

THE EFFECTS OF AN INDIVIDUAL AUDIO MASTERY  
REHEARSAL TAPE ON SELF-CONFIDENCE AND  
ANXIETY OF INTERCOLLEGIATE VARSITY SWIMMERS

BY

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## ABSTRACT

The purpose of this study was to examine the effects of an individual mastery rehearsal audio tape on cognitive anxiety, somatic anxiety, and self confidence of NCAA Division-I swimmers. Pre-competition intensity levels were measured via the Competitive State Anxiety Inventory-2 (CSAI-2) (Martins et al., 1990). In addition, gender differences were also examined. A secondary purpose involved completion of follow-up questions which examined intervention group subject's opinions of their individual mastery rehearsal audio tape.

Three two-way analysis of covariance (ANCOVA) were performed to look at differences between gender and group, as well as possible interaction between gender and group, for each subscale. All data analyses were examined using the .05 level of significance. Means, and standard deviations were run on the nine follow-up questions related to personal opinions on the intervention strategy.

Twenty-four male and twenty-four female swimmers were subjects in this study (n=48). The ANCOVA indicated no significant interaction between the intervention and gender and no significant main effect for gender. However, significant main effects were found for the intervention factor. The findings showed a significant decrease in pre-competition cognitive anxiety  $F(1, 47) = 7.27, p = .01$ , as well as a decrease in somatic anxiety  $F(1, 47) = 8.7, p = .005$ , from before to after the

utilization of an individual mastery rehearsal audio tape. Additionally, after the utilization of the individual mastery rehearsal audio tape, swimmers showed significant increases in pre-competition self-confidence  $F(1, 47) = 10.49, p = .002$ . Means showed that in the opinions of the athletes, they were so satisfied with the tape, they would utilize an individual mastery rehearsal audio tape again to help enhance their potential for success.

The utilization of an individual mastery rehearsal audio tape may provide an ideal method for coaches and athletes trying to address the problem of anxiety or the pursuance of self-confidence. The individual mastery rehearsal audio tape may also be the most practical method when considering the relative short time it takes to produce the tape.

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## DEDICATION

This dedication is not simply because of the incredible support I received over the last eight months while completing this Dissertation. No, this dedication is for so much more.

I dedicate my ten year journey that has brought me to this fantastic point in my life, to my family.

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Mom, see where we have come? Let's see where we can go now!

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## CHAPTER ONE

### The Problem

#### Introduction

Athletes competing against one another, both with equal talent and ability, yet one totally dominating the other -- this is a dilemma facing athletes and coaches at all levels of competition. Physical practice, conditioning theories, and conditioning techniques have been a constant in the world of sport and athletics. Today, athletes and coaches are seeking an added edge over their competition. As with the previously mentioned example of the two equal athletes, the dominating athlete would most likely have less anxiety and more self-confidence than the other one (McAuley, 1985a). As the field of applied sport psychology advances and becomes more accessible, it is crucial that sport psychologists continue to seek out specific techniques to enhance performance.

Producing images of a perfect performance in one's own mind has been labeled with many different names. Mental rehearsal, positive visualization, visual motor behavior rehearsal, symbolic practice and mental imagery remain some of the terms scattered throughout sport psychology literature (Feltz & Landers, 1983; Weinberg, 1982; Oxendine, 1984; Vandelli & Madison, 1985). Any of these expressions can be used to describe the mental practice technique of listening to an individualized audio mastery rehearsal tape prior to a

competition. This technique has been found to build self-confidence (Andre & Means, 1986; Noel, 1980), which is inversely related to anxiety (McAuley, 1985a; Martins et al., 1990). Though these variables come from different theories, they have been found to have a direct as well as indirect effect on performance (McAuley, 1985a; Vealey, 1986).

Research in the area of self-confidence has been closely paralleled to Bandura's self-efficacy research (1977). According to self-efficacy theory, efficacy expectations (self-confidence), mediates performance (Bandura, 1977). Self-efficacy is primarily found to be developed through performance accomplishments which are based on previous performance experiences that the individual has had with the task. Since the development of self-efficacy theory, several studies have attempted to test Bandura's hypothesis (1977) in the athletic world (Feltz, Landers and Raeder, 1979; Bandura, 1977; McAuley, 1985a). Generally, these researchers have applied the hypothesis made by Bandura (1977) to competitive situations and have found that efficacy expectations were positively related to performance (Weinberg et al., 1979; Weinberg et al., 1980; Weinberg et al., 1981; Lee, 1982; Feltz & Mungo, 1983, McAuley, 1985a).

In response to self-efficacy theory, Eysenck (1978) proposed that it was not self-efficacy but anxiety reduction that mediated behavior. Researchers have found that better athletic

performances were found when anxiety levels were low (Martens et al., 1990; Weinberg and Genuchi, 1980; Miller & McAuley, 1987).

Individuals possess a general predisposition to feel anxious toward competitive situations. This general feeling of anxiety has been termed competitive trait-anxiety (Weinberg & Genuchi, 1980, Martens et al., 1990). Competitive state-anxiety is a state variable that is based on competitive trait-anxiety and factors which vary dependent on competitive situations. Competitive state-anxiety has been found to be a better predictor of performance than the more general competitive trait-anxiety (Weinberg & Genuchi, 1982).

In the sport psychology literature, competitive state-anxiety is often thought to be closely related to arousal; however, there are several differences between these states (Martens et al., 1990). Arousal is the physiological process that an individual experiences on a continuum ranging from deep sleep to extreme excitement (Martens et al., 1990). Anxiety, on the other hand, is a cognitive label placed on threatening situations (Cratty, 1989). Such a cognitive label adds a negative dimension to the physiological state of arousal (Sonstroem & Bernardo, 1982; Martens et al., 1990; Kerr, 1987). Although there are several theories of arousal, most researchers have found that high levels of arousal or high anxiety have a negative effect on performance (Weinberg & Genuchi, 1980; Cox, 1986).

A number of studies have attempted to determine whether self-confidence or anxiety remains the best predictor of performance. Although neither self-efficacy nor anxiety was found to be the best predictor of performance in any of the studies, the researchers reported that self-efficacy fared much better than the anxiety-based theory of performance. Some studies demonstrate a positive relationship between self-confidence and performance, as well as the negative relationship between anxiety and performance, findings on the hypothesis of the inverse relationship between self-efficacy and anxiety have been inconsistent in the literature. Few studies were found that support the inverse relationship hypothesis (McAuley, 1985a; Martens et al., 1990).

Researchers, within the field of sport psychology, have devoted great effort towards a better understanding of how confidence and anxiety affect performance. A technique or strategy, to increase confidence or decrease anxiety when needed would be of great value to the field. It appears that the use of mental practice in sports has been shown to be an effective supplement to any physical training program to enhance performance. According to the literature, mental practice was most effective with tasks deemed cognitive in nature (Feltz & Landers, 1983; Ryan & Simons, 1981). It seemed also evident that individualized mental training programs were appropriate (Seabourne et al., 1985) and that imagery was most

effective when used with some method of relaxation to enhance the image. Kendall et al. (1982) demonstrated that audio taped imagery rehearsal was an effective means to improve the execution of a specific defensive skill. The study by Vernacchia and Cook (1989, 1993) also concluded that mastery rehearsal tapes were effective. However, the specific indications of mental training are not yet fully understood. It is still unclear as to the realm of imagery use in sport and the effectiveness of audio tapes as a mechanism for increased confidence or decreased anxiety.

As two time Olympic gold medalist swimmer, Brian Goodell stated, "There are a lot of good swimmers in any race, but when I'm feeling confident, no one can beat me" (Ferguson, 1993, p. 4-26). The utilization of mastery rehearsal audio tapes have been shown to aid in sport performance (Kendall et al., 1982; Noel, 1980; Vernacchia & Cook, 1989, 1993). If Brian Goodell's statement is true for most athletes, then the knowledge of the effects of an individual audio mastery rehearsal tape on anxiety and self-confidence is a potentially rewarding research undertaking.

#### Purpose of the Study

The purpose of this study was to examine the effects of an individual mastery rehearsal audio tape on cognitive anxiety, somatic anxiety, and self confidence of NCAA Division-I swimmers in competitive situations. Pre-competition intensity

levels of cognitive anxiety, somatic anxiety, and self-confidence were measured via the Competitive State Anxiety Inventory-2 (CSAI-2) (Martins et al., 1990), (Appendix A). In addition, gender differences were also examined.

A secondary purpose involved describing experimental group subjects' opinions of their individual mastery rehearsal audio tape, via a follow-up questionnaire (Appendix B).

#### Assumptions and Limitations

It was assumed that each subject read and understood the inventory and answered the questions honestly. It was also assumed that the athletes in this study were representative of other NCAA Division I swimming programs. Lastly, it was assumed that all subjects utilized their individual mastery rehearsal audio tape according to instruction.

#### Scope of the Study

This investigation was conducted using the University of Kansas men's and women's intercollegiate swim team. Twenty-five male and twenty-five female swimmers were subjects in this study. The data were collected in the fall of 1995 utilizing an inventory consisting of three subscales that measured cognitive anxiety, somatic anxiety, and self-confidence (Martins et al., 1990). Subjects within the experimental group were also asked to indicate their personal opinions of the intervention strategy. All data derived from athletes who completed the study as directed were included in the analyses.

### Significance of the Study

The results of this study may pose a worthwhile contribution to the literature in the field of sport psychology. A proven technique such as the use of an individual audio mastery rehearsal tape (Kendall et al., 1982; Noel, 1980; Vernacchia & Cook, 1989, 1993), will give everyone involved in sport and athletics a concrete and tangible solution to the anxiety and self-confidence problems related to athletic competition. Several studies have measured how self-confidence and anxiety affected athletic performance (Martins et al., 1990; McAuley, 1985a; Vealey 1986), yet few studies have addressed the use of individual audio mastery rehearsal tapes to improve athletic performance (Kendall et al., 1982; Noel, 1980; Vernacchia & Cook, 1989, 1993). Past research was limited by the small sample size involved, and no studies were published which researched the affects of an individual audio mastery rehearsal tape on pre-performance confidence or anxiety. For these reasons, the results obtained from this research will be beneficial to athletes, coaches, and sport psychologists alike.

### Definition of Terms

Cognitive Anxiety - Is the mental component of anxiety characterized by a conscious awareness of unpleasant feelings about oneself, external stimuli, worry or disturbing visual images. In sport it is most commonly

manifested by negative performance expectations and thus negative self-evaluation.

Competitive State Anxiety Inventory-2 (CSAI-2) - An inventory developed by Martens et al., (1990) to measure cognitive anxiety, somatic anxiety and self-confidence in athletes.

Imagery - All those quasi-sensory and quasi-perceptual experiences about which we are self-consciously aware and which exists for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts (Richardson, 1967a).

Individual Audio Mastery Rehearsal Tape - Audio cassette tape produced by an athlete for the purpose of providing a method of mental preparation for competition.

Mental Practice - The cognitive rehearsal of a physical skill in the absence of overt, physical movements (Magill, 1989).

Self-Confidence - (Self-Efficacy, Sport-Confidence), A belief in one's own ability to be successful.

Somatic Anxiety - Refers to the physiological and affective elements of the anxiety experience that develop directly from autonomic arousal. Somatic anxiety is reflected in such responses as rapid heart rate, shortness of breath, clammy hands, butterflies in the stomach, and tense muscles.

## CHAPTER TWO

### Review of Literature

#### Introduction

Athletes, coaches, performance consultants, and sport psychologists, either personally or with a client, have had to, at one time or another, try to overcome the effects of nervousness and uncertainty about an athletic competition. This review of literature examined two psychological variables; self-confidence and anxiety. Self-confidence and anxiety theories were both explored, and evaluated regarding how they affected sport performance.

The final section of this review explored imagery as a basis for understanding the effectiveness of mastery rehearsal tape usage. This exploration included theories that explained how mental training worked and the use of audio stimulated mental imagery.

#### Self-Confidence

The virtue of being confident in one's self has been a highly-regarded characteristic to possess in our society. It was often thought that this general feeling of self-confidence can be an attribute which distinguishes successful people from unsuccessful people. It was possible, however, to be confident in one aspect of life while lacking confidence in another. In Bandura's (1977) Self-Efficacy Theory, the term self-efficacy was used to describe this specific feeling of confidence. Self-

efficacy was a self-confidence that individuals possessed about certain abilities they may have. Based on Bandura's work, Vealey (1986a) hypothesized about a sport specific self-confidence construct and referred to it as "sport-confidence." This concept was a self-confidence that was related to a person's ability to be successful in sport (Vealey, 1986a). For the purposes of this study, self-confidence, self-efficacy and state sport-confidence were to be considered interchangeable and were used as such throughout the remaining chapters of this study.

### The Self-Efficacy Theory

The relationship between self-confidence and behavior was explored in depth through Bandura's (1977) theory of self-efficacy. In Bandura's work with snake phobics, self-efficacy was determined to be a common cognitive mechanism for mediating behavioral change. Bandura proved in his studies that snake phobics can diminish their fear of snakes through increasing their self-efficacy in handling them. According to the self-efficacy theory, all behavioral and psychological change occurred through the alteration of an individual's sense of personal mastery or efficacy (Bandura, 1977). Consequently, most of the current literature involving the effects of self-confidence on athletic performance have been based on this research.

Bandura (1977) described two related self-efficacy expectancies necessary to the development of personal self-efficacy. The first outcome expectancy was defined as a person's belief that a given behavior would lead to a certain outcome. The second--efficacy expectancy--was defined as the belief that one had the capabilities necessary to successfully execute a behavior (Bandura, 1977). If an individual lacked the confidence (efficacy expectations) to perform a behavior, the issue of the outcome which the behavior would produce (efficacy outcome) remained trivial. Therefore, according to the self-efficacy theory, efficacy expectations were thought to be more important to behavioral change than outcome expectations.

According to Bandura's theory (1977), efficacy-expectations could increase an individual's performance. Efficacy-expectations also determined how much effort an individual would expend and how long this effort would persist in the face of obstacles and/or aversive situations. As long as the individual had the appropriate skills and incentives, enhanced self-efficacy expectations would produce stronger, as well as longer effort. Self-efficacy expectancies were therefore considered to be predictors of both the initiation and persistence of behavior. (Bandura, 1977; Weinberg, R. S., Gould, D., and Jackson, A., 1979; Weinberg, R. S., Yukelson, D., and Jackson, A., 1980)

Bandura proposed that individuals developed self-efficacy expectations from four sources of information--performance accomplishment, vicarious experiences, verbal persuasion, and emotional arousal. These four sources were hypothesized to have varying degrees of power in influencing self-efficacy and will be discussed in the order of their hypothesized strength. Performance accomplishments were considered the most influential source of information because they were based on authentic or "hands on" mastery experiences (Bandura, 1982). Mastery experiences were developed through, among other things, participant modeling.

In participant modeling, the subject actually performed behavioral tasks with guided assistance. As the behavioral tasks were successfully mastered, self-efficacy began to develop. As long as the tasks were continuously mastered--with only periodic failures, self-efficacy would continue to increase. However, if repeated failures were experienced, self-efficacy would begin to decrease. (Bandura, 1977)

The second source of self-efficacy expectations was based on vicarious experience (observational learning) (Bandura, 1977). Vicarious experiences influenced self-efficacy through live or symbolic models performing the task. As these models were observed successfully performing the task, the self-efficacy of the observer was likely to be enhanced. The power which vicarious experiences had over the observer depended on

the similarity that existed between the model and the observer, the number and variety of models, and the perceived power of the models (Maddux & Stanley, 1986). Observational learning was most effective when the observer had some experience with the task.

Verbal persuasion was another source of self-efficacy expectations (Bandura, 1977). Verbal persuasions were suggestions that lead people into believing that they could be successful in an activity. The strength of these verbal suggestions depended on the expertness, trustworthiness, and attractiveness of the source (Maddux & Stanley, 1986). As with observational learning, in order for verbal persuasion to work most effectively, it was important for the individual to be already familiar with the activity. Although verbal persuasion by itself had limited value, when used with other self-efficacy sources, it became more effective than other sources alone (Bandura, 1977).

Emotional arousal, the last major source of self-efficacy expectations, was hypothesized to have an inverse relationship with self-efficacy (Bandura, 1977). When an individual perceived a situation as potentially threatening, anxiety rose and self-efficacy lowered. Emotional arousal affected self-efficacy when people associated aversive emotional states (anxiety) with poor behavioral performance, incompetence, and failure (Maddux & Stanley, 1986). Bandura (1977) considered

the association between arousal and anxiety to be very close. When negative thoughts were associated with physiological feelings of arousal, arousal became anxiety. Thus, when people became aware of unpleasant emotional arousal, they were likely to doubt their behavioral competence (Maddux & Stanley, 1986).

Successful experiences did not necessarily increase self-efficacy; they must be attributed to internal factors. Successful performance will enhance efficacy expectations only when the outcome of the performance was attributed to factors such as ability or effort (Bandura, 1977). Conversely, when successful performance was thought to be based and/or attributed to luck or external factors, these experiences, although successful, may not enhance personal expectations of efficacy. Therefore, causal attributions appeared to be a determinant of whether self-efficacy expectations were enhanced or lowered. When success was attributed to external factors, the individual may have believed that the chance of future success existed outside his or her control. Without control, an individual may lose the confidence in his or her ability to succeed at the task.

### Sport-Confidence and Performance

Since the publishing of Bandura's Self-Efficacy theory in 1977, several researchers have attempted to apply the hypothesis made by Bandura to high-avoidance tasks as well as to competitive situations. These studies have been made in both experimental non-sport settings and in non-experimental sport

settings. Feltz et al. (1979) used a modified back dive to test whether different types of modeling; participant, live, or videotape, had an influence on self-efficacy expectations and further influence on the repeated trials of a back dive. The participant-modeling group used in this study was a form of the first source of self-efficacy (performance accomplishments). Both the live and videotape modeling groups in this study were modified versions of the second source of self-efficacy (vicarious experiences). The results were in accord with Bandura's hypothesis, when Feltz et al. (1979) reported "... the participant-modeling treatment produced higher, more generalized, and stronger efficacy expectations than did the modeling-alone treatment ..." (p. 118). All three modeling groups, in support of Bandura (1977), showed improvements in self-efficacy expectations as well as performance. Feltz et al. (1979) suspected that the difference between the efficacy expectations and performance of the modeling groups was due to the guidance that the participant-modeling group received during practice.

Aided participant-modeling and unaided participant-modeling were tested once again in McAuley's (1985a) study on students performing a dive forward roll mount onto a gymnastic balance beam. Their results were also supportive of the basic hypothesis of Bandura's (1977) work and suggested that when the students participating in the modeling groups expressed

stronger efficacy expectations, they had lower anxiety and performed better on the gymnastics task than the students in the control group. McAuley (1985a) suggested that "the modeling treatments made the subjects feel more competent and satisfied with their performance than did those subjects in the control group" (p. 292).

The researchers found that the aided participant-modeling group performed better than the unaided participant-modeling group, even though the two modeling groups did not differ significantly in self-efficacy or anxiety levels. McAuley (1985a) reported that the findings may have been due to the overlap in modeling treatments. The findings that different modes of treatment produced different results in performance were, however, consistent with Feltz et al. (1979).

Other relationships in McAuley's (1985a) study were supportive of Bandura's self-efficacy theory, such as finding self-efficacy to have a negative relationship with anxiety and anxiety to be negatively correlated with performance, thus lending support for the relationships that anxiety is theorized to have in the self-efficacy theory. Bandura (1977) had theorized that an increase in anxiety would have a detrimental effect on performance and would have an inverse effect on self-confidence.

The above studies researched the impact that the different sources of self-efficacy made on self-efficacy expectations.

There are, however, several studies that have tested the hypothesis that self-efficacy was the major determinant of behavior. Some of the first studies that actually applied self-efficacy to competitive situations were done by Weinberg and his colleagues (Weinberg et al., 1979; Weinberg et al., 1980; Weinberg, R. S., Gould, D., Yukelson, D., and Jackson, A., 1981). These studies applied Bandura's (1977) predictions to motor performance situations by having subjects compete against trained assistants on muscular leg-endurance tasks.

In a Weinberg et al. (1979) study, subjects were first divided into either a high self-efficacy group or a low self-efficacy group through the manipulation of the subjects' self-efficacy. The subjects then competed against the trained assistants twice by seeing which person could hold his or her leg up the longest. The competition was fixed so that the subjects lost both trials. The researchers found that even though both groups lost the previous trial, the high self-efficacy group extended their legs significantly longer on the second trial than the subjects in the low-efficacy trial.

These findings supported Bandura's (1977) prediction that "efficacy expectations determine how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences" (Bandura, p. 194). Weinberg et al. (1979) subsequently became the first study to support Bandura's self-efficacy theory in a competitive setting.

Findings in Weinberg et al. (1979) were extended in both Weinberg et al. (1980), and Weinberg et al. (1981) studies. Weinberg et al. (1980) set out to test the hypothesis that public statements of efficacy expectations would increase motor performance, and Weinberg et al. (1981) tested whether or not preexisting self-efficacy expectations had an influence on motor performance. Again, both studies used the leg lifting task and procedures that had been previously used by Weinberg (1979). Weinberg et al. (1980) stated public and/or private statements had no significant effects on performance. However, they did find that the high self-efficacy group significantly outperformed the low self-efficacy group during the competition. Weinberg et al. (1981) also showed support for the earlier findings in which they found that both preexisting self-efficacy and manipulated self-efficacy positively influenced performance.

Weinberg et al. (1981) concluded that efficacy-expectations may produce different motivational effects in response to failure. Based on the findings of this study (Weinberg et al., 1981) and the previous studies (Weinberg et al., 1979; Weinberg et al., 1980), Weinberg et al. (1981) proposed;

"High-manipulated self-efficacy subjects respond to failure by mobilizing greater effort because failure is seen as discordant with their beliefs in personal efficacy. Low-manipulated self-efficacy subjects,

however, become demoralized by failure because they were led to believe they could not win, failed in the actual competition, and felt sure they would fail in subsequent competition against the same opponent" (p. 352).

In 1982, Feltz tested Bandura's hypothesis that self-efficacy was a common cognitive mechanism for mediating performance. Feltz applied the results of another study and used the back dive for a path analysis. Prior to this study, most research had only tested different hypothesis made by Bandura's self-efficacy theory or simple cause and effect hypothesis (Feltz, 1982). Feltz (1982) applied the results of her study to the self-efficacy model of performance where self-efficacy is considered a common mediating variable between sources of efficacy and behavior; she then performed a path analysis on the model.

Feltz (1982) also applied these results to the anxiety-based model of performance and performed another path analysis to determine the strength of this model as well. The path-analysis technique was not used to determine cause and effect but rather to test the direction of all paths of causation that are already specified in a model. For example, in the self-efficacy theory, the pathway between self-efficacy and performance should be the strongest path, while the path

between anxiety and performance should be the strongest in the anxiety-based model.

Although the initial results of Feltz's (1982) study showed little support for Bandura's model of self-efficacy, the anxiety-based model fared much worse (Feltz, 1982). On the first trial, self-efficacy was the best predictor of performance, even though self-reported anxiety, physiological anxiety, and past performance were also found to have a direct relationship with performance. After the initial trial, previous performance became the major predictor. Feltz (1982) then applied the data to the full models of both the self-efficacy-based model and the anxiety-based model. (The full model is a model of a theory where every possible pathway is opened). According to these models, self-efficacy was neither the only predictor of performance, as hypothesized by Bandura's theory, nor merely an effect of anxiety, as hypothesized by the anxiety-based model (Feltz, 1982).

In the full model of Bandura's theory, both self-efficacy and previous performance were predictors of performance; however, previous performance was more significant than self-efficacy following the initial trial. In the anxiety-based full model, self-efficacy directly affected the three performance trials instead of the hypothesized anxiety. Feltz (1982) then applied her results to a re-specification of Bandura's model in which she deleted all non-significant and meaningless paths.

The re-specification model was found to be a stronger model than both the anxiety-based model and Bandura's model. In the re-specification model, both self-efficacy and previous performance were found to be significant predictors of subsequent performance. Heart rate was also a direct predictor of performance, but this was the case only on the first trial. Feltz (1982) concluded that self-confidence was a significant predictor of performance but, after the initial trial, was not the most significant predictor, as hypothesized in Bandura's theory.

The findings by Feltz (1982) were then replicated by Feltz and Mungo (1983) in another study using the modified back dive. As Feltz (1982) had previously found, self-efficacy and heart rate were predictors of performance only on trial one, with self-efficacy being the most significant. After trial one, however, performance on the previous back dive again was found to be the major predictor of subsequent performance, even though self-efficacy also remained a significant predictor.

In support of Bandura's (1977) study, Feltz and Mungo (1983) did find that past performance was the best predictor of self-efficacy. Contrary to Bandura's theory, however, Feltz and Mungo (1983) again found no inverse relationship between physiological arousal and self-efficacy. Therefore, Bandura's (1977) theory of self-efficacy was only partially supported by both Feltz (1982) and Feltz and Mungo's (1983) studies, since after the initial trial, each performance was influenced better by

the previous trial's performance--a hypothesized source of self-efficacy--rather than directly by self-efficacy itself.

Consequently, support for Bandura's self-efficacy theory was found only on the initial trial.

In the second part of McAuley's (1985a) study, path analysis was also used to test data against Bandura's model and the anxiety-based model, as proposed by Esyneck (1978). It was found that the data from the trials on the dive forward roll mount fit the self-efficacy model better than it fit the anxiety-reduction model, although the self-efficacy model did not completely explain the relationship among the models. Self-efficacy was found to be the mediator between the modeling treatments and performance. However, McAuley (1985a) also reported that there was a direct effect of treatment on performance. This path was not only significant but was found to be stronger than the self-efficacy-performance path. In the study, modeling treatment had an indirect effect on performance through self-efficacy, as well as affecting performance directly.

These findings were consistent with Feltz (1982), when it was found that past performance directly affected subsequent performance. Hedrick and Brinton (1981), concluded that outside factors create confidence (OFCC), such as the maturation process. McAuley (1985a) commented that "self-efficacy is a

common mechanism in the mediation of behavior and not expected to fully explain behavior" (p. 293).

Other influences on behavior may include such things as self-evaluation and goal setting (McAuley, 1985a). Treatment, however, was theorized to only have indirect effects on performance. McAuley (1985a) did state that there was a small population being used for study and that, consequently, one should be cautioned in interpreting the data. McAuley (1985a) commented that "... failure of the anxiety-reduction model to explain behavior change in this study is compatible with the findings of previous researchers who have reported that anxiety and/or defensive actions are merely co-effects of the behavior change process as opposed to being causal factors in the process" (p. 293). McAuley (1985a) also stated that self-efficacy was hypothesized to be a common mechanism of behavior change, not the only mechanism.

The previous studies were experimentally based and completed in non-sport settings. The following two studies were some of the first exploratory field studies to apply the theories of Bandura directly to actual sport settings. These studies reported that self-confidence was a distinguishing factor in successful and unsuccessful wrestlers. Due to the nature of the study, no cause and effect conclusions could be made.

Specific psychological factors that differentiate successful and unsuccessful elite wrestlers competing for positions on three

Canadian World Wrestling teams were explored by Highlen and Bennett (1979). The results indicated that self-confidence was the most important factor distinguishing those who qualified for the teams and those who did not.

In the other exploratory study of wrestlers, Gould, Weiss, and Weinberg (1981) found that self-confidence was consistently one of the most important variables related to successful performance among wrestlers competing in the 1980 Big Ten Championship Tournament. Performance was measured in two ways: tournament placement and seasonal win-loss record. The researchers first found that place winners had higher precompetitive confidence than non-place winning wrestlers. Gould et al. (1981) also found that wrestlers who had above-average win-loss records were more confident than those wrestlers who had below-average win-loss records.

Lee (1982) wanted to test if an individual's self-confidence could help the individual predict future performance more accurately. The subjects consisted of fourteen novice female artistic gymnasts preparing for a major competition. In support of the self-efficacy theory, the researchers found that the gymnasts could predict the outcome of their performance significantly better than previous performance. It was noted, however, that the gymnasts' coaches were better predictors than the athletes. (Lee, 1982)

Vealey (1986) attempted to provide a theoretical model in which self-confidence could be conceptualized based on the unique context of sport. A confidence inventory called the State Sport-Confidence Inventory (SSCI) was developed to measure the construct. The study concluded that sport-confidence, as measured by the SSCI, was demonstrated to be an effective conceptualization of self-confidence, as sport situations.

Another inventory, the Competitive Orientation Inventory (COI), was also developed from this model to test individual differences that subjects might have in defining success in sport. Vealey (1986) hypothesized that athletes base their confidence on either performance orientations or outcome orientations. If an athlete was more performance-oriented, then he or she would emphasize the goal of performing well. If the athlete was more outcome-oriented, then he or she would emphasize the goal of winning. It is through successive sport experiences that athletes become performance- or outcome-oriented. Overall, it was found that the evidence supports both a sound theoretical framework and valid operationalization of the variables within the conceptual model (Vealey, 1986).

Gayton and Nickless (1987) found that state sport-confidence as measured by the SSCI could predict finishing times of athletes running in a marathon. It was found, however, that trait-confidence was an even better predictor of the marathon runners finishing times.

As can be seen, significant research exists on the understanding of self-efficacy and the strategies for enhancing self-efficacy expectations. However, it was not until the Gould, Hodge, Peterson, and Giannini's (1989) study that the strategies used by experts in the field to increase their athletes' self-confidence were examined. Gould et al. (1989) surveyed elite coaches to find out which strategy was most often employed, as well as which strategies were deemed the most helpful. It has been argued in the past that research of this type would serve as an additional source of knowledge within the field of sport psychology (Gould et al., 1989).

Thirteen strategies, partially based on the work by Feltz and Doyle (1981), were chosen by the researchers to be evaluated by elite coaches in two studies. Feltz and Doyle (1981) had developed techniques for teaching and coaching self-confidence in the sporting world based on Bandura's work. The surveys required the coaches to first determine which of the thirteen strategies designed to enhance self-efficacy they most often used and which of the thirteen they found to be the most effective.

The researchers reported that the coaches in both studies used, at least to some extent, each of the thirteen strategies. In addition, that "enhance performance through instruction-drilling," "act confident yourself," and "encourage positive talk" were the three strategies that were most frequently used. In

the first study, such concepts as "enhance performance through instruction-drilling," "act confident yourself," and liberal use of "reward statements" were found to be the most effective strategies used by the coaches. "Enhance performance through instruction-drilling," "encourage positive talk," and "act confident yourself" were found to be the most effective strategies in the second study. The fact that both studies reported that "enhance performance through instruction-drilling" (a performance-based technique and the major source of self-efficacy expectations) was the most used and thought to be the most effective way to enhance self-efficacy. This finding lends support for the application of the self-efficacy theory to the coaching of athletics.

### Anxiety

Anxiety has been described as a cognitive label attached to either a situation that is judged as threatening or applied to thoughts that signify some kind of threat to an individual's psychosocial or physical well-being (Cratty, 1989). Often, anxious feelings are irrational reactions to perceptions that are unknown to others (Cratty, 1989). These emotional reactions consist of different combinations of: (1) feelings of tension, apprehension and nervousness, (2) unpleasant thoughts (worries), and (3) physiological changes (Spielberger, 1989):

"A number of theories exist concerning the effects of anxiety on performance, and while

there seems to be an interaction effect between the amounts of anxiety necessary to maximally perform certain specific tasks, all theories seem to agree that maximum performance is reduced by too much anxiety. The area of maximum athletic performance is no exception, and both coaches and athletes are beginning to give considerable attention to the area of competition anxiety and its management." (Murphy & Woolfolk, 1987, p. 219)

According to Cratty (1989), determining how individual athletes will react to anxiety was difficult to predict. There were, however, several factors that may have had an effect on the athlete's reaction. These included: (1) how the athlete defined anxiety, (2) how the psychologist chose to measure this elusive quality, (3) how the athlete, with or without the help of a psychologist, interpreted the fear experienced (as good or bad), (4) the experience of the athlete in anxiety-producing situations, and, finally, (5) the demands of a given sport or subskill (Cratty, 1989).

### Theories of Anxiety

One theory of anxiety was that anxiety can be divided into two related terms; trait-anxiety and state-anxiety. Martens, R., Vealey, R. S., and Burton, D., (1990) described trait-anxiety as "a

predisposition to perceive certain situations as threatening and to respond to these situations with varying levels of state-anxiety" and refers to state-anxiety "as an existing or immediate emotional state characterized by apprehension and tension" (p. 5). In the sporting world, trait- and state-anxiety were referred to as competitive trait-anxiety and competitive state-anxiety respectively. According to Martens et al., (1990), "competitive trait-anxiety is a predisposition to perceive certain environmental stimuli as threatening or non-threatening and to respond to these stimuli with varying levels of competitive state-anxiety" (p. 7). Martens et al., (1990) described competitive state-anxiety as "an existing or current emotional state characterized by feelings of apprehension and tension and associated with activation of the organism." (p. 9)

Competitive trait-anxiety was thought to be a stable tendency to feel anxious about competitive situations and has been found to be a determinant of the amount of competitive state-anxiety an individual may feel (Cooley, 1987; Wandzilak, Potter, & Lorentzen, 1982; Weinberg & Genuchi, 1980; Martens & Gill, 1976; Scanlan, 1978). Competitive state-anxiety was characterized by the anxious feeling that an individual experienced just prior to a particular competition and has been found to be better than competitive trait-anxiety at predicting performance. (Weinberg & Genuchi, 1980; Sonstroem & Bernardo, 1982; Martens et al., 1990). It was theorized that

competitive trait-anxiety was composed of three general components which created cognition's that suggest a competition was (1) ego threatening--a threat to the individual's self-esteem, (2) stressful because of its ambiguity relative to performance expectations and outcomes, and (3) stressful because of the potential physical danger involved (Cratty, 1989). Some suggested that during the competition the threat of failing may influence the anxiety of the athlete more than the actual dangers of the activity (Cratty, 1989).

There were many other sources that could affect an athlete's state-anxiety other than the athlete's competitive trait-anxiety. Many of these were situational factors. Such factors may include the perceived importance or difficulty of the game (Dowthwaite & Armstrong, 1984; Gruber & Beaucamp, 1979), presence of an audience (Ferreira, 1971), knowledge about the opponent (Cooley, 1987), expectations of team and individual performance (Scanlan and Lewthwaite, 1984; Scanlan & Passer, 1978), outcome of contests (Gruber & Beaucamp, 1979), previous experiences of success and failure (Martens & Gill, 1976), and feeling of lessened self-efficacy (Martens et al., 1990). Cratty (1989) discussed other situational sources of anxiety, including an over concern about success, a fear of failing, a fear of succeeding, and about pain experienced or anticipated.

According to several of the anxiety-based theories of performance, anxiety was a determinant of performance. In a response to Bandura's (1977) self-efficacy theory, Eysenck (1978) suggested that behavior is mediated by anxiety reduction rather than by self-efficacy. According to this theory, self-efficacy was only a by-product of this reduction.

A unique relationship existed between anxiety and arousal in the anxiety-based theory. Therefore, it became necessary to understand the different theories of arousal. To date, two of the most accepted theories of arousal were the "Drive Theory" and the "inverted-U hypothesis." The "Drive Theory" was based on the work by Hull (LeUnes & Nation, 1989). According to this theory, a linear relationship existed between drive (arousal) and performance (Cratty, 1989). An increase in arousal was expected to result in a linear increase in performance (LeUnes & Nation, 1989). This theory, however, may not be appropriate for all situations. The performance of a well-learned or simple task may linearly increase with an increase in drive, but when the task was not well-learned or was complex, an increase in drive may have interfered with the performance of the task (Cratty, 1989).

Another arousal theory, the "inverted-U hypothesis," was proposed by Yerkes & Dodson in 1908 (Taylor, 1987). The inverted-U hypothesis suggested that for optimal performance to occur in any task, an optimal point of arousal must be

achieved. Arousal that was either too high or too low resulted in less than optimal performance (Cratty, 1989; LeUnes & Nation, 1989).

Oxendine (1970) expanded on the inverted-U hypothesis by theorizing that the optimal point of arousal was dependent on whether the task was complex or simple. This theory had three major generalizations: (1) A high level of arousal was essential for optimal performance in gross motor activities involving strength, endurance, and speed; (2) a high level of arousal interfered with performance involving complex skills, fine muscle movements, coordination, steadiness, and general concentration; and (3) a slightly-above-average level of arousal was preferable to a normal or sub-normal arousal state for all motor tasks. Cratty (1989) suggested that within various sports there may be skills which not only require different points of activation (arousal) but different optimal levels for each of these activation points depending on the requirements of the skill.

Anxiety and arousal were thought to be closely related to one another and were often referred to in the literature as being similar (Murphy & Woolfolk, 1987). This similar relationship was based on the fact that feelings of anxiety generally accompanied the feelings of arousal associated with upcoming competitive situations (Martens, 1971). These terms, however, were not synonymous. Martens et al., (1990) referred to arousal as an intensity dimension of behavior defined as the state of the

organism varying on a continuum from deep sleep to intense excitement. Anxiety, on the other hand, referred to intensity and direction and was always negative in direction (Sonstroem & Bernardo, 1982; Gruber & Beauchamp, 1979). Feelings of arousal were not always negative; they could also be interpreted as feelings of excitement, depending on the cognitive appraisal of the arousal state (Kerr, 1989; Bandura, 1977). LeUnes & Nation (1989) interpreted this relationship by describing anxiety as a negatively-charged emotional state characterized by internal discomfort and a feeling of nervousness. LeUnes and Nation (1989) linked arousal and anxiety by hypothesizing that anxiety contributed to the overall arousal state.

Anxiety and arousal were, therefore, not identical to each other, yet they were not completely independent of each other. Anxiety could be experienced when the athlete's arousal level was not deemed appropriate for the situation (Cratty, 1989). Most studies in the literature, however, focused on the reduction of anxiety rather than the problem of under arousal impeding performance. This finding may be tied to the place that sport has in our society. In sport, athletes have to continuously deal with the pressures associated with winning. Such a pressure to perform sustains the athlete's high arousal level (Weinberg, 1989).

Recently, Martens et al., (1990) extended the research on a multidimensional view of state-anxiety in an attempt to

develop a measurement of competitive state-anxiety for sport. According to this multidimensional view, it was hypothesized that there were two components of competitive state-anxiety and one component of self-confidence. The two components of competitive anxiety included a physical component (somatic anxiety) and a mental component (cognitive anxiety). Somatic anxiety was the physiological response to threatening situations, such as an increase in heart rate. Cognitive anxiety was the negative thought and/or cognition's that were created by threatening situations. Martens et al., (1990) believed that these variables had different relationships with performance. Somatic anxiety was theorized to have an inverted-U hypothesis with performance and peak at the beginning of competition. Cognitive anxiety was theorized to have a negative relationship or inverse relationship with performance and maintains or increased its level prior to and throughout competition (Martens et al., 1990). Because cognitive anxiety was thought to maintain its level throughout competition, it was proposed to have a greater effect on performance than somatic anxiety.

Self-confidence, like cognitive anxiety, was another construct in this theory that maintained a stable level prior to and during competition but, unlike anxiety, had a positive relationship with performance. Martens et al., (1990) hypothesized that self-confidence and cognitive anxiety were on opposite ends of a continuum in that a high level of cognitive

anxiety can be viewed as a low level of self-confidence and vice versa. Cook et al., (1983) reported similar findings in his study with golfers in that the anxiety the golfers felt prior to their play was inversely related to the self-confidence that each golfer felt. McAuley (1985a) as described earlier also found support for this inverse relationship.

### Sport-Anxiety and Performance

Weinberg and Genuchi's (1980) study was one of the first to investigate the anxiety-motor performance relationship in a field setting. Weinberg and Genuchi (1980) were interested in the relationship between competitive trait-anxiety and competitive state-anxiety and their effects on performance amongst collegiate golfers. It was predicted that golfers who scored low on a sport competitive trait-anxiety test would have lower precompetitive state-anxiety and, consequently, perform better than the golfers who scored moderate to high on the sport competitive trait-anxiety test. Oxendine (1970) had theorized that tasks which are complex and require fine motor coordination would require lower arousal levels for optimal performance. The researcher's results supported Oxendine's (1970) theory that golfers with low levels of state-anxiety produced significantly higher performances than those golfers with moderate or high levels of anxiety. The results also supported the competitive trait, competitive state-anxiety

relationship in that competitive trait-anxiety was found to be a source of competitive state-anxiety in golfers.

Cook et al. (1983) set out to replicate and extend the findings of Weinberg and Genuchi (1980) in their study with amateur golfers. Cook et al. (1983) felt that when researching anxiety-performance relationships, the ability levels of the performers needed to be considered, because the difference in an athlete's ability level may confound the anxiety performance relationship. Cook et al. (1983) found support for Weinberg and Genuchi's (1980) findings that lower pre-competition anxiety resulted in better golf performance. However, when the ability factor was controlled, the difference between performance in Day 1 and Day 2 were accounted for by ability rather than anxiety.

Sonstroem and Bernardo (1982) explored the inverted-U hypothesis between state-anxiety levels and performance of thirty female starting basketball players from six teams. To test this theory, intra-individual low, medium, and high levels of pre-game state-anxiety were measured across three games. Performance was measured through a formula which combined several variables of basketball performance. Results supported the inverted-U hypothesis in that basketball players performed better when they were at a moderate level of arousal. Sonstroem and Bernardo (1982) concluded that "although a person's arousal level may vary somewhat over different sports,

serial participation at any one sport will establish an optimal arousal level which will be positioned near the mid-range of arousal values experienced by the individual in that sport." (p. 243)

Cox (1986), however, reported that the "coaches of women's volleyball teams should not strive for the elusive 'optimal' level of state-anxiety but should encourage a confident but relaxed approach to volleyball competition" (p. 88). Cox's (1986) findings were not supportive of the findings reported in Sonstroem and Bernardo (1982). Cox (1986) studied state-anxiety levels of female volleyball players and performance as measured by serving, service reception, and spiking. Cox (1986) administered a state-anxiety inventory 5 to 10 minutes prior to each game of a match. The data was analyzed, using linear and curvilinear regression procedures, to determine what type of relationship existed between the state-anxiety scores and the performance scores. Cox (1986) found that lower anxiety levels produced better performance in spiking performance in a linear relationship. It was also found that serving performance was better with lower anxiety levels; however, this finding was not deemed significant. These findings seemed to be in support of Weinberg and Genuchi (1980), in that players' performances linearly increased when sport-anxiety was lower.

Contrary to previous findings, Gould, Horn, and Spreemann (1983) found that there were no differences in precompetitive

and performance anxiety patterns between successful and unsuccessful wrestlers. Gould et al. (1983) surveyed 464 elite junior wrestlers participating at the 1981 U. S. Wrestling Federation Junior National Greco Roman and/or Free Style championships and studied the precompetitive and competitive anxiety patterns in successful and less successful wrestlers. Successful wrestlers were considered to have placed in the top six of their weight class. The wrestlers were asked to rate their perceived anxiety 1 week, 24 hr., 1 hr., and 2 min. prior to the competition. These findings were in opposition to Highlen and Bennett's (1979) findings, where it was reported that wrestlers who qualified for Canadian national teams reported less anxiety both prior to and during wrestling matches than wrestlers who did not qualify. However, Gould et al. (1983) declared results that were supportive of the findings in Gould, Weiss, and Weinberg's (1981) study where it was discovered that few differences in levels of anxiety existed between successful and unsuccessful wrestlers competing in the 1980 championship tournament. An interesting note was found in Gould et al. (1983) study: wrestlers became worried or nervous in 66% of their matches. These wrestlers reported that nervousness sometimes helped and sometimes hindered their performance. Slightly more wrestlers said that the nervousness helped their performance.

Although there was growing evidence to support the Martens et al, (1990) hypothesis that there were two separate constructs of competitive state-anxiety, the findings as to whether cognitive anxiety were a better predictor than somatic anxiety or self-confidence were still equivocal (Gould, Petlichkoff, & Weinberg, 1984; Gould, Petlichkoff, Simons, & Veveva, 1987; Krane & Williams, 1987; Burton, 1988; McAuley, 1985b).

Krane and Williams (1987) wanted to test the predictability of the three sub-components of the multidimensional theory as proposed by Martens et al., (1990) in golfers and gymnasts. Krane and Williams (1987) used a multiple regression analysis to test the hypothesis made by Martens et al. (1990) but did not find any of the sub-components to be predictors of high school gymnastics or golf performance. McAuley (1985b) also did not find support for the three variables as predictors of performance in golfers. McAuley (1985b) found that self-confidence was significantly correlated with golf performance by itself, but when a multiple regression analysis was done with all three of the variables, no variables were found to be significant predictors. Based on his research, McAuley (1985b) concluded that implementing techniques for maintaining self-confidence during performance might positively influence the outcome.

In a study by Gould et al. (1987) somatic anxiety was found to be more influential than cognitive anxiety in pistol shooting performance. Burton (1988) theorized that these findings were a result of pistol shooting, requiring fine motor coordination and only lasting for a short duration. Burton (1988), however, did find support for the relationships between the subscales of the multidimensional scale and performance. Burton (1988) found that cognitive anxiety was the best predictor of performance in two swimming competitions. Furthermore, it was found in two other competitions that self-confidence was the best predictor. This finding that self-confidence was a predictor of performance in two of the competitions was noted by Burton to be caused by the close relationship that exists between these constructs.

Lanning and Hisanaga (1983) attempted to support and extend earlier findings by studying how cognitive interventions affect the anxiety-performance relationship. He suggested that the use of cognitive behavioral techniques were effective interventions in reducing competitive state-anxiety prior to a competitive situation. Lanning and Hisanaga (1983) used a treatment involving seven 30-minute sessions of relaxation training with twenty-four female volleyball players in order to lower performance anxiety. Treatment sessions were given in a two 1/2-week period prior to different practices. Performance was measured by serving performance. Pre- and post-test

measures were made using the Sport Competition Anxiety Test. The researchers found that competitive anxiety can be reduced through training in anxiety-management programs. They also found that actual athletic performance can be increased through anxiety-management training.

With the information available to coaches about the relationship between arousal levels and performance, coaches often attempted to alter their athletes' arousal levels in an effort to enhance their performance (Hanson & Gould, 1988). Two studies have determined, however, that coaches are poor predictors of their athletes' pre-competition anxiety-states (Martens & Simon, 1976; Martens, Rivikin, & Burton, 1980). Martens et al. (1980) commented that "coaches who lack the skill to perceive accurately players' A-states (pre-competition anxiety-states) may engage in well-meaning but misdirected actions that result in players being less able to utilize the skills acquired in practice." (p. 88)

The problem with coaches not being able to predict their athletes' precompetitive anxiety-states may be linked to outside factors. These factors include size of the team, importance placed on the detection of anxiety by the coach, a coach's effort to detect the athlete's anxiety, how long the coach has known the athlete, coaching experience, the coach's age, and the athlete's gender (Hanson & Gould, 1988). Hanson and Gould (1988) attempted to replicate and extend earlier research by not

only studying the coaches' ability to predict their athletes' anxiety levels but by having coaches identify what cues they use to detect their athletes' anxiety. They also wanted to study the coach/athlete relationship between the coaches and their athletes (Hanson & Gould, 1988). Results from this study indicated again that coaches were not accurate predictors of their athletes' anxiety levels. Only 25% of the coaches in this study were labeled accurate estimators. In an effort to give future practical coaching implications to coaches who were interested in their athletes' arousal performance relationship, Hanson and Gould (1988) proposed;

"that coaches make a concentrated effort to become more aware of their athletes' anxiety levels through better communication and active observation. They also need to help their athletes learn to regulate their own state anxiety or arousal levels. By initiating such strategies, it is hoped that coaches will be able to improve their abilities to accurately detect emotional states in athletes and help them achieve optimal arousal levels, and in turn, peak performance" (p. 311).

### Mental Training Theories

There were two basic theories that were believed to explain how mental training functions. The

psychoneuromuscular theory (PT) as explained by Vealey (1986), stated that the brain was constantly transmitting impulses to the muscles for the execution of movements in sport. The PT suggested that similar impulses occurred in the brain and muscles when athletes imagined the movements without actually performing them. Imagined events produce innervation in our muscles that was similar to that produced by the actual physical execution of the event (Vealey, 1986). This theory was investigated by Jacobson (1931) and Shaw (1938) and supported by Hale (1982). Whether athletes actually performed movements or vividly imagined performing them, similar neural pathways to the muscles were used which were transferred to actual performance.

Schmidt (1987) explained the PT as very small forces which are generated by mental practice. These forces were detected by the very sensitive Golgi tendon organs. Feedback from these structures went to the premotor cortex and strengthened the existing motor program or allowed for adjustments in the motor program to take place. These changes in the motor program improved subsequent performance. Feltz and Landers (1983) suggested that very few quantitative studies existed to support this theory and that those that did exist did not include motor performance measures as a dependent variable such as Hale (1982). They noted a need for

comparing task performance of muscle groups involved in the task and those not involved in the task.

Shaw (1938) examined electromyographic (EMG) activity in uninvolved muscle groups. He recorded action potentials in various body locations while subjects imagined squeezing a hand grip dynamometer. Shaw found heightened EMG activity in the involved arm, as expected, but he also found increased activity in the right leg. It remained logical that an individual performing a maximal grip will tense up other muscle groups. Nearly all activities involve other muscle groups as assistors or stabilizers in the movement. The amount of EMG activity occurring in the uninvolved muscles, would most likely be less.

Harris and Robinson (1986) performed a study approximately three years after the Feltz and Landers (1983) meta-analysis. They examined the localization of the response in 36 karate athletes. The activity was a lateral arm raise. Electrodes were placed on the middle deltoid of each arm. Subjects performed five right lateral arm raises. Results revealed a significant within subjects effect ( $F=17.11, p<.001$ ) indicating more EMG activity was present on the right side than on the left side. These findings indicated that localized response observed during imagery was specific to the muscle group being used in the imagery task, thus supporting the work of Jacobson (1931) and Hale (1982).

The symbolic learning theory (SLT) stated that imagery may function as a coding system to help athletes acquire or understand movement patterns. Movements are first encoded in our central nervous systems. The SLT suggested that imagery facilitated performance by helping individuals to code their movements into symbolic components, thus making movements more familiar and perhaps more automatic (Vealey, 1986). This theory was first proposed by Sacket in 1934. Sacket stated that imagery enables performers to rehearse the sequence of movements as symbolic components. The SLT appeared to apply to tasks that were primarily cognitive in nature, or high in symbolic elements.

Feltz and Landers (1983) found support for the SLT in their meta-analysis. They believed that the distinction between symbolic and motor aspects of motor skill learning provided very strong support for the symbolic learning explanation. Tasks highly cognitive in nature and having a high symbolic component were more positively influenced by mental practice than motor activities.

### Mental Imagery

Ryan and Simons (1981) compared mental practice (MP) to physical practice (PP) and no practice (NP). Subjects were put into the three above mentioned groups. Each subject was tested on a stabilometer, (a high motor, low cognitive skill) and also a dial a maze, (a low motor, high cognitive skill). The subjects in

the PP group received 12 trials on both tests. The stabilometer trials were 30 seconds long with a 30 second rest between each one. Subjects in the MP group were given one actual 30 second trial, then asked to sit down, close their eyes, relax, and picture themselves balancing on the stabilometer. They were instructed to attempt to see the performance as vividly as possible, and were also asked to try to imagine how it would feel as they performed. Subjects were given nine mental rehearsal trials, each 30 seconds long separated by 30 second rest periods.

The same protocol was followed for the dial-a-maze. In the NP condition, subjects on the stabilometer were given one trial, nine minute rest, then two more trials of 30 seconds with 30 second rest between each trial. The dial-a-maze subjects received one trial, a rest period corresponding to the total time required for the PP subject to complete trials two through nine. Then they received two actual trials with 30 second rest between trials.

Their findings confirmed that on a task deemed cognitive in nature, (dial-a-maze) mental practice produced results that were similar to those of physically practicing the same task. There was no effect of mental practice on tasks that consisted of predominantly motor responses (stabilometer).

Meyers, Schleser, and Okwumabua (1982) examined the use of imagery to improve field goal and free throw percentages through an intrasubject research design where both treated and

untreated performance variables were evaluated. The subjects were two varsity basketball players (a sophomore center and a junior forward.) who were members of the Association of Intercollegiate Athletics for Women. For the center, the intervention was applied to free throw shooting, while field goal shooting remained untreated. For the forward, the intervention was applied to field goal shooting while free throw shooting remained untreated.

After initial sessions of identifying performance problems and instruction on relaxation and imagery techniques, eight sessions were devoted to imagery and self-instruction exercises. Again after imagining successful performances the athlete coped with imagining presentations of unsuccessful performances. In the remaining sessions, imagery and self instruction exercises were combined with physical performance for each athlete. A reversal design was used for the center. During the baseline, she made 41.3% of her free throws. She was successful on 54.8% during the 13 game intervention, but made only 28.6% during the 11 game return to baseline.

During the baseline, the forward made 36.7% of her field goal attempts, but increased this rate to 52.2% during intervention. The imagery provided a means to enable the subjects to cope with problematic performance by reducing anxiety, setting positive expectancies, and building a conception of self-efficacy.

Seabourne, Weinberg, Jackson, and Suinn (1985) investigated the effectiveness of different types of mental intervention procedures on karate performance. Five different groups were formed: (1) individually tailored, (2) paired assignment of techniques, (3) a mental training package, (4) a placebo, and (5) a control group. Subjects were pre and post tested on their performance in categories of skill, techniques, and sparring.

The results indicated that the individualized group performed significantly better than the paired, placebo, and control groups. According to this study, individualized intervention techniques where subjects play an active role in choosing their mental practice techniques are beneficial to athletic performance.

Richardson (1967a&b) and Corbin (1972) conducted extensive reviews of studies which evaluated the effects of imagery training on motor performance. The researchers concluded that imagery was valuable in learning and in performing sport skills. Richardson (1967a&b) came to the same conclusions as Ryan and Simons (1981). He supported their findings in relation to mental practice (MP) versus physical practice (PP) and no practice (NP). He found that MP effects were slightly better than no practice at all. Martens (1982) reviewed imagery research related to sport and motor behavior

from 1970 to 1982. He concluded that imagery was an effective technique to improve performance.

The above findings revealed that mental imagery was an effective means for enhancing performance especially with tasks primarily cognitive in nature. There were also studies that contradicted the previous finds. Andre and Means (1986) examined imagery through the use of audio taped instruction. They used 66 male introductory psychology students who were asked to throw a frisbee through a target ranging 12 to 30 feet from the target for a total of 50 throws. Two groups received the treatment on five nights for five minutes per night. A control group met for the same amount of time as the mental practice groups, during which time they received a treatment rationale and a flying disc skills instructional package.

After the final session, each subject returned to the performance site and performed an additional 50 trials. The results indicated that there was not significant enough change for the two treatment groups as compared to the placebo control group. These results were not consistent with the substantial reviews of imagery studies by Richardson (1967a) and Corbin (1972), which suggested that imagery was valuable in learning and performing sport skills.

Feltz and Landers (1983) conducted a review of imagery literature to provide some definitive answers to previous contradictory findings. Through the use of a meta-analytical

procedure, they found that the estimated average effect size of mental practice was .48. They concluded that using imagery to practice sport skills influences performance better than no practice at all, and tasks that are primarily cognitive in nature elicit more positive mental practice effects than do tasks composed of simple motor and/or strength.

### Audio Stimulated Imagery

In the previously mentioned study by Andre and Means (1986) an audio tape was used as the mental practice technique. The tape consisted of a brief mental practice treatment rationale, a 45 second relaxation phase, and a closely guided visual, kinesthetic, and affective imaginable practice of a frisbee "putting" throw. The subjects were randomly assigned to one of three groups: mental practice (MP), slow motion mental practice (SMMP), or a control group.

The treatment procedure consisted of three sets of three mental trials. Each set of trials was five minutes in duration. This procedure was repeated for five nights. The SMMP group was instructed to perform the second and third trials of each set in slow motion. Results indicated no significant differences in performance of the frisbee throw between the MP, the SMMP, and the control groups. Even more pertinent to this study, there was no difference between the mental practice groups and the control group.

Vernacchia and Cook (1989, 1993) found that audio enhanced imagery in the form of a mastery rehearsal tape for two intercollegiate basketball players was an effective tool for mental practice. In this study, a male basketball player used the tape because his performance statistics were unusually low -- he was in a slump. His field goal percentage had dropped to 28% from 52% prior to the slump. A female basketball player used the tape to improve her ability to concentrate during games. Her statistics prior to the intervention were .51 field goal percentage, 6.9 rebounds per game, .50 free throw percentage, and 11.9 points per game.

The athletes were instructed to identify their desired performance behaviors and goals by writing a script which vividly described how they would like to perform their skills in the actual game situation. The athletes then recorded the script (approximately three to five minutes in length) on an audio cassette tape which was supplemented with background music selected by the athlete. The athletes were instructed to listen to the tape for a minimum of two to three times daily during the days prior to competition.

A pre-experimental research design was employed in this study and was directed toward collecting objective and subjective information which could be utilized to evaluate the influence of the mastery rehearsal tape upon each athlete's competitive performances. The male athlete regained his

shooting form and effectiveness. He returned to the 52% field goal percentage he was shooting prior to the slump, and he averaged 22 points per game for the seven games during which the mastery rehearsal tape was utilized. The female athlete was able to improve her overall performance due to her ability to better concentrate on her performance cues and behaviors throughout the course of the game as reflected by her performance during regional and national championship games (3), in which she averaged 21.6 points per game, a field goal percentage of .67, 7.7 rebounds per game, and a foul shooting percentage of .54. In both cases there were notable improvements in performance statistics using the mastery rehearsal tapes.

Kendall, Hrycaiko, Martin, and Kendall (1990) used a single-subject design, a multiple-baseline across individuals, to measure a specific defensive skill of four female collegiate basketball players. The intervention was an audio tape consisting of relaxation and a mental preparation script of the correct behavior.

The four players were either starters or those who played often. A stable pre treatment baseline was established for each subject. The intervention was then introduced to each subject after their pre treatment data had stabilized or a maximum of seven games. After the instruction phase, the subjects continued

to use the audio tape for a minimum of 15 minutes for the remainder of the season.

Both the authors and the head coach rated the defensive skill of cutting off the baseline as either correct or incorrect based on pre-established definitions of correct and incorrect behaviors. Raw scores were plotted to show performances before and after intervention. Pre-treatment performances were compared to post-treatment performances. The results showed that performances after intervention were significantly higher than the original baseline performance.

Recommendations have been made to enhance mental practice techniques. Cratty (1989) states that moderate relaxation usually enhances mental rehearsal and enhances the ability to produce internal pictures. Relaxation was included in the mental training package used in the study by Kendall et al. (1990). Kolonay (1977) showed that imagery and relaxation was more effective than either mental imagery or relaxation alone in facilitating basketball free throw percentage. Noel (1980) found that the percent of good first serves in high-ability tennis players increased with the use of a relaxation and imagery tape, whereas the control group did not.

Perhaps the strongest evidence that relaxation enhances imagery potential was exhibited in Lee and Hewitt's study (1987). Thirtysix gymnasts were randomly assigned to one of three treatment conditions: visual imagery practiced while on a

mat, visual imagery practiced in a flotation tank, or control. A flotation tank was designed to enhance relaxation where subjects float effortlessly.

Subjects listened to tapes that were recorded with three stages: initial relaxation, visualization or routines, and wake up. The measure of performance consisted of the average score obtained in three state qualifying gymnastic meets. A t-test was performed comparing the means of the three treatment conditions. The flotation treatment group had higher meet scores than either of the two other groups. Subjects who visualized on the mat did not have significantly higher meet scores than subjects in the control condition. The indications of this study were that imagery potential is significantly enhanced in a highly relaxed environment.

Research also shows it was important to individualize mental training techniques (Seabourne et al. 1985; Silva, 1982) Seabourne et al. (1985) found that an individualized group performed significantly better in karate performance than a yoked, placebo control, or control group.

Mental practice literature indicated that previous experience appeared influential in mediating practice effects (Feltz & Landers, 1983; Richardson, 1967a). Research also indicated that familiarity with the imaged tasks was important for beneficial mental practice effects to occur (Shick, 1970). Harris and Robinson (1986) found that skill level influences

specific muscle innervation during imagery. The more experience that the athlete had in the activity, the greater his or her ability to image how to perform correctly. If he or she had not been able to perform a skill correctly then he or she did not know how it felt.

Cratty (1989) recommended music to heighten the image. Oxendine (1968) stated that mental practice may occur at different times in relation to performance, immediately preceding, following, or coinciding with performance. Nideffer (1985) recommended that whenever possible one should supplement mental practice of competitive conditions with auditory or visual aids. The more practiced an individual was in the use of imagery, the more benefit he or she would receive. However, a minimal amount of experience in mental practice appeared to enhance the effectiveness of imagery (Feltz & Landers, 1983).

### Summary

The central topic of this review of literature was the examination of relationships that exist between self-confidence and anxiety, and how each variable affected athletic performance. Although these variables were based in different theories, they have both been found to have a direct as well as indirect effect on performance.

According to the self-efficacy theory, efficacy expectations (self-confidence), mediate performance (Bandura, 1977). Self-

efficacy was primarily found to be developed through performance accomplishments which were based on previous performance experiences that the individual has had with the task. Since the development of the self-efficacy theory, several studies have attempted to test the hypothesis made by Bandura (1977) in the athletic world (Feltz & Raeder, 1979; Bandura, 1977; McAuley, 1985a). Generally, these researchers had applied the hypothesis made by Bandura (1977) to competitive situations and have found that efficacy expectations can have a positive influence on performance (Weinberg et al., 1979; Weinberg et al., 1980; Weinberg et al., 1981; Lee, 1982; Feltz, 1982; Feltz & Mungo, 1983; McAuley, 1985a) .

In response to the self-efficacy theory, Eysenck (1978) proposed that it was not self-efficacy but anxiety reduction that mediated behavior. Researchers have found that better athletic performance were found when anxiety levels were low (Martens et al., 1990; Weinberg and Genuchi, 1980; Cox, 1986). Anxiety was found to be inversely related to self-confidence (Martens et al., 1990; Weinberg & Genuchi, 1980; Miller & McAuley, 1987).

Individuals possess a general predisposition to feel anxious toward competitive situations. This general feeling of anxiety has been termed competitive trait-anxiety (Weinberg & Genuchi, 1980, Martens et al., 1990). Competitive state-anxiety was a state variable that was based on competitive trait-anxiety and factors which varied with competitive situations.

Competitive state-anxiety was found to be a better predictor of performance than the more general competitive trait-anxiety (Weinberg & Genuchi, 1980).

In the literature, competitive-state anxiety was often thought to be closely related to arousal, however, there were several differences between these states (Martens et al., 1990). Arousal was the physiological process that an individual experienced on a continuum from deep sleep to extreme excitement (Martens et al., 1990). Anxiety, on the other hand, was a cognitive label placed on threatening situations (Cratty, 1989). This cognitive label added a negative dimension to the physiological state of arousal (Sonstroem & Bernardo, 1982; Martens, 1990; Kerr, 1987). Although there were several theories of arousal, most researchers have found that high levels of arousal or high anxiety has a negative effect on performance (Weinberg & Genuchi, 1980; Cox, 1986). Although the inverted-U hypothesis was one of the most popular theories of arousal, it was not found to be highly supported in the literature.

A number of studies have attempted to determine whether self-confidence or anxiety was the best predictor of performance. Although neither self-efficacy nor anxiety were found to be the best predictor of performance in any of the studies, the researchers reported that self-efficacy fared much better than the anxiety-based theory of performance. Although a positive relationship between self-confidence and

performance, as well as the negative relationship between anxiety and performance have been found, findings on the hypothesis of the inverse relationship between self-efficacy and anxiety have been inconsistent in the literature. There were only a few studies that have found support for this hypothesis (McAuley, 1985a; Martens et al., 1990).

It appears that the use of mental practice in sports was a effective supplement to any physical training program to enhance performance. Mental practice, according to the literature, was most effective with tasks deemed cognitive in nature (Feltz & Landers, 1983; Ryan & Simons, 1981). It was also evident that individualized mental training programs were appropriate (Seabourne et al., 1985) and that imagery was most effective when used with some sort of relaxation to enhance the image. However, the research showed that the specific indications of mental training were not fully understood, and the realm of imagery used in sports and the effectiveness of audio tapes remained unclear. Previous evaluations of mental practice techniques have only examined isolated skills rather than total performance.

Kendall et al. (1982) demonstrated that audio taped imagery rehearsal was an effective means to improve the execution of a specific defensive skill. The study by Vernacchia and Cook (1989, 1993) also showed that the mastery rehearsal

tapes were effective in a portion of the game, field goal percentage, points per game, and rebounds.

This review of the literature exploited the knowledge that self-confidence and anxiety has in the past been shown to be a predictor of performance. Additionally, in this review, mastery rehearsal audio tapes have been shown to aid in sport performance. Through this review, the knowledge of the effects of a mastery rehearsal audio tape on anxiety and self-confidence was a potentially rewarding research undertaking.

## CHAPTER THREE

### Methodology

#### Research Design

The purpose of this study was to examine the effects of an individual mastery rehearsal audio tape on cognitive anxiety, somatic anxiety, and self confidence of NCAA Division-I swimmers in competitive situations. Pre-competition intensity levels of cognitive anxiety, somatic anxiety, and self-confidence were measured via the Competitive State Anxiety Inventory-2 (CSAI-2) (Martins et al., 1990), (Appendix A). In addition, gender differences were also examined.

A secondary purpose involved describing experimental group subjects' opinions of their individual mastery rehearsal audio tape, via a follow-up questionnaire (Appendix B).

#### Selection of Sample

Subjects consisted of fifty male (n=25) and female (n=25) NCAA Division 1 intercollegiate varsity swimmers from the University of Kansas swim team. The head coach agreed to allow the investigator to collect data within one hour, before two different swim competitions. All the subjects volunteered and gave informed consent to participate in this investigation. Male subjects (n=25) and female subjects (n=25) were randomly assigned to either the experimental group or the control group. Two days prior to the first competition, all subjects were informed of the research group to which they were assigned,

and what was to be expected of them. Additionally, the two groups were apprised about the general purpose of the study. Subjects involved in the study ranged from freshman to fifth-year seniors, scholarship and non scholarship athletes, who competed in distance and sprint events.

### Instrumentation / Equipment Used

#### Competitive State Anxiety Inventory-2 (CSAI-2)

Pre-competition intensity levels of state anxiety and self-confidence were measured via the Competitive State Anxiety Inventory-2 (CSAI-2) (Martins et al., 1990), (Appendix A). The CSAI-2 is a sport-specific, self-report inventory that had been demonstrated to be a reliable and valid measure of cognitive anxiety, somatic anxiety and self-confidence in competitive situations (Martins et al., 1990). Cognitive anxiety is the mental component of anxiety caused by negative expectations about success or by negative self evaluation. According to Morris, Davis, and Hutchings (1981), cognitive anxiety is characterized by "conscious awareness of unpleasant feelings about oneself or external stimuli, worry, and or disturbing visual images" (p. 547). Somatic anxiety refers to the physiological and affective elements of the anxiety experience that develop directly from autonomic arousal. Somatic anxiety is reflected in such responses as rapid heart rate, shortness of breath, clammy hands, butterflies in the stomach, and tense muscles (Martins et al., 1990). Self-confidence is an individual's belief in his or her

abilities to be successful (Vealey, 1986). The scale is comprised of 27 items, with 9 items in each of the three subscales. The three subscales measure cognitive anxiety, somatic anxiety and self-confidence. Responses to each item are on a 4-point Likert scale, ranging from 1(not at all) to 4 (very much so). Thus, possible scores on the three subscales range from 9 to 36. The higher the score, the greater the cognitive or somatic anxiety or the greater the state self-confidence. No total score for the inventory is computed.

The cognitive anxiety subscale is scored by totaling the responses for the following 9 items: 1, 4, 7, 10, 13, 16, 19, 22, and 25. The somatic anxiety is scored by adding the responses to the following 9 items: 2, 5, 8, 11, 14, 17, 20, 23, and 26. Scoring for item 14 must be reversed in calculating the score for the somatic anxiety subscale. The self-confidence subscale is scored by adding the following item responses: 3, 6, 9, 12, 15, 18, 21, 24, and 27 (Martins et al., 1990).

### Individual Mastery Rehearsal Script

Each of the subjects involved in the experimental group, with the guidance of the investigator, were responsible for writing their personal individual mastery rehearsal script. The individual mastery rehearsal script was a mechanism utilizing guided imagery to take the subject through a perfect performance situation. The typed script was no longer than 3 double spaced pages, enabling the final recorded version to be 3

to 5 minutes in length. The script was the most important aspect to the final product. Each subject's script within the investigation incorporated relaxation, imagery from an internal perspective, mental rehearsal of task along with performance outcome, awareness of the senses performance in real time, and goals which were realistic and attainable. These factors have been identified as essential for successful imagery by a number of investigators (Bell, 1983; Bird, 1984; Cook et al., 1989; Kohen, 1986; Mitchel & Lundy, 1986; Vealey, 1986; Woolfolk, 1985). All of the subjects in this group were given an outline to follow when writing his or her script (Appendix C). The scripts were scrutinized to insure that each included the essential factors and followed the script guidelines. In addition, the script outline helped to keep the scripts consistent, while maintaining individuality.

#### Individual Mastery Rehearsal Tape

After each subject has completed his or her script, each was transferred to audio tape form in the University of Kansas Peak Performance Clinic, using a Tascam Porta One four track audio recorder. The Tascam is a mixer and a multi-track recorder all in one. In addition to the Tascam, a compact disc player, and an audio cassette player/recorder were utilized to produce the finished tape. The clinic provided a private, relaxing, environment which allowed for full expression by the subject during recording.

## Background Music

Listening to music has been shown to influence emotional state and enhance the production of imagery (Quittner & Glueckauf, 1983). Music was used in the background of each tape to help subjects attain his or her optimum arousal level. The background music was important to help encourage the mood of the event. A selection of instrumental music was available to each subject ranging from extremely relaxing and soothing to very upbeat and arousing. Each individual subject selected the type of background music for their personal tape. A subject's type of swimming event would most often define the type of music used. A short speed event tended to have upbeat background music, while a long endurance event might have relaxing background music.

## Portable Cassette Tape Player (i.e. Walkman)

Subjects using the individual mastery rehearsal tapes listened to their individual tapes with some type of portable cassette player. This allowed for convenient listening for the subjects. Each subject was personally responsible for ensuring access to a portable cassette player during the experimental period.

## Reliability and Validity

### Reliability of the CSAI-2

Test-retest analysis has been found to be inappropriate for state scales, so the preferred method of estimating reliability for

the CSAI-2 was by examining the internal consistency of the scale (Kerlinger, 1973). Internal consistency measures the degree to which items in the same subscale are homogeneous. Cronbach's alpha coefficient was computed to assess the internal consistency of the CSAI-2 on three samples using data collected in conjunction with concurrent validation. Separate alpha coefficients were computed for the three CSAI-2 subscales for each sample. Sample 1 was comprised of 35 male track athletes and 22 elite high school wrestlers. Sample 2 consisted of 40 elite male high school wrestlers and women collegiate volleyball players. Sample 3 contained 54 elite high school wrestlers. Alpha coefficients ranged from .79 to .90, demonstrating a sufficiently high degree of internal consistency for each of the CSAI-2 subscales (Martens et al., 1990).

#### Validity of the CSAI-2

The American Psychological Association's (1974) *Standards for Educational and Psychological Tests* recommends that self-report inventories must first be validated by demonstrating concurrent validity with previously validated scales. Thus, concurrent validity is inferred when a new inventory is congruent with or divergent from theoretically predicted relationships using previously validated scales (Martens et al., 1990).

The concurrent validity of the CSAI-2 was examined by investigating the relationships between each of the CSAI-2

subscales and eight selected A-state, A-trait, and self-confidence inventories. Although further concurrent validation may be appropriate, present research evidence firmly supports the concurrent validity of the CSAI-2 (Martens et al., 1990).

Evidence supporting the construct validity of the CSAI-2 as a measure of sport specific A-state, somatic A-state, and state self-confidence is provided through a systematic progression of research studies (Martens et al., 1990). Study 1 supported hypothesized relationships between the CSAI-2 components and various individual differences and situational factors. Study 2 provided support for the hypothesized independence of the CSAI-2 components by demonstrating differential changes in components based on proximity of competition. Study 3 examined the relationship between the CSAI-2 components and performance and found equivocal results. Finally, to study the relationship between CSAI-2 components and sport performance more precisely, study 4 extended study 3 by utilizing individual performance measures. The results of study 4 provided evidence that the relationship between anxiety and performance is influenced by the multidimensionality of A-state as well as by task complexity and duration. In conclusion, data collected from these four studies demonstrated expected relationships, thus supporting the construct validity of the CSAI-2 (Martens et al., 1990).

## Intervention Procedures

All members of the experimental group attended a briefing session in which the investigator provided a general description of the theory behind the individual audio mastery rehearsal tape technique. At this meeting with the experimental group, the outline (Appendix C) for writing individual mastery rehearsal scripts was discussed, and the investigator assisted the subjects in beginning the script writing process. An appointment to make the individual audio tape was made with each of the experimental subjects at this time. The investigator helped prepare and reviewed all mastery rehearsal scripts, as well as produced the individual audio tapes for each of the subjects. The tapes were given to the experimental subjects immediately following practice three days prior to the second swimming competition. Having the tape three days before competition gave each swimmer ample time to listen to it according to directions. All experimental subjects were given directions about how to utilize their audio tape. Three days prior competition day, the tape was to be listened to each day -- in the morning, at least once during the day, and just before going to bed. On the day of the swim meet, listening to the tape just before taking the CSAI-2 was added to the regimen.

### Individual Mastery Rehearsal Tape Recording Procedures

The finished product was a three to five minute individual audio mastery rehearsal tape ready to be used by swimmers in

the experimental group of this study. The first step when making the individual audio mastery rehearsal tape was to record the subject reading his or her script onto track one of the four track recorder. When the taping was completed, background music chosen by the subject was recorded onto track three and four of the Tascam. Track two is available for special effects such as crowd noise, but is not always utilized. The final step was remixing the voice and music together and transferring that mix onto a blank cassette tape. At that point, the voice and music levels were adjusted for pleasurable listening.

#### Collection of Data

Subjects were members of the University of Kansas swimming team. Subjects were asked to volunteer at the beginning of the 1995-1996 swimming season. Research data were collected on two occasions. The head coach and investigator selected two swimming competitions taking place at the University of Kansas within a short period time of one another. For this study, as near identical competitions, as well as convenience to the athletes was a priority. The head coach indicated that the two swim competitions selected would most likely elicit equal emotional and physical responses. A letter written to the investigator, from the head coach, outlined reasons why he felt the two competitions were equal in nature (Appendix D). The investigation was submitted to the

University of Kansas Advisory Committee on Human Experimentation (ACHE) and was approved (Appendix E).

Research data were collected just prior to the swim competitions. The day before the first swim competition, the investigator addressed all of the subjects, informing them of the procedures of the research. The subjects were informed that they would be involved in a research study (specifically with the swim team) being conducted at the by the Peak Performance Clinic at the University of Kansas. Subjects were informed that, on two occasions prior to competitions, they would be asked to complete a short questionnaire. Additionally, it was explained that 25 of the swimmers would be asked to be involved in some additional research being conducted in the clinic the following week. All graduate students and staff involved in the Peak Performance Clinic were asked not to produce any mastery rehearsal tapes with any member of the swim team until after the research was completed. Subjects (N = 50) were all administered the CSAI-2 within one hour of the Crimson & Blue Meet, (the first swim competition), held in Lawrence, Kansas, October 13, 1995. This meet was an intersquad competition that the head coach assured was as intense as any other meet particularly because it was the first competitive situation of the year. Subjects were then allocated to control (n=25) and experimental (n=25) groups through randomization. The randomization process was simply the assigning of a number to

each subject, then by using a table of random numbers, splitting the subjects (N=50) into two equal groups. At the end of the first practice after the first swim meet, the experimental group was informed who they were, and with the help of the head coach, an experimental group meeting to begin the mastery rehearsal tape process was scheduled. At this meeting with the experimental group, the outline (Appendix C) for writing individual mastery rehearsal scripts was discussed, and the investigator helped the subjects begin the script writing process. An appointment to make the individual audio tape in the Peak Performance Clinic was scheduled with each of the experimental subjects at this time. All experimental subjects were individually given directions for how to utilize their audio tape during the taping process in the clinic. The experimental subjects were told, "starting three days prior competition day the tape was to be listened to each day, in the morning, at least once during the day, and just before going to bed. On the day of the swim meet, listening to the tape just before taking the CSAI-2 was added to the procedures. These directions were also written out and provided to each experimental subject with their individualized audio mastery rehearsal tape three days prior to the second swim competition.

Following the utilization of an individual audio mastery rehearsal tape by the experimental group (n=25), all subjects (N=50) were administered the CSAI-2 within one hour of the

Southern Illinois Meet (the second swim competition), held in Lawrence, Kansas, October 27, 1995. This swim meet was a competition between men and women swimmers from the University of Kansas and swimmers from Southern Illinois University. In a letter to the investigator, the head swim coach at the University of Kansas assured the investigator that the Southern Illinois Meet was very comparable to the Crimson and Blue Meet (Appendix D).

### Analysis of Data

Although, a number of studies had already declared the CSAI-2 to be reliable (Martins et al., 1990), Cronbach's alpha coefficients were computed for each of the three subscales by combining the pretest data from both groups. Determining a Cronbach's alpha in this case, was a check to make sure the CSAI-2 was reliable with the specific population involved in the study. Since the Cronbach's alpha coefficients were high ( $> .6$ ), indicating good internal consistency, means for each subscale were computed for each subject and used in further analyses.

Three two-way analysis of covariance (ANCOVA) were performed to look at differences between gender and group, as well as possible interaction between gender and group, for each subscale. The pretest subscale values were used as the covariate in the ANCOVA. All data analyses were examined using the .05 level of significance.

Scheffe Post hoc analyses were used to examine any interaction effects. Because a statistically significant covariate was used in the analysis, adjusted means were used for all post hoc tests. Basic means and standard deviations were computed for the nine follow-up questions data.

## CHAPTER FOUR

### Results and Discussion

#### Introduction

The purpose of this study was to examine the effects of an individual mastery rehearsal audio tape on cognitive anxiety, somatic anxiety, and self confidence of NCAA Division-I swimmers in competitive situations. Pre-competition intensity levels of cognitive anxiety, somatic anxiety, and self-confidence were measured via the Competitive State Anxiety Inventory-2 (CSAI-2) (Martins et al., 1990), (Appendix A). In addition, gender differences were also examined.

A secondary purpose involved describing experimental group subjects' opinions of their individual mastery rehearsal audio tape, via a follow-up questionnaire (Appendix B).

This investigation was conducted using the University of Kansas men's and women's intercollegiate swim team. Twenty-five male and twenty-five female swimmers were subjects in this study. The data were collected during the Fall 1995 swimming season. An inventory consisting of three subscales that measured cognitive anxiety, somatic anxiety, and self-confidence was utilized (Martins et al., 1990). Subjects within the experimental group were also asked to indicate their personal opinions on the intervention strategy. All data derived from athletes who completed the study as directed were included in the analyses.

Although, a study using three different sample populations had already declared the CSAI-2 as being reliable (Martins et al., 1990), a Cronbach's alpha coefficient was computed for each of the three subscales by combining the pretest data from both groups. Determining a Cronbach's alpha in this case was a check to make sure the CSAI-2 was reliable with the specific population involved in the study. Since the Cronbach's alpha coefficients for each one of the subscales were high ( $> .6$ ), indicating good internal consistency, means for each subscale were computed for each subject and used in further analyses.

Three two-way analysis of covariance (ANCOVA) were performed to look at differences between gender and group, as well as possible interaction between gender and group, for each subscale. The pretest subscale values were used as the covariate in the ANCOVA. All data analyses were examined using the .05 level of significance. Means, and standard deviations were computed on data from the nine follow-up questions.

### Findings

The findings derived from this investigation are presented in this section. First, demographic information will be provided on the subjects. Secondly, data obtained from the Cronbach's alpha coefficients will be presented. Third, data obtained from the three separate ANCOVAs examining differences between gender and group, as well as possible interaction between

gender and group for the subscales cognitive anxiety, (CSAI-2-cog), somatic anxiety, (CSAI-2-som) and self-confidence, (CSAI-2-sc), will be presented. Finally, means and standard deviations from the nine follow-up questions will be presented.

There were 50 University of Kansas men's and women's intercollegiate swimmers who volunteered to participate in the study. Of those 50, forty eight were utilized for the data analyses for this study. One of the subjects was not used because she became injured and unable to participate in the second swim meet. The other subject was not used because he was no longer with the team at the time of the second swim meet. The subjects were randomly divided into either the control group or the experimental group. Table 1 presents the demographic information of the subjects.

Separate alpha coefficients were computed for the three CSAI-2 subscales for the subjects in the study. A high alpha coefficient ( $> .6$ ), indicates good internal consistency. Cronbach's alpha coefficients were .85 for CSAI-2-cog, .84 for CSAI-2-som and .90 for CSAI-2-sc, demonstrating a high degree of internal consistency for each of the CSAI-2 subscales (Table 2).

Table 1

Demographic Information of all the subjects

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Subjects	Number
Total Subjects	50
Usable Subjects	48
Usable Male Subjects	24
Usable Female Subjects	24
Control Group Subjects	24
Experimental Group Subjects	24

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Table 2

Cronbach alpha coefficients of CSAI-2 Subscales

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Sample	N	CSAI-2-cog	CSAI-2-som	CSAI-2-sc
Swimmers	48	.85	.84	.90

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Note. Alpha >.6 indicates high internal consistency

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A 2 X 2 analyses of covariance (ANCOVA) were conducted for the three subscales of cognitive anxiety, somatic anxiety and self-confidence scores. The factors were the intervention and gender. Intervention was divided into two levels, an experimental group which utilized a mastery rehearsal audio tape and a control group which received no tape. Gender was divided into male and female. The dependent variables were scores on CSAI-2-cog, CSAI-2-som, and CSAI-2-sc; and the covariates were pretest scores on the three subscales.

ANCOVA for cognitive anxiety subscale scores indicated no significant interaction between the intervention and gender,  $F(1, 47) = 1.93, p = .172$ , and no significant main effect for gender,  $F(1, 47) = .292, p = .592$ . Significant main effects were found for the intervention factor,  $F(1, 47) = 7.27, p = .01$  (Table 3).

Table 3

2 X 2 ANCOVA for CSAI-2 Cognitive Anxiety Score by Intervention & Gender

Groups	N	Adjusted M	df	F-ratio	P
Intervention			1,47	7.27	.01*
Experimental	24	16.60			
Control	24	20.01			
Gender			1,47	.292	.592
Male	24	17.97			
Female	24	18.65			
Intervention by Gender			1,47	1.93	.172

\* Significant at .05

For somatic anxiety subscale scores ANCOVA indicated no significant interaction between the intervention and gender,  $F(1, 47) = .11, p = .739$ , and no significant main effect for gender,  $F(1, 47) = 0.34, p = .561$ . However, significant main effects were found for the intervention factor,  $F(1, 47) = 8.7, p = .005$  (Table 4).

Table 4  
2 X 2 ANCOVA for CSAI-2 Somatic Anxiety Score by Intervention & Gender

Groups	N	Adjusted M	df	F-ratio	P
Intervention			1,47	8.70	.005*
Experimental	24	15.06			
Control	24	18.52			
Gender			1,47	.344	.561
Male	24	16.45			
Female	24	17.13			
Intervention by Gender			1,47	.11	.739

\* Significant at .05

ANCOVA for self-confidence subscale scores indicated no significant interaction between the intervention and gender,  $F(1, 47) = 1.36, p = .25$ , and no significant main effect for gender,  $F(1, 47) = 0.37, p = .548$ . However, significant main effects were found for the intervention factor,  $F(1, 47) = 10.49, p = .002$  (Table 5).

Table 5  
2 X 2 ANCOVA for CSAI-2 Self-Confidence Score by Intervention & Gender

Groups	N	Adjusted M	df	F-ratio	P
Intervention					
Experimental	24	27.27	1,47	10.49	.002*
Control	24	23.85			
Gender					
Male	24	25.90	1,47	.367	.548
Female	24	25.22			
Intervention by Gender			1,47	1.36	.25

\* Significant at .05

Means for the nine additional follow-up questions were obtained for each of the subjects in the experimental group (Table 6). These questions evaluated the subjects' opinions about specific aspects, as well as the effectiveness of the mastery rehearsal audio tape. The first eight of these nine questions were on a 4 point Likert scale with 1 being, "not at all," 2, "somewhat," 3, "moderately so," and 4, "very much so. The final question, number nine, was on a 3 point Likert scale with 1 being, "1-4 times," 2, "5-8 times," and 3, "9 or more times. The means for the questions were 2.71, 2.71, 3.00, 3.17, 1.88, 2.80, 3.50, 3.33, and 2.21 respectively.

Table 6

Means & Standard Deviations for the 9 Follow-Up Questions

Question #	Mean	S.D.
1	2.71	.859
2	2.71	.999
3	3.00	.834
4	3.17	.917
5	1.88	.947
6	2.80	.884
7	3.50	.794
8	3.33	.761
9	2.21	.658

Note. Questions:

1. = This tape lowered my pre-meet anxiety...
2. = This tape helped my performance...
3. = This tape increased my confidence...
4. = I was satisfied with the tape...
5. = Listening to my own voice distracted me...
6. = These two swim meets were equivalent...
7. = The background music was an important...
8. = I would utilize this technique again...
9. = I listened to my tape a total of...

## Discussion

In this section, results presented earlier will be discussed. First, the demographic information will be discussed. Next, data from Cronbach's Alpha Coefficient will be discussed relative to the three CSAI-2 subscales, cognitive anxiety, (CSAI-2-cog), somatic anxiety, (CSAI-2-som) and self-confidence, (CSAI-2-sc). Then, data from three separate ANCOVAs examining differences between gender and group, as well as possible interaction between gender and group for the subscales cognitive anxiety, (CSAI-2-cog), somatic anxiety, (CSAI-2-som) and self-confidence, (CSAI-2-sc), will be discussed. Finally, basic means will be discussed relative to the nine follow-up questions.

### Demographic Information

Fifty University of Kansas men and women intercollegiate swimmers volunteered to participate in the study. Forty eight were utilized for the study. No previous research has been published which studied the effects of the individual mastery rehearsal audio tape on as large a sample as this study did.

### Cronbach's Alpha

Separate alpha coefficients were computed for the three CSAI-2 subscales of cognitive anxiety, (CSAI-2-cog), somatic anxiety, (CSAI-2-som) and self-confidence, (CSAI-2-sc). Determining a Cronbach's Alpha in this case, was a check to make sure the CSAI-2 was reliable with the specific population involved in this study of NCAA Division I swimmers.

Alpha coefficients were high, meaning this was a very reliable tool for measuring this particular population. This finding was consistent with data obtained by Martens et al (1990).

#### Cognitive Anxiety - CSAI-2-cog

ANCOVA for cognitive anxiety indicated that there was no significant interaction between the intervention and gender and no significant main effect for gender. However, significant main effects were found for the intervention factor. This indicated that the mastery rehearsal tape was an effective tool for both male and female subjects. Although similar positive results have been established with mastery rehearsal and performance, none have been related to cognitive anxiety (Kendall et al., 1982, Noel, 1980, Vernacchia and Cook, 1989, 1993). However, the effectiveness of a mastery rehearsal tape relative to cognitive anxiety supported findings that declared that anxiety can be reduced through anxiety management training (Lanning and Hisanaga, 1983). The positive results of the findings of this study can also be attributed to the individualization of the mastery rehearsal tapes. Seabourne et al. (1985) and Silva, (1982) found it was important to individualize mental training techniques.

#### Somatic Anxiety - CSAI-2-som

ANCOVA for somatic anxiety indicated that there was no significant interaction between the intervention and gender and

no significant main effect for gender. However, significant main effects were found for the intervention factor. This indicated that the mastery rehearsal tape was an effective tool for both male and female subjects. Although similar positive results have been established with mastery rehearsal and performance, none have been related to somatic anxiety (Kendall et al., 1982, Noel, 1980, Vernacchia and Cook, 1989, 1993). However, the effectiveness of a mastery rehearsal tape relative to somatic anxiety supports findings that declare that anxiety can be reduced through anxiety management training (Lanning and Hisanaga, 1983). A study by Gould et al. (1987) found that somatic anxiety was more influential than cognitive anxiety during performance. Interestingly, the individual mastery rehearsal tape was shown to be most effective in reducing somatic anxiety. The positive results of the findings of this study can also be attributed to the individualization of the mastery rehearsal tapes. Seabourne et al. (1985) and Silva, (1982) found it was important to individualize mental training techniques.

#### Self-Confidence CSAI-2-sc

ANCOVA for self-confidence indicated that there was no significant interaction between the intervention and gender and no significant main effect for gender. However, significant main effects were found for the intervention factor. This indicated that the mastery rehearsal tape was an effective tool for both

male and female subjects. Although similar positive results have been established with mastery rehearsal and performance, none have been related to self-confidence (Kendall et al., 1982, Noel, 1980, Vernacchia and Cook, 1989, 1993). However, the effectiveness of a mastery rehearsal tape relative to self-confidence enhanced such findings that declared that self-confidence is a predictor of performance (Burton, 1988). A study by McAuley (1985b) concluded that implementing techniques for maintaining self-confidence during performance might positively influence the outcome. Interestingly, the individual mastery rehearsal tape was shown to be just as effective in increasing self-confidence as in reducing anxiety. The positive results of the findings of this study can also be attributed to the individualization of the mastery rehearsal tapes. Seabourne et al. (1985) and Silva, (1982) found it was important to individualize mental training techniques.

### Follow-Up Questions

Nine additional follow-up questions were analyzed to evaluate the experimental group's personal opinions about the mastery rehearsal audio tape. It was thought that these questions would give additional information on the subjects' opinions about specific aspects, as well as the effectiveness of the mastery rehearsal audio tape.

The first of these nine questions asked if "this tape lowered my pre-meet anxiety". The mean for this question was

2.71, indicating that most thought it did just less than moderately so. Question #2 asked if "this tape helped my performance". The mean for this question was 2.71, indicating that most thought it did just less than moderately so. The third question asked if "this tape increased my confidence". The mean for this question was 3.00, indicating that most thought it did moderately so. Question #4 asked if "I was satisfied with the tape". The mean for this question was 3.17, indicating that most thought it did just a little more than moderately so. The fifth question asked if "listening to my own voice distracted me from concentrating on the words". The mean for this question was 1.88, indicating that most thought it did just less than somewhat. Question #6 asked whether "these two swim meets were equivalent in their significance to me". The mean for this question was 2.80, indicating that most thought it did just less than moderately so. Question #7 asked if "the background music was an important part of the overall effect of the imagery tape". The mean for this question was 3.25, indicating that most thought it did more than moderately so. The eighth question asked if "I would utilize this technique again to help enhance my potential for success". The mean for this question was 3.33, indicating that most thought they would more than moderately so. Lastly, question #9 asked "I listened to my tape prior to the meet a total of". The mean for this question was 2.21, indicating

that most listened to their tape more than 5-8 times prior to the meet.

These findings produced interesting results important to the making and utilization of an individualized mastery rehearsal audio tape. It was particularly evident that most of the subjects were satisfied with their tapes to the extent that they would utilize the technique again. Subjects especially indicated the importance of the background music. This was supportive of Cratty (1989) who recommended music to heighten mental imagery.

#### Implications

The findings of this study showed a significant decrease in pre-competition cognitive as well as somatic anxiety before and after the utilization of an individual mastery rehearsal audio tape. Additionally, after the utilization of the individual mastery rehearsal audio tape, swimmers showed significant increases in pre-competition self-confidence. The idea of using an individual mastery rehearsal audio tape before competition to decrease anxiety and increase self-confidence is relatively new (Kendall et al., 1982, Noel, 1980, Vernacchia and Cook, 1989, 1993). There has been little previous empirical research that has tested the effects of an individual mastery rehearsal audio tape.

This investigation provides valuable information to coaches, athletes or any person trying to decrease anxiety or

increase self-confidence before a competition. It may be that mentally experiencing a perfect athletic performance prior to the actual competition offers the ideal opportunity for decreasing anxiety and increasing self-confidence. The individual mastery rehearsal audio tape provides such an opportunity.

The individual mastery rehearsal audio tape requires that the athlete script out his or her perfect performance. The script is designed so the athlete is strictly positive, showing no fear, and trusting in his or her own abilities. The findings indicated that the individual mastery rehearsal audio tape was successful in achieving these goals.

A noteworthy finding of this study was that there were no gender differences relative to the effectiveness of the individual mastery rehearsal audio tape. This indicated that any athlete, male or female, has the same opportunity to decrease anxiety and increase self-confidence before a competition.

Additional findings from the follow-up questions gave solid indications that the background music was important, and should be selected with this in mind. Also, the athletes were so satisfied with the tape, to the extent that they stated they would utilize an individual mastery rehearsal audio tape again to help enhance their potential for success.

The utilization of an individual mastery rehearsal audio tape may provide an ideal method for coaches and athletes

trying to address the problem of anxiety or the pursuance of self-confidence. The individual mastery rehearsal audio tape may also be the most practical method when considering the relative short time it takes to produce the tape.

## CHAPTER FIVE

### Summary, Conclusions, and Recommendations

#### Summary

The purpose of this study was to examine the effects of an individual mastery rehearsal audio tape on cognitive anxiety, somatic anxiety, and self confidence of NCAA Division-I swimmers in competitive situations. Pre-competition intensity levels of cognitive anxiety, somatic anxiety, and self-confidence were measured via the Competitive State Anxiety Inventory-2 (CSAI-2) (Martins et al., 1990), (Appendix A). In addition, gender differences were also examined. A secondary purpose involved completion of follow-up questions (Appendix B) which examined intervention group subject's perceptions of his or her individual mastery rehearsal audio tape.

This review of literature examined the relationship between anxiety, self-confidence, and athletic performance. The use of mental practice in sport was an effective supplement to any physical training program to enhance performance (Feltz & Landers, 1983). Additionally, in this review, mastery rehearsal audio tapes have been shown to aid in sport performance (Kendall et al., 1982, Noel, 1980, Vernacchia and Cook, 1989, 1993). However, the specific indications of mental training are not yet fully understood (Seabourne et al. 1985). It is still unclear as to the realm of imagery use in sport and the effectiveness of audio tapes as a mechanism for increased

confidence or decreased anxiety. Through this review, the knowledge of the effects of a mastery rehearsal audio tape on anxiety and self-confidence was a potentially rewarding research undertaking.

This investigation was conducted using the University of Kansas men's and women's intercollegiate swim team. Twenty-five male and twenty-five female swimmers were subjects in this study. The data were collected in the fall of 1995 utilizing the Competitive State Anxiety Inventory-2 (CSAI-2) consisting of three subscales that measured cognitive anxiety, somatic anxiety, and self-confidence (Martins et al., 1990).

Three two-way analysis of covariance (ANCOVA) were performed to look at differences between gender and group, as well as possible interaction between gender and group, for each subscale. Subjects within the experimental group were also asked to indicate their personal opinions on the intervention strategy.

The ANCOVA indicated no significant interaction between the intervention and gender and no significant main effect for gender relative to each of the three subscales. However, significant main effects were found for the intervention factor for each of the three subscales. Thus, indicating the statistically significant effectiveness of mastery rehearsal tapes for both male and female subjects.

Nine additional follow-up questions were analyzed to evaluate the experimental group's personal opinions about the mastery rehearsal audio tape. These questions gave additional information on the subjects' opinions about specific aspects, as well as the effectiveness of the mastery rehearsal audio tape. The feedback from the subjects' responses was generally positive relative to the effectiveness of the intervention. Additionally, subjects indicated a willingness to utilize the technique in the future.

### Conclusions

Based on the findings of this study, the following conclusions were made:

1. Individualized mastery rehearsal audio tapes were helpful in reducing cognitive anxiety.
2. Individualized mastery rehearsal audio tapes were helpful in reducing somatic anxiety.
3. Individualized mastery rehearsal audio tapes were helpful in increasing self-confidence.
4. The individualized mastery rehearsal audio tape was just as helpful in reducing cognitive anxiety and somatic anxiety in females as in males.
5. The individualized mastery rehearsal audio tape was just as helpful for increasing self-confidence in females as in males.

6. Athletes were most often satisfied with their audio tape.
7. Background music was an important part of the overall effect of the individualized mastery rehearsal audio tape.
8. Athletes would utilize the individualized mastery rehearsal audio tape technique frequently.

### Recommendations

Based on the results of this study, the following recommendations are made:

1. It is recommended that further studies be conducted examining the use of a mastery rehearsal audio tape with different sports.
2. It is recommended that further studies be conducted examining the use of a mastery rehearsal audio tape with different competitive levels.
3. It is recommended that studies be done examining the effect of mastery rehearsal audio tapes on performance.
4. It is recommended that studies be done examining differences in the effectiveness of mastery rehearsal audio tapes between athletes in different positions and or events within a given sport.

5. It is recommended that future studies examine effects of different types of music utilized in the making of mastery rehearsal audio tapes.

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## APPENDICES

APPENDIX A  
Competitive State Anxiety Inventory-2

## Self-Evaluation Questionnaire

KUID #: \_\_\_\_\_ Sex: M F Date: \_\_\_\_\_

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate *how you feel right now* at this moment. There are no right or wrong answers. Do *not* spend too much time on any one statement, but choose the answer which describes your feelings *right now*.

	Not At All	Somewhat	Moderately So	Very Much So
1. I am concerned about this competition.....	1	2	3	4
2. I feel nervous.....	1	2	3	4
3. I feel at ease.....	1	2	3	4
4. I have self-doubts.....	1	2	3	4
5. I feel jittery.....	1	2	3	4
6. I feel comfortable.....	1	2	3	4
7. I am concerned that I may not do as well in this competition as I could.....	1	2	3	4
8. My body feels tense.....	1	2	3	4
9. I feel self-confident.....	1	2	3	4
10. I am concerned about losing.....	1	2	3	4
11. I feel tense in my stomach.....	1	2	3	4
12. I feel secure.....	1	2	3	4
13. I am concerned about choking under pressure.....	1	2	3	4
14. My body feels relaxed.....	1	2	3	4
15. I'm confident I can meet the challenge.....	1	2	3	4
16. I'm concerned about performing poorly.....	1	2	3	4
17. My heart is racing.....	1	2	3	4
18. I'm confident about performing well.....	1	2	3	4
19. I'm concerned about reaching my goal.....	1	2	3	4
20. I feel my stomach sinking.....	1	2	3	4
21. I feel mentally relaxed.....	1	2	3	4
22. I'm concerned that others will be disappointed with my performance.....	1	2	3	4
23. My hands are clammy.....	1	2	3	4
24. I'm confident because I mentally picture myself reaching my goal.....	1	2	3	4
25. I'm concerned I won't be able to concentrate	1	2	3	4
26. My body feels tight.....	1	2	3	4
27. I'm confident of coming through under pressure.....	1	2	3	4

APPENDIX B  
Follow-Up Questions

## Follow-up Questions

KUID#: \_\_\_\_\_ Sex: M F Date: \_\_\_\_\_

Directions: Read each statement and then circle the appropriate number to the right of the statement. There are no right or wrong answers.

	Not At All	Somewhat	Moderately So	Very Much So
1. This tape lowered my pre-meet anxiety.....	1	2	3	4
2. This tape helped my performance.....	1	2	3	4
3. This tape increased my confidence.....	1	2	3	4
4. I was satisfied with the tape.....	1	2	3	4
5. Listening to my own voice distracted me from concentrating on the words.....	1	2	3	4
6. These two swim meets were equivalent in their significance to me.....	1	2	3	4
7. The background music was an important part of the overall effect of the imagery tape...	1	2	3	4
8. I would utilize this technique again to help enhance my potential for success.....	1	2	3	4
9. I listened to my tape prior to the meet a total of .....	1-4 times		5-8 times	9 or more times

APPENDIX C

Mastery Rehearsal Tape Script Outline

## INDIVIDUAL MASTERY REHEARSAL OUTLINE

### Paragraph I. Introduction: "It's Competition Day"

- What are the things that you do on meet days that prepare you for a successful race and that set it apart from other days.
- Focus on general positive thoughts and feelings about yourself, your training and the competition.

### Paragraph II. Warm-Up:

- Begin to go through your warm-up routine for next race.
- Begin to OBSERVE the environment around you. (Competitors, people, places and things, etc.)
- Internal intensity and focus begins to become more acute.
- Begin to pick general "ready cues." (Feeling relaxed, loose, energized, etc.)
- Go through your specific race STRATEGY. (What is your strategy for the upcoming race?)

### Paragraph III. The Competition:

- Focus is turned to "performance cues." (I feel strong, I feel relaxed, etc.)
- Go through "Mental Focusing Routine" - Two Steps
  - 1) PICTURE STRATEGY - (As you walk to the blocks immediately prior to your race.)  
Picture yourself going to the blocks with confidence.
  - 2) TRUST - Believe in yourself. Let it happen.  
Develop a one word or phrase cue to focus on in the blocks.
- Highlight the race. "Make a highlight film of your perfect race. Describe how water feels; what it feels like to glide through water effortlessly; feelings you have had during your best swims "
- Focus in on positive performance cue words and goals throughout the competition.

### Paragraph IV. Conclusion:

- Conclude your tape by focusing in on the positive feelings that you have after a great performance. (Feelings of satisfaction, joy, excitement, etc.)
- Here are some examples of different feelings and thoughts that people have during their best performances. These might be similar to yours; however, you may also have different ones.

Physically Relaxed  
Automatic  
Energized  
Self-Confident

Effortless  
Low Anxiety  
Mentally Focused  
Enjoyment

Mentally Calm  
Alert  
Optimistic  
In-Control

APPENDIX D  
Letter From Head Coach



**THE UNIVERSITY OF KANSAS**  
**DEPARTMENT OF INTERCOLLEGIATE ATHLETICS**

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Allen Fieldhouse • Lawrence, Kansas 66045-8333

September 28, 1995

Scott Ward

Dear Scott,

Our athletes and staff are pleased to be a part of your doctoral research. Please feel free to call or come by the swim office in Allen Fieldhouse; or stop by practice in Robinson natatorium anytime. We will try to accommodate you and your research as best we can.

After we discussed your research, I looked at our schedule, and it would be best for our athletes and your study if you used the October 13th - Crimson/Blue Meet, and the October 27th - Southern Illinois Meet. I feel these two competitions fulfill your need to have the competitions as equal as possible. Both meets take place at Robinson and all our swimmers will be competing.

Although the Crimson-Blue meet is an intrasquad competition, I am sure the intensity will be there, especially since we use the results to determine our travelling squad. Again, as far as all things being equal, I suggest these two meets.

Remember, if we can assist you in any other way, please don't hesitate to ask.

Sincerely,

Gary Kempf  
Swimming & Diving Coach

"Home of the Kansas Jayhawks"

APPENDIX E  
ACHE Approval

THE UNIVERSITY OF KANSAS  
Advisory Committee on Human Experimentation  
(ACHE)

Research Support and  
Grants Administration

October 11, 1995  
ACHE #9731

D. Scott Ward  
4020 Parkway Court  
Lawrence, Kansas 66047

The Advisory Committee on Human Experimentation has reviewed your research project application:

9731 Ward/Cook (HPER) The Effects of an Individual Audio Mastery Rehearsal Tape on Self-Confidence and Anxiety of Intercollegiate Varsity Swimmers

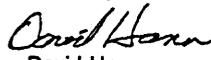
and found that, as described, it complied with all the requirements and policies established by the University for protection of human subjects in research. The proposal is exempt from the usual Committee review under category (b) (2) of 45 CFR part 46.46.101. The subjects will not be at risk. The Committee assumes that voluntary participation and confidentiality of individual responses is understood.

1. At designated intervals until the project is completed, a Project Status Report must be returned to the ACHE office, about a month before the anniversary date of your project approval.
2. Any significant change in the experimental procedure as described should be reviewed by this Committee prior to altering the project.
3. Any injury to a subject because of the research procedure must be reported to the Committee immediately.

Please inform ACHE when this project is terminated. You must also provide ACHE with an annual status report to maintain ACHE approval. If your project receives funding which requests an annual update approval, you must request this from ACHE one month prior to the annual update. Thanks for your cooperation. If you have any questions please contact me.

cc: Research Support: Strong Hall  
Faculty Supervisor: Dr. David Cook  
Department: HPER

Sincerely

  
David Hann  
ACHE Coordinator