This is to certify that the

thesis entitled

EXAMINATION OF THE RELATIONSHIP BETWEEN
SELF-EFFICACY FOR MENTAL IMAGERY AND
SELF-REPORTED IMAGERY SKILLS

presented by

Amy Juliana Tenute

has been accepted towards fulfillment
of the requirements for

M.S. degree in Kinesiology

Deborah L. Feltz

Major professor

Date 8/17/01

# EXAMINATION OF THE RELATIONSHIP BETWEEN SELF-EFFICACY FOR MENTAL IMAGERY AND SELF-REPORTED IMAGERY SKILLS

By

Amy Juliana Tenute

AN ABSTRACT OF A THESIS

Submitted to
Michigan State University
In partial fulfillment of the requirements
For the degree of

MASTER OF SCIENCE

Department of Kinesiology

2001

Professor Deborah L. Feltz

ABSTRACT

EXAMINATION OF THE RELATIONSHIP BETWEEN SELF-EFFICACY FOR MENTAL IMAGERY AND SELF-REPORTED IMAGERY SKILLS

By

Amy Juliana Tenute

The purpose of this study was to examine the relationship between self-efficacy for mental imagery and self-reported imagery skills. The investigator designed a questionnaire to measure self-efficacy for mental imagery (SEMII) and administered it to NCAA Division I, II, & III athletes, as well as competitive club sport athletes participating in several sports (i.e., tennis, golf, track). These athletes were also given four other questionnaires measuring imagery use, imagery ability, imagery content, and trait sport confidence. Exploratory Factor Analysis of the SEMII indicated that is comprised four factors accounting for 70% of variance: Cognitive Specific, Motivational Specific, Motivational General – Mastery, and Motivational General – Arousal imagery efficacy. The SEMII correlated significantly with measures of imagery use, ability, and content as well as trait sport confidence in a positive direction. Elite athletes reported more imagery efficacy than novice and intermediate level athletes did. Women reported more imagery efficacy than men, and more experienced athletes had more imagery efficacy than less experienced athletes.

ACKNOWLEDGEMENTS

I have many people to acknowledge and thank for helping me with this thesis and achieving this degree. First, my parents, who have supported every life choice I have ever made, whether they agreed with it or not. You allowed me to explore the areas I wanted and try near impossible endeavors, but always with just one rule, "if you make this commitment you must see it through to the end." I have kept that lesson with me my whole life and at no other time has it seemed more apropos than here, finishing my Masters'. Thank you for not only instilling in me the ideal of finishing what you start, but being there to support me every step of the way, and even prodding me at times over these last few years just to make I sure I would make it. I love you both.

Second, I would like to thank Dr. Marty Ewing and Dr. Crystal Branta for serving on my committee (and remembering me despite my lengthy absence from MSU). I greatly appreciate your insight, comments, ideas and patience in working with me on my degree and thesis. Thank you!

Next, I want to thank Dr. Sandra Short for all your help with the statistical analyses and your continued belief in my study and ability to finish it. Thank you for responding to ALL my emails and understanding all my questions, even when I was not sure what I was actually asking. Congratulations on the little one and thank you again.

And finally, thank you Dr. Deb Feltz. Your unbelievable commitment to me and my thesis are why I am writing this and will graduate with a Masters' degree from Michigan State University. You could have easily dismissed me ever finishing after not hearing from me for months (ok, maybe even years) at a time. But no matter how long it had been since my last contact, you were right there to give me direction and encouragement for completing this thesis. And for that, I am forever grateful.

TABLE OF CONTENTS

LIST OF TABLES

# GLOSSARY

**Kinesthetic Imagery** - To imagine feeling what performing a movement is like without actually doing the movement (Hall & Pongrac, 1983).

**Mental Imagery** – A psychological activity that evokes the physical characteristics of an object, person, or place that is either permanently or temporarily absent from our perception (Denis, 1985).

**Self-Confidence** - A global trait of one's overall competency beliefs (Bandura, 1997)

**Self-Efficacy** - An individual's belief in his/her ability to successfully execute a specific task (Bandura, 1977).

**Self-Efficacy for Mental Imagery Inventory** – The belief that one has the capacity to perform a variety of mental imagery tasks.

**Sport Confidence** - The belief of degree of certainty individuals possess about their ability to be successful in sport (Vealey, 1986).

**Sport Imagery Questionnaire Subscales** (Hall, Paivio, Mack & Hausenblas, 1998)

Cognitive Specific (CS). Imagery focused on performing a specific sport skill.

Motivational Specific (MS). Goal-oriented Imagery such as

Motivational General – Mastery (MG-M). Imagery focused on mastery of a Competitive situation.

Motivational General – Arousal (MG-A). Imagery related to general Physiological and emotional arousal.

Cognitive General (CG). Imagery related to strategies for a competitive event

**Visual Imagery** - Visually imaging performance of a movement without actually doing the movement (Hall & Pongrac, 1983).

# CHAPTER 1

## Introduction

### Nature of the Problem

Studies on the effects of imagery and self-efficacy on sport performance are numerous (Feltz, 1988; Feltz & Landers, 1983; Hecker & Kaczor, 1988; Heishman & Bunker, 1989; Weinberg, Gould, & Jackson, 1979). Based on many of these studies, the positive effects of mental imagery on competitive athletic performance have been supported. However, the underlying reasons for why some athletes engage in mental imagery and others do not has not been investigated. One reason may be the degree of confidence athletes have in their ability to image. The present study examined the role that self-efficacy for mental imagery plays with respect to imagery use, imagery ability, and trait sport-confidence.

The research literature on self-efficacy and motor task performance has been based on Bandura's (1977, 1997) self-efficacy theory. This is a social-cognitive theory based on efficacy expectations. Specifically, the belief individuals possess about their ability to successfully execute the psychological procedures needed to complete a particular task affects the level and strength of their self-efficacy (expectations). Bandura outlined four principal sources of information from which efficacy expectations are derived. One's efficacy expectations are posited to influence subsequent behavior and performance in a particular situation.

The effect of self-efficacy on motor and sport performance is one area of psychology research stemming from Bandura's (1977) theory. Studies have been conducted on strength and endurance tasks (Lerner & Locke, 1995; Weinberg, Gould, Yukelson, & Jackson, 1981), high avoidance motor tasks (Feltz, 1988; Feltz, Landers, & Raeder, 1979), and competitive sport performance situations (Barling & Abel, 1983; George, 1994). In general, the findings of self-efficacy on motor and sport performance

studies have shown that, indeed, self-efficacy can predict and enhance performance (Feltz & Lirgg, 2001; George, 1994), particularly in individual sports such as gymnastics (Lee, 1982; Weiss, Wiese, & Klint, 1989) and tennis (Barling & Abel, 1983).

The effects of mental imagery have been studied in relation to learning of a motor task (Corbin, 1967; Goss, Hall, Buckolz, & Fishburne, 1986), as a psyching up method (Gould, Weinberg, & Jackson, 1980; Lee, 1990), to enhance performance of an already learned task (Wrisberg & Anshel, 1989; Ziegler, 1987) and to improve competitive sport performance (Heishman & Bunker, 1989; Van Gyn, Wenger, & Gaul, 1990). The majority of imagery research has focused on either novel tasks (e.g., wand-juggling, pursuit rotor task) or a sport skill (e.g., free throw shooting ) in a neutral, noncompetitive situation. However, much like the self-efficacy research, for imagery to be considered generalizable to a sport setting, research needs to be conducted in competitive athletic situations. In fact, numerous studies have looked at the effects of imagery use on subsequent competitive performance (Davis, 1990; Heishman & Bunker, 1989; Salmon, Hall, & Haslam, 1994), and in particular, individual sports (Mahoney & Avener, 1977; Mumford & Hall, 1985; Noel, 1980).

Most studies have not directly assessed the effects of mental imagery use on self-efficacy beliefs for future motor performance. Some investigators have conducted anecdotal analyses of their results to assess this area (Clark, 1960; Martin & Hall, 1995; Woolfolk, Parrish, & Murphy, 1985). For example, Clark reported that participants experienced progressively increasing confidence in their free throw shooting performance as a result of mental practice.

Feltz and Riessinger (1990) directly tested whether in vivo emotive imagery and performance feedback helped enhance self-efficacy beliefs on a competitive motor task. Results revealed a significant increase in self-efficacy for the imagery group after brief exposure. Imagery group participants also had significantly higher efficacy scores than feedback alone or control subjects after each performance trial. This study used mastery

imagery, which consisted of generating images that were assumed to elicit feelings of competence and being psyched up.

Paivio (1985) studied the roles of cognitive and motivational imagery in enhancing performance and self-confidence in more depth than Feltz and Riessinger. Paivio (1985) asserted that the analytic framework for imagery effects comprised motivational and cognitive functions. Each function was further categorized into general and specific functions. Paivio proposed that motivational type imagery may affect enhancement of sport performance more than the cognitive type because many motivational procedures are designed to decrease anxiety and tension, or to increase self-confidence for future performance. Several other researchers appear to agree with Paivio's assertion (Barr & Hall, 1992; Hall et al., 1990; Moritz, Hall, Martin & Vadocz, 1996).

Moritz et al. (1996) took these assertions a step further by analyzing the actual content of what confident athletes image. The authors found that high sport confident athletes tended to use more mastery and arousal type imagery (motivational) than low sport confident athletes, as measured by the State Sport Confidence Inventory (SSCI; Vealey, 1986). They also found that high sport confident athletes had better perceived kinesthetic and visual imagery ability that low confident athletes. Based on their results, the researchers believed that there is a clear relationship between image content and sport confidence. The present thesis extended Moritz et al's (1996) findings by analyzing the link between self-efficacy for mental imagery and the types of imagery athletes use and their subsequent trait sport confidence.

The present study asserted that, based on the previous research, it was possible that self-efficacy for mental imaging would correlate positively with the different types of imagery use, imagery ability, and trait sport confidence. Based on Bandura's (1977) self-efficacy theory, when an individual is highly efficacious (has the expectation of personal

mastery) for a particular task (in this case mental imagery) s/he will initiate and persist in performing that task more than someone low in self-efficacy for the same task.

Statement of the problem

The purpose of the present study was to examine the relationship between self-efficacy for mental imagery and imagery use, ability, content, and trait sport confidence.

Hypotheses

1. One's self-efficacy for mental imagery is positively associated with reported imagery use.

2. One's self-efficacy for mental imagery is positively associated with reported mental imagery ability.

3. One's self-efficacy for mental imagery is positively associated with using similar type of imagery.

4. One's self-efficacy for mental imagery is positively associated with reported trait sport confidence.

Delimitations

The participants in this study were at the college level. Results of this study may not generalize to team sport athletes or athletes of younger ages.

Limitations

This study was limited by the following uncontrolled factors:

1. Only self-reported imagery behavior was measured
2. All psychometric procedures used in developing an instrument (i.e. Confirmatory Factor Analysis, Independent Sample) were not conducted on the SEMII.
3. Participant selection was voluntary, potentially causing a subject self-selection bias.

# CHAPTER 2

## Review of Related Literature

The effects of mental imagery practice on learning and enhancing motor performance has been one of the most widely studied topics in the area of sport psychology (Feltz & Landers, 1983; Hecker & Kaczor, 1988; Heishman & Bunker, 1989; Murphy, 1990; Richardson, 1967A & B; Suedfeld & Bruno, 1990). Another topic of investigation in sport psychology receiving attention has been the effects of self-efficacy on motor and sport performance (Feltz, 1988; Weinberg et al., 1979; Weinberg et al., 1981). Some researchers have also conducted analyses on the use of mental imagery to increase self-efficacy or self-confidence of motor performance (Clark, 1960; Feltz & Riessinger, 1990; Gould et al., 1980; Hall & Rodgers, 1989; Martin & Hall, 1995; Woolfolk et al., 1985) and sport skill performance (Kendall, Hrycaiko, Martin, & Kendall, 1990).

The present discussion has several purposes. The first purpose is to review and discuss the sport psychology literature relating self-efficacy to sport performance. Second, a literature review of the effects of mental imagery on motor and sport skill performance is presented. Third, the relationship between self-efficacy, mental imagery and sport performance is addressed. Finally, the need for a measure assessing self-efficacy for mental imagery is discussed.

### Self-Efficacy and Sport Performance

The research literature on self-efficacy and motor task performance has been based on Bandura's (1977, 1997) self-efficacy theory. This is a social-cognitive theory based on efficacy expectations. Specifically, the belief individuals possess about their ability to successfully execute the psychological procedures needed to complete a particular task affects the level and strength of their self-efficacy. Bandura (1997) originally outlined four principal sources of information from which efficacy

expectations are derived: (a) past performance accomplishments, (b) vicarious experience, (c) verbal persuasion and, (d) physiological, or emotional arousal. Feltz and Lirgg (2001) reported that other categories such as self-modeling, social comparison, and imaginal experience have been added as sources of efficacy information (Bandura, 1997; Maddux, 1995; Feltz, 1994). Maddux (1995) believed imagining oneself being successful or unsuccessful in an upcoming performance situation could generate efficacy beliefs. Bandura (1997) called this cognitive self-modeling. These generated efficacy beliefs are then posited to influence subsequent behavior and performance in a particular situation.

Bandura (1977, 1997) asserts that the individual must have the capabilities to carry out the required behavior needed to produce a specific outcome. Assuming individuals do have the capabilities, then self-efficacy theory states that performance will be based (in part) on their perception of their own competencies. Bandura's theory differs from the concept of self-confidence, which is seen as a global trait of one's overall competency beliefs. Self-efficacy is confidence on a specific task, or in a particular situation. In other words, self-efficacy expectations change from situation to situation, although Bandura noted that efficacy effects can generalize from one task, or situation, to a similar one.

Self-efficacy theory (Bandura, 1977, 1997) has provided a framework for studying the effects of self-efficacy on performance in a wide range of situations. Bandura's model has been used to study self-efficacy in settings of behavioral change (Bandura, Adams, Hardy, & Howells, 1980; Marcus, Selby, Niaura, & Rossi, 1992), goal-level and goal-commitment (Lerner & Locke, 1995), strength performance (Feltz & Riessinger, 1990; Weinberg et al., 1979), and competitive sport performance (Corbin, 1967; Lee, 1982). These studies have varied on the task used to assess performance as well as on the various ways self-efficacy has been measured and manipulated.

The effect of self-efficacy on motor and sport performance is one area of research stemming from Bandura's (1977) theory. Studies have been conducted on strength and endurance tasks (Lerner & Locke, 1995; Weinberg et al., 1981), high avoidance motor tasks (Feltz, 1988; Feltz et al., 1979), and competitive sport performance situations (Barling & Abel, 1983; George, 1994). In general, the findings of self-efficacy and motor and sport performance studies have shown that, indeed, self-efficacy can predict and enhance competitive sport performance (Feltz & Lirgg, 2001; George, 1994). Several of these studies are described at length below.

Lee (1982) studied the self-efficacy of young, female gymnasts and their performance in a major competition. The participants ranged in age from 7 to 12 years old and were of differing ability levels. The investigator assessed the accuracy of the gymnasts' expectations, their coach's expectations, and their past competition scores as predictors of their upcoming competition performance. The comparison in accuracy of the gymnasts' self-efficacy expectations and past competition scores were used to test the gymnasts' expectations of their ability. The results indicated that the gymnasts' expectancies were more accurate estimates of their performance than their previous competition scores demonstrating that an individual's efficacy expectations can accurately predict his/her competitive performance.

Other research has expanded these findings by looking at different populations. For example, Weiss et al. (1989) also studied the self-efficacy of gymnasts and its influence on competitive performance. However, they examined gymnasts who were older than Lee's (1982) sample. The researchers assessed gymnastic self-efficacy by having the gymnasts record what scores they thought they were capable of attaining approximately 2 hours before the beginning of the competition. They found that self-efficacy was more highly correlated with performance than was years of experience, worry cognitions, and state anxiety. The authors reported that gymnasts who had higher efficacy expectations were significantly more successful that those with low expectations.

Another example of the self-efficacy and competitive sport performance was a study conducted by Barling and Abel (1983). Participants' mean age was 26.6 years and they were of varying ability levels. This particular study assessed the relationship between efficacy, response-outcome, valence expectancies and tennis serving performance. All participants completed a self-rating scale on the above independent variables and were assessed on their performance by two raters. Participants were rated on 12 behavioral categories relevant to tennis performance including accuracy, footwork, anticipation, and concentration. The results showed that, like Lee's (1982) study, the participants' efficacy expectations of their own performance were significantly related to the external ratings of the 12 behavioral criteria of tennis performance, whereas, only two of the criteria were related to response-outcome expectations, and valence beliefs.

Based on the research presented, Bandura's (1977) self-efficacy theory has been shown to be significantly related to competitive sport performance. The previous investigations have yielded support for the predictive power of self-efficacy, as well as the performance enhancing effects self-efficacy can promote. Mental imagery has been another variable studied to examine its effects on sport performance.

Mental Imagery and Sport Performance

Mental practice has been one of the earliest and most widely studied topics in sport psychology. Richardson (1967a) defined mental practice as "the symbolic rehearsal of a physical activity in the absence of any gross muscular movements" (p. 95). In other words, when an individual sits with his/her eyes closed and imagines going through the motions of shooting a free throw he/she is using mental practice. Richardson also noted that mental practice has been studied under a variety of other names including symbolic rehearsal, mental rehearsal, visualization, and mental imagery.

The effects of mental imagery have been studied in relation to learning and development of a motor task (Corbin, 1967; Goss et al., 1986), as a psyching up method (Gould et al., 1980; Lee, 1990), to enhance performance of an already learned task

(Wrisberg & Anshel, 1989; Ziegler, 1987) and to improve competitive sport performance (Heishman & Bunker, 1989; Van Gyn, Wenger, & Gaul, 1990). The majority of imagery research has focused on either novel tasks (i.e., wand-juggling, pursuit rotor task) or a sport skill (i.e., free throw shooting) in a neutral, noncompetitive situation. However, much like the self-efficacy research, for imagery to be considered generalizable to a sport setting, research needs to be conducted in competitive athletic situations. In fact, several studies have looked at the effects of imagery use on subsequent competitive performance (Davis, 1990; Heishman & Bunker, 1989; Salmon et al., 1994), and in particular, individual sports (Barr & Hall, 1992; Hall et al., 1990; Mahoney & Avener, 1977; Mumford & Hall, 1985; Noel, 1980).

The above research supports the notion that mental imagery enhances sport performance of experienced athletes, but not necessarily lower ability athletes. For example, Noel (1980) conducted a study of imagery and competitive sport performance using visuo-motor behavior (VMBR) training to help enhance tennis serve performance during competition. The experimental group was trained, first, in relaxation and then, in repeated mental practice of its serves. The participants were also divided into low and high tennis ability groups. The high tennis ability group achieved significant improvement in their percentage of good first serves, but the lower ability group's performance actually decreased from pretest to competition performance. It is possible that the skill of serving among low ability participants was not a well-learned task and the VMBR training may have been more distracting than helpful. Other researchers looked at how different types of imagery might affect subsequent sport performance for experienced versus novice athletes.

Mumford and Hall (1985) also conducted a study on the effects of imagery on sport performance. In their study, the effects of internal and external imagery on performing figures in skating by senior and novice skaters were examined. External imagery is where an athlete views him/herself from a third-person perspective, whereas

the internal approach takes on a first-person quality, a "through their own eyes" approach. The researchers did not find a significant difference between internal and external imagery groups or even between the imagery groups and the control group. However, they reported that the senior skaters using mental imagery showed greater performance improvement than the novice skaters. This suggests that individuals more skilled in a particular sport may benefit more from imagery practice than a beginner, or someone more unfamiliar with the skills involved in executing a specific task. It also appears that the higher the competitive level, the more the use of psychological strategies such as mental imagery play a role in who wins and loses. Researchers studying the effects of mental imagery now are turning their focus to the characteristics of imagery to determine which type, or method of imaging is most effective in enhancing self-efficacy and, in turn, sport performance.

Characteristics of Mental Imagery That Influence Self-Efficacy and Sport Performance

Most studies have not directly assessed the effects of mental imagery use on self-efficacy beliefs or future motor performance. Some investigators have reported anecdotal results assessing this area (Clark, 1960; Woolfolk et al., 1985). For example, in Clark's (1960) study, he reported that participants experienced progressively increased confidence in their free throw shooting performance as a result of mental practice. Other studies have looked at differing aspects of mental imagery and its effects on efficacy and performance.

For instance, Woolfolk and his colleagues (1985) found that a number of the participants in the positive imagery group reported that "seeing" the putt go into the cup increased their expectations of success in actual performance of the task. While some of the individuals in the negative group indicated that imagining failing at the task tended to erode their self-confidence in successfully executing the actual putt. Performance success was found to be greater for the positive imagery group than both the control and negative imagery groups.

In the Mumford and Hall (1985) study on imagery and figure skating performance, the authors reported that all the skaters receiving imagery training said they believed it helped their skating performance. The researchers asserted that the imagery increased the skaters' confidence in their ability to perform the figure.

Feltz and Riessinger (1990) went a step further and directly tested whether in vivo emotive imagery and performance feedback helped enhance self-efficacy beliefs on a competitive motor task. Participants were assigned to one of three experimental conditions: mastery imagery plus feedback, feedback alone, or control condition. Results revealed a significant increase in self-efficacy for the imagery group after brief exposure. Imagery group participants also had significantly higher efficacy scores than feedback alone or control subjects after each performance trial. The type of imagery used in this study was mastery imagery. Mastery imagery consisted of generating images that were assumed to elicit feelings of competence and being psyched up such as imagining holding out longer than the opponent and being successful. Paivio (1985) has studied the roles of cognitive and motivational imagery in enhancing performance and self-confidence in more depth than the Feltz and Riessinger (1990) study.

Paivio (1985) analyzed the functional roles through which imagery can affect performance. He asserted that the analytic framework for imagery effects comprised motivational and cognitive functions. Each function was further categorized into general and specific functions. The motivational-general level refers both to the affect or physiological arousal that might accompany imagery use. The motivation-specific level refers to goal-oriented imagery (i.e. seeing one winning the race, seeing the audience cheering for you). The cognitive-general level refers to imaging of performance strategies and the cognitive-specific level to imaging specific sport skills to be used in performance.

Paivio (1985) proposed that motivational type imagery may affect enhancement of sport performance more than the cognitive type because many motivational procedures

are designed to decrease anxiety and tension, or to increase self-confidence of future performance. Several other researchers have supported Paivio's assertion (Barr & Hall, 1992; Hall et al., 1990; Moritz, Hall, Martin, & Vadocz, 1996). Both Hall et al. and Barr and Hall examined imagery use of athletes in a variety of sports. Both studies found that athletes tended to use mental imagery more frequently just before competing than at any other time. The researchers asserted this could mean that these athletes were using imagery in a motivational way to help them control their arousal levels and to help build their self-confidence for their upcoming performance. This notion was also supported by Salmon et al. (1994) who investigated imagery use by soccer players. The researchers again found that the athletes tended to use imagery more just prior to competition than in training. Players also said they tended to use mental imagery more for its motivational function than its cognitive function.

Moritz and her colleagues (1996) took these assertions a step further by analyzing the actual content of what confident athletes image. The researchers administered the Movement Imagery Questionnaire - Revised (MIQ-R: Hall & Martin, 1997), the Sport Imagery Questionnaire (SIQ: Hall et al., 1998), and the State Sport Confidence Inventory (SSCI) to 57 elite competitive rollerskaters. The authors found that high sport confident athletes tended to use more mastery and arousal type imagery (motivational) than low sport confident athletes. They also found that high sport confident athletes had better kinesthetic and visual imagery ability than the low confident athletes did. Based on their results, the researchers believed that there is a clear relationship between image content and sport confidence. The present thesis extended Moritz et al's findings by analyzing the link between self-efficacy for mental imagery and the types of imagery athletes use. The present study also proposed that self-efficacy for mental imagery is positively linked to imagery use and ability, and subsequent trait sport-confidence.

The Influence of Self-Efficacy for Mental Imagery on Sport Confidence

Vealey (1986) developed the concept of sport-confidence to measure the degree of certainty individuals possess about their ability to be successful in sport. She divided this into state sport-confidence (SSC) and trait sport confidence (TSC). SSC measured confidence at a particular moment, often right before actual performance while TSC measured and athletes overall sport-confidence. More recently, researchers have proposed sources of sport-confidence (Vealey, Hayashi, Garner-Holman, & Giacobbi, 1998). They identified psychological strategies, including visualizing successful performance as one of the informational sources that influences confidence beliefs. The present thesis proposes that self-efficacy for visualizing successful performance could, in turn, affect trait sport confidence. While no studies have examined this directly, previous research has suggested that confidence in using mental imagery could affect subsequent performance and confidence.

Clark (1960) found that mental practice progressively increased confidence in free throw shooting performance. The results of the study also indicated that the mental imagery groups showed significant gains in actual performance of foul shooting, but not as high as physical practice only. However, an introspective analysis by Clark found that one of the mental practice group's coach made facetious and deprecating remarks to the participants concerning the possibilities of mental practice. When the author recomputed the results dropping the group exposed to the coach's negative remarks, mean performance gains went up 14% and significantly surpassed the physical practice group's mean performance gains. What this finding suggests is that the coach's remarks may well have affected the participants' confidence in using mental imagery to help performance, which in turn may have affected how much they actually imaged and subsequently their physical performance of shooting.

Corbin (1967) also noted that all but one of the participants in the experimental condition reported confidence in mental practice as a factor in improving wand-juggling

performance. Therefore, the present study has examined an athlete's efficacy in using mental imagery to predict mental imagery use and subsequent trait sport confidence.

As discussed in the first section of this thesis, self-efficacy has been shown to both predict and help enhance competitive sport performance. Research presented also supported the assertion that mental imagery helps to improve competitive sport performance as well as increase self-efficacy expectations that individuals can successfully execute a specific imaged task. The present study asserted that based on the previous research, self-efficacy for the skill of mental imaging will correlate positively with imagery use, imagery ability, and trait sport confidence. Based on Bandura's (1977) self-efficacy theory, when an individual is highly efficacious (has the expectation of personal mastery) for a particular task (in this case mental imagery) s/he will initiate and persist in performing that task more than someone low in self-efficacy of the same task. The relationship between imagery use and sport confidence (state) has been discussed (Moritz et al., 1996). This study asserted that individuals confident in their ability to mentally image would use it more often, report high ability to image, and report having higher trait sport-confidence.

In conclusion, the above review has outlined the self-efficacy and mental imagery literature as it relates to motor and sport performance. No measure of self-efficacy for mental imagery currently exists; therefore, the present study consisted of, first, designing and testing a self-efficacy for mental imagery inventory, and second, examining the relationships between imagery efficacy, imagery use, imagery ability, imagery strategy and sport confidence.

# CHAPTER 3

## Methods

### Participants

Participants in this study consisted of 91 male and 104 female competitive athletes in 12 collegiate and club sports, most of them individual sports (badminton, cross-country running, fencing, golf, martial arts, pitching, racquetball, soccer, swimming, synchronized swimming, tennis, track and field). Athletes were recruited to participate from National Collegiate Athletic Association (NCAA) Division I, II, and III colleges as well as from competitive Club sports.

Forty-nine athletes participated in Division I programs, 48 in Division II, 53 in Division III, and 45 were involved in competitive club sports. Table 1 shows the breakdown of athletes by sex and division. Study participants ranged in age from 18 to 48 years. However, 82.5% were between 18 and 22. The reported experience level of participants ranged from 1 year to 21 years, with 74.3% having 5 to 12 years of experience. Athletes participating were from 12 different sports with track and field, golf, tennis and swimming comprising 75% of participants. The majority of the athletes considered themselves to be at an advanced level for their sport (68.2%). Twenty-six athletes ranked themselves in the elite class, 29 considered themselves to be of intermediate level and seven called themselves novices (all club athletes). Finally, only 26 of the 195 participants reported having ever worked with a sport psychology consultant.

Table 1

Athletes by Division and Sex

| Division | Male | Female | Total |
|---|---|---|---|
| NCAA I | 23 | 26 | 49 |
| NCAA II | 22 | 26 | 48 |
| NCAA III | 23 | 30 | 53 |
| CLUB | 23 | 22 | 45 |
| Total | 91 | 104 | 195 |

Instruments

The Imagery Use Questionnaire (IUQ). This questionnaire measured how often and under what circumstances an individual engages in mental imagery use (Hall et al., 1990). The self-report questionnaire consisted of 34 items. Responses were rated on a 7-point Likert scale from 1 (never, very difficult) to 7 (always, very easy). Two items required a yes/no response (see Appendix B). Each item was analyzed separately with the SEMII in correlational analyses. No psychometric evaluation has been undertaken on the IUQ (Hall, 1998).

The Sport Imagery Questionnaire (SIQ). The SIQ measures how often the athlete reports using different types of sport imagery (Hall et al., 1998). This questionnaire consists of 30 items comprising five subscales, in which the athletes rate how frequently they image the item suggested. The Cognitive General subscale measures strategies athletes employ (e.g. "I make up new plans/strategies in my head"). The Cognitive Specific subscale focuses on imaging a particular skill (e.g. "I can mentally make corrections to physical skills"). The Motivational Specific subscale measures goal-oriented imagery ("I imagine other athletes congratulating me on a good performance"),

while the Motivational General subscales look at mastery (e.g. "I imagine myself appearing self-confident in front of my opponents") and arousal imagery (e.g. "I imagine myself being in control in difficult situations"). The statements are rated on a 7-point Likert scale ranging from 1 (rarely) to 7 (often) (see Appendix C). The internal consistency ranged from .85 (MG-M subscale) to .93 (MS subscale).

The Mental Imagery Questionnaire-Revised (MIQ-R). The MIQ-R measures an individual's self-reported ability to visually and kinesthetically image physical movements (Hall & Martin, 1997). This inventory consists of 8 items, four related to visual imagery and four related to kinesthetic imagery. Questions are rated on a 7-point Likert scale that ranges from 1 (very hard to see or feel) to 7 (very easy to see or feel) (see Appendix D). The internal consistency for the present sample for each scale was .93 (Visual) and .96 (Kinesthetic), respectively.

The Trait Sport Confidence Inventory (TSCI). The TSCI is a measure developed by Vealey (1986) that assesses an individual's dispositional confidence to perform well in competition. In the present study, the TSCI was instead of the SSCI because athletes were tested in a noncompetitive environment and the researcher wanted to test whether self-efficacy for different types of imagery would be positively associated with a general sport-confidence in an athlete. The TSCI consists of 13 items in which participants rate their sport- confidence on a 9-point Likert scale (1 = 'low' and 9 = 'high'). Scores are obtained by summing the 13 items. The TSCI asks athletes to think about how confident they were when competing in their sport and then rate their confidence for how they "generally feel" in reference to "the most confident athlete" they know. An internal consistency reliability of .97 was obtained for the present sample on the TSCI (see Appendix E).

Initial Item Development of the SEMII

The SEMII is an inventory developed by the researcher to measure an individual's self-efficacy in employing mental imagery techniques in sport (see Appendix A). The

items were adapted from the SIQ (Hall et al., 1998) by changing the stem of each item. The SEMII used only 4 of the 5 SIQ subscales (CS, MS, MG-A, MG-M). The Cognitive General subscale was not used because the items were believed to be too general in nature for the present study. The SEMII contained 22 items, constructed according to Bandura's (1977, 1997) recommendations. Specifically, respondents were told that, "mental imagery self-efficacy refers to your belief that you have the capacity to perform a variety of mental imagery tasks." They were then instructed to think about how confident they were in their mental imagery skills and to rate their confidence in their ability to perform the skills asked based on an 11-point Likert scale ranging from 0 (not at all confident) to 10 (extremely confident). All questions on the SEMII began with the stem "How confident are you in your ability to..." The inventory contained items such as "... image yourself being interviewed as a champion?," "... imagine yourself performing a skill perfectly before attempting it physically?," "... get emotionally excited when imaging a competition?" Seventeen of the items were related to the motivational function of mental imagery and the rest were related to the cognitive-specific function of mental imagery. Table 2 contains the SEMII items and their corresponding item on the SIQ.

Table 2

SEMII items and the corresponding SIQ item

| SEMII Item | SIQ Item | SIQ Factor |
|---|---|---|
| 1 | 4 | MG-A |
| 2 | 26 | MG-M |
| 3 | 18 | CS |
| 4 | 25 | MS |
| 5 | 6 | MG-M |
| 6 | 28 | MG-A (Loaded on MG-M for SEMII) |
| 7 | 20 | CS |
| 8 | 2 | MS |
| 9 | 15 | MG-A |
| 10 | 13 | CS |
| 11 | 7 | MS |
| 12 | 17 | MG-A |
| 13 | 23 | MG-M (Loaded on MG-A for SEMII) |
| 14 | 27 | CS |
| 15 | 10 | MS |
| 16 | 22 | MG-A |
| 17 | 28 | MG-M |
| 18 | 8 | CS |
| 19 | 12 | MS |
| 20 | 24 | MG-A |
| 21 | 14 | MS |
| 22 | 21 | MG-M (Was dropped from further analyses as it did not load on any factor on the SEMII) |

The SEMII was given to three researchers who were familiar with the concept of mental imagery and had studied it in previous research. The evaluators were asked to examine each item for content validity and relevancy of the questions on the dimension of mental imagery ability. These researchers recommended that the scale length should be from 0 to 10, instead of the original 0 to 5. They also suggested that each item use the word image (or a derivation thereof) instead of interchanging image and imagine as is done in the SIQ. They also believed that the definition was clear and accurate and the length of the inventory was appropriate as well.

The inventory was given to 32 Physical Education and Exercise Science undergraduate students. The students participating had played competitively (i. e. high

school varsity) in at least one of the sports under study. They were administered the inventory twice (one week apart) to assess test-retest reliability. The MG-A factor had a reliability correlation of .84. The reliability for the MG-M factor was .82. The CS factor reliability coefficient was .91 and for the MS factor was .92.

Procedure

The testing consisted of two sessions for each participant. In Session 1, the SEMII and a demographics questionnaire (see Appendix G) were administered. The demographics questionnaire included asking questions about one's age, sex, sport, competitive experience, and previous mental imagery experience. In Session 2, the participants took the IUQ, the TSCI, MIQ-R, and the SIQ. Administration of the tests in this session were counterbalanced to help control order effects. For example, one group, or athlete took the questionnaires in an alternate: IUQ, TSCI, MIQ-R, and SIQ; while a different group, or athlete took them in the following order: TSCI, SIQ, MIQ-R, and IUQ.

All testing sessions took place in the afternoon at either the beginning of a practice session or the end. Testing also took place in the indoor area where the participants practice, unless there was a team room available for administration. Coaches were asked prior to testing to not be present during either of the testing sessions and none were.

The first session began with an introduction of what the testing involved and what the purpose of the study was. Participants were then asked to participate. Those who chose to participate were given the informed consent form (Appendix H). Upon completing the informed consent, the SEMII and Demographics questionnaire were distributed. The head administrator read the instructions to participants for whichever inventory was being administered and again answered any questions before athletes began. After everyone completed the inventories, they were collected individually and

the participants were asked to not discuss their answers on any of the inventories until after the second testing session.

The second testing session began by reminding the participants of their confidentiality, anonymity, and voluntary status. Then, the inventories were distributed to the participants and again the instructions read and questions answered before they began. As athletes finished, they were asked to bring their tests to the administrator and find their inventory and informed consent form from the previous week and staple them together. The informed consent form was then separated and filed. After all participants finished and returned their inventories, they were debriefed regarding the hypotheses of the study.

# CHAPTER 4

## Results

### Preliminary Analyses

An Exploratory Factor Analysis (EFA) was conducted on the 22-item SEMII to determine its factorial structure. A principal components factor analysis, using maximum likelihood procedures with oblique rotation was forced onto four factors. The factors that resulted were labeled Motivational Specific (MS), Cognitive Specific (CS), Motivational General-Arousal (MG-A), and Motivational General-Mastery (MG-M). Only one item ("image yourself being mentally tough") loaded on both the MG-A and MG-M factor, and thus, was eliminated, resulting in a 21-item scale. The final factor structure accounted for 69.6% of the overall variability in scores and matched very closely to the four factors of the SIQ from which the SEMII was adapted. The factor loadings and Cronbach alpha levels are contained in Table 3.

Table 3

SEMII Items and Corresponding Factor Loadings, Oblique Rotation

| Item and (Questionnaire number) | Factor 1: MS | Factor 2: CS | Factor 3 : MG-A | Factor 4: MG-M |
|---|---|---|---|---|
| Image yourself being interviewed as a champion (4) | -.77 | -.04 | -.15 | .21 |
| Image the atmosphere of winning a championship (8) | -.75 | .00 | .04 | .07 |
| Image other athletes congratulating you on a good Performance (11) | -.87 | .02 | .00 | -.01 |
| Image the atmosphere of receiving a medal (15) | -.86 | -.03 | .08 | -.04 |
| Image the audience applauding your performance (19) | -.90 | -.01 | -.08 | .08 |
| Image yourself winning a medal (21) | -.95 | -.02 | -.01 | -.04 |
| Mentally make corrections to physical skills (3) | .07 | -.79 | .06 | .00 |
| Image yourself performing a skill perfectly before Attempting it physically (7) | .02 | -.90 | .00 | -.04 |
| Consistently image performing a particular skill perfectly In your mind (10) | -.05 | -.82 | -.03 | .10 |
| Image yourself performing a newly learned skill perfectly (14) | -.05 | -.85 | -.05 | -.01 |

Table 3 (cont'd)

| Item and (Questionnaire number) | Factor 1: MS | Factor 2: CS | Factor 3 : MG-A | Factor 4: MG-M |
|---|---|---|---|---|
| Consistently control the image of a physical skill (18) | - .22 | -.61 | .00 | .11 |
| Mentally recreate the emotions you feel before competing (1) | .05 | .04 | .62 | .25 |
| Image the stress and anxiety associated with competing (9) | -.06 | .02 | .62 | .17 |
| Get emotionally excited when imaging a competition (12) | -.02 | -.09 | .84 | -.17 |
| Image yourself appearing self-confident in front of your Opponents (13) | -.04 | -.30 | .56 | .12 |
| Feel anxiety when imaging an event/game that you are About to compete in (16) | -.03 | .09 | .77 | -.01 |
| Image the excitement associated with competition (20) | -.14 | -.02 | .67 | .09 |
| Image yourself being focused during a challenging Situation (2) | -.14 | -.14 | .15 | .43 |
| Image yourself handling the stress and excitement of Competitions and remaining calm (5) | .04 | .05 | .17 | .72 |
| Image yourself being in control in different situations (6) | .04 | .09 | .05 | .88 |
| Image yourself being in control in difficult situations (17) | .15 | .13 | .16 | .59 |
| Cronbach's Alpha Coefficient | .95 | .92 | .89 | .90 |
| Number of items on scale | 6 | 5 | 6 | 4 |
| Eigen Values | 2.04 | 1.78 | .80 | 10.70 |

Note. MS = Motivation Specific. CS = Cognitive Specific. MG-A = Motivation General- Arousal. MG-M = Motivation General-Mastery.

Table 4 contains the means, standard deviations, and minimum and maximum scores for each subscale.

Table 4

Means, Standard Deviations and Ranges for SEMII

| Subscale | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|
| CS | 7.59 | 1.60 | 2.20 | 10.00 |
| MS | 7.43 | 1.81 | 1.33 | 10.00 |
| MG-A | 6.49 | 1.66 | 2.00 | 9.67 |
| MG-M | 7.47 | 1.58 | 2.75 | 10.00 |

Results of Hypotheses

All four hypotheses were correlational with the alpha level set at .05. Hypothesis 1 predicted that one's self-efficacy for mental imagery (as measured by the SEMII) was positively associated with using imagery. Table 5 contains the means and standard deviations for each IUQ item. Table 6 contains the Pearson Product-Moment correlation coefficients for items 1-28 of the IUQ with each factor of the SEMII and point biserial correlation coefficients for items 29 and 30, (yes/no items) and the SEMII factors. Significant relationships were found between the four factors of the SEMII and where and when imagery took place (e.g. before, during or after training or competition). There were no significant relationships with between the MG-A, MG-M and MS imagery and reporting seeing someone else perform. No significance was found between the SEMII and reporting having regular imagery sessions.

Table 5

Means and Standard Deviations for IUQ items

| IUQ Item | Mean | SD |
|---|---|---|
| 1. Use in training | 4.46 | 1.48 |
| 2. Use in competition | 4.79 | 1.47 |
| 3. Use before practice | 2.91 | 1.48 |
| 4. Use during practice | 4.34 | 1.64 |
| 5. Use after practice | 3.14 | 1.63 |
| 6. Use before an event | 4.74 | 1.57 |
| 7. Use during an event | 4.29 | 1.77 |
| 8. Use after an event | 3.61 | 1.65 |
| 9. Use during another unrelated activity | 3.86 | 1.67 |
| 10. Use during breaks in the day | 3.88 | 1.63 |
| 11. Use before/in bed | 4.54 | 1.70 |
| 12. Watching self on video | 5.14 | 1.47 |
| 12A. Vividness of image | 5.07 | 1.29 |
| 12B. Ease of changing image | 3.27 | 1.35 |
| 13. See as if actually playing/performing | 4.45 | 1.35 |
| 13A. Vividness of image | 4.98 | 1.29 |
| 13B. Ease of changing image | 3.42 | 1.37 |
| 14. See isolated parts of skill | 3.05 | 1.44 |
| 15. See entire skill | 2.77 | 1.43 |
| 16. See part of an event | 2.71 | 1.32 |
| 17. See the entire event | 3.01 | 1.47 |
| 18. See someone else perform | 2.68 | 1.38 |
| 19. See self performing incorrectly | 2.78 | 1.18 |
| 20. See self losing an event | 2.03 | 1.07 |
| 21. See self doing a pre-event routine | 3.22 | 1.72 |
| 22. See the atmosphere of competition day | 3.87 | 1.59 |
| 23. See self winning event | 4.84 | 1.41 |
| 24. See self receiving a first place award | 3.75 | 1.61 |
| 25. Extent actually feel self performing | 4.17 | 1.32 |
| 26. Feel contact with equipment | 3.61 | 1.59 |
| 27. Feel specific muscles | 3.72 | 1.51 |
| 28. Feel body control | 3.25 | 1.49 |

IUQ 29 and 30 were Yes/No response items and not included in this table.

Table 6
Pearson Product-Moment Correlation Coefficients Between the IUQ and SEMII

| IUQ Item | SEMII Factors MG-A | MG-M | MS | CS |
|---|---|---|---|---|
| 1.Use in training | .38** | .44** | .33** | .45** |
| 2.Use in competition | .41** | .46** | .35** | .51** |
| 3.Use before practice | .41** | .37** | .26** | .31** |
| 4.Use during practice | .25** | .37** | .28** | .43** |
| 5. Use after practice | .41** | .34** | .23** | .33** |
| 6. Use before an event | .53** | .48** | .36** | .42** |
| 7. Use during an event | .31** | .29** | .29** | .37** |
| 8. Use after an event | .46** | .35** | .26** | .31** |
| 9. Use during another unrelated activity | .38** | .51** | .38** | .49* |
| 10. Use during breaks in the day | .41** | .47** | .42** | .41** |
| 11. Use before/in bed | .33** | .30** | .33** | 26** |
| 12. Watching self on video | .00 | .17* | .27** | .26** |
| 12a. Vividness of image | .30** | .41** | .41** | .44** |
| 12b. Ease of changing image | -.19** | -.37** | -.23** | -.45** |
| 13. See as if actually playing or performing | .37** | .28** | .18* | .14* |
| 13a. Vividness of image | .44** | .48** | .30** | .32** |
| 13b. Ease of changing image | -.23** | -.41** | -.16* | -.42** |
| 14. See isolated parts of skill | -.22** | -.42** | -.31** | -.55** |
| 15. See entire skill | -.23** | -.41** | -.34** | -.46** |
| 16. See part of an event | -.33** | -.45** | -.35** | -.48** |
| 17. See the entire event | -.29** | -.44** | -.40** | -.46** |
| 18. See someone else perform | .10 | -.02 | -.06 | -.16* |
| 19. See self performing incorrectly | -.25** | -.45** | -.38** | -.41** |
| 20. See self losing an event | -.20** | -.42** | -.33** | -.38** |
| 21. See self doing a pre-event routine | .42** | .26** | .27** | .24** |
| 22. See the atmosphere of competition day | .60** | .46** | .34** | .29** |
| 23. See self winning event | .43** | .47** | .51** | .33** |
| 24. See self receiving a first-place award | .43** | .40** | .58** | .32** |
| 25. Extent actually feel self performing | .56** | .43** | .29** | .31** |
| 26. Feel contact with equipment | -.38** | -.46** | -.41** | -.41** |
| 27. Feel specific muscles | -.40** | -.45** | -.34** | -.43** |
| 28. Feel body control | -.44** | -.55* | -.39** | -.51** |
| 29. Structured sessions | -.25** | -.19** | -.15* | -.05 |
| 30. Regular sessions | -.14 | -.12 | -.01 | -.01 |

*$p < .05$ **$p < .01$

The second hypothesis proposed that one's self-efficacy for mental imagery was positively associated with using similar types of imagery. The SIQ measured five types of imagery use similar to the SEMII: Cognitive-General, Cognitive-Specific, Motivational-General/Arousal, Motivational-General/Mastery and Motivational Specific. Significant correlations were found on all four SEMII factors with the cognitive-general factor of the SIQ (see Table 7). The SIQ Cognitive-Specific factor correlated with all SEMII factors, but most significantly with the CS factor of the SEMII ($\underline{r}$ = .72). All four SEMII factors also correlated significantly with the SIQ Motivational-General/Mastery and Motivational Specific factors. The SIQ Motivational-General/affective factor correlated significantly with the SEMII-MG-A and the MG-M factors, but not the CS or MS factors.

Hypothesis 3 proposed that one's self-efficacy for mental imagery was positively associated to one's reported imagery ability. The MIQ-R tested visual and kinesthetic imagery ability. Correlation analyses showed that the SEMII subscales were positively related with kinesthetic imagery ability with the MG-A factor being the most strongly correlated ($\underline{r}$ = .57) (see Table 7). Significant correlations were also found between visual imagery ability and all the SEMII factors except MS imagery. MG-A was also the strongest factor associated with visual imagery ability ($\underline{r}$ = .45).

The final hypothesis predicted that the higher one's self-efficacy for mental imagery, the higher would be one's reported trait sport confidence. Athletes reporting a high degree of confidence in their respective sport reported significantly more confidence in using all types of imagery techniques (see Table 7). The highest reported correlations were with the MG-M ($\underline{r}$ = .65) and the CS factors ($\underline{r}$ = .64).

Table 7

Pearson Correlation Coefficients between the SEMII and Imagery Variables

| | SEMII Subscales | | | |
|---|---|---|---|---|
| Imagery Variables | MS | CS | MG-A | MG-M |
| SIQ Motivational-Specific | .51** | .19* | .56** | .32** |
| SIQ Cognitive-Specific | .40** | .72** | .40** | .50** |
| SIQ Motivational-General/Mastery | .37** | .35** | .58** | .55** |
| SIQ Motivational-General/Arousal | .14 | .05 | .63** | .29** |
| SIQ Cognitive-General | .42** | .51** | .50** | .54** |
| MIQ-R Kinesthetic | .21** | .29** | .57** | .36** |
| MIQ-R Visual | .18 | .32** | .45** | .35** |
| TSCI | .50** | .64** | .36** | .65** |

*$p < .01$ **$p < .001$

Exploratory Analyses

One-way ANOVAS and Tukey HSD Post Hoc tests were calculated for the four factors of the SEMII and several demographic categories. Women reported significantly higher confidence than men in using MG-M, CS, and MS imagery, but not MG-A imagery. Significantly higher SEMII means were found for NCAA Division I athletes compared to club sport athletes for the MG-A, MG-M, and MS imagery factors. NCAA Division III athletes also reported significantly less confidence in using MS imagery than Division I athletes. The means and standard deviations for gender by competition level

are reported in Table 8. The means and standard deviations for sex, competition level, ability level and whether an athlete had consulted a sport psychologist or not are contained in Table 9

Table 8

Means and Standard Deviations for SEMII by Gender and Competitive Level

| | SEMII Factors | | | |
|---|---|---|---|---|
| | MG-A | MG-M | CS | MS |
| Males | | | | |
| NCAA I (n=23) | 7.33 (1.56) | 8.48 (1.46) | 8.51 1.46) | 8.73 (1.34) |
| NCAA II (n=22) | 6.16 (1.57) | 7.60 (1.37) | 8.24 (1.39) | 8.36 (1.65) |
| NCAA III (n=23) | 6.33 (1.54) | 7.85 (1.32) | 7.70 (1.30) | 7.33 (1.68) |
| Club (n=23) | 6.46 (1.70) | 7.67 (1.76) | 7.79 (1.86) | 7.37 (1.94) |
| Females | | | | |
| NCAA I (n=26) | 6.88 (1.92) | 7.58 (1.60) | 7.28 (1.49) | 7.69 (1.72) |
| NCAA II (n=26) | 6.55 (1.24) | 7.21 (1.13) | 7.41 (1.48) | 7.13 (1.91) |
| NCAA III (n=30) | 6.46 (1.77) | 6.97 (1.74) | 7.03 (1.64) | 6.47 (1.51) |
| Club (n=22) | 5.61 (1.58) | 6.54 (1.52) | 7.01 (1.64) | 6.63 (1.67) |

Table 9

Means and Standard Deviations for SEMII Factors by Demographic Variables

| Demographic Variables | | SEMII Variables MG-A | MG-M | MS | CS |
|---|---|---|---|---|---|
| Sex | | | | | |
| | Male | 6.58 (1.63) | 7.90 (1.51) | 7.94 (1.75) | 8.06 (1.53) |
| | Female | 6.41 (1.69) | 7.09 (1.55) | 7.18 (1.75) | 6.97 (1.55) |
| Competition Level (Division) | | | | | |
| | Division I | 7.09 (1.76) | 8.00 (1.59) | 8.18 (1.63) | 7.86 (1.59) |
| | Division II | 6.31 (1.40) | 7.34 (1.26) | 7.63 (1.88) | 7.75 (1.48) |
| | Division III | 6.44 (1.65) | 7.39 (1.61) | 6.87 (1.62) | 7.31 (1.54) |
| | Club | 6.06 (1.69) | 7.12 (1.75) | 7.01 (1.85) | 7.44 (1.78) |
| Ability Level | | | | | |
| | Novice | 4.24 (1.84) | 5.11 (1.57) | 4.76 (2.32) | 5.20 (1.25) |
| | Intermediate | 6.22 (1.51) | 7.09 (1.46) | 7.02 (1.66) | 7.41 (1.51) |
| | Advanced | 6.44 (1.51) | 7.44 (1.45) | 7.47 (1.66) | 7.59 (1.53) |
| | Elite | 7.63 (1.78) | 8.72 (1.35) | 8.39 (1.86) | 8.48 (1.46) |
| Consulted a Sport Psychologist | | | | | |
| | Yes | 7.13 (1.48) | 7.99 (1.67) | 8.05 (1.86) | 7.84 (1.54) |
| | No | 6.39 (1.67) | 7.39 (1.55) | 7.33 (1.79) | 7.56 (1.61) |

Those athletes who rated themselves elite reported significantly higher self-efficacy for using mental imagery on the MG-A, MG-M, and CS factors than those rating

themselves at the novice, intermediate, or advanced ability levels. Elite athletes also reported more confidence in using MS imagery than novice and intermediate ability athletes. Novice ability athletes reported significantly less self-efficacy for using mental imagery than any of the other four groups for all four factors. There were no significant differences found for efficacy between the intermediate and advanced ability level athletes. Table 10 contains the F-ratios for these demographic variables.

Table 10

One-way ANOVAS between SEMII and Demographic Variables

| | | F-Ratios for SEMII Factors | | | |
|---|---|---|---|---|---|
| Demographic Variables | df | MG-A | MG-M | CS | MS |
| Sex | 1 | .50 | 13.63*** | 15.68*** | 14.86*** |
| Competition Level (Division) | 3 | 3.51* | 2.78* | 1.44 | 6.32*** |
| Ability Level | 3 | 9.90*** | 13.45*** | 8.98*** | 8.99*** |
| Consulted a Sport Psychologist | 1 | 4.55* | 3.2E1 | 1.80 | 3.61 |

*p < .05. **p < .01. ***p < .001.

Pearson Product-Moment Correlation Coefficients were calculated for the four factors for the SEMII and age of the athletes, and years of experience. The age of the athletes produced no significant correlations in reported confidence in using mental imagery for any of the four factors.

Those with more years of overall experience in a sport reported significantly more self-efficacy in using mental imagery techniques of all kinds. The MG-M factor was

strongest at $r = .39$ ($p < .001$), followed by the CS factor ($r = .32$, $p < .001$), the MG-A factor ($r = .25$, $p < .001$), and the MS factor ($r = .23$, $p < .001$).

Participants were also asked if they had ever heard of mental imagery before the present situation. Only 30 of the 195 athletes tested reported that they had never heard of mental imagery before the present situation. There was at least one individual from all the sports examined who never heard of mental imagery, but the most were from badminton (5), fencing (4), swimming (5) and tennis (4).

Those that reported having been familiar with the term mental imagery were asked to describe what they thought the term meant. There was a wide variety of beliefs about mental imagery, everything from focusing energy (2) to visualizing skills (54) to enhancing performance (2). Table 11 displays all the categories athletes used to described mental imagery. Many descriptions included more than one of the categories contained in the table. While visualizing skill performance was the most common idea of mental imagery, there were five individuals who believed it could be used to stay calm or psych up before an event and two who mentioned using imagery to gain confidence. Many descriptions were very general such as 'seeing doing something in my mind (14)' or 'performing in my mind (5).' Other descriptors included 'using all my senses (2),' 'see what might happen (4),' and 'doing your sport (3).'

Table 11

Descriptions of Mental Imagery by Participants

| Category | Number of Responses |
|---|---|
| Image skills | 54 |
| Image being successful/perfect/positive | 40 |
| Image whole race/routine | 22 |
| Image goals/winning/outcome | 19 |
| Image the action are about to do | 16 |
| Image seeing in one's mind | 14 |
| Image competition prior to event | 11 |
| Image strategies | 10 |
| Image remaining calm/easing anxiety | 5 |
| Image what might happen | 4 |
| Forming mental pictures | 3 |
| Image doing your sport | 3 |
| Enhance performance | 2 |
| Focus Energy | 2 |
| Gain Confidence | 2 |
| Use all senses | 2 |

# CHAPTER 5

## Discussion

Bandura's (1977, 1997) theory purported that efficacy expectations helped predict whether a behavior would be initiated, how much effort would be used, and how long one would persist in that behavior. As predicted in this study, in general, individuals reporting greater self-efficacy for using mental imagery for all four types tested here (MG-M, MG-A, MS and CS) also reported using it with greater frequency and in a larger variety of training and competition situations. However, a couple of items did not correlate significantly with the some of the SEMII subscales. For example, when asked if they image externally, no significant relationship was found for the MG-A factor, but there was a positive significant relationship for internal imagery. The could be explained, in that, internal imagery may have a more affective component (used to help calm or 'psych up'), whereas imaging as if watching yourself on a video is a much more emotionally removed viewpoint. Other researchers (Hall et al., 1997) have argued that the internal approach uses more of one's senses, such as feeling. The same could hold true for the affective part of imagery.

Another incongruent finding to Hypothesis 1 was that no relationship was found between the motivational factors and individuals' reports of imaging someone else performing. This finding is not surprising because imagers are generally taught to image themselves and not someone else performing. Also, no significant relationship was found between the four factors and reports of imagery in regular sessions. This finding is

congruent with Hall et al. (1990), who found that athletes reported not having very regular imagery sessions.

The factors of the SEMII most closely related to the SIQ, because the items on the SEMII were adapted from the SIQ. Prior research (Hall et al., 1990; Salmon et al., 1994) found that athletes tended to use imagery more for its motivational function than its cognitive function. In the present study, athletes reporting higher self-efficacy for using motivational imagery (MS, MG-A, and MG-M) reported using more types of imagery, both motivational and cognitive.

However, no significant relationship was found between efficacy for MS and CS imagery and reported use of Motivational-Arousal (MG-A) imagery. While the lack of a significant relationship between MG-A imagery and CS imagery efficacy might be expected, as they are very different types of imagery, it is mildly surprising that no relationship was found between efficacy for MS imagery and using MG-A imagery. This could be because MG-A imagery deals much more with the emotional component of competition and pre-competition jitters, whereas MS imagery deals more with outcomes and accomplishments. However, further research in this area may be needed to make any conclusive arguments.

As predicted, the more self-efficacy one had for mental imagery, the stronger was one's confidence for sport performance. Vealey et al. (1998) have identified mental strategies, including visualizing successful performance, as an important source of sport confidence. The finding in this thesis adds support to their model of success of sport confidence in this regard.

There were no significant differences in efficacy scores between those who had worked with a Sport Psychology consultant and those who had not, except for MG-Arousal imagery. One possible reason differences were found for MG-A imagery is that working with a consultant exposed athletes to that component of imagery. As was presented, the most common descriptions in this study of what mental imagery is were cognitive-specific (skills), motivational-specific (goals/outcome), and motivational mastery (being successful/perfect) types. Only five individuals in their descriptions of mental imagery mentioned MG-A imagery. This would suggest that if an athlete uses mental imagery, particularly one who has never used a Sport Psychology consultant, s/he would probably being using either MS, MG-M, or CS imagery and not MG-A. So, while most athletes reported being familiar with the term of mental imagery (165 or the 195 tested), they had not necessarily worked with a consultant to learn how to image. Nor, can it be assumed that individuals who have worked with a sport psychology consultant did so to work on using mental imagery.

The significance in the Arousal type of imagery could be explained by the fact that most of the athletes who had worked with a sport psychology consultant were of the advanced or elite levels. Previous research found that higher level athletes tended to use imagery right before competition (Barr & Hall, 1992; Salmon et al., 1994). These researchers proposed the idea that this was possibly done to help control arousal levels.

Previous research (Barr & Hall, 1992; Hall et al., 1990; Salmon et al., 1994) found that elite athletes used imagery more often, were better at it, and used internal and kinesthetic types of imagery more. The current study found that those athletes rating themselves at the elite level were also more confident in using MG-A, MG-M and CS

imagery than any of the other three groups (advanced, intermediate and novice). It is possible that elite level athletes have been exposed to more types of imagery, have tried it in a wider variety of situations, and have just had more sport experience than lower level athletes, and thus, would be more confident in imaging something they have already experienced.

Research such as Noel (1980) and Mumford et al. (1985) found that more experienced athletes had greater performance improvement as a result of mental practice than less experienced/novice athletes. It could be that if mental imagery is more effective for higher level athletes, they would tend to use it more and believe in it more than novice level athletes. Thus, because more experienced/elite athletes had more positive results with imagery, they may have more self-efficacy for using it.

The present investigation also found that elite level athletes were more confident in using MS imagery than intermediate and novice level participants. Paivio (1985) saw MS imagery as more goal- or outcome-oriented imagery. Hall et al. (1998) also found that elite level athletes used MS imagery more than non-elite athletes. The current study did not find that there was a significant difference in self-efficacy for MS imagery between elite and advanced level athletes. This may be because as athletes become more advanced, they are more likely to use motivational imagery and would be more confident in using it. Specifically, they would be more likely to imagine themselves as winners receiving medals or being interviewed as champions – the scenarios that MS imagery suggests. Hall, Rodgers, and Barr (1990) found that higher level athletes (in this case, the more competitive level athletes) saw themselves winning more often than recreational/house league athletes. As mentioned above, it may be that these level

athletes have experienced these kinds of outcomes already, and thus, would be more confident imaging them than those who have not had such experiences. Again, further study could be conducted to differentiate mental training techniques and competitive athlete level.

The current study also reported that Division I level athletes were more confident than club athletes on the three motivational imagery types. Division I level athletes considered themselves at the elite level more often than any of the other groups. Conversely, club athletes were the only ones to rate themselves at the novice level. Therefore, it seems reasonable that results would be similar to self-ratings of athletes' competitive level.

In the present study, women had significantly higher self-efficacy for mental imagery than men on the MG-M, CS and MS factors, but not the MG-A factor. This is contrary to Salmon et al. (1994) and Hall et al. (1990), who found no significant gender differences in imagery use. Hall et al. also reported that their sample was skewed to predominantly male participants with the inclusion of hockey and football athletes. Previous research on mental imagery training and performance has been dominated by all male samples (Hall et al., 1998; Mahoney & Avener, 1977; Noel, 1980). While Barr and Hall (1992) did not find gender differences in the responses for most variables they measured, they did find that female rowers practice imagery more regularly than male rowers. Again, as discussed earlier, imagery use correlated positively with confidence in using imagery. However, more research into gender differences and imagery could be conducted to make more conclusive assertions. The above results and discussion have presented possible relationships between confidence in using different types of mental

imagery and use, ability and performance. Athlete differences were also viewed with regard to confidence in using mental imagery. The SEMII could be used in future research to examine, more closely, the relationship between confidence in using different types of imagery and sport performance.

APPENDIX A

Self-Efficacy for Mental Imagery Inventory

**Directions: Please circle the number which best represents your confidence in your ability to perform the skills asked based on the below rating scale.**

**RATING SCALE: Not at all Confident** **Extremely Confident**

**0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10**

**"How confident are you in your ability...."**

| | **Not at all Confident** | **Extremely Confident** |
|---|---|---|
| 1. to mentally recreate the emotions you feel before competing? | **0....1....2....3....4....5....6....7....8....9....10** | |
| 2. to image yourself being focused during a challenging situation? | **0....1....2....3....4....5....6....7....8....9....10** | |
| 3. to mentally make corrections to physical skills? | **0....1....2....3....4....5....6....7....8....9....10** | |
| 4. to image yourself being interviewed as a champion? | **0....1....2....3....4....5....6....7....8....9....10** | |
| 5. to image yourself handling the stress and excitement of competitions and remaining calm? | **0....1....2....3....4....5....6....7....8....9....10** | |
| 6. to image yourself being in control in different situations? | **0....1....2....3....4....5....6....7....8....9....10** | |
| 7. to imagine yourself performing a skill perfectly before attempting it physically? | **0....1....2....3....4....5....6....7....8....9....10** | |

| | Not at all Confident | Extremely Confident |
|---|---|---|
| 8. to image the atmosphere of winning a championship (e.g., the excitement that follows winning a championship)? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 9. to image the stress and anxiety associated with competing? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 10. to consistently image performing a particular skill perfectly in my mind? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 11. to imagine other athletes congratulating you on a good performance? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 12. to get emotionally excited when imaging a competition? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 13. to imagine yourself appearing self-confident in front of your opponents? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 14. to image yourself performing a newly learned skill perfectly? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 15. to image the atmosphere of receiving a medal (e.g., the pride, the excitement, etc.)? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 16. to feel anxiety when imaging an event/game that you are about to compete in? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 17. to image yourself being in control in difficult situations? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 18. to consistently control the image of a physical skill? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 19. to image the audience applauding your performance? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 20. to image the excitement associated with competition? | 0....1....2....3....4....5....6....7....8....9....10 | |
| 21. to image yourself winning a medal? | 0....1....2....3....4....5....6....7....8....9....10 | |

APPENDIX B

Imagery Use Questionnaire

**Directions:** Think about how often and when you use imagery in your sport. Answer the questions below based on your imagery use in the various situations. Please answer how often and when you actually use imagery, not when you should use imagery. Your answers will be kept completely confidential. Circle your answer.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. To what extent do you use mental imagery in your training? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. To what extent do you use mental imagery in competition? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Do you use mental imagery before a practice? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. Do you use mental imagery during a practice? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Do you use mental imagery after a practice? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Do you use mental imagery before an event? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. Do you use mental imagery during an event? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. Do you use mental imagery after an event? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. Do you use mental imagery during another unrelated activity (e.g. riding bike)? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. Do you use mental imagery during breaks in the day? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. Do you use mental imagery before/in bed? | Never | | | | | | Always |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

12. When you use mental imagery, do you see yourself from outside of your body as if you are watching yourself on a video?

Never Always
1 2 3 4 5 6 7

12a. How vivid is this image?

Not at all Very Vivid
1 2 3 4 5 6 7

12b. How easily can you change that image?

Very easy Very difficult
1 2 3 4 5 6 7

13. When you use mental imagery, do you see what you would see as if you were actually playing or performing?

Never Always
1 2 3 4 5 6 7

13a. How vivid is this image?

Not at all Very Vivid
1 2 3 4 5 6 7

13b. How easily can you change that image?

Very easy Very difficult
1 2 3 4 5 6 7

14. How easily can you see isolated parts of a skill?

Very easy Very difficult
1 2 3 4 5 6 7

15. How easily can you see the entire skill?

Very easy Very difficult
1 2 3 4 5 6 7

16. How easily can you see part of an event?

Very easy Very difficult
1 2 3 4 5 6 7

17. How easily can you see the entire event?

Very easy Very difficult
1 2 3 4 5 6 7

18. How often do you see someone else performing?

Never Always
1 2 3 4 5 6 7

19. How often you see yourself performing incorrectly?

Never Always
1 2 3 4 5 6 7

20. How often you se yourself losing an event?

Never Always
1 2 3 4 5 6 7

21. How often do you see yourself doing a pre-event routine (e.g. warm-up)?

Never 1 2 3 4 5 6 7 Always

22. How often do you see the atmosphere of the competition day?

Never 1 2 3 4 5 6 7 Always

23. How often do you see yourself winning an event?

Never 1 2 3 4 5 6 7 Always

24. How often do you see yourself receiving a first-place award?

Never 1 2 3 4 5 6 7 Always

25. When using mental imagery, to what extent do you actually feel yourself performing?

Never 1 2 3 4 5 6 7 Always

26. How easily do you feel contact with equipment?

Very Easy 1 2 3 4 5 6 7 Very Difficult

27. How easily do you feel specific muscles?

Very Easy 1 2 3 4 5 6 7 Very Difficult

28. How easily do you feel body control?

Very Easy 1 2 3 4 5 6 7 Very Difficult

29. Are your imagery sessions structured (i.e. you know in advance what you will imagine and for how long)?

Yes No

30. Are your imagery session regular (i. E., at a specific time each day)?

Yes No

(Hall et al., 1990)

APPENDIX C

Sport Imagery Questionnaire

This questionnaire was designed to assess the extent to which you incorporate imagery into your athletic training. Imagery involves "mentally" seeing yourself performing. The image in your mind should approximate the actual physical performance as closely as possible. Imagery may also include sensations, and/or feelings associated with the performance itself. Imagery can also be used in conjunction with mood states, attentional focus, game plans, etc. Your ratings will be made on a seven-point scale, where *one* is the rarely or never engage in that kind of imagery end of the scale and *seven* is the often engage in that kind of imagery end of the scale. Read each statement below and fill in the blank the appropriate number from the scale provided to indicate the degree to which the statement applies to you when you are practicing or competing in your sport. Remember, if you rarely or never engage in the type of imagery in the type of imagery depicted in the statement, then a rating of 1 should be given; if you often engage in the type of imagery depicted by the statement, a rating of 7 should be given; frequencies of imagery that fall within these two extremes should be rated accordingly along the rest of the scale. Don't be concerned about using the same numbers repeatedly if you feel they represent your true feelings. For example, the statement "*I imagine other athletes congratulating me on a good performance*" should be rated according to how often you imagine other athletes congratulating you on a good performance. Remember, there are no right or wrong answers, so please answer as accurately as possible.

**Rarely** **Often**
**1 2 3 4 5 6 7**

(1) I make up new plans/strategies in my head. (CG)

_____

(2) I image the atmosphere of winning a championship (e. g., the excitement that follows winning a championship). (MS)

_____

(3) I image giving 100% during an event/game. (MG-M)

_____

**Rarely** **Often**
**1 2 3 4 5 6 7**

(4) I can re-create in my head the emotions I feel before I compete. (MG-A)

_____

(5) I image alternative strategies in case my event/game plan fails. (CG)

_____

(6) I imagine myself handling the stress and excitement of competitions and remaining calm. (MG-A)

_____

(7) I imagine other athletes congratulating me on a good performance. (MS)

_____

(8) I can consistently control the image of a physical skill. (CS)

_____

(9) I image each section of an event/game (e. g., offense vs. defense, fast vs. slow). (CG)

_____

(10) I image the atmosphere of receiving a medal (e. g., the pride, the excitement, etc.). (MS)

_____

(11) I can easily change an image of a skill. (CS)

_____

(12) I image the audience applauding my performance. (MS)

_____

**Rarely** **Often**
**1 2 3 4 5 6 7**

(13) When imaging a particular skill, I consistently perform it perfectly in my mind. (CS)

_____

(14) I image myself winning a medal. (MS)

_____

(15) I imagine the stress and anxiety associated with competing. (MG-A)

_____

(16) I image myself continuing with my game/event plan, even when performing poorly. (CG)

_____

(17) When I image a competition, I feel myself getting emotionally excited. (MG-A)

_____

(18) I can mentally make corrections to physical skills. (CS)

_____

(19) I imagine executing entire plays/programs/sections just the way I want them to happen in an event/game. (CG)

_____

(20) Before attempting a particular skill, I imagine myself performing it perfectly. (CS)

_____

(21) I imagine myself being mentally tough. (MG-M)

_____

(22) When I image an event/game that I am to participate in, I feel anxious. (MG-A)

_____

**Rarely** **Often**
**1 2 3 4 5 6 7**

(23) I imagine myself appearing self-confident in front of my opponents. (MG-M)

_____

(24) I imagine the excitement associated with competing. (MG-A)

_____

(25) I image myself being interviewed as a champion. (MS)

_____

(26) I image myself being focused during a challenging situation. (MG-M)

_____

(27) When learning a new skill, I imagine myself performing it perfectly. (CS)

_____

(28) I imagine myself being in control in difficult situations. (MG-M)

_____

(29) I imagine myself successfully following my game/event plan. (CG)

_____

(30) I image myself working successfully through tough situations (e. g., a power play, sore ankle, etc.). (MG-M)

_____

(Hall et al., 1998)

APPENDIX D

Mental Imagery Questionnaire – Revised

**Instructions:** This questionnaire concerns two ways of **mentally** performing movements, which are used by some people more than by others, and are more applicable to some types of movements than others. The first is attempting to form a visual image or picture of a movement in your mind. The second is attempting to feel what performing a movement is like without actually doing the movement. You are requested to do both of these mental tasks for a variety of movements in this questionnaire, and then rate how easy/difficult you found the tasks to be. The ratings that you give are **not** designed to assess the goodness or badness of the way you perform these mental tasks. They are attempts to discover the capacity individuals show for performing these tasks for different movements. There are no right or wrong ratings or some ratings that are better than others.

Each of the following statements describe a particular action or movement. Read each statement carefully and then actually perform the movement as described. Only perform the movement a **single** time. Return to the starting position for the movement just as if you were going to perform the action a second time. Then depending on which of the following you are asked to do, either 1) form as clear and vivid a visual image as possible of the movement just performed, or 2) attempt to feel yourself making the movement just performed without actually doing it.

After you have completed the mental task required, rate the ease/difficulty with which you were able to do the task. Take your rating from the following scale. Be as accurate as possible and take as long as you feel necessary to arrive at the proper rating for each movement. You may choose the same rating for any number of movements "seen" or "felt" and it is not necessary to utilize the entire length of the scale.

## RATINGS SCALES

### Visual Imagery Scale

| 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| **Very easy to see** | **Easy to see** | **Somewhat easy to see** | **Neutral (not easy nor hard)** | **Somewhat hard to see** | **Hard to see** | **Very hard to see** |

### Kinesthetic Imagery Scale

| 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| **Very easy to feel** | **Easy to feel** | **Somewhat easy to feel** | **Neutral (not easy nor hard)** | **Somewhat hard to feel** | **Hard to feel** | **Very hard to feel** |

1. **STARTING POSITON:** Stand with your feet and legs together and your arms at your sides.

**ACTION:** Raise your right knee as high as possible so that you are standing on your left leg with your right leg flexed (bent) at the knee. Now lower your right leg so that you are again standing on two feet. Perform these actions slowly.

**MENTAL TASK:** Assume the starting position. Attempt to <u>feel</u> yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

**RATING:_____**

2. **STARTING POSITION:** Stand with your feet slightly apart and your hands at your sides.

**ACTION:** Bend down low and then jump straight up in the air as high as possible with both arms extended above your head. Land with your feet apart and lower your arms to your sides.

**MENTAL TASK:** Assume the starting position. Attempt to <u>see</u> yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/ difficulty with which you were able to do this mental task.

**RATING:_____**

3. **STARTING POSITION:** Extend the arm of your non dominant hand straight out to your side so that it is parallel to the ground, palm down.

**ACTION:** Move your arm forward until it is directly in front of your body (still parallel to the ground). Keep your arm extended during the movement and make the movement slowly.

**MENTAL TASK:** Assume the starting position. Attempt to <u>feel</u> yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

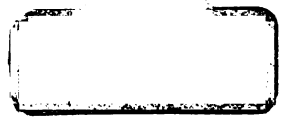
**RATING:**_____

4. **STARTING POSITION:** Stand with your feet slightly apart and your arms fully extended above your head.

**ACTION:** Slowly bend forward at the waist and try and touch your toes with your fingertips (or if possible, touch the floor with your fingertips or hands). Now return to the starting position, standing erect with your arms extended above your head.

**MENTAL TASK:** Assume the starting position. Attempt to <u>see</u> yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/ difficulty with which you were able to do this mental task.

**RATING:**_____



5. **STARTING POSITION:** Stand with your feet slightly apart and your hands at your sides.

**ACTION:** Bend down low and then jump straight up in the air as high as possible with both arms extended above your head. Land with your feet apart and lower your arms to your sides.

**MENTAL TASK:** Assume the starting position. Attempt to <u>feel</u> yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you able to do this mental task.

**RATING:**_____

6. **STARTING POSITION:** Stand with your feet and legs together and your arms at your sides.

**ACTION:** Raise your right knee as high as possible so that you are standing on your left leg with your right leg flexed (bent) at the knee. Now lower your right leg so that you are again standing on two feet. Perform these actions slowly.

**MENTAL TASK:** Assume the starting position. Attempt to <u>see</u> yourself making just the movement performed with as clear and vivid a visual image as possible. Now rate the ease/ difficulty with which your were able to do this mental task.

**RATING:**_____

7. **STARTING POSITION:** Stand with your feet slightly apart and your arms fully extended above your head.

**ACTION:** Slowly bend forward at the waist and try and touch your toes with your fingertips (or if possible, touch the floor with your fingertips or hands). Now return to the starting position, standing erect with your arms extended above your head.

**MENTAL TASK:** Assume the starting position. Attempt to <u>feel</u> yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

**RATING:_____**

8. **STARTING POSITION:** Extend the arm of your non dominant hand straight out to your side so that it is parallel to the ground, palm down

**ACTION:** Move your arm forward until it is directly in front of your body (still parallel to the ground). Keep your arm extended during the movement and make the movement slowly.

**MENTAL TASK:** Assume the starting position. Attempt to <u>see</u> yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/ difficulty with which you are able to do this mental task.

**RATING:_____**

(Hall et al., 1997)

APPENDIX E

Trait Sport Confidence Inventory

**Directions:** Think about how self-confident you are when you compete in sport. Answer the questions below based on how confident you *generally feel* when you compete in your sport. Compare your self-confidence to the *most self-confident athlete* you know.
Please answer as you *really* feel, not how you would like to feel. Your answers will be kept completely confidential.

**When you compete, how confident do you *generally feel*? (circle number)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. Compare your confidence in your *ability to execute the skills necessary to be successful* to the most confident athlete you know. | Low | | | | Medium | | | | High |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2. Compare your confidence in *your ability to make critical decisions during competition* to the most confident athlete you know. | Low | | | | Medium | | | | High |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3. Compare your confidence in *your ability to perform under pressure* to the most confident athlete you know. | Low | | | | Medium | | | | High |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4. Compare your confidence in *your ability to execute successful strategy* to the most confident athlete you know. | Low | | | | Medium | | | | High |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 5. Compare your confidence in *your ability to concentrate well enough to be successful* to the most confident athlete you know. | Low | | | | Medium | | | | High |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 6. Compare your confidence in *your ability to adapt to different game situations and still be successful* to the most confident athlete you know. | Low | | | | Medium | | | | High |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

7. Compare your confidence in *your ability to achieve your competitive goals* to the most confident athlete you know.

Low Medium High
1 2 3 4 5 6 7 8 9

8. Compare your confidence in *your ability to be successful* to the most confident athlete you know.

Low Medium High
1 2 3 4 5 6 7 8 9

9. Compare your confidence in *your ability to consistently be successful* to the most confident athlete you know.

Low Medium High
1 2 3 4 5 6 7 8 9

10. Compare your confidence in *your ability to think and respond successfully during competition* to the most confident athlete you know.

Low Medium High
1 2 3 4 5 6 7 8 9

11. Compare your confidence in *your ability to meet the challenge of competition* to the most confident athlete you know.

Low Medium High
1 2 3 4 5 6 7 8 9

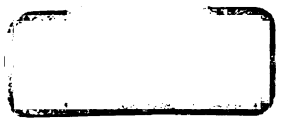
12. Compare your confidence in *your ability to be successful even when the odds are against you* to the most confident athlete you know.

Low Medium High
1 2 3 4 5 6 7 8 9

13. Compare your confidence in *your ability to bounce back from performing poorly and to be successful* to the most confident athlete you know.

Low Medium High
1 2 3 4 5 6 7 8 9

(Vealey, 1986)



APPENDIX F

Demographic Data Sheet

Age: _____

Sex: (Circle One) M F

What sport do you participate in collegiately? (If you participate in more than one, list the one you are currently in)

Years of experience in above named sport:

Please rate your level of ability by checking one of the following:

Novice_____
Intermediate_____
Advanced_____
Elite_____

Please rate your highest level of competition by checking one of the following:

Recreational (e.g. Intramurals)_____
Intermediate (e.g. H.S. Varsity)_____
Advanced (e.g. Collegiate)_____
Elite(e.g. Div. I; International)_____

Had you ever heard of mental imagery prior to this situation? If so, please describe your view of what mental imagery is:

If so, have you ever consulted with a Sport Psychology consultant?

## APPENDIX G

### Participant Consent Form

Dear Student,

I would like to ask for your participation in a research project being conducted by the Faculty of Physical Education and Exercise Science (PEES) at Michigan State University. The purpose of this study is to assess mental imagery use and confidence in college athletes.

If you are willing to participate you will be asked to complete 6 questionnaires. These questionnaires should take approximately 5 to 15 minutes each to complete. All answers given on the questionnaires are completely confidential and anonymity is assured. They are only for the use of the experimenter and the project supervisor from the Faculty of PEES listed below. By signing this consent form you are agreeing that your results may be used for scientific and sport specific journals as long as your privacy is maintained.

If you do not wish to participate, or choose to withdraw from the study at any time, you may do so without repercussion. Participation in this project is completely voluntary, and you may refuse to answer any questions. There are no risks involved to you through your participation. If you have any questions or concerns, please feel free to call the numbers below.

---

I have read the above and agree to participate in the study.

Name:_____ Signature:_____

Date:_____

Amy Tenute
Head Softball Coach
Dept. of Physical Education
and Recreation
Carleton College
(507)646-5898
atenute@carleton.edu

Dr. Deb Feltz
Department Chairperson
Dept. of Physical Education and
Exercise Science
Michigan State University
(517) 353-1824
dfeltz@msu.edu

# REFERENCES


Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191-215.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Bandura, A., Adams, N. E., Hardy, A. B., & Howells, G. N. (1980). Tests of the generality of self-efficacy theory. Cognitive Therapy and Research, 4(1), 39-66.

Barling, J. & Abel, M. (1983). Self-efficacy beliefs and tennis performance. Cognitive Therapy and Research, 7(3), 265-272.

Barr, K. & Hall, C. (1992). The use of imagery by rowers. International Journal of Sport Psychology, 23, 243-261.

Clark, L. V. (1960). Effect of mental practice on the development of a certain motor skill. The Research Quarterly, 31(4), 560-569.

Corbin, C. B. (1967). Effects of mental practice on skill development after controlled practice. The Research Quarterly, 38(4), 534-538.

Davis IV, H. (1990). Cognitive style and nonsport imagery in elite ice hockey performance. Perceptual and Motor Skills, 71, 795-801.

Feltz, D. L. (1994). Self-Confidence and performance. In D. Druckman and R. A. Bjork (Eds.), Learning, remembering, believing: Enhancing human performance (173 – 206). Washington, D. C.: National Academy Press.

Feltz, D. L. (1988). Gender differences in the causal elements of self-efficacy on a high avoidance motor task. Journal of Sport and Exercise Psychology, 10, 151-166.

Feltz, D. L. & Landers, D. M. (1983). The effects of mental practice on motor skill learning and performance: A meta-analysis. Journal of Sport Psychology, 5, 25-57.

Feltz, D. L., Landers, D. M., & Raeder, U. (1979). Enhancing self-efficacy in high-avoidance motor tasks: A comparison of modeling techniques. Journal of Sport Psychology, 1, 112-122.

Feltz, D. L. & Lirgg, C. D. (2001). Self-efficacy beliefs of athletes, teams, and coaches. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), Handbook of sport psychology. (pp. 340-361). New York: John Wiley & Sons, Inc.

Feltz, D. L. & Riessinger, C. A. (1990). Effects of in vivo emotive imagery and performance feedback on self-efficacy and muscular endurance. Journal of Sport and Exercise Psychology, 12, 132-143.

George, T. R. (1994). Self-confidence and baseball performance: A causal examination of self-efficacy theory. Journal of Sport and Exercise Psychology, 16, 381-399.

Goss, S., Hall, C., Buckolz, E., & Fishburne, G. (1986). Imagery ability and the acquisition and retention of movements. Memory and Cognition, 14(6), 469-477.

Gould, D., Weinberg, R., & Jackson, A. (1980). Mental preparation strategies, cognitions, and strength performance. Journal of Sport Psychology, 2, 329-339.

Hall, C. R., Mack, D. E., & Paivio, A., Hausenblas, H. A. (1998). Imagery use by athletes: Development of the sport imagery questionnaire. International Journal of Sport Psychology, 29(1), 73-89.

Hall, C. & Martin, K. (1997). Measuring movement imagery abilities: A revision of the movement imagery questionnaire. Journal of Mental Imagery, 21, 143-154.

Hall, C. & Rodgers, W. M. (1989). Enhancing coaching effectiveness in figure skating through a mental skills training program. The Sport Psychologist, 3, 142-154.

Hall, C., Rodgers, W. M., & Barr, K. A. (1990). The use of imagery by athletes in selected sports. The Sport Psychologist, 4, 1-10.

Hecker, J. E. & Kaczor, L. M. (1988). Application of imagery theory of sport psychology: Some preliminary findings. Journal of Sport and Exercise Psychology, 10, 363-373.

Heishman, M. F. & Bunker, L. (1989). Use of mental preparation strategies by international elite female lacrosse players from five countries. The Sport Psychologist, 3, 14-22.

Kendall, G., Hrycaiko, D., Martin, G. L., & Kendall, T. (1990). The effects of an imagery rehearsal, relaxation, and self-talk package on basketball game performance. Journal of Sport and Exercise Psychology, 12, 157-166.

Lee, C. (1990). Psyching up for a muscular endurance task: Effects of image content on performance and mood state. Journal of Sport and Exercise Psychology, 12, 66-73.

Lee, C. (1982). Self-efficacy as a predictor of performance in competitive gymnastics. Journal of Sport Psychology, 4, 405-409.

Lerner, B. S. & Locke, E. A. (1995). The effects of goal setting, self-efficacy, competition, and personal traits on the performance of an endurance task. Journal of Sport and Exercise Psychology?, 17, 138-152.

Maddux, J. E. (1995). Self-efficacy theory: An introduction. In J.E. Maddux (Ed.), Self-efficacy, adaptation, and adjustment: Theory, research, and application. (pp. 3-33). New York: Plenum Press.

Mahoney, M. J. & Avener, M. (1977). Psychology of the elite athlete: An exploratory study. Cognitive Therapy and Research, 1(2), 135-141.

Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. Research Quarterly for Exercise and Sport, 63(1), 60-66.

Martin, K. A. & Hall, C. R. (1995). Using mental imagery to enhance intrinsic motivation. Journal of Sport and Exercise Psychology, 17, 54-69.

Moritz, S. E., Hall, C. R., Vadocz, E., & Martin, K. A. (1996). What are confident athletes imaging?: An examination of image content. Sport Psychologist, 10(2), 171-179.

Mumford, B. & Hall, C. (1985). The effects of internal and external imagery on performing figures in figure skating. Canadian Journal of Applied Sport Sciences, 10(4),

Noel, R. C. (1980). The effect of visuo-motor behavior rehearsal on tennis performance. Journal of Sport Psychology, 2, 221-226.

Paivio, A. (1985). Cognitive and motivational functions of imagery in human performance. Canadian Journal of Applied Sport Science, 10(4), 22S-28S.

Richardson, A. (1967A). Mental practice: A review and discussion, pt. 1. The Research Quarterly, 38(1), 95-107.

Richardson, A. (1967B). Mental practice: A review and discussion, pt. 2. The Research Quarterly, 38(2), 263-273.

Salmon, J., Hall, C., & Haslam, I. (1994). The use of imagery by soccer players. Journal of Applied Sport Psychology, 6, 116-133.

Suedfeld, P. & Bruno, T. (1990). Flotation REST and imagery in the improvement of athletic performance. Journal of Sport and Exercise Psychology, 12, 82-85.

Van Gyn, G. H., Wenger, H. A., & Gaul, C. A. (1990). Imagery as a method of enhancing transfer from training to performance. Journal of Sport and Exercise Psychology, 12, 366-375.

Vealey, R. S. (1986). Conceptualization of sport-confidence and competitive orientation: Preliminary investigation and instrument development. Journal of Sport Psychology, 8, 221-246.

Vealey, R. S., Hayashi, S. W., Garner-Holman, M., & Giacobbi, P. (1998). Sources of sport-confidence: Conceptualization and instrument development. Journal of Sport and Exercise Psychology, 20, 54-80.

Weinberg, R., Gould, D., & Jackson, A. (1979). Expectations and performance: An empirical test of bandura's self-efficacy theory. Journal of Sport Psychology, 1, 320-331.

Weinberg, R., Gould, D., Yukelson, D., & Jackson, A. (1981). Effect of preexisting and manipulated self-efficacy on a competitive muscular endurance task. Journal of Sport Psychology, 3, 345-354.

Weiss, M. R., Wiese, D. M., & Klint, K. A. (1989). Head over heels with success: The relationship between self-efficacy and performance in competitive youth gymnastics. Journal of Sport and Exercise Psychology, 11, 444-451.

Woolfolk, R. L., Parrish, M. W., & Murphy, S. M. (1985). The effects of positive and negative imagery on motor skill performance. Cognitive Therapy and Research, 9(3), 335-341.

Wrisberg, C. A. & Anshel, M. H. (1989). The effect of cognitive strategies on the free throw shooting performance of young athletes. The Sport Psychologist, 3, 95-104.

Ziegler, S. G. (1987). Comparison of imagery styles and past experience in skills performance. Perceptual and Motor Skills, 64, 579-586.