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THE EFFECTS OF PREPERFORMANCE IMAGERY AND PREPERFORMANCE POSITIVE AFFIRMATIONS ON THE PERFORMANCE OF A GOLF PUTTING TASK

By

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ABSTRACT

THE EFFECT OF PREPERFORMANCE IMAGERY AND
PREPERFORMANCE AFFIRMATIONS ON THE
PERFORMANCE OF THE GOLF PUTTING TASK

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The purpose of this investigation was to compare the effectiveness of using mental preparation strategies to enhance performance over to control groups. 40 students participated in the experiment for course credit. The 40 subjects performed the basal measure and were then randomly assigned to one of four groups, a no practice control group (NPC), a practice control group(PI), a preperformance positive affirmation group (PA), and a preperformance positive imagery group (PI). The PI, PA, and PC groups putted on days 2-5. The NPC only putted on the last day. Results of the study revealed that all groups did not improve from pre to post test at a significant level. The PI, PA, and PC were found to to be significantly different from the NPC pre to post test in performance measures, but not in accuracy measures.

IN MEMORY OF SHIRLEY KORNSPAN

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Chapter I

Introduction

Athletes often allude to using mental preparation in order to excel in athletics (Graham, 1991; Martens, 1987; Nicklaus, 1974; Orlick, 1990; Weinberg, 1984). However, only recently have an increasing number of sport psychologists systematically begun researching mental preparation techniques in sport and physical activity (Gould, 1990; Weinberg, 1984). Although there has been a recent surge in the study of sport psychology, in North America the beginnings can be traced to the seminal work of Coleman Griffith in the 1920's (Gould, 1990; Whelan, Mahoney, & Myers, 1991). In the 1960's and early 1970's new organizations and research began to rejuvenate the field. During the 1960's and early 1970's research issues in sport psychology focused on non intervention issues, such as social facilitation and the arousal-performance relationship (Feltz, 1992). In the late 1970's, with the seminal work of Mahoney and Avener (1977), cognitive interventions in sport began to receive attention from researchers in both psychology and physical education (McCauley, 1992). In recent years, investigators have been using the field of sport and physical activity as an arena for studying the effects of interventions on performance (Greenspan & Feltz, 1989).

To aid athletes in performing optimally in the athletic arena, sport practitioners and researchers have developed specific performance enhancement cognitive strategies (Martens, 1987; Orlick, 1986). Two specific cognitive strategies are mental imagery and positive self-talk, i.e., positive affirmations (Weinberg, 1984).

Vandel, Clugston and Davis (1943) and Twinning (1949) were the first researchers to employ the mental practice design. Both studies found mental practice to positively influence performance (Richardson, 1967). Throughout

the years, imagery has been researched extensively, and reviewed by many (Corbin, 1972; Feltz & Landers, 1983; Hinshaw, 1991; Oslin, 1985; Richardson, 1967). Feltz and Landers (1983) found that mental practice is better than no practice at all. Expanding the body of imagery knowledge, researchers have begun studying imagery as a preperformance strategy for physical tasks (Elko & Ostrow, 1992; Epstein, 1980; Gould, Weinberg, & Jackson, 1980; Lutkus, 1975; Tynes & McFatter, 1987; Weinberg, Gould, Jackson, & Barnes, 1980; Woolfolk, Parish, & Murphy, 1985).

Positive affirmations have also been investigated as a mental preparation strategy that can be used directly before performance (Weinberg, 1984; Wilkes & Summers, 1984). Athletes have often alluded to the power of positive thinking, however, research has been sparse on using this technique in sport and physical activity (Feltz, 1988). There has been recent research on positive affirmations (saying positive thoughts to yourself before performance) in the "psyching up" literature (Tynes & McFatter, 1987; Weinberg, Gould, Jackson & Barnes, 1980; Wilkes & Summers, 1984)

Imagery and positive affirmations have recently become a topic of research in sport psychology mainly because of the initial correlational studies comparing successful athletes to nonsuccessful athletes (Gould, Weiss, & Weinberg, 1981; Highlen & Bennett, 1979, 1983; Mahoney & Avener, 1977; Meyers, Cooke, Cullen & Lilies, 1979; Rotella, Gansender, Ojala & Billing, 1980). As a result of these initial studies, researchers designed studies allowing subjects a choice of psyching up strategies before performance (Caudill, Weinberg, & Jackson, 1983; Shelton & Mahoney, 1978, Weinberg, Gould & Jackson, 1980, 1981). However, these studies did not allow the researcher to identify which strategy produced the best performance (Murphy, 1990; Murphy & Jowdy, 1992). Subsequently, investigators designed experiments in

which the subjects were asked to utilize a psyching up strategy before performance (Gould, Weinberg, & Jackson, 1981; Epstein, 1980; Weinberg, Gould, Jackson, & Barnes, 1980; Wilkes & Summers, 1984; Woolfolk, Parrish, & Murphy, 1985).

Results of studies asking subjects to use a specific psyching up technique have been equivocal. Research on imagery and positive affirmations as preperformance mental strategies have been slow to develop in the last fifteen years. This lack of information has created a need for more research on preperformance mental strategies which may add to the development of a body of knowledge. This type of research will allow assessment of the effects of using imagery and positive affirmations directly before performance. Therefore, more studies are needed to investigate the effects of preperformance mental strategies on the effects of motor skill acquisition and performance. This study specifically focused on the assessment of both preperformance positive affirmations and preperformance imagery on the effects of golf putting performance and accuracy.

Background Research

Recent research has shown preperformance cognitive strategies to enhance performance of a motor skill (Woolfolk, Parrish, & Murphy, 1985) while other research has not shown this effect (Gould, Weinberg, & Jackson, 1980; Woolfolk, Murphy, Gottesfeld, & Aitken, 1985). Anecdotal evidence from athletes have attested to the fact that certain cognitive strategies helped them attain high levels of performance (Nicklaus, 1974; Ungerleider & Golding, 1992). Therefore, using a cognitive strategy directly before performance may help novice golfers improve their performance on the simple motor skill of golf putting.

Woolfolk, Parrish, and Murphy (1985) assessed the effects of positive imagery instructions on a simple closed motor skill task of golf putting. Thirty students were blocked by ability and randomly assigned to one of three conditions: (a) positive imagery, (b) negative imagery, and (c) a control condition. Subjects in the positive imagery group imagined the ball going in before each putt, while the negative imagery group imagined the ball narrowly missing before every putt. The control group did not use a preperformance strategy before attempting each putt. Results of the study found that the positive imagery instruction group improved performance while the negative imagery instruction group showed a performance decrement.

Woolfolk, Murphy, Gottesfeld, and Aitken (1985) conducted a methodologically similar investigation of the effect of imagery instructions on the simple closed motor skill of golf putting. Fifty students were randomly assigned to one of five imagery conditions. The subjects were told to use their assigned imagery strategy before each putt. Consistent with past research (Woolfolk, Parrish, & Murphy, 1985), preperformance negative imagery was found to cause performance decrement. However, this study was inconsistent with past research (Woolfolk, Parrish, & Murphy, 1985) which found positive imagery to enhance performance. The authors (Woolfolk, Murphy, Gottesfeld, & Aitken, 1985) suggested that future research try to establish the conditions in which positive imagery instructions may or may not show increased performance.

Purpose of the Study

The results of the Woolfolk, Parrish, and Murphy (1985) study and the Woolfolk, Murphy, Gottesfeld, and Aitken (1985) study illustrate the inconsistencies of the findings in the positive imagery and cognitive strategy

literature. Thus, the purpose of this study was to partially replicate and extend certain aspects of the Woolfolk, Parrish, and Murphy (1985) study and the Woolfolk, Murphy, Gottesfeld, and Aitken, (1985) study by investigating the effects of imaging and positive affirmations. The aspects of these studies that were replicated are (a) the use of a golf putting task, and (b) the use of the same positive performance outcome imagery instructions. This study extended the Woolfolk, Parrish, and Murphy (1985) study and the Woolfolk, Murphy, Gottesfeld, and Aitken, (1985) studies by adding additional general and specific training exposure phases for the experimental groups and another strategy group and control group which were: (a) inclusion of an educational exposure phase for the imagery group, (b) basic imagery exposure exercises, (c) a skill specific imagery exposure exercise (d) the inclusion of a positive affirmation statement group, (e) an educational exposure phase for the positive affirmation group, (f) a basic affirmation exposure exercises, (g) a skill specific affirmation exposure exercise and, (h) a no practice control group.

The present study investigated the effects of two intervention strategies, (1) positive affirmation instructions, and (2) positive imagery instructions, on the putting performance of novice golfers. The dependent measures were performance assessed by how many putts were made, and accuracy assessed by how many feet the golf ball stopped from the aluminum putting cup. The independent variable was based upon the specific intervention group or experimental group to which subjects were assigned, i.e., a preperformance imagery group (PI), a preperformance positive affirmation group (PA), a practice control group (PC), or a no physical or mental practice control group (NPC).

The present study was designed to test the effects of preperformance strategies on the performance of a closed motor skill. The study was designed

specifically to test the effect of various strategies on performance of golf putting. One experimental group was tested using preperformance imagery (PI), the second experimental group was instructed to use preperformance positive affirmation statements (PA). The practice control group (PC) was tested on golf putting without being instructed to use any mental preparation directly before performance. The no practice control group (NPC) was tested on only two days without physical or mental practice.

Research Hypotheses

Given the findings and procedures of the Woolfolk, Parrish, and Murphy (1985) and Woolfolk, Murphy, Gottesfeld, and Aitken (1985) study, the following hypotheses were developed to provide a framework for determining the performance differences based on the effect of preperformance imagery and preperformance positive affirmations.

1. There will be statistically significant differences between pre and post performance scores for the PI, PA, and the PC groups.
2. There will be no statistically significant differences between pre and post performance scores for the NPC group.
3. There will be a statistically significant difference between the scores of the PI group and the NPC group with the PI group having higher performance scores on the post test.
4. There will be a statistically significant difference between the scores of the PA group and the NPC group with the PA group having higher performance scores on the post test.

5. There will be a statistically significant difference between the scores of the PI group and the PC group with the PI having higher performance scores on the post test.
6. There will be a statistically significant difference between the scores of the PA group and the PC group with the PA group having higher performance scores on the post test.
7. There will be a statistically significant difference between the scores of the PC group and the NPC group with the PC group having higher performance scores on the post test.
8. There will be no significant differences between the performance scores of the PI group and the PA group.

Exploratory Hypotheses

1. There will be statistically significant differences between pre and post accuracy scores for the PI, PA, and the PC groups.
2. There will be no statistically significant differences between pre and post accuracy scores for the NPC group.
3. There will be a statistically significant difference between the scores of the PIG group and the NPC group with the PI group having lower accuracy scores on the post test.
4. There will be a statistically significant difference between the scores of the PA group and the NPC group with the PA group having lower accuracy scores on the post test.
5. There will be a statistically significant difference between the scores of the PI group and the PC group with the PI group having lower accuracy scores on the post test.

6. There will be a statistically significant difference between the scores of the PA group and the PC group with the PA group having lower accuracy scores on the post test.
7. There will be a statistically significant difference between the accuracy scores of the PC group and the NPC group with the PC group having lower accuracy scores on the post test.
8. There will be no significant differences between the accuracy scores of the PI group and PA group.

Limitations

This study was limited to students enrolled in the introductory psychology classes at Michigan State University. The results of this study will only generalize to subjects having characteristics similar to the participants in this study. Another limitation of this study is that assessment techniques to determine if the subject used the cognitive intervention strategies were a post-experimental questionnaire and verbal assessments. Therefore, there is no way of knowing for sure if the intervention was used. Another concern and limitation of the study is that athletes who use imagery, and positive affirmations are usually motivated to excel and achieve performance excellence. Subsequently, these athletes may go through lengthy systematic training programs to improve these psychological skills. No attempt was made in this thesis to employ a systematic training program, over many weeks. Therefore a limitation in this study was the lack of time that was given to the subjects in order to learn their assigned psychological skill.

Assumptions

An assumption made in the partial replication of the Woolfolk, Parrish, and Murphy (1985) study, and the Woolfolk, Murphy, Gottsfeld, and Aitken (1985) study is that negative imagery and negative affirmations would degrade the performance of novice golf putters. Therefore a negative imagery instruction group and negative affirmation group was not included in this study.

Another major assumption in this study was that the imagery exposure time, and the affirmation exposure time would be long to introduce imagery and positive affirmations to the subjects. Because all groups will have putted the golf ball a total of twenty times before the exposure phase, assumptions were made that the participants would be familiar with the skill. The rationale behind the assumption that this was enough time to be exposed to the psychological skills was based on previous research which has found limited imagery and affirmation exposure to enhance the performance of strength and motor skills in novice participants (Wilkes & Summers, 1984; Woolfolk, Parrish, & Murphy, 1985).

Definitions

Psyching up

The term psyching up has been used in a variety of ways throughout the anecdotal and experimental literature. For the present study the term psyching up is defined as mental preparation directly before performance (Weinberg, Jackson, & Seabourne, 1985).

Positive Affirmations

Throughout the literature positive affirmations refer to thought in many different contexts. For the purposes of this paper, positive affirmations will be defined as a cognitive strategy which can influence one's feelings of self-efficacy through verbal persuasion (Weinberg, 1986).

Imagery

Richardson (1969) suggests, "Mental imagery refers to all of those quasi-sensory and quasi-perceptual experiences of which we are self-consciously aware and which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts" (pp. 2-3).

Cognitive interventions

Strategies that may assist in helping subjects or athletes improve performance (Mahoney, 1984).

Positive Imagery

Using imagery to see a successful outcome of performance (Murphy & Jowdy, 1992). For example in the present study, positive imagery is seeing the ball roll into the hole.

Negative imagery

Using imagery to see an unsuccessful outcome of performance (Murphy & Jowdy, 1992).

Closed Motor skill

A skill performed in a predictable relatively stable environment in which the performers execute the movement at their own pace (Singer, 1988). An example of a closed motor skill would be the a putt or a basketball free throw. The present study used the closed motor skill of golf putting.

Open Motor Skill

A skill performed in an unpredictable, relatively unstable environment in which the performer executes the movement in reaction to the changing environment (Singer, 1988). An example of a open motor skill would be passing or dribbling in a game .

Internal Imagery

Internal imagery is when a person visualizes from a perspective inside their own body. The image is much like you are seeing through your own eyes, yourself performing the task (Mahoney & Avener, 1977).

External Imagery

This is when a person visualizes from a perspective of outside their own body. The image is much like you are watching yourself perform on a film or videotape (Mahoney & Avener, 1977).

Performance

For the purposes of this thesis performance is defined by the number of putts that remain in the metal cup.

Accuracy

For the purposes of this thesis, accuracy is defined by the number of feet the putt is left from the hole (between each circle is 12 inches). For example by using concentric circles, if the putt is made it is scored a 0. If the putt is left between the first circle (1 ft. from the cup) the accuracy score is a one. If the putt is left between the second circle and the first, the accuracy score is two. If the putt is left between the third circle and the second, the accuracy score is three. If the putt is left between the fourth circle and the third, the accuracy score is four. If the putt is left between the fifth circle and the fourth, the accuracy score is five. If the putt is left beyond the fifth circle, the accuracy measure is scored a six.

In sum, the first chapter has set out the problem and theoretical background to the problem. In the next chapter literature is reviewed which provides a rationale for each of the variables used in the study.

Chapter II

Review of Literature

This chapter will review the literature on the use of the specific psyching up techniques of imagery and positive affirmations. The psyching up literature will be broken into three sections, (a) imagery, (b) positive affirmations, and (c) psyching up research. The first section will be concerned with the research of mental practice and imagery. A historical overview will be provided, immediately followed by both positive and negative evidence of the efficacy of mental practice in motor performance. Following a discussion of the studies showing relationships of imagery to motor performance, an overview of the use of imagery as a preperformance strategy will be documented. Next, theoretical explanations for the positive results of imagery will be presented. The second section of this chapter will provide an historical and theoretical overview of positive affirmations and confidence as related to performance enhancement of motor skills. Specific studies involving the use of positive affirmation statements will be discussed in detail. The third section and the major focus of this thesis will provide the background of the research leading up to this study. The third section will begin with a discussion of the correlational research which provided the framework for the "psyching up" studies. Following the correlational studies, the first psyching up studies will be described. The last component of the final section will discuss past research dealing with the specific "psyching up" strategies of imagery and positive affirmations. Thus, the present chapter has three main purposes: (a) to introduce the area of mental practice, and describe historical and theoretical issues related to imagery, (b) to present the area of positive affirmations, and describe historical and theoretical issues related to

positive affirmations, and (c) to review literature on psyching up techniques and suggest further areas for research study.

Imagery

Richardson (1969) suggests, "Mental imagery refers to all of those quasi-sensory and quasi-perceptual experiences of which we are self-consciously aware and which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts" (pp. 2-3). This definition can be applied to many situations. For example, a golfer may see the putter moving back, striking the ball and the ball rolling into the hole. The golfer does not need to be on the golf course for imagery to occur. Throughout the literature, imagery has also been referred to as "symbolic rehearsal, visualization, modeling, covert practice, cognitive rehearsal, imaginal practice, hallucinations, hypnosis, visuomotor training, introspective rehearsal, implicit practice, ideomotor training, and even sofa training (Murphy & Jowdy, 1992 p. 222).

Experiential Evidence For Imagery use

Famous athletes allude to using imagery as a tool for enhancing and facilitating quality of performance (Weinberg, 1984). Jack Nicklaus (1974) suggests that he never hits a shot without going to the movies. First, he visualizes a positive outcome. Secondly, he images perfect trajectory of ball flight. Finally, he visualizes the swing that will allow him to perform the perfect shot. Another athlete who alludes to having used imagery to enhance performance is Dick Fosbury, a world famous high jumper, and innovator of the Fosbury flop. Before every jump Fosbury went through a mental imagery routine (Ungerleider & Golding, 1992). Therefore, If some of the greatest

athletes of all time uses preperformance imagery, then it may be possible to aid the average performer through the teaching of imagery.

There are many questions that remain to be answered about how preperformance imagery affects sport performance. For example, does this type of imagery enhance self confidence, have a neuro muscular effect, degrade performance, or have no effect at all?

Imagery in Sport Psychology Research

Murphy (1990) recently suggested that imagery has been used by sport psychology researchers in two ways. The two applications of mental imagery are mental practice and psyching up. The mental practice research is based upon the premise that if athletes can improve their performance by physical practice of a skill, then the possibility may exist that mental practice of a skill can also aid in improving performance (Hall, Buckoltz, & Fishburne, 1992; Richardson, 1967; Weinberg, 1981). For example, before going to bed an athlete can mentally practice putting a golf ball. This would be in addition to the physical practice performed earlier in the day (Murphy & Jowdy, 1992).

Research studies have used the above mental practice paradigm of comparing one group that practices mentally, a physical practice group, a combination physical practice and mental practice group, and a control group that receives no practice. The research on mental practice has shown that physical practice is still best, but mental practice is better than no practice at all (Feltz & Landers, 1983).

Alternatively, imagery has been used and researched as a preperformance mental training technique often called psyching up. A typical design compares one, all or a combination of five groups who use imagery, preparatory arousal, relaxation, self-efficacy statements, attentional focus , or a control condition.

Mental Practice History

Perhaps the first mental practice studies specifically related to sport were conducted by physical educator William Anderson. Research by Anderson (cited in Wiggins, 1984) was conducted to test whether or not muscles could be trained to perform gymnastics skills if the movements were not physically rehearsed, but only thought about instead. After several research investigations, Anderson suggested that gymnastic movements could be learned through the training of the mind (Wiggins, 1984).

After Anderson's initial work, Washburn (1916) suggested that when imaging a movement, the muscle activity that occurs is basically the same, although of lesser magnitude, as the actual movement. In 1932, Jacobson used a physiological technique and deciphered that when imaging movement, minute muscle activation is created. Hence, Jacobson provided evidence for what came to be called the psychoneuromuscular hypothesis. Following Jacobson, Sackett (1934) conducted an imagery experiment using a maze task, and suggested that motor imagery was more useful for cognitive tasks than motor tasks. Perry (1939) conducted a study of five different tasks and found that imaginary practice was effective in improving performance in pegboard, symbol digit distribution, and card sorting.

Vandel, Clugston, and Davis (1943) conducted two classic studies utilizing basketball free throws and dart throwing. One group physically practiced on only the first and last day, a second group practiced physically everyday. The third group physically practiced on the first and last day and mentally practiced on every day in between. The results of the study showed that mental practice was almost as effective as physical practice. However, the study was marred by the fact that no statistical analysis was completed.

Twinning (1949), in order to expand the findings of the above study, used the ring-toss, in a similar design as the Vandel et al. (1943) investigation, and found that the physical practice group improved the most, the two-day physical practice group showed no improvement. The mental practice group improved significantly over the two-day practice group, but, improved much less than the everyday physical practice group. Throughout the 1950's and 1960's studies were conducted in mental practice research that were concerned about the efficacy of mental practice as a helpful aid to improving performance.

Vandel et al. (1943) found that dart throwing and basketball shooting were improved by using mental practice. Twinning (1949) found that mental practice could improve performance in ring tossing. Bowling performance was also shown to be improved by mental practice (Waterland, 1956, as cited in Richardson, 1967), as was a basketball task (Clark, 1960; Start, 1962). Additional evidence that supports the idea that mental practice can improve performance comes form the works of Egstrom (1964) and Kelsey (1961). Egstrom (1964) suggested that mentally practicing a skill (ball-strike) was effective in improving performance, but not as effective as physical practice. Kelsey (1961) found that mentally practicing sit-ups daily for five minutes increased the muscular endurance of the abdominal and thigh flexor muscles. However, Kelsey, found that physical practice was significantly better than mental practice. Mendoza and Wichman (1978) found that mental practice improved the performance for dart throwers. Supporting evidence for the use of mental practice also comes from outside the sport literature. For instance, in 1985 Ross found that mental practice improved the performance of college trombonists.

Obviously this is only a collection of a few studies that have produced positive mental practice results. Fairly consistent evidence exists for the positive effects of mental practice, however, not all studies have found a relationship between mental practice and improved performance. Steel (1952) did not find a positive relationship between mental practice and the acquiring of a baseball skill. Corbin (1967) found mental practice to be ineffective in improving wand juggling. Stebbins (1968) also found mental practice ineffective in improving the task of throwing rubber balls at a target. Shick (1970) did not find a positive relationship of mental practice and performance when the tasks were volleyball serving or wall volley. In accordance with Schick, Stebbins, and Corbin, Smyth (1975) did not find a positive relationship of mental practice on the tasks of mirror drawing and a pursuit rotor. More recently, mental practice has been shown not to have a positive relationship in improving performance of dart throwing (Epstein, 1980) or figure skating (Mumford & Hall, 1985).

Conclusions of Mental Practice Literature

As documented by Richardson (1967) and Corbin (1972) the mental practice literature indicates that in spite of numerous methodological inadequacies, most published studies show improved performance after engaging in mental practice. Recent meta-analyses (Feltz & Landers, 1983; Hinshaw, 1991; Oslin, 1985) have suggested that mental practice may benefit athletic performance. In an effort to statistically test mental practice effects, Feltz and Landers (1983) conducted a meta-analysis of sixty studies and concluded that "mentally practicing a motor skill influences performance somewhat better than no practice at all."(p. 25). The summary of Feltz and Landers (1983) research includes the following: (a) "mental practice effects are primarily associated with cognitive symbolic rather than motor elements of the task" (p.45), (b)

"mental practice effects are not just limited to early learning, they are found in early and later stages of learning and may be task specific" (p.46), (c) "it is doubtful that mental practice effects are produced by low gain innervations of muscles that will be used during actual performance" (p. 48), and (d) "mental practice functions to assist the performer in psychologically preparing for the skill to be performed" (p.50).

The Use Of Imagery as a Psyching Up Technique

The mental practice research to date has rarely utilized mental imagery as a preperformance routine strategy. However, the psyching up literature does use imagery as a preperformance routine. For example, a high jumper, before attempting a jump would mentally see himself/herself clearing the bar. Another example would be the golfer imaging before every shot. At present, the psyching up research appears to be equivocal on the effects of utilizing imagery before performance. The full studies will be reviewed in the psyching up section, however, the imagery effect immediately prior to performance will be reviewed in this section.

Lutkus (1975) found that imaging immediately prior to performance led to significantly faster times and less errors in the task of mirror drawing. Waterland (1956) found that imaging before a ten pin bowling task improved performance. Gould , Weinberg, and Jackson (1980) found that imagery improved performance on a leg kick task. Weinberg, Gould, Jackson, and Barnes (1980) found that imaging before attempting a tennis serve did not improve performance over a control group. Epstein (1980) using imaging immediately before dart throwing did not find that imagery improved performance. In 1984, Wilkes and Summers found imagery did not improve performance on a leg kick task. Woolfolk, Parrish and Murphy (1985) found that preperformance imagery improved golf putting performance. However,

in a follow up study by Woolfolk, Murphy, Gottsfeld, & Aitken (1985), golf putting performance was found not to be improved by preperformance imagery. Tynes and McFatter (1987) found that imagery before completing a weightlifting task improved performance over a control group. Recently, Elko and Ostrow (1992) found that imaging immediately prior to performing a hand grip dynamometer task significantly improved performance.

The results of using imaging before performing a motor task have shown equivocal results. However adding an educational and general imagery training to psyching up research may help ascertain an understanding of the psyching-performance relationship. A good example of brief skill specific exposure is the Epstein (1980) study. However, exposure sessions may be aided by basic imagery exercises such as the ones written by Vealey (1986). Of course, a much longer training session may (see Vealey, 1986, for a full description of an imagery training program) allow imagery to be practiced and learned by the subjects over many weeks or months. This may produce enhanced controllability of images, vividness of imagery, as well as improved performance. This type of study would require subjects who had the motivation to excel in a selected activity. This type of experiment would take much more time than the currently published psyching up investigations (Murphy & Jowdy, 1992).

The present investigation chose to briefly expose the subjects to an imagery educational exposure and basic training as an extension of the Woolfolk, Murphy,and Parrish (1985) study, and the Woolfolk, Murphy, Gottesfeld, & Aitken (1985) study. The lack of exposure and lack of belief in the imagery strategies may have been one of the reasons that equivocal results were found in studies (Vealey, 1986; Weinberg, 1986).

After studying the effects of imagery on performance, it is necessary to test specific theories of preperformance imagery. The next section discusses theories that researchers have developed to try and explain the positive and negative effects of mental practice, and imagery.

Theories of Imagery and Mental Practice

Maltz (1960) has hypothesized that imagery is used in a very complicated way and that our brain and nervous system combine to seek a goal. Therefore, imagery acts to set the goal then the brain and nervous system automatically take over. Although Maltz's theory may seem reasonable, there is little scientific evidence to support these notions.

Marks (1977) suggested that "imagined stimuli and perceptual or real stimuli have a qualitatively similar status in our conscious mental life" (p.285). Martens (1987) suggested that this is a significant conclusion because in normal processes we take in things from the environment and process then in our brain. By also using our own memory, we can create our own internal environment which our brain processes.

There are many theories proposed on how imagery works, nevertheless, the psychoneuromuscular theory and the symbolic learning theory have received the most focus from the sport psychology researchers. The following sections define and detail the research behind these two important theories.

Psychoneuromuscular Theory

The psychoneuromuscular theory is supported by Jacobson (1932). Jacobson suggested that actually visualizing events may stimulate minute muscular firings to the part of the body that is performing the activity. Jacobson showed that when visualizing the activity, electromyographic responses accompany the imaging. Since Jacobson's initial exploration,

researchers have found that minute muscle activation does occur when imaging.

In 1981, Hale found minute muscle activation when subjects used imagery of a biceps curl. Suinn (1980) found that a skier using imagery showed minute muscle activation when imaging rather than only thinking about the skill. Bird (1984) recorded Emg's for five athletes and also found minute muscle activation. Although minute muscle activation has been shown, Murphy and Jowdy (1992) stated that "there is very little direct evidence to suggest feedback to the premotor cortex from minute innervations of the peripheral musculature causes mental practice effects"(p.233).

Symbolic Learning Theory

Sackett (1934) was one of the first researchers to propose the symbolic learning theory which suggests that mental practice improves performance because athletes can use cognition's to prepare and plan for performance (Murphy & Jowdy, 1992; Hinshaw, 1991). Sackett (1934) found that subjects who imagined maze tracing performed better than verbal or overt practice groups. Perry (1939) found that mental practice improved the primarily cognitive skills of pegboard, symbol digit substitution, and card sorting. However, the primary motor tasks of mirror tracing and tapping were less improved by mental practice. Wrisberg and Ragsdale (1979) found that mental practice showed greater effects on a highly symbolic task, as opposed to a low symbolic task. More recently, Ryan and Simmons (1981) found that the mental practice group on a highly cognitive task (dial-a-maze) improved performance. However, in the same study these researchers found that in a primarily motor task (stablometer) mental practice did not improve performance. In their meta-analysis Feltz and Landers (1983) found trends to support the symbolic learning hypothesis. However, they suggest that

classification of motor tasks into primarily motor tasks or primarily cognitive tasks may be artificial.

Other Theories

Although the preceding two theories, the pscyhoneuromuscular theory and the Symbolic learning theory, are the most popular in sport psychology literature, other theories and suggestions exist. Schmidt (1982) suggests that it may be possible that the " performer is merely preparing for the action, setting the arousal level, and generally getting prepared for competition" (p.520). The lower minimal tension levels may allow the performer to perform optimally. This explanation incorporates physiological and cognitive aspects of mental imagery. Feltz and Landers (1983) suggest that imagery allows the athlete to set physiological arousal at optimal levels. The cognitive aspect of this explanation suggests that imagery may help athletes focus on the task at hand. Although this theory has much appeal, there is little evidence to lend support (Hecker & Kaczor, 1988).

Recently, Pavio (1985) posits that imagery may act as a motivational or cognitive function. The performer imagines a goal, and then the behavior that needs to be produced. When imaging success of skills, a positive feeling which increases confidence is created. In summary, imagery may motivate a performer through enhancement of self-confidence and an increase of positive self-talk (Pavio, 1985).

Positive Affirmations

Positive affirmations or self efficacy statements are other techniques like imagery that sport psychologists have suggested may improve performance in athletic tasks (Bunker & Williams, 1986). Psychologists have recently begun to investigate the phenomenon of positive affirmations in physical tasks

(Wilkes & Summers, 1984). Positive affirmations are defined as a cognitive strategy which can influence one's feelings of self-efficacy through verbal persuasion (Weinberg, 1986). A positive affirmation strategy consists of an individual repeating such statements as "I can make that putt", "I can do it", or "I can win" to foster confidence in the individuals ability to successfully complete the task (Weinberg, 1986). The positive affirmation strategy can be applied directly before performance or during the performance.

Although the study of inner thoughts is a recent area of study in sport psychology, the usage and study of affirmations have been studied for thousands of years (Van Noord, 1984). Bhuddists and Hindus have used affirmations for life improvement for a long time. Sir Francis Galton attempted to analyze thoughts that barely crossed his mind. Emile Coue' instructed his patients to use statements such as "Every day in every way I'm getting better and better" (Van Noord, 1984).

Self-Talk in Sport

"It has been said many times that the only difference between the best performance and the worst performance is the variation in our self-talk and our self-thoughts and attitudes" (Harris & Harris, 1984, p. 101). Wiren, Coop, and Sheehan (1979) lent support to this quote. They suggest that often the good professional golf teachers can successfully execute difficult shots when conducting a clinic. For example, they can fade or draw on command. This may suggest that the power of positive self-efficacy suggestions can increase performance. This example supports positive affirmations in that the golf professionals are thinking only about positive outcomes when they are conducting a clinic.

Wiren, Coop and Sheehan (1979) also describe the phenomenal putting of former Oklahoma State University golf coach, Labron Harris Sr. His technique

was not overly impressive. The authors suggested that Harris' positive self-confidence in performing the putt may have allowed him to be a great putter. Wiren and Coop (1979) also state, "Finally we realized it was his attitude, not his method, that let him sink so many putts. His faith in himself was total. He said he was a great putter, he believed it and he was"(p.101).

To illustrate how positively affirming oneself can affect an athlete's behavior, the following is an account of a past golf tournament (Wiren, Coop, & Sheehan, 1979). Curtis Strange, now a great professional golfer, hit a great 1 iron approach shot to help his team win the NCAA golf title. However, the following year while trying to qualify for the PGA tour Strange used a six iron to hit his shot into a bunker. Needless to say, Strange missed qualifying by one shot. Strange recalls his thought as he hit both shots. On the first shot he thought "hit the best shot for the team". However, as he addressed the crucial six iron shot in the qualifying event, "he thought do not miss the shot". Both positive self-efficacy and negative self-efficacy statements may have been major determinants in the athletic performance of professional golfer Curtis Strange.

Confidence and Performance

Weinberg (1986) suggested that the premise that how confident an athlete is can significantly affect subsequent performance is not a new idea. Coaches and athletes have talked of the importance of confidence, however, only recently have sport psychologists begun to research the confidence-performance relationship. A few studies have been conducted to illustrate how positive thinking and negative thinking can influence behavior. Nelson and Furst (1972) conducted an investigation to test the effects of confidence on performance. First, male subjects were tested for arm strength, and then asked to estimate their strength relative to their peers. Secondly, subjects

were matched with someone who was clearly stronger. However, both subjects believed that the weaker subject was stronger. The results showed that the objectively weaker subject won the arm wrestling competition 83 percent of the time. A possibility exists that if subjects believe they will win, they perform at a higher level.

Ness and Patton (1979) also conducted an investigation of whether weight lifting was influenced by how much the person thought was being lifted. Results showed that participants lifted more weight when they believed it to be less than it was.

Feltz (1988) suggested that the sport literature shows a significant relationship between self-efficacy and performance. Research that usually investigates sport confidence often tests Bandura's Self-Efficacy Theory (Feltz, 1988).

Self-Efficacy Theory

Self Efficacy can be defined as an individuals belief that he or she can successfully execute the behavior that is needed to produce a desired outcome (Bandura, 1977). Self efficacy theory refers to a situationally specific self-confidence that can change depending on many factors such as the task, skill level of the individual, or the situation. Bandura suggested that there are expectations of personal efficacy which are referred to as the four major sources of efficacy information; namely past performances, vicarious experiences, verbal persuasion, and physiological states. The strongest source of self-efficacy information, past performance, refers to how one performed in a specific situation. The second strongest efficacy information source, vicarious experiences, derives information through imaging or observing others performing the task. Persuasive techniques, although less powerful than vicarious techniques are often used by teachers, peers, and coaches as

well as the individual. Lastly, physiological arousal can influence performance.

Performance accomplishments have been shown to enhance self-efficacy and performance (Brody, Hatfield & Spalding, 1988; Feltz, Landers, & Raeder, 1979; Hogan & Stantomeir, 1984). Relationships have been similar to performance accomplishments, however, weaker when vicarious techniques are used (Corbin, Laurie, Gruger, & Smiley, 1984, Gould & Weiss, 1981; Weinberg, Gould & Jackson, 1979). Self-efficacy research when manipulated as a persuasive technique has revealed mixed results (Weinberg, Gould, Jackson, & Barnes, 1980; Wilkes & Summers, 1984). Feltz (1988) posits that often when studies do not use a performance based treatment as a source of efficacy information, lack of effects may be caused by a confounding of treatment and actual performance. For example, if a study has multiple trials, the performer may miss the first couple of shots or putts, and then do poorly because of their first couple of performances; irregardless of the fact that the treatment is trying to persuade the subject to do well.

Persuasive self-efficacy statement techniques, testing Bandura's theory, have been studied in sport and physical activity. A line of research was started because of the correlational studies which linked a relationship between positive thoughts and confidence of elite successful athletes. These studies (Higlen & Bennett, 1979, 1983; Meyers, Cooke, Cullen, & Lillies, 1979) found that positive thoughts were used by successful competitors, and hence psyching up studies began to use self efficacy statements as mental preparation. These studies (Higlen & Bennet, 1979, 1983; Meyers, Cooke, Cullen, & Lillies, 1979) will be reviewed in the psyching up section. However, in this section three studies using positive affirmations in sport will be reviewed.

Rushall (1984), using a case study design with a rower, investigated the effects of positive self-efficacy statements on the performance of a rower. The subject completed a six minute rowing ergometer task while saying positive self-statements every fifteen seconds. Rushall found self-efficacy statements increased performance. Rushall suggested that not only was the performance enhanced but the nature of the performance was changed. The performance was more consistent and did not display the usual decrease in performance that occurs in the latter half of such a test.

In 1984, Weinberg, Smith, Jackson, and Gould conducted a study with the purpose of comparing associative, dissociative and positive affirmation psyching interventions in the performance of running for thirty minutes. The subjects were randomly assigned to groups, including a positive self-talk group. Specifically, the positive affirmation group received these instructions, "While you perform I would like you to constantly talk to and encourage yourself that I can do it, I can make it, I can go for a longer time; It hurts but I can do it, I'll keep it up. Repeat statements like these throughout the entire performance." As a manipulation check of interventions subjects were asked the following question. What percentage of time did you use the cognitive strategy that the experimenter presented to you? They used a rating scale from 0 to 100%. Results of the manipulation check revealed that the mean of the subjects using the intervention was 71.5 %. Results found no significant differences in the mean number of laps run by subjects in different groups.

The above mentioned studies demonstrate how self-efficacy statements have been used while the performance has been taking place. These experimental studies have shown that self efficacy statements can improve performance (Rushall, 1984; Weinberg, 1984). Recent research has also looked at the effects

of self-efficacy statements immediately prior to performance. This research will be reviewed in the psyching up literature section. However, a good example of using self efficacy statements is the Wilkes and Summers (1984) investigation. In this research 60 male volunteers were randomly assigned to one of five mental preparation groups: arousal, attention, imagery, self-efficacy statements, and a control. All subjects first completed 3 pretest trials in which they were told to do the best they could do. Then during the experimental phase, the subjects were told to use the cognitive strategies instructed to them. Specifically, the positive self-efficacy group was given these instructions, "tell yourself how confident you are that you will do well at this leg extension; that is I want you to think only that you are good at this task and that you are going to put in a good performance. Think of absolutely nothing except that you are going to really succeed at this." The results of this study demonstrated that self-efficacy statements and arousal improved performance over the control group.

Psyching Up Research

Correlational Studies

Research has recently been conducted that has tested the effects of self-efficacy statements and imagery on the effects of performance. Most of this research has been conducted under "psyching up research." This line of research began when Mahoney and Avener (1977) conducted an exploratory study on elite athletes. Subjects in this study were twelve male gymnasts who were attempting to qualify for the Olympic team. Success in this study was determined by who made the Olympic team, and failure was defined as those athletes who were cut from the team. The procedure in this study was to

interview the 12 remaining male athletes left to try out for the 1976 Olympic team. The authors were looking for a correlation in cognitive strategies between the 6 who were successful and the 6 who were unsuccessful. The results of this study were considered astonishing by the authors. They found the more successful gymnasts to be more self confident, and that the more successful gymnasts reported using self-talk in training and competition. They also found that athletes who used internal imagery as opposed to external imagery were more successful.

Meyers, Cooke, Cullen, and Lillies (1979) attempted to replicate the findings (Mahoney & Avener, 1977) that successful Olympic gymnasts showed different psychological characteristics than nonsuccessful gymnasts with college racquetball players. Racquetball members completed one questionnaire in the middle of the season and one at the end. Results revealed that the more skilled racquetball players used more self-talk in training and competition. Also, more successful competitors were found to have more clarity of imagery and an easier time in controlling images.

As a follow up to the Mahoney and Avener (1977) study, Highlen and Bennett (1979) looked at specific influences which may have separated successful and unsuccessful wrestlers. Subjects in this study were 39 elite wrestlers who were trying to qualify for positions on one of three national teams. A successful wrestler was defined as an athlete who was selected to compete on at least one of three national teams. Wrestlers completed a questionnaire that inquired about psychological factors which affected training and competition. Results of the study found that responses to imagery and self-talk questions were similar among the nonsuccessful and successful athletes. The authors (Highlen & Bennett, 1979) suggested that imagery and

self-talk were only used to a moderate degree. Imagery and self-talk did not seem to characterize any differences between winners and losers.

Highlen and Bennett (1979) also suggested that gymnastics, a closed skill sport which was the focus of the Mahoney and Avener (1977) study, may be more conducive to imagery than wrestling which is an open skilled sport. Subsequently, Highlen and Bennett (1983) conducted a study which examined the psychological techniques used by open versus closed skilled athletes.

Highlen and Bennett (1983) administered a questionnaire to 39 divers and 44 wrestlers. This survey was similar to the Mahoney and Avener (1977) study and the Highlen and Bennett (1979) study. The researchers specifically were looking for factors that separated the successful and unsuccessful athletes in each sport. Also, they were assessing psychological factors associated with training and competition. The results of the study found the successful divers to use imagery more often than the nonqualifiers. Divers were not found to use more imagery strategies than wrestlers and self-talk was used more for the successful divers than the unsuccessful divers. Self-talk was not found to differentiate elite divers from elite wrestlers.

Gould, Weiss, and Weinberg (1981) attempted to replicate the research of Highlen and Bennett (1979). Forty-nine subjects completed a questionnaire. Results of this study indicated that self-talk, imagery, attentional focus, and arousal were the strategies most often used. Also, subjects were asked to respond to the question, "How often do you use self -talk and imagery as a prematch preparation technique?" Utilizing a scale of 1 (not at all) to 11 (almost always), a mean of 7.46 was reported for the self talk group, and 7.74 was reported for the imagery group.

As a group these studies have shown that elite level athletes use self-talk and imagery during training and competition. This type of cognitive strategy

may have aided their performance. However, one can not imply that any of these strategies caused an elite athlete to become successful (Murphy, 1990).

The First Psyching Up Studies

The first study using "psyching up" strategies before performance was the Shelton and Mahoney (1978) study. These investigators conducted a study using thirty male weight lifters who were participating in an Olympic style weight lifting competition. The subjects were tested for strength on a Lafyette pneumatic hand dynamoter. The procedures for the experiment included (a) conducting a baseline trial, (b) having subjects count backward by sevens before testing for strength (control condition), (c) having subjects "psych up" before testing for strength (d) and conducting post experimental interviews. Interviews indicated that when asked to choose a psyching up technique, the participants chose techniques that ranged across the following four categories: (1) attentional focus (2) preparatory arousal (3) imagery and (4) self-efficacy statements. Attentional focus was the most popular technique followed by self-efficacy statements. Results indicated that the "psyching up" group showed large increases in strength performance compared to a decrease by the control group subjects.

In a follow up study Weinberg, Gould, and Jackson (1980) used a psyching up design with the purpose of extending the results of the Shelton and Mahoney study (1978). The investigation specifically researched tasks that required speed, strength, and balance. In the first experiment 20 subjects were used to perform the task of balancing on a stabliometer. All subjects performed in both the psyching up and control conditions. Subjects in the experimental group were told to mentally prepare themselves for maximum performance. In the control condition, subjects were told to count backwards by sevens from a four-digit number. Results of this experiment found that

balancing on the stabliometer was not facilitated by the use of the psyching up technique. The other two experiments in this study used the same design, but used the tasks of strength on a Cybex orthotron and a speed of arm movement task. Results showed that only the strength task was facilitated when using a psyching up technique. In all of the experiments the psyching up techniques seemed to fall into the following categories: (1) attentional focus, (2) imagery (3) self-talk, (4) preparatory arousal, and (5) relaxation. The findings from this study are consistent with those of Shelton and Mahoney (1978) in terms of strength performance.

Weinberg, Gould, and Jackson (1981) investigated the relationship of "psyching up" techniques on the performance of a leg strength task. All subjects performed one trial under the control condition, and four more trials under the "psyching up" condition. Results of the study demonstrated that "psyching up" enhanced performance of the leg strength task.

Caudill, Weinberg, and Jackson (1983) examined the use of psyching up techniques in a field setting. The sample used in the study were male and female hurdlers and sprinters from a university track team. Subjects performed under both the psych up and control conditions. The psyching up subjects were told to psych-up one minute before the race. Results revealed that the psyching up group improved running speed performance significantly over a control group. Also, this study was consistent with other research which found that the psyching up techniques fell into the categories of imagery, self-efficacy statements, attentional focus, and preparatory arousal.

Recently, Weinberg, Hankes, and Jackson (1991) examined the relationship of psyching up techniques on the performance of an open skill task of timed basketball shooting performance from beyond fifteen feet. One hundred and

five university students who had previous basketball experience participated in this experiment. Each subject chose their psyching up technique before performance. The results of the study indicated that imagery, attentional focus, preparatory arousal, relaxation and positive self-talk were all used as psyching up techniques.

These initial studies demonstrate support for the finding that when asked to use a psyching up strategy before performance, athletes used one of five strategies. The five mental preparation techniques used were positive self-talk, attentional focus, preparatory arousal, imagery, and relaxation. Psyching up studies seemed to influence the performance of strength skills (Shelton & Mahoney, 1978; Gould, Weinberg & Jackson, 1980). A problem with the original design of Shelton and Mahoney (1980) is that it allowed the subject the choice of choosing a psyching up strategy (Murphy & Jowdy, 1992; Wilkes & Summers, 1984; Murphy, 1990). These designs may show that a preperformance mental preparation strategy may improve performance, however these studies do not make an attempt to specifically identify which strategies influenced the performance (Murphy & Jowdy, 1992; Murphy, 1990).

Specific Psyching Up Strategies Involving Strength

In an attempt to identify the type of psyching up strategy that was responsible for enhanced performance, Gould, Weinberg and Jackson (1980) conducted one of the first specified psyching up investigations. Two experiments were conducted. In the first experiment subjects performed on a Cybex Orthotron machine under five different strategies of attentional focus, imagery, preparatory arousal, a rest condition, and a control group who counted backwards. Results showed that the preparatory arousal group was not significantly different from the other, however, the preparatory arousal group produced greater performance than the other three conditions. In the

second experiment, subjects were randomly assigned to one of three groups, preparatory arousal, imagery, or a control condition. The experimental groups mentally prepared before performing on the Cybex Orthotron #7120. The preparatory arousal strategy was shown to increase performance, however, the imagery group's performance did not improve.

Caudill and Weinberg (1983) conducted an investigation to test the effects of imagery, focus of attention, and preparatory arousal, on the performance of the bench press. Subjects were tested on a universal bench press machine. Subjects performed under the following conditions: (a) imagery (b) preparatory arousal (c) focus of attention, or (d) a control condition. Results of this study revealed that all experimental "psych up" conditions improved over a control condition. As in other studies there was no significant difference between experimental groups in enhancing performance.

Wilkes and Summers (1984), as noted in the positive affirmation section, found that the psyching up techniques of self-efficacy statements and preparatory arousal produced significantly greater strength performance than the control group.

Weinberg, Jackson, and Seabourne (1985) conducted a study to test if imagery, preparatory arousal, or a non-specific "psych-up" condition most enhanced the performance of sit-ups, pushups, pull ups, and the standing long jump. The subjects performed each task using each condition. This study demonstrated that a non-specific strategy improved performance over a control strategy. The specific strategies of imagery and preparatory arousal also enhanced performance more than the control group.

Tynes and McFatter (1987) conducted an investigation using 36 experienced weight lifters. The weight lifters completed a weightlifting task under one of five conditions: self-efficacy, attentional focus, imagery, preparatory arousal,

or a control condition. Results showed that only preparatory arousal increased performance.

Elko and Ostrow (1992) conducted a study to examine three psyching up strategies on the hand grip strength of college age and older subjects. The older subjects and younger subjects each performed the experiment in three separate categories, an imagery group, a preparatory arousal group, and a control counting backwards group. The subjects were told to employ the strategy to the best of their ability for twenty seconds. The subjects performed three trials under each condition. Results showed that mental imagery increased performance in both the younger and older adults. Elko and Ostrow concluded that age has no influence on the effectiveness of the mental strategies used.

Psyching Up Strategies Involving Motor Performance

Weinberg, Gould, Jackson, and Barnes (1980) investigated the effects of cognitive strategies on the influence of a tennis serve. Forty subjects were told they would serve using four different mental preparation strategies. These strategies were imagery, statements of positive self-efficacy, attentional focus, and no strategy. The results of the study found that psyching up techniques did not influence the performance of the serves for the subjects.

Positive effects of imagery were not found in an investigation of dart throwing (Epstein, 1980). Subjects were assigned to one of three conditions, an external imagery, internal imagery, or a control group that did not receive mental training and the instructions to mentally rehearse before each throw. The experimental group was given a training session which included two minutes of imaging dart throwing. Subjects were then told to mentally rehearse their performance before throwing the darts. Results of the study did not find a difference between any of the groups.

McFadden (1982) conducted a study to examine the effects of imagery rehearsal strategies in order to improve goaltending performance. Sixty-three fourteen to 18 year old Toronto area ice hockey goaltenders participated in the study. Subjects were randomly assigned to one of four of the following groups: (a) an internal imagery condition, (b) an external imagery condition, (c) a delayed training control group, or (d) a film placebo condition. Subjects were tested on a "reaction tunnel" device which simulates a puck being fired at prime areas of the goal. The subjects first completed a thirty shot baseline measure. Next experimental groups received sixty minutes of external or internal imagery training over four days. After the last training session, participants in the experimental conditions, completed two sets of 30 shots on goal. Before each set of thirty shots subjects in the experimental group were asked to "psych-up" for five minutes. McFadden (1982) suggested that the findings show that imagery used as a psyching up technique was very effective in enhancing skilled goaltending performance.

Lutkus (1975) used imagery before performance in a mirror drawing test. Subjects in the control condition were to try and trace their figure using the mirror as a guide. Subjects in the experimental imagery condition were told to form an image of the figure in their minds before performing the mirror drawing. Results of the study found that the imagery groups significantly improved their performance over the control group. The imaging group showed faster times and fewer errors than the control group.

Waterland (cited in Richardson,1967) conducted an investigation using preperformance imagery before bowling practice. There were two groups, a mental practice group and a control condition. The mental practice kinesthetic imagery group was found to produce a smoother action, greater

speed of delivery, and a higher score than the control group while bowling under standard conditions.

Woolfolk, Parish and Murphy (1985) conducted a study to test the effects of preperformance imagery on the golf putting task. Subjects were thirty university students randomly assigned to one of three groups, a positive outcome imagery group, negative outcome imagery group, and non imagery control group. Before each shot, the positive outcome imagery group was told to imagine themselves making a " gentle but firm backswing and stroking the putt smoothly down the target line." Then they were told to imagine the ball "rolling, rolling right into the cup"(p. 337). The negative outcome group was given the same instructions except that they were told to imagine the ball, "rolling, rolling toward the cup but at the last second narrowly missing"(p.337). The control group was told to try and sink each putt. The results of the study found that the positive outcome group significantly improved their performance and performed significantly better than the other two groups.

Woolfolk, Murphy, Gottesfeld, and Aitken (1985) conducted a similar investigation of the effect of imagery instructions on the simple motor skill of golf putting. Fifty students were randomly assigned to one of five imagery conditions. Subjects used their assigned imagery strategy before each putt. Consistent with past research (Woolfolk, Parrish, & Murphy, 1985), negative imagery was shown to cause performance decrement. This study was inconsistent with past research (Woolfolk, Parrish, & Murphy, 1985) which found positive imagery to enhance performance. The authors (Woolfolk, Murphy, Gottesfeld, & Aitken, 1985) suggested that future research try to establish the conditions in which positive imagery instructions may or may not show increased performance.

To summarize the findings in the psyching up literature, strength seems to be enhanced when a psyching up technique is used. Specific psyching up strategies of imagery have been found to increase strength in a hand grip dynometer task (Elko & Ostrow, 1992) and a leg kick task (Gould, Weinberg & Jackson, 1980). However, other studies have found imagery to be less efficient in a strength task (Tynes & McFatter, 1987). Positive affirmation statements seem to have improved performance in one study (Wilkes & Summers, 1984) of strength performance. However, in gross-motor tasks the use of preperformance self-efficacy statements have shown negative results in the performance enhancement of a tennis serve (Weinberg, Gould, Jackson & Barnes, 1980), and positive results in endurance performance (Weinberg, Smith, Jackson & Gould, 1984). Imagery when used as a psyching up technique for a gross-motor skill has been shown to influence positively the performance of golf putting (Woolfolk, Parrish, & Murphy, 1985), bowling (cited in Richardson, 1967), mirror drawing (Lutkus, 1975). Imagery used as a psyching up technique for an accuracy and precision skill was not found to enhance performance in dart throwing (Epstein, 1980).

The results of the psyching up literature have been equivocal when using a specific preperformance strategy before a motor skill. We do know that mental activity can work either degrade, enhance, or have no effect directly before performance (Weinberg, Gould, Jackson, & Barnes, 1980; Woolfolk, Murphy, Gottesfeld, & Aitken 1985; Woolfolk, Parrish, & Murphy, 1985).

The research provides a detailed description of what subjects will be told to imagine, and say to themselves. Most studies do not provide the reader with a detailed description of what the subjects were told to imagine (Murphy, 1990; Murphy & Jowdy, 1992). Psyching up literature often only provides a few sentences of intervention descriptions (Murphy & Jowdy, 1992).

As previously stated, the present research is designed as a partial replication and extension of the Woolfolk, Parish, and Murphy (1985) study, and the Woolfolk, Murphy, Gottesfeld, and, Aitken (1985) study which found that preperformance mental activity may influence the performance of a golf putt. The replicated aspects of these studies are the use of a golf putting task, and the same positive outcome imagery instructions. Extensions of the studies are the inclusion of an exposure phase for the positive imagery group (PI), and the inclusion of a positive affirmation group (PA), and affirmation exposure. No study to my knowledge has used the cognitive strategy of positive affirmations directly before golf putting. Often anecdotal reports are given by professional golfers that the difference between the best and worst putts are just a belief that the putt will go in. Since no studies have tested the effect of preperformance positive affirmations before a putt, this strategy was included. Psyching up experiments often use more than two strategies, however, these two strategies were thought to be most important to golfers.

Conclusion of the Review of Literature

This review of literature shows that mental imagery and positive affirmations have begun to receive attention from athletes and researchers. Specifically, researchers have moved from testing for a mental practice effect as compared to physical practice to applying mental practice (i.e., imagery and positive affirmations) directly before performance. However, theories have been slow to develop on the psyching up performance relationship. This is unlike the mental practice research which has many theories on why a mental practice effect is found. Theories such as the symbolic learning theory and the psychneuromuscular theory have been developed to attempt to explain mental practice findings. Positive affirmations are also based on a theory, Bandura's self-efficacy theory.

This review of literature indicates that psyching up effects can have positive, negative, or no effects on the performance of a closed motor skill. What remains to be determined is what illicits a psyching up effect. A psyching up effect may be task specific. However, the effect on performance may not be the major reason to use a psyching up technique. It may be that the major reason one should use a psyching strategy is so that the skill becomes automatic. A strategy or routine may also help ease the stress of a performer during competition, and allow the specific motor skills to run off automatically.

In summary this chapter presented a review of the literature discussing specifically, mental practice and imagery, positive affirmations and self efficacy theory, and studies dealing with "psyching up" and athletic performance. In the third chapter, the methodology of the experiment will be discussed.

Chapter III

Methods

In this chapter the experimental procedure will be described in terms of (a) Subjects, (b) Experimental design, (c) Task, (d) Procedure, (e) Experimental phase, (f) Exposure phase, (g) Post experimental questionnaire, (h) Debriefing, and (i) Treatment of Data.

The purpose of this study was to replicate and extend the Woolfolk, Parrish, and Murphy (1985) study, and the Woolfolk, Murphy Gottesfeld, Aitkens (1985) study. This study was designed specifically to test the effects of preperformance positive affirmation and preperformance imagery on the performance accuracy of golf putting.

Subjects

Participants were forty university students who signed formal consents before participating in the experiment (see Appendix A). They ranged in age from 18-23 years of age. The average age of the subjects in this study was M= 19.55. Of the 40 Subjects, 9 were females, and 31 were males. Thirteen subjects described themselves as novices, 20 described themselves as intermediate, and 7 described their golfing ability as never played Subjects were assigned with 10 to each condition. Only subjects who indicated on the pre-experimental questionnaire that they were beginners to intermediate skill level, and who made between 30 to 70 percent on the baseline putting task from their assigned distance were used in this analyses. Twenty subjects were assigned to putt from 5 feet, 18 subjects putted from 7 feet and 2 subjects putted from 8 feet. Forty subjects were assigned to one of four groups, a preperformance imagery group (PIG), a preperformance affirmation group (PA), a practice control group (PC), and a no practice control group (NPC). Although random assignment was stringently tried for, 4 subjects dropped out of the PA group, 5

subjects dropped out of the PI group, 1 subject dropped out of the NPC, and 1 subject dropped out of the PC before beginning the experimental sessions due to having fulfilled the required number of experimental credits needed. Therefore, 11 subjects were then recruited and assigned to one of the four groups. This assignment procedure was deemed successful since there were no initial significant differences on performance and accuracy scores of the baseline measures. Also, all eleven fit the criteria for participation in the experiment.

Experimental Design

The design for this study was a 4X2 (Group X pre/post) design. One group received, imagery exposure, a second received positive affirmation exposure. The groups in the control conditions performed the experiment in the absence of mental preparation. In order for the data to be reliable, pilot testing was conducted before beginning the study. Special care was taken to make sure the equipment was usable for the study. Also, data collection procedures were assessed in order to make sure data was being measured correctly.

Task

Accuracy and performance on the golf putting task was used as the dependent measures. Each subject putted from an assigned distance. The actual assignment procedure for the golf putting task was similar to the procedures described by Woolfolk, Parrish, and Murphy (1985), Woolfolk, Murphy, Gottesfeld, and Aitken (1985), and Murphy and Woolfolk (1987). Previous research has shown these procedures to reduce floor and ceiling effects (Woolfolk, Parrish & Murphy, 1985; Woolfolk, Murphy,Gottesfeld, & Aitken, 1985; Murphy & Woolfolk, 1987). The golf putting task was performed a total number of 110 times over eleven different blocks (8 experimental, 1 pre-

baseline, and 2 baseline). A zero was scored for each putt made, if the putt landed between 0 to 1 feet from the hole a 1 was scored, a miss of 1-2 feet was scored as a 2, a miss of 2-3 feet was scored as a 3, a miss of 3-4 feet was scored as a 4, a miss of 4-5 feet was scored as a 5, over 5 feet was scored as a 6. The experimenter picked up all golf shots immediately after recording the score. Before hitting the shot, the subject placed a golf ball on the line then took and then hit the ball.

Apparatus

The apparatus for the golf putting task was a knight putting cup. The putters were a knight 35-inch putter, model number 300 or a 33 inch Knight model number 300 putter. The golf balls were 432 Matrix surlyn Wilson 90 compression golf balls.

Procedure

The study lasted for five sessions on five data collection days(an extra sixth session was needed for the experimental groups general affirmation and imagery training, and the NPC group was tested on the first and last days). Each subject was tested on ten putts for ten blocks. First the subjects were tested and assigned to putt from a specific distance to assure no individual differences. After subjects were assigned to putt from an assigned distance, the first twenty putts were used without a "psyching up" strategy, to secure a baseline. Then two blocks of ten trials were conducted on the second day, with two more blocks of ten trials conducted on the third thru fifth day.

Orientation

Subjects reported to the Center for The Study of Human performance where the requirements for participation were explained and a informed consent was signed (See Appendix A). Subjects then completed a brief background questionnaire similar to the background questionnaire (see Appendix B) used

by Weinberg and his associates (1991). After completing the questionnaire, the subject was given a putter and golf balls. The subject was asked to putt a golf ball across a putting surface a total of ten times from a distance of six feet. Each subject was allowed three practice putts before each block. Subjects were told that these putts were to allow them to become familiar with the task. How a subject performed on the first ten putts determined the final distance from which the subject putted for the remainder of the experiment. Subjects who made between 8-10 putts were assigned to putt from eight feet. Subjects who made between 4-7 putts were assigned to putt from a distance of seven feet. Subjects who only made between zero and three shots from six feet were assigned to putt from a distance of 5 feet (this method of assignment is similar to the procedures of Woolfolk, Parrish, and Murphy, 1985, and Woolfolk, Murphy, Gottesfeld, and Aitkens, 1985 and Murphy and Woolfolk, 1987). After the subject was assigned to the appropriate putting distance, the subject performed a basal measure of twenty putts from their assigned distances. After completion of the twenty putts the subjects were thanked (See Table 1 for summary). Subjects were then randomly assigned to either the PI group, PA group, PC group or the NPC group. Following random assignment, experimental exposure (See Tables 2 and 3) was given to the experimental subjects and no exposure was given to the control subjects on the second day. The second through fifth day of the experiment consisted of the educational exposure phase and the skill specific exposure phase for the experimental condition, and then two blocks of ten putts each (See Tables 5 and 6). The practice control group did not receive an exposure phase but performed two blocks of ten putts each on the second thru fifth day (See Table 4). The no practice control group also did not receive an exposure phase, but performed two blocks of ten putts on the last day (See Table 4). Upon completion of the

experiment on each data collection day, experimental subjects completed a post-experimental questionnaire which addressed whether or not they actually used the mental preparation strategy before they putted the golf ball.

Table 1

Summary Table for Day 1

Day One (Same For All Groups)
1. Sign informed consent form and explain requirements of the students
2. Complete Background questionnaire
3. Perform prebaseline performance task
4. Rest one minute, and assign subject to putting distance
5. Perform ten putts from assigned putting distance using no assigned mental preparation strategy
6. Rest one minute
7. Perform ten putts form assigned putting distance using no assigned mental preparation strategy

Table 2

Summary for Preperformance Imagery Group on Day 2

Group Session (PI) Lesson Plan (Day 2)
1.Watch videotape (Visualization: What You See is What You Get).
2. Group discussion
3. Guided general imagery exercises
4. Guided skill specific imagery
5. Putting with imagery strategy

Table 3

Summary for Preperformance Affirmation Group on Day 2

Group Session (PA) Lesson Plan (Day 2)
1.Watch Videotape
2. Group Discussion
3. General affirmation exercises
4. Guided skill specific affirmations
5. Putting with affirmation strategy

Table 4

Summary for NPC on Day 2 and PC on Day 2-5

Control Group (PC) (Day 2-5) and No Practice Contol Group (NPC)(Day 2)
1. Subjects reminded that we are testing the effects of repeated practice on a task
2. Ten putts using no assigned mental preparation strategy
3. Rest 1 minute
4. Ten putts using no assigned mental preparation strategy

Table 5

Summary for Preperformance Imagery Group on Day 3 -6

PI Group (Day 3-6))
1. Review imagery education- have subjects reread
2. Practice guided skill specific imagery
3. Remind Subjects to use imagery before each putt
4. Ten putts using imagery strategy
5. Rest 1 minute
6. Ten putts using imagery strategy
7. Subjects completed post experimental questions

Table 6

Summary for Preperformance Affirmation Group on Day 3 -6

PA Group Day 3-6

1. Review affirmation education- have subjects reread
2. Reread skill specific affirmations
3. Remind Subjects to use affirmations before each putt
4. Ten putts using affirmation strategy
5. Rest 1 minute
6. Ten putts using affirmation strategy
7. Subjects completed post experimental questions

Experimental Phase

After the educational sessions, subjects in the PI group were told to imagine themselves before each shot making a "gentle but firm back swing" and stroking the putt straight towards the hole. Then they were told "to imagine the ball rolling, rolling, right into the cup." They were told to employ their strategy before each subsequent putt. The PA group were told to tell themselves before every putt that they are a good putter and could succeed at this putting task. They then were told to employ their strategy before every putt. As in the baseline condition each subject was given three practice putts before every block of ten. Each subject completed three practice putts and the ten performance putts. Subjects were given one minute to rest, and then the

sequence was repeated. This identical experimental session was conducted on the third through fifth days. At the end of the tenth block on the fifth day the experimenter thanked the subject, and asked the subjects to indicate where the results of the test should be sent.

Control Phase

The identical procedure was used with the control group. However, subjects did not receive educational sessions and were not instructed to use a mental preparation strategy before each putt. Subjects in the control condition were instructed to try and sink each putt. They were also informed that they were participating in the study to examine the effects on performance of repeated practice on a task.

Educational Phase for (PI)

The imagery group received an educational exposure (see Appendix C), basic imagery exposure(see Appendix D), and skill specific imagery exposure (see Appendix E), on the second day, which lasted a total of thirty minutes. On the third through sixth day of the experiment the PI group reread the educational exposure section. The skill specific exposure was read to the subjects on the third through sixth day.

Educational Phase for (PA)

The affirmation group received an educational exposure (see Appendix E), basic affirmation exposure (see Appendix F), and skill specific affirmation exposure (see Appendix G), on the second day, which lasted a total of twenty minutes. On the third through sixth day of the experiment the PA group reread the educational exposure section. The skill specific exposure was read by the subjects on the third thru sixth day.

Post Experimental Questionnaire and Assessment

Immediately following the final trial subjects in the experimental groups were asked questions pertaining to the experiment (a copy of the questionnaire can be found in Appendix H). The first question asked was a manipulation check to decipher how often and whether or not the participant used the psyching up technique they were instructed to use. This question was as follows, "What percentage of the time did you use the mental preparation strategy presented to you on a scale from 0 -100%. The remaining questions were asked to explore whether the technique was effective. Following the written questionnaire, verbal assessments of the imagery group were asked on the last day of the experiment. The imagery group was asked in an exploratory nature to explain what they saw directly before performance.

Debriefing

After completing the post experimental questionnaire the subjects in the experimental conditions were debriefed. Subjects in the control groups were debriefed as soon as the last trial of the experimental testing was completed on the last day. For a copy of what was read to the subjects during the debriefing (see Appendix I).

Treatment of Data

A 4X2 (GroupXPre/Post) analysis of variance was performed with repeated measures on the last factor, to test the hypotheses that: (a) there will be a statistically significant difference between the performance scores of the PI, PA, PC, NPC (b) there will be no significant differences between the performance scores of the PI group and the PA group (c) there will be statistically significant differences between pre and post performance scores for the PI group, PA group, and the PC groups (d) there will be no statistically significant differences between pre and post performance scores for the NPC

group. A one way analysis of variance using the newman keuls post hoc analysis was conducted to decipher which groups significantly differed from each other on the post test.

A 4X2 (GroupXPre/Post) analysis of variance was performed with repeated measures on the last factor, to test the hypotheses that: (a) there will be a statistically significant difference between the accuracy scores of the PI, PA, PC, and NPC groups (b) there will be no significant differences between the accuracy scores of the PI group and the PA group (c) there will be statistically significant differences between pre and post accuracy scores for the PI group, PA group, and the PC groups (d) there will be no statistically significant differences between pre and post accuracy scores for the NPC group.

Chapter IV

Results and Discussion

The results are presented in four sections. Section one covers the background information for subjects in the experiment. The second section pertains to the golf putting performance results. The third section pertains to the golf putting accuracy results. Finally, the fourth section presents the results of the post-experimental questionnaire.

A 4 X 2 (groups X Pre/Post) analysis of variance with repeated measures on the last factor was employed to analyze the data for main and interaction effects. The criterion for all analyses performed was $p < .05$.

Demographic Information

The results from the pre-experimental questionnaire revealed that the average age of the subjects in this study were M= 19.55. Of the 40 Subjects, 9 were females, and 31 were males. Thirteen subjects described themselves as novices, 20 described themselves as intermediate, and 7 described their golfing ability as never played. In response to the question , "Have you ever been taught a mental preparation technique to improve sports performance? ", 14 subjects answered yes, while the 26 responded that they have never used or been taught a mental preparation technique to improve sports performance. Of the fourteen that answered Yes, not one of the subjects had ever been taught a mental preparation technique specifically for golf performance. In response to the question, "have you taken any golf classes at MSU, only 1 out of 40 subjects had, and the one subject took the intermediate class. Of the 40 subjects, 24 owned their own clubs, while only 4 of them played on their high school team for an average of one year. Only 2 of the 40 subjects responded that they had participated in a city league or scramble. Five of the 40 subjects

answered yes in response to the question "Have you ever received private instruction from a golf teaching professional?".

Performance Results

After the subjects were randomly assigned to groups a one-way analysis of variance was conducted to test if the group performance means on the basal measure differed by a significant amount. Results of the analysis of variance were not significant, $F(3,36) = .8015$, $p < .5012$ (see Figure 1).

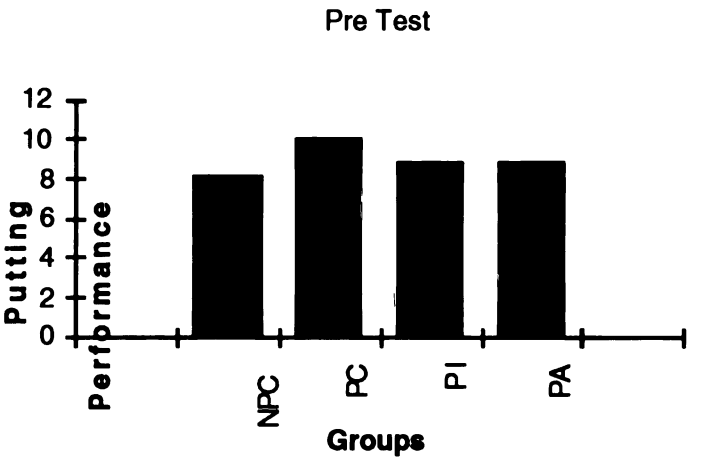

Figure 1. Mean Baseline Performance Scores of the No Practice Control Group(NPC), Practice Control Group (PC) ,Preperformance Imagery Group (PI), and the Preperformance Affirmation Group (PA)..

To test performance results a 4X2 (Groups by pre-post) analysis of variance with repeated measures on the last factor was conducted. Results revealed a significant main effect, $F(3,36) = 7.5$, $p \leq .001$. Therefore, a one way anova using the newman keuls post hoc analysis was conducted. Results revealed a

significant effect, $p<.001$, with the PI group, PA group, and PC group all significantly different from the NPC group. Results did not reveal a significant group by pre/post interaction effect, $F(3,36) = 2.36$, $p< .088$. The means and standard deviations for the pre/post scores for the PI, PA, PC, NPC, are presented in table 7 and graphically represented in Figure 2 (See Appendix J for performance means and standard deviations for all groups). The group by pre/post performance interaction is graphically represented in figure 3.

Table 7

Means and Standard Deviations for the Pre/Post Performance Scores for the PI, PA, PC, NPC.

	Pretest		Post-test	
	M	SD	M	SD
PI	8.9	2.183	13.7	2.627
PA	8.9	1.912	13.4	3.204
PC	10.1	2.079	13.4	2.413
NPC	8.2	1.874	9.0	3.232

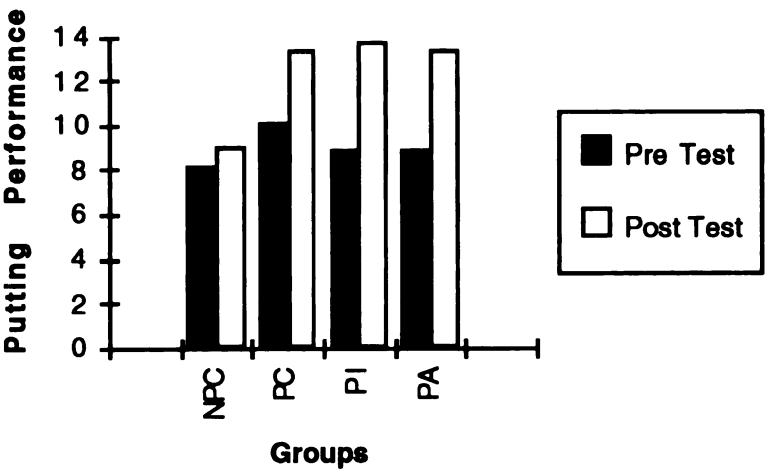

Figure 2. The Performance Means of the NPC, PC, PI, and PA Groups from Pre to Post Test

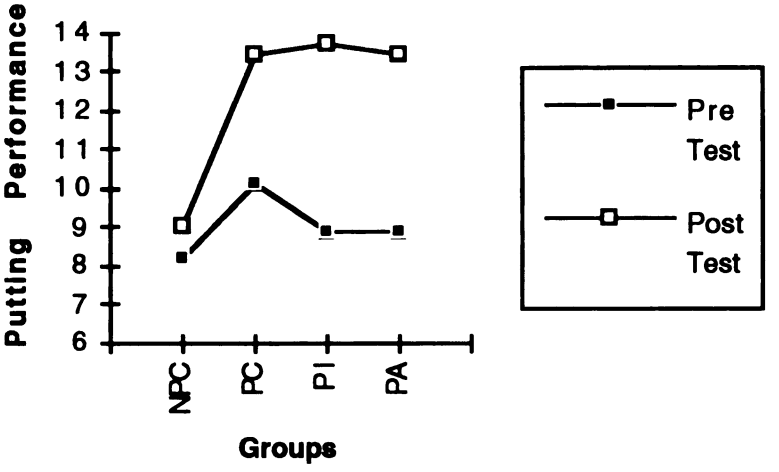

Figure 3. The Interaction of Groups by Pre/Post Performance for All Groups

In summary, the PI, PA, and PC groups improved performance significantly more than the NPC groups. The results of the group by pre/post interaction revealed that the NPC, PC, PI, and PA groups did not significantly improve their scores from pre to post test. In conclusion, there was a significant difference in performance between the NPC, PI, PA, and PC with the PI, PA, and PC groups improving significantly more then the NPC on the post test.

Accuracy Results

A one-way analysis of variance was conducted to test whether or not the group accuracy means on the baseline measure differed by a significant amount. Results of the analysis of variance were not significant, $F(3,36) = .8015$ $p < .5012$. Therefore, further analyses using repeated measures were conducted. To test accuracy results a 4X2 (Groups by pre/post) analysis of variance with repeated measures on the last factor was conducted. Results did not reveal a significant main effect for groups, $F(3,36) = 1.61$ $p < .203$. Results also did not reveal a significant group by pre/post interaction, $F(3,36) = 2.11$ $p < .116$..The means and standard deviations for the pre/post accuracy scores for the PI, PA, PC, NPC, are presented in table 12, and the performance means from pre to post test are graphically represented in figure 7(See Appendix J for accuracy means and standard deviations for all groups). The group by pre/post accuracy interaction is graphically represented in figure 5.

Table 8

Means and Standard Deviations for the Pre/Post Accuracy scores for the PI, PA, PC, and NPC groups.

	Pretest		Post-test	
	M	SD	M	SD
PI	31.4	9.38	15.4	6.518
PA	36.3	9.38	17.3	8.512
PC	30.0	12.01	19.1	10.214
NPC	33.4	7.23	26.2	7.983

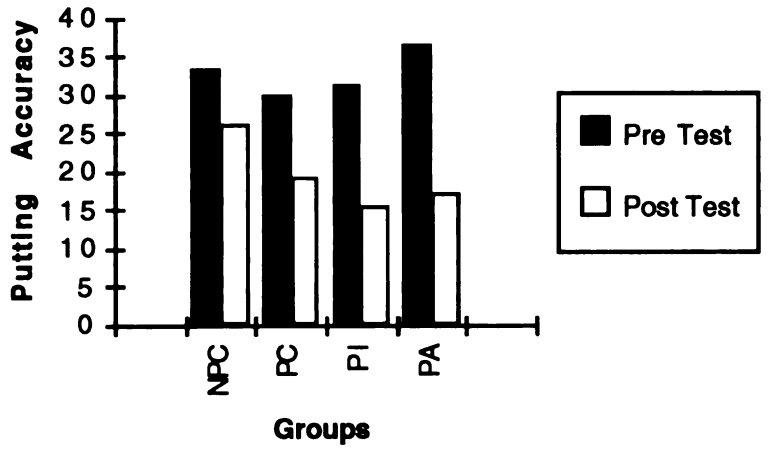

Figure 4. The Accuracy Mean Scores of the NPC, PC, PI, and PA Groups From Pre to Post Test

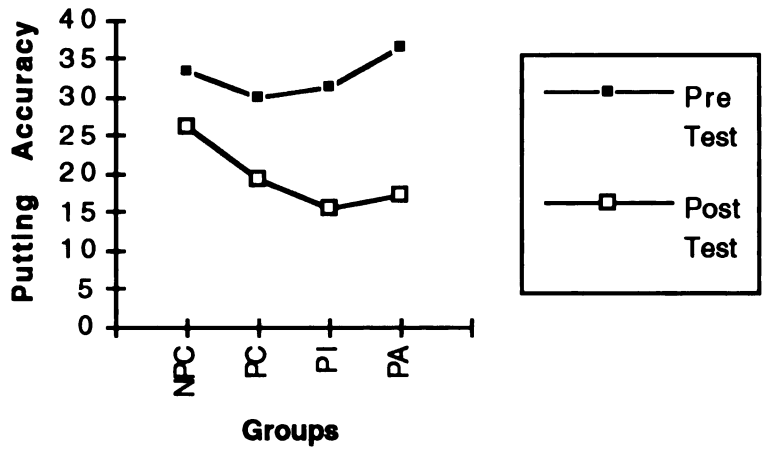

Figure 5. The Interaction of Groups by Pre/Post Accuracy for All Groups

In summary, the PI, PA, and PC groups did not improve accuracy significantly more than the NPC groups. The results of pre/post interaction revealed that the NPC, PC, PI, and PA groups did not significantly improve their accuracy scores from pre to post test. In conclusion, there was not a significant difference in performance between the NPC, PI, PA, and PC in terms of accuracy.

Post-Experimental Manipulation Check for Strategy Use

Two manipulation questions were asked of the experimental groups at the end of each experimental question. Question one asked the subject how often they used the mental preparation strategy presented to them, and question two asked the subjects if they believed in the ability of this mental preparation strategy to improve performance. Results of the day by day manipulation checks for strategy use are shown in Table 9.

Table 9

Percentage of Time the Preperformance Imagery Group and Preperformance Affirmation Group Reported Using Given Strategy

Group	day 2	day3	day 4	day 5
PI	88	77	76	86
PA	89.5	81	89	74

Results of asking the subjects if they believed the strategy was helpful in improving performance are as follows. Ninety percent of subjects in the PA group answered that the strategy was helpful in improving performance on the first day, as compared to 100% of the subjects in the PI group. On the second through fifth day of putting 100% of the subjects in both groups answered that the strategy was helpful in improving performance (see Figure 6).

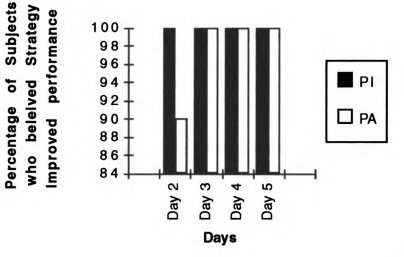

Figure 6. Percentage of Subjects Who Believed the Strategy Helped Improve Performance

Responses To The Imagery Probe

Subjects in this study answered open ended questions about how they used imagery. Table 10 is a summary of their responses.

Table 10

Responses to the Imagery Questions

It helped me concentrate, know what I was planning, it helps to relax, I saw myself and it helped my confidence. The images were clear.

Basically I kind of thought with my breathing. When I inhaled it was like I was going back, and when I exhaled it was like I was going forward. That's what I saw and I did that and then visualized it going toward the thing. It was not hard to visualize.

Sometimes if I closed my eyes I could see myself do the actual putting. If I didn't it was more of feeling the motion. That seemed to work best, and I could hear it always hitting the little metal thing. So I thought it kind of helped me. It wasn't necessarily seeing it but more of feeling it. The hands went straight back. It works if you concentrate on it.

Well when I walked up I actually pictured myself actually playing my friends, pictured myself on the green like when we play for money, and I pictured myself beating them. I could really hear the two sounds like the ball hitting the putter, and the I heard the metal when the ball went into the hole. I wasn't really aware of anything around me and seemed really focused.

I saw myself bringing the putter back, not to firm and holding the putter nice and gentle in my hands. If I pushed or pulled the previous one I would always try to see the ball going straight, I could always hear the ball hitting the aluminum cup.

I saw myself holding the putter and taking it back and hitting the shot and once I actually did it I thought I could get myself into a zone and just keep doing it even if I missed, I would try to erase this shot and keep trying until I found the perfect shot. I didn't have to do it every time. Doing it once or twice, once if I made it I would keep going like if I made three in a row, but if I missed I would replay it.

I mainly concentrated on bringing the putter straight back and hitting the back of the ball.

I saw myself taking the backswing hitting the ball, and seeing the ball roll into the hole. The images were vivid, I could see it clear. I saw myself from outside my body.

I saw myself putting the ball, more I saw the putter going back and imagined the ball rolling straight toward the target. I didn't see myself, I felt the motion, and I saw the ball and concentrated on the ball.

I first imagined what I saw in front of my face, which was that aluminum cup and the ball below me, and the putter looking down but in my mind it was like the putt in progress. The wing contacted the ball and the ball rolling into the cup regardless if I made or missed the shot before. I basically tried to get a feel of how I did it in my mind, and then just let go and did it without thinking.

Self-Confidence. Subjects in the study reported feelings of confidence while putting the golf ball. The statement by one subject portrays the image of confidence, "It helped me concentrate, know what I was planning, it helps me to relax, and it helped my confidence." Another subject said, "I thought I could get myself into a zone, and just keep doing it even if I missed."

Kinesthetic Imagery. Subjects reported using feeling oriented imagery. One subject stated, "Sometimes if I closed my eyes I could see myself do the actual putting. If I didn't it was more of feeling the motion. That seemed to work best." Others stated, " I didn't see myself, I felt the motion." "I basically tried to get a feel of how I did it in my mind and then just let go and did it without thinking."

Visual Imagery. The subjects reported seeing the ball roll into the hole. For example, one subject stated, " I could really hear the two sounds like the ball hitting the putter, and I heard the metal when the ball went into the hole."

External Imagery. A few subjects seemed to experience the imagery from a perspective of seeing their own body perform the putting task. This is best exemplified by the following quote, " I saw myself taking the backswing, hitting the ball, and seeing the ball roll into the hole. The images were vivid, I could see it clear, I saw it from outside my body.

Internal Imagery. A few subjects seemed to experience the imagery from a perspective internally, as if they were seeing the putting task as if it were actually happening. This is best exemplified by the following quote, " I first imagined what I saw in front of my face, which was that aluminum cup and the ball below me, and the putter looking down, but in my mind it was like the putt in progress."

Discussion

The main purpose of this study was to compare the effectiveness of using a mental preparation strategy (i.e, preperformance positive imagery, preperformance positive affirmations) in improving golf putting performance and accuracy over a no practice control group and practice control group. Additionally, an attempt was made to study the effects of using an educational phase, general phase and specific phase on adherence to using the strategy, and belief in the mental preparation strategy to help improve performance.

Results of the study showed that the preperformance imagery group (PI) and the preperformance affirmation group (PA) group did not improve significantly on either of the two measures when compared to a practice control group who was not given a strategy to use. As expected, both mental preparation groups did improve performance significantly when compared to a no practice control group who only putted on the first and last days. In general the hypotheses stated in Chapter I have been partially supported.

The discussion section of this chapter will be presented in three sections. The first section will describe the analysis on the performance and accuracy measures for the golf putting task. The second section will analyze and describe the results of the post-experimental questionnaire and the manipulation checks. Finally the third section will present a general discussion of the findings.

Performance and Accuracy Measures For the Putting Task

The first hypotheses in this study predicted that there will be a statistically significant difference between pre and post performance scores for the PI, PA, and the PC groups. After analyzing the results the analysis did not support this hypotheses. Although nonsignificant, the PI group improved from an

average of 8.9 putts made to an average of 13.7 putts made on the last day. The PA group improved from an average of 8.9 putts on the first day to an average of 13.4 putts on the last day. These results are not consistent with past research (Caudill & Weinberg, 1983; Weinberg, Smith, Jackson, & Gould, 1984; Weinberg, Jackson, Seabourne, 1985; Wilkes & Summers, 1984; Woolfolk, Parrish, & Murphy, 1985) in which the imagery or positive affirmation group improved their performance from pre to post test. However, these results are in accordance with past research (Epstein, 1980; Weinberg, Gould, Jackson, & Barnes, 1980; Woolfolk, Parrish, Gottsfeld, & Aitken,1985) that has found imagery or affirmations to not lead to statistically significant differences between pre and post performance scores.

The data partially supported the hypothesis that there would be a statistically significant difference between the scores of the PI, PA, PC, and NPC groups with the PI, and PA groups having higher post test performance scores than the PC and NPC groups. Findings showed that the PI, and PA groups improved significantly greater than the NPC group, but not better than the PC group. This finding however is not in accordance with the Woolfolk, Parrish, and Murphy (1985) study which found that the mental preparation strategy group improved significantly greater than a practice control group which putted on all six days. However, the finding that the preperformance mental preparation groups did not significantly improve performance as compared to a practice control group in this study do concur with past research (Epstein, 1980; Weinberg, Gould, Jackson, & Barnes, 1980; Woolfolk, Parrish, Gottsfeld, & Aitken,1985) Although the PI and PA groups did not improve performance significantly over the practice control group it should be noted that on average from pre/post test the imagery group and the

affirmation group improved more than the PC group on performance measures.

The first two exploratory hypotheses in this study that there will be a statistically significant difference between pre and post accuracy scores for the PI, PA, and the PC groups. After analyzing the results the analysis did not support this hypotheses. The PI group improved an average of 31.4 to an average of 15.4 the last day. The PA group improved from an average of 36.3 the first day to an average of 17.3 on the last day.

The data did not support the hypothesis that there will be a statistically significant difference between the accuracy scores of the PI, PA, PC, and NPC groups with the PI group, and PA groups having higher accuracy scores than the PC and NPC groups. Although these hypotheses were not supported at a significant level it should be noted that on average from pre/post test the imagery group and the affirmation group improved more than the PC or NPC on accuracy measures.

Subjects using preperformance imagery and preperformance affirmations, although showing the best overall average improvement across the five blocks, did not improve their scores significantly when compared to a practice control group over five days. Explanations are offered to describe this finding by looking at the past results of the studies most similar.

The performance and accuracy results of the present study do not exactly replicate the findings of the Woolfolk, Parrish, & Murphy (1985) study that showed a preperformance mental preparation strategy did significantly better than a control group from pre/post test. Although it is difficult to explain why there are discrepancies in the results of the two studies, they both offer minimal support to the belief that a positive image or thought immediately prior to performance is associated with performance enhancement.

One possible explanation for the discrepancy in results is that the practice control group improved a great deal more in the present study than the former study. A reason for the improvement of the practice control group may have been that the numbers of trials in the present study were much greater. The present study conducted 40 more trials than the 1985 study which may have allowed the main predictor of self-efficacy in Bandura's theory to have taken place. By having practiced so much, the practice control group may have started to feel more positive and hence through performance accomplishments of repeated practice, improved performance almost as much as the PI, and PA groups. However, failure to directly assess the practice control's possible self-initiated mental preparation in this study was a weakness and should be assessed in future studies of this nature. It was apparent from a few subjects in the practice control group that they were using both positive and negative affirmations. Occasionally, subjects in the practice control group made statements such as, "damn I missed", or "UMMph", or "C'mon I can make this shot." Although there was a failure in this study to assess the self-initiated cognitive techniques employed by the practice control group, this was not the major concern of this investigation. Of major concern was whether subjects in the PI, and PA groups improved performance, and whether they believed the mental preparation strategies helped them improve performance.

Belief in the Mental Preparation Strategy

Many factors have been studied when trying to test if psyching up improves performance or to explain findings. Most studies have found inconsistent results, however elite athletes continue to give reports of using psyching up strategies to enhance performance. Vealey (1986) has suggested that imagery and mental preparation strategies have a better chance to be

successful if the subjects or athletes believe that these strategies will help them. In testing this suggestion an educational phase was used based on the suggestions of Vealey (1986).

The present study was unique from other psyching up studies in that it included an educational phase for the PI and PA groups to persuade subjects to believe that this strategy could help them improve their performance. Before each experimental session subjects read an informative 2 page persuasive essay suggesting that the mental preparation strategy improves performance. The present investigation found that the subjects reported that they believed in the mental preparation strategies ability to help improve performance. Results of the physical dependent measures support that the contention that belief in mental preparation will be associated with enhanced performance. However, this strategy and belief in the strategy was not helpful in producing significantly higher performance and accuracy scores than the NPC and PC groups.

One possible explanation for these findings may have been due to the fact that these techniques were perceived as different and strange. Subjects may have remained skeptical throughout the experiment even though they stated that they believed that these techniques were helpful in improving performance. In addition, subjects did not have a choice of choosing another strategy, even if they felt that it helped improve performance. Subjects were not able to choose another strategy that may have been more effective for them to use based on individual and personal style. One note of importance is the percent of time the subjects used the strategy taught to them. Subjects for the most part used the strategy most of the time. This, indicated that subjects believed that the strategy may have been helping them improve their performance.

Responses to the Imagery Questions

Self-Confidence. Many of authors have suggested that self-confidence is one of the most important aspects of excellence in sport (Feltz, 1988; Highlen & Bennett, 1979, 1983; Mahoney & Avener, 1977). Only a few golfers reported associating the imagery strategy with self-confidence. However, of importance in Bandura's Self-Efficacy Theory (1977) is whether imagery strategies can vicariously create heightened confidence. Future research should carefully decipher if confidence is heightened by using imagery as a preperformance mental preparation strategy. The results of imagery probe in this study would suggest that imagery may heighten confidence for some subject and not for others.

Kinesthetic Imagery. Many of the subjects reported that they used more of a feeling oriented imagery instead of visualizing or seeing anything. The imagery literature documents the benefits of using this type of imagery (Martens, 1987; Orlick, 1990). It is believed that this imagery may be related greatly to the psychoneuromuscular hypothesis. Future studies should ask subjects about feeling oriented imagery so that we can begin to understand the processes of this type of imagery.

Positive Imagery. Subjects all seemed to be able to use imagery either kinesthetically or visually. Also, the subjects focus seemed to be on the ball rolling into the hole. This shows that the subjects focused on what they were persuaded to focus on. However, future studies should decipher if the subjects would focus on the ball rolling into the hole if they were not told to do this.

Imagery Perspective. Subjects visualized using both perspectives. They seemed to choose a perspective based on personal preference. Studies have been equivocal on whether one perspective is better than another (Murphy & Jowdy, 1992).

General discussion

The data from this experiment minimally support the belief that using a mental preparation strategy can improve performance over time. Furthermore, the results support prior lab research (Woolfolk, Parrish, and Murphy, 1985, Wilkes & Summers, 1984) and anecdotal literature that say that positive thinking and positive imagery can help aid in improving closed motor skills. Also, the present research is consistent with Weinberg, Gould, Jackson, & Barnes (1980) who found that mental preparation including imagery and positive affirmation statements did not improve performance of beginning and advanced tennis players significantly over the control condition.

A possible explanation to explain why significant results over the practice control group did not occur may be that using mental preparation techniques is task specific and only seems to show significant improvement over a control group in strength tasks (Shelton & Mahoney, 1978; Weinberg, Gould, & Jackson, 1980).

Because the golf putting task is not a strength task and requires accuracy and precision, it may have been difficult to show immediate positive effects of using affirmations and imagery over a practice control group. However using those strategies may have been laying the groundwork for future success. It was thought that five days would be long enough to show an effect for golf putting because of the results of a previous study (Woolfolk, Parrish, & Murphy, 1985). However, affirmations and imagery may work best for causing immediate effects for strength tasks such as those done in recent lab studies (Wilkes & Summers, 1984; Tynnes & McFatter, 1987).

Another general possible explanation for not finding performance and accuracy results significantly better than the practice control group could have been that subjects did not have enough practice in using the technique.

Weinberg, Gould, Jackson, and Barnes (1980) suggested that practicing a strategy may be more advantageous than just telling subjects to use various cognitive strategies. It could be that for a cognitive strategy to be effective, considerable practice may be needed. Because of this, the present study introduced an educational, general, and specific phase to the experimental group based on the suggestions of previous researchers (Vealey, 1986; Weinberg, Gould, Jackson, & Barnes, 1980). In the present study it was thought that enough education and practice was given to the experimental group since the Woolfolk, Parrish, & Murphy (1985) study did not have these phases, and were still able to show significant improvement. From a psychological standpoint the educational exposure was long enough to persuade subjects to believe the cognitive technique was helpful in improving performance. However, from a physical standpoint more general and specific training may be needed than what was given in the present study.

Because all practice groups improved performance over days, instructors and golfers may want to reevaluate strategies used in putting. It seems that subjects similar to the ones in this study can improve performance by utilizing a mental preparation strategy or through continued practice. Typically, instructors say that practice makes perfect and that the traditional thought on how to improve is repetition. However, a new philosophy is to use mental preparation. Although one strategy may not lead to better results in a lab setting over five days, the fact that subjects in the experimental group believed they could make the putt is very important from a practical standpoint. For example, when subjects have a pressure putt, if they use imagery or self-talk it may feel automatic and they may have a better chance than just putting and letting fear disrupt the effortlessness of the putt.

Considering the results of this study, using imagery and positive affirmations may not be for everybody. However, we should educate learners about these techniques. Golfers may not need to be told how to think, although the results of the study do not show that it hurts performance. Instructors should present golfers with the mental strategy but not force them to use it.

In summary, the data analysis seem to show that preperformance imagery and preperformance affirmations can be considered a useful adjunct to helping improve performance. Also, equally effective was the practice group in which the subjects were not instructed to use a mental practice strategy. Therefore, these techniques should be offered to novices and let them choose the one that they enjoy most.

Chapter V

Summary, Conclusions, and Suggestions For Future Study

The overall purpose of this study was to compare the effectiveness of using preperformance mental preparation strategies in order to enhance performance and accuracy over a practice control group and a no practice control group in a closed motor skill. Specifically, the four groups included a no practice control group, a practice control group, a preperformance imagery group and a preperformance positive affirmation group. An experiment using the golf putting task was used. The data helped add to an understanding of the utilization of mental preparation strategies.

The present study investigated the effects of using preperformance mental preparation strategies in order to enhance performance and accuracy over a practice control group and a no practice control group in a closed motor skill. Subjects in the study were 40 introductory psychology students who participated in the experiment for course credit. The 40 subjects all performed the basal measure on the golf putting task and were then randomly assigned to one of four groups, a no practice control group (NPC), a practice control group (PI), a preperformance positive affirmation group (PA), and preperformance positive imagery group (PI). The PA and PI groups were then given a group session in which they were shown videos about their strategy, and presented with general exercises introducing them to the strategy they were to use. The PC and NPC were not given a group session. On the second through fifth day of putting the PC group putted twenty shots without being instructed to use a mental preparation strategy. The NPC only putted one more session of twenty putts without being instructed to use a mental preparation strategy. The PI

and the PA groups, on the second through fifth day of putting were instructed to use their assigned mental preparation strategy. The PI and PA groups following each day filled out manipulation strategy checks to assess how often they used the strategy and whether or not they believed the strategy helped them improve performance.

Results of the present study revealed that the PI, PA, PC and NPC, did not improve performance and accuracy from pre to post test at a significant level. Also, the PI, PA, PC were found to be significantly different from the NPC pre to post test in performance measures, but not in accuracy measures. However no differences between the PI, PA, and PC groups were found. Possible explanations for the PI, and PA groups not improving at a statistically significant level over the PC group may be that not enough practice of the mental preparation strategy was given to the PI, and PA, and also maybe mental preparation is most effective when a strength task is used as the task for the dependent measure. Of importance in this study is that the subjects in both experimental groups believed that the mental preparation strategy was helpful in improving performance, possibly indicating that the educational exposure manipulation was successful.

Conclusions

Based on the findings of this study with regard to the research hypotheses, the following conclusions are made:

1. Preperformance imagery and preperformance affirmations may aid in enhancing the performance of the golf putting task,over a group that does not practice.

2. Practice over five days may aid in enhancing the performance of the golf putting task, over a group that does not practice the task.

3. Subjects believed that the mental preparation strategies were helpful in improving golf putting performance.

4. Among the PC, PI, PA groups, all were equally effective in enhancing the performance of the golf putting task.

5. No support was provided to show that mental preparation strategies significantly increased performance and accuracy over a control group that physically practiced the same amount of days.

Suggestions For Future Study

The findings of the present study seem to warrant these following suggestions for future study.

1. One research direction in this area should probably be to further examine what type of intervention elicits performance improvement over a practice control group.

2. Of interest would be a study in which subjects are screened for both motivational factors and belief in the mental preparation strategy to help improve performance.

3. In order to test if psyching up performance measures are task specific, as this study may suggest, two tasks for each group could be used, to further address this question.

4. A future suggestion in the next study is to have one group read the persuasive literature everyday and have another group using the same intervention not read the persuasive literature. This could possibly test how important it is for subjects to believe in the mental preparation strategy that they are using. It would be hypothesized that the persuasive literature with intervention groups would have a higher belief in the mental preparation strategy due to the mere exposure effect.

5. In accordance with many of the researchers in motor learning and sport psychology, the next step in this type of research is to use athletes who are participating in junior golf, high school golf, or college golf in an applied field setting. Therefore, researchers would begin to understand how using these techniques affect advanced, motivated golfers. Questions that could be considered are would the strategy disrupt the normal routine of an advanced player? Would these players find these strategies as helpful as those in this study who were less advanced players.

6. Finally, what is of major need is a longitudinal study in which mental preparation strategies are used to determine psychological and physical effects. A longer study will allow for teaching and learning of the strategy in great detail.

Appendix A

Informed Consent

I give my informed consent to participate in this study of how psychological techniques influence sport performance. I agree to the publication of the results of this study as long as the information is kept confidential so that no individual identification can be made. I also understand that a record will be kept of my having participated in the experiment, but my individual data of having participated will only be able to be identified by number only.

(1) I have been informed that my participation in this experiment will involve using a psychological process before golf putting.

(2) I have been informed that the general purpose of this experiment is to investigate how participants use psychological techniques in performing sport skills.

(3) I have been informed that there are no known risks or discomforts involved in my participation in this experiment.

(4) I have been told that there are no "disguised" procedures in this experiment. Procedures in this study can be taken at face value.

(5) I have been informed that the investigator will take the time to answer any questions about the procedures, at any point in the testing session.

(6) I have been informed that at any time I am free to discontinue my participation at any time during the experiment.

If you have any concerns about any procedures or aspects of the study, you are referred to the UCRIHS Committee, 232 Administration Building, Michigan State University.

_____ _____

(experimenter signature) (participant signature and date)

Appendix B

Background Questionnaire

Directions: Please complete the following background questions to the best of your ability:

1. Age: _____
2. Sex: _____ m _____ f
3. Please circle the following statement which best describes your golf putting ability:
   novice intermediate advanced
4. Have you ever used or been taught any mental preparation techniques to improve sports performance.
   _____ Yes _____ No
5. Have you taken golf classes at MSU? _____Yes _____ NO
   If Yes, _____ beginner _____ intermediate
6. Do you own your own golf clubs? _____Yes _____NO
7. Did you play on a golf team in high school? _____Yes _____NO
   If yes How many years _____., avg. score, Handicap
8. Have you played in golf tournaments _____Yes _____NO
9. Have you had private golf instruction lessons from a Professional? _____ Yes _____No

Thank you for completing the questionnaire.

Appendix C

Introducing Imagery To The Participants

What is imagery? Imagery is using your imagination to rehearse something in your mind. For example, you may have had the experience of making an important phone call that you were scared to make. Before you actually made the phone call you rehearsed what you were going to say. Another imagery experience may have been when someone asked you for directions. When giving the directions you may have imagined yourself driving the route. Or before putting a golf ball you may have imagined a putt falling in to the hole. Imagery is rehearsal in your mind of a skill you are about to perform. You may be asking well then how do we know that imagery works. The evidence is outstanding. Great athletes speak of using imagery to obtain optimal levels of performance. Dwight Stones a three time Olympian high jumper used imagery before every jump. Many other athletes have used imagery in athletics. Such famous athletes as Fran Tarkenton, Chris Evert, Dick Fosburry, and O.J. Simpson all say they have used imagery to improve their performance.

You may be wondering if any famous golfers have used the skill of imagery. The answer is clearly yes. Many of today's top professionals use this technique to obtain great performance. Jack Nicklaus is probably the most famous athlete to attest to using imagery before every shot he ever hit in golf. He described imagery as going to the movies before every shot. Nicklaus says that before every shot he sees were the ball is to finish, secondly he sees the ball roll or fly to the intended target, and finally, he imagines the swing that will get him the intended results. You are probably wondering how we know that imagery works. Imagery works because your muscles cannot distinguish between something that actually occurred and something that is imagined.

Therefore, if you imagine putting the golf ball before putting you are actually building the correct mental machine to perform the skill. As a result of imaging the putt, our strokes become more fluid and automatic.

Why should you use Imagery.

Golfers of all ability should use imagery before every putt for three reasons (1) Imagery builds a mental machine and helps the stoke become fluid and automatic, (2) Imagery improves concentration (by visualizing yourself making a putt prior to attempting it). You are in a sense stopping your mind from wandering and thinking irrelevant thoughts, (3) Using imagery before putting builds self-confidence in your putting stroke. You must remember that imagery is not magic. It is a skill that must be practiced to be effective. Using imagery before every putt will give you a better chance to make each putt.

Appendix D

Basic Imagery Exposure Exercises

It is important to understand the formation of using basic images before using imagery in sport. There are two components of imagery we are now going to practice. The first component is vividness, and the second component is controllability.

Imagery Vividness Exposure

The following exercise is taken from Vealey (1986).

Exercise 1

Pick a close friend or someone that you are around quite often. Have the person sit in a chair in front of you. Try to get a sharp image of the person. Try to visualize the details of the person: facial features, body build, mannerisms, clothes, etc.

Now imagine that person talking. Still focusing on the person's face, try to hear his or hear voice. Imagine all of the person's facial expressions as he or she talks.

Think about how you feel about the person. Try to recreate the emotions you feel toward him or her whether they be warm friendship, deep love, or admiration and respect.

The following exercises were taken from Bump (1989).

Exercise two

"Think back to the bedroom you had when you were 12 years old. Do you know what it looked like. Create a picture in your mind's eye of that bedroom. You are standing in the doorway looking in. Notice the color of the walls...and see the floor. Focus on the texture and color of the floor covering. Now step into your room and look around. See your dresser, you desk, the chair, and the windows; see the pictures and all of your favorite things. Now focus on your

bed. Notice the wood finish. The look at the bed spread; notice its color, its texture, the way it hangs on the bed. in your minds eye reach out and touch the bedspread. Is it smooth or knobby, fluffy or flat? now step back and take one last look around. The windows are open and a cool breeze brings the outdoor smells to your attention. Focus on those smells. Hear the sounds of your family and friends gathering. Now, focus on the feelings you had when you lived in that room."(Bump, 1989, p.100).

Imagery Controllability Exposure

The following exercises will be practices as training for controllability

Exercise 3

"The exercise begins with a good friend. Try to create a truly vivid image of this friend. Now imagine that you have sprinkled that friend with "Ratio" a magical potion that allows you to change his or her size. Gradually shrink the person you have selected down to the size of a soda can. Try to see a gradual change. After you shrink your subject, return him or her to normal size. Then go the other way. Make your friend into a giant. Before you finish, always return your friend to his or her normal size."(Bump, 1989, p. 100)

Exercise 4

"Imagine that you are holding a bucket in your right hand and extend your arm straight out to the side at shoulder level. Feel the weight of the bucket as you hold it straight out to the side. Now imagine someone pouring 5 pounds of sand into the bucket. Feel how heavy your arm begins to feel. Focus on how much heavier the bucket feels as an additional five pounds of sand is added. Let yourself feel the heaviness of your bucket as your arm gets more and more tired. Feel your arm getting heavier and heavier... very, very heavy.

Focus on the heaviness of your arm. Now someone takes the heavy bucket from you. Tell yourself that your hand and arm feel pretty normal again. Let

your hand and arm come back down to your side and relax." (Bump, 1989, p. 100)

Now some more general imagery exercises will be given: The following exercises were taken from Harris & Harris (1984).

Exercise 5

"In your mind's eye visualize a spot of color such as red, zoom in until your whole visual field is covered with red, zoom out again until it recedes into blackness.

Change the color to blue and repeat, continue this exercise using several colors. Each time start with a small dot of color, let it approach you like an oncoming light until it engulfs your entire visual field, then reverse direction until it disappears."(p. 110).

Exercise 6

"In your mind's eye pick up a lemon. Feel the texture of the oiliness.

Smell the lemon, roll it on the table, take a bite out of the end and taste the juice. Note all the ways you can experience a lemon in your imagination"(p. 111).

Appendix E

Exposure Phase for PI

The imagery group will receive the following exposure session similar to Epstein (1980). This following will be read to each subject. I will now ask you to form images that are related to the task of golf putting. As previously indicated this technique is called mental imagery, and it has been used by great athletes such as Jack Nicklaus, Fran Tarkenton, and Greg Lougainis, to enhance performance in sport skills. First I will describe to you a scene, and I want you to try and imagine it as clearly as possible. If you are experiencing trouble in imaging the description, relax, and remember it is time to become familiar with the task. When imaging try to stay inside your body as if you are actually performing the putting technique. Try and see things through your own eyes. Try to pretend you are making the putt. It is only important now that you understand that your goal is to try and mentally image as clearly as possible. Now I want you to imagine seeing yourself walking up to the golf ball. Try and see the line of the putt. Try to visualize yourself holding the putter in your hand. Now visualize making a gentle but firm backswing and stroking the putt smoothly down the target line seeing the ball rolling, rolling right into the cup. Let's put the golf ball again. Visualize another golf ball lying on the putting surface below you. This time really concentrate on taking the club straight back and try to see the ball rolling, rolling straight into the cup. Now let's do it in slow motion. Visualize the ball before you. This time really concentrate on seeing the ball rolling, rolling right into the cup. For about 5 or 10 more times I would like you to practice in your mind seeing the ball and then taking the putter back and striking the back of the ball, as the ball is rolling, rolling, right into the hole. While you are practicing really focus on seeing the ball roll into the hole. Practice as many putts in your

mind as you want but remember to try and see the ball rolling, rolling into the hole. Like many other sports, imaging the golf putt in your mind will become easier with time. Go ahead and start practicing putting until I tell you to stop.

Appendix F

Educational Affirmation Exposure

Affirmations are what you say to yourself. For example have you ever gone into a test knowing that you were not prepared. Chances are you may have said to yourself, "I think I am not going to do very well." This statement is a negative affirmation. Or maybe you have had the experience where you knew everything you were going to do would turn out well. Maybe you knew you were going to get an A on the test, So before you took the test you said to yourself, " I think I am going to do well on the test." This is an example of a positive affirmation. Maybe a sport specific example would be more interesting. Say the Spartans are in the NCAA finals with the score tied and the Spartans worst free throw shooter is on the line. Do you think he should say to himself, "I can make it" before he shoots? Many basketball players and golfers would tell you that the most important thing in shooting a free throw or making a golf putt is to believe you are going to make it. If you can make one then you must have the skill to put it in the hole. One athlete that would agree with using positive affirmations is David Graham. He always believes he can make the putt. Before hitting a shot, the golfer who holds the all time low record for a round in golf, Chip Beck says to himself, "Just Perfect." He then knows he has given the shot the best possible chance of going in. Pro golfer Jeff Thomsen says before every shot, "I can make this shot." And Peter Jacobsen says before every shot, "Knock it close." It is important to use Positive statements so that no negative thoughts enter your mind. Like if you say to yourself, "I hope I do not miss, You are really only hearing I hope I miss. For example, Don't be aware of your breathing? Pause. Most people immediately become aware of their breathing. So if a golfer makes a negative statement before putting. The negative statement usually comes true. There

are two main reasons why you should use positive affirmations: (1) When you say a positive affirmation to yourself it improves concentration to focus on the task at hand. (2) Your confidence will be heightened which may lead to an automatic stroke. It is important to remember to only say positive affirmations before the skill. Remember, it is best when actually putting to have no thoughts in your mind.

Appendix G

Basic Affirmation Exposures (PA)

Now we will go over some basic affirmation exercises.

I would like you to now read the following affirmations to yourself. Please read each one ten times.

Every day in every way I am greater and greater

I like who I am

I trust myself

I am relaxed

I forgive my errors

I can do it

I enjoy life

I am on my side

I always do the best job I can

I am proud of my efforts

I can do anything I choose to do

Basic affirmations can make you feel good about who you are.

The second exercise we are going to do is to fill in these statements:

I am a good

I am an efficient

I am a creative

I am a relaxed

I am a courageous

I am a strong

I am a purposeful

I am a graceful

The third exercise is an activity about a golfer who is trying out for a the Spartan Golf team.

George is a very talented golfer. Over the course of his career he has been quite successful, compiling above average scores. As a high schooler he was awesome. Now he is trying to make the Michigan State University Golf-team. He is not on a scholarship. As George got to the West course for his first day of tryouts, the senior and junior golfers hung out together, while George was alone waiting for his name to be called so he could tee off. While practicing on the putting green George began to question his ability to make the team. While warming up he continually saw the members of the golf team making almost every putt they attempted. Then a little while later at the driving range, George began to dwell on how far and accurate the members of the golf team hit the ball. George began to think to himself, " I can't possibly beat these guys." As you probably would guess this thought made things worse. Then the following thoughts passed through his mind

What will my parents and friends think of me if I lose

What if I can't hit the ball straight

What if I can't make any putts

What if I slice the first shot in the water.

Because these thoughts took over George's mind, he was not at all ready for the competition. He then heard his name called to tee off, and got an uneasy feeling in his stomach.

Now answer the following questions:

1. What was the causes of George's nervousness?
2. What negative statements may have George been making to himself?
3. What could George say to himself to focus on the present and not worry about others?

Appendix H

Skill Specific Exposure Phase for PA

I will now ask you to tell yourself you are a good putter. Positively reaffirm to yourself that you are a good putter and that you can be successful at this task. Also, tell yourself that if you do not make the putt, that does not mean that you were not successful. You will be able to putt again shortly. I am asking you to think positive about golf putting because professional and low handicap golfers allude to becoming great putters by thinking positively. They often say that anyone can putt with any technique, but the putter's who think they can make the putt are usually the best. Also, there once was a legendary former Oklahoma State University golf coach who was one of the best putters. However, his technique was not that impressive. There was nothing special about what he did. Gary Wiren a former golf professional and sport psychologist Richard Coop state, " It was his attitude, not his method, that let him sink so many putts. His faith in himself was total. He said he was a great putter, he believed it. And he was. At this time I would like you to repeat these statements to yourself. "I am a good putter, (pause), I am a good putter,", I am a successful person". Now go ahead for the next minute and tell yourself that you are a good putter.

Post Experimental Questionnaire (Appendix I)

Directions : Please answer the questions to the best of your ability. In the following questions, please circle the appropriate number or answer corresponding to the question asked.

1. What percentage of the time did you use the mental preparation strategy presented to you? (Please estimate)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2. Do you believe the mental preparation strategy taught to you was helpful in improving performance?

Yes No

3. Would you consider using this strategy in other sports or facets of life?

Yes No

Please elaborate: _____
_____
_____

4. When you missed a putt how often did you think you would not make the next putt because you missed the putt directly before?

never sometimes often always

5. Did missing a putt make you try harder to make the next putt?

Yes No

6. When you missed a putt how often did you think that the mental preparation routine taught to you was not working?

never sometimes often always

Thank you for completing the questionnaire.

Appendix J

Debriefing

The purpose of this investigation was to increase understanding about using mental preparation immediately before performing a motor skill. This investigation tested the hypothesis that using psychological processes directly before performance will increase performance over a control group. Four groups participated in the experiment. In one group subjects were asked to perform the skill in their mind directly before executing the skill. In a second group participants were asked to say to themselves before putting, I think I can make this putt" directly before performance. The control groups were only instructed to try and sink each putt. It is expected that the two experimental groups will improve performance over the control groups. If you have any questions, please do not hesitate to ask the investigator. If you would like a copy of the summary of results of this experiment when completed, please leave your name and address with the experimenter. Thanks for participating in this experiment.

Appendix K

Means and Standard Deviations for Performance and Accuracy for All Days

Table 11

Means and Standard Deviations for the PI Group Over Days (Performance)

	day1(pre)	day 2	day 3	day 4	day 5(post)
Means	8.9	11.3	10.6	13.2	13.7
Std dev.	1.91	2.7	3.65	3.19	2.627

Table 12

Means and Standard Deviations for the PA Group Over Days (Performance)

	day1(pre)	day 2	day3	day 4	day 5(post)
Means	8.9	11.3	11.1	13.1	13.4
Std dev.	2.183	2.710	2.6	2.56	2.413

Table 13

Means and Standard Deviations for the PC Group Over Days (Performance)

	day1(pre)	day 2	day3	day 4	day 5(post)
Means	10.1	9.9	11.6	12.9	13.4
Std dev.	2.08	3.75	2.17	2.85	2.413

Table 14

Means and Standard Deviations for the NPC Group Over Days (Performance)

	Day1(pre)	Day 2(post)
Means	8.2	9.0
Std dev.	1.874	3.204

Table 15

Means and Standard Deviations for the PI Group Over Days (Accuracy)

	day1(pre)	day 2	day3	day 4	day 5(post)
Means	31.4	24.0	28.6	16.2	15.4
Std dev.	9.38	7.61	11.52	6.877	6.518

Table 16

Means and Standard Deviations for the PA Group Over Days (Accuracy)

	day1(pre)	day 2	day3	day 4	day 5(post)
Means	36.3	25.5	25.6	22.2	17.3
Std dev.	9.38	7.66	6.293	8.364	8.512

Table 17

Means and Standard Deviations for the PC Group Over Days (Accuracy)

	day1(pre)	day 2	day3	day 4	day 5(post)
Means	30.0	29.3	25.2	19.7	19.1
Std dev.	12.02	14.56	10.61	8.945	10.214

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