### METHODOLOGY

Research began by typing in information about imagery and basketball free throw shooting into the database from the CSUSB internet Library resources. Next, scholarly journals were searched and reviewed by library keyword search at the university library. After reviewing journals specifically dealing with basketball free throw shooting and imagery, the main focus was on imagery use and how it affected free throw shooting. 13 scholarly journals were used for this study, which included journal articles from Journal of Sport and Exercise Psychology (JSEP), Journal of General Psychology (JGP), Journal of Sport Behavior (JSB), and the International Journal of Sport Psychology (IJSP). Four textbooks, entitled as "Foundations of Sport and Exercise Psychology" (Weinberg and Gould, 2003), "Handbook of Research on Sport Psychology" (Singer, Murphy, and Tennant, 1993), "Sport Psychology: Concepts and Applications" (Cox, 1985) and "Applying Sport Psychology: Four Perspectives" (Taylor and Wilson, 2005), were used as key sources to gather information for this study. The common theme was that imagery can be used to develop self

confidence, develop pre-competition and competition strategies which teach athletes to cope with new situations before they encounter them, and help the athlete to focus their attention or concentration on a particular skill they were trying to learn or develop. The main focus of the study was then decided to state clearly how these factors can positively affect free throw shooting ability.

The 13 journal articles were printed for review purposes. Many positive factors related to imagery use were found, which included developing self confidence, developing pre-competition and competition strategies which teach athletes to cope with new situations before they encounter them, and helping the athlete to focus their attention or concentrate on a particular skill they were trying to learn or develop. These factors were considered as the main factors affecting the use of imagery in basketball free throw shooting.

## CHAPTER FOUR

### FINDINGS AND RESULTS

After completing the review of literature, this study focused on three factors that included player skill, use of VMBR, and consistent use of imagery for improvement and sustaining improvement.

According to Weinberg and Gould (2003) when using imagery the performer's skill level in addition to their character and confidence, affected how imagery will enhance performance. Weinberg and Gould (2003) also found "the nature and the skill level of the performer affect how imagery will enhance performance." Better players would benefit more than other players, but once a player used imagery consistently, over time that player would have an improvement in their free throw shooting accuracy.

In addition, Weinberg and Gould (2003) concluded that using imagery could improve concentration, build confidence, control emotional responses, help in practice of sport skills, help in developing practicing strategy, and help athletes deal with pain and injury.

Onestak (1997) indicated that across levels of condition and ability, there was a significant improvement

in free throw shooting from pre to post-assessment.

Overall, 35 of the 48 subjects in his study improved their free throw shooting performance (p.190).

Lane (1980) reported a trend in favor of the use of VMBR. This method of imagery use showed how high school basketball team was able to increase their free-throw accuracy, based on the previous years performance.

Hall and Erffmeyer (1983) reported results indicating that groups that used VMBR had significantly higher foul shooting scores than the VMBR group at post-testing.

Peynircioglu, Thompson, and Tanielian (2000) concluded that imagery improved performance in free-throw shooting tasks. There was an improvement after the imagery manipulation, but no improvement before. When imagery was not used there was no improvement, but when it was used, the performer was able to show improvement in free-throw shooting accuracy.

Carboni, Burke, Joyner, Hardy and Blom (2002) showed a high self-efficacy in estimating free-throw attempts by the participants. All the participants that used imagery reported that the imagery helped them, and two participants reported that they would continue to use the imagery (p. 60).

Felt and Landers (1983) found that subjects using imagery, or some other form of mental practice, performed consistently better on tasks that were primarily cognitive (mental) in nature than on those that were more purely motoric.

Taylor and Wilson (2005) found that imagery was a powerful tool for improving athletic skill and ability. They also found that imagery use could have a powerful and positive impact on an athlete's performance (p. 123).

In addition, Taylor and Wilson (2005) found that imagery impacted multiple factors when applied to sport. They found that it improved skill learning and performance execution. They also found that by using imagery the performer could increase their confidence and focus (p. 123). These factors, which are closely related to free throw shooting, can increase the performer's chances of being able to make successful free throw attempts.

Another factor that was found as having an effect on free throw shooting was relaxation. Many times during game play or even during practice, the performer is at a much higher intensity level than needed when shooting free throws. Taylor and Wilson (2005) recommended having some

kind of relaxation strategy before an imagery session (p. 124).

## CHAPTER FIVE

### CONCLUSIONS

The purpose of this study was to examine the effects of the use of the imagery on the performance of free throw shooting among high school and college athletes. The majority of research findings included in each of the studies and the review of literature, showed significant gains in their free throw shooting success. When the subjects in the studies used imagery consistently, they showed improvement in their free throw shooting. Based on skill set and experience in being able to use imagery alone, technique in shooting the free throws was less emphasized, but seemed to be a non-factor in the success of each subject.

Imagery use while basketball free throw shooting is appropriate during actual game situations and in practice. The more it is used, the better the outcome has resulted to be. The types of imagery, such as, VMBR, and mental imagery, were both effective types of imagery. VMBR seemed to be the most used when it came down to free throw shooting.

Many positive factors related to imagery use were found, which included developing self confidence, developing pre-competition and competition strategies which teach athletes to cope with new situations before they actually encounter them, and helping the athlete to focus their attention or concentrate on a particular skill they were trying to learn or develop. These factors were considered as the main factors affecting the use of imagery in basketball free throw shooting.

The hypothesis for this study was that the use of imagery techniques for both during game situations and in practice, both with and without outside distractions will help basketball players improve their free throw shooting. Most of the data has shown this hypothesis to be true. Using imagery on a consistent basis can help to improve free throw shooting. Using imagery can also help build self-confidence and motor skills that are used during free throw shooting.

Basketball free throw shooting is an important part of the game of basketball. Games are won and lost from the free throw line. The use of imagery in basketball free throw shooting is an important tool to use to make individual basketball players perform better. Though the

use of imagery has proven to be affective based on the literature, more up to date research and studies are needed to further understand the significance of imagery use with basketball free throw shooting.

APPENDIX  
IMAGERY SCRIPT

## Imagery Script

Successful free throw shooting requires confidence, sound mechanics, a routine, relaxation, rhythm and concentration. Routine, relaxation, and rhythm contribute to concentration and confidence (Wissel, 2004). Coach Wissel has a wealth of NBA experience as an Assistant Coach with the Atlanta Hawks, Golden State Warriors, Memphis Grizzlies and New Jersey Nets. He was also Director of Player Personnel with the Nets and Advance Scout with the Milwaukee Bucks and Dallas Mavericks. As a head college coach, Wissel compiled over 300 victories. He also coached Florida Southern College to the 1981 Division II NCAA Championship.

This script is intended to further direct teachers and coaches into implementing imagery in free throw shooting. The following script is taken from Wissel (2004).

### Imagery Script For Basketball Free Throw Shooting

- Use deep breathing to relax your mind and body. Breathe in deeply and exhale fully. (e.g., take a deep breath for a count of three and exhale for a count of three)

- Relax your shoulders, letting them drop and loosen. Do the same for your arms, hands, and fingers. (e.g., while practicing relaxation breathing, also practice tightening your muscles during inhalation and relax muscles while exhaling.)
- Learn to relax other parts of your body as necessary. (Imagery use states that while relaxing parts of the body, you should also use all senses)
- Set up in a balanced stance.
- Bounce the ball, keep your shooting hand on top.
- Use a relaxed hand position, and line up your index finger with the valve on the ball.
- Check your elbow in alignment.
- Have your shooting hand face the basket
- Start your shot high and use the down-and-up motion of your legs for rhythm rather than lowering the ball for rhythm.
- Shoot the free throw with a smooth, free-flowing rhythm.

- Use personalized key words to help establish a smooth, sequential rhythm for free throw shooting. (doing this will help focus on a rhythm, rather than being distracted by fatigue, heart rate, crowd noise, and other sensations typically felt while free throw shooting)
- Say your words in the rhythm of your shot.
- Exaggerate your follow-through, keeping your eyes on the target and your shooting arm up until the ball reaches the basket.

### FITT

In designing your own imagery program, apply the FITT principals. These principals come from Mac (2008).

- **F** is for Frequency - Aim to incorporate imagery into every day of your training schedule. For busy people, just before you sleep could be a good time, and it helps if you are in a relaxed and tranquil state
- **I** is for Intensity - Try to create an all-sensory experience that is as vivid and clear as possible. Initially, practicing in a quiet environment can help to minimize distractions and facilitate clear images
- **T** is for Time - Imagery should make big demands on your attention, so short (5-10 minutes) frequent quality sessions are preferable to long ones
- **T** is for Type - Remember to decide on your desired outcome and select the type of imagery to match it.

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