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**The effects of visuomotor behavior rehearsal on Tang Soo Do performance**

**Johnson, Clifton Lee, D.A.**

**Middle Tennessee State University, 1990**

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The Effects of Visuo-motor Behavior Rehearsal  
on Tang Soo Do Performance

Clifton L. Johnson

A dissertation presented to the  
Graduate Faculty of Middle Tennessee State University  
in partial fulfillment of the requirements  
for the degree Doctor of Arts

August, 1990

The Effects of Visuo-motor Behavior Rehearsal  
on Tang Soo Do Performance

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## Abstract

### The Effects of Visuo-motor Behavior Rehearsal on Tang Soo Do Performance Clifton L. Johnson

The purpose of this study was to determine if mental rehearsal, combined with relaxation techniques, improves Tang Soo Do performance more than mental rehearsal or relaxation techniques used separately. The subjects were selected from members of the Memphis State Karate Club and assigned to either a VMBR, mental rehearsal, relaxation, or placebo group. State, trait, and pre-competition anxiety tests were administered at the beginning and end of the study, as well as skills evaluations. The subjects practiced their mental strategy daily and met for skills practice twice a week for the duration of the six weeks of the study. A one-way analysis of variance was computed to determine differences between pre- and post-data between groups. The 0.05 level was used to determine significant differences. The F probabilities for the pre- and post-measures did not reach the 0.05 level of significance necessary to reject the null hypotheses for any of the groups before or after the introduction of the mental strategies. No significant differences were found among the groups.

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## CHAPTER 1

### Introduction

Oriental martial arts have recently become popular as activity classes in physical education and as sports clubs in colleges and universities in the United States. Their popularity may be due in part to their ability to fill the gap for those students who are not satisfied with traditional activity classes or sports clubs (Min, 1979). Traditional oriental martial arts emphasize unity of mind, body and spirit through physical training. Stated in another way, the perfection of the self instead of competition with others is the goal of the traditional martial artist.

The traditional martial artist strives to obtain the state of "mushin." "Mushin" is an ego-less mind set, which liberates one from fear and allows one to perform to his maximum potential. This meditative feature is often overlooked in western sports (Min, 1979). Although orientals have studied the mental aspects of physical activity for a considerable time, the importance of the connection between the cognitive and the physical is relatively new in western culture (McCollough, 1987).

Robert Nideffer (1976), in his book The Inner Athlete, acknowledged the special importance placed on mental

development in the martial arts. Nideffer liberally uses examples of training procedures and demonstrations of martial arts prowess to give insight into mental and physical integration. This increasing importance being placed on the mental aspects of athletics in the United States can be seen in the number of books being written on the subject, the number of sports psychology classes being taught in the universities, and the amount of research in the area.

In the United States the increased demand for improvement in athletic performance has led to an increase in anxiety for athletes (Weinberg, Seabourne, & Jackson, 1981). The martial arts, in the United States, have not been totally removed from the demands of increased athletic performance. There has been a tendency for some martial artists in the United States to emphasize the competitive aspects of the martial arts. Terms such as "sport karate," "tournament karate," "free-style karate," and "American karate" have emerged. Consequently, those engaged in competitive martial arts will be searching for improved methods to continually improve athletic performance.

One method recommended for improving athletic performance, by reducing stress, is relaxation training. Some techniques used in relaxation training are meditation, autogenic training, EMG biofeedback and progressive muscle relaxation training, which is often referred to as PMR

(Brandon & Poppen, 1985). Other techniques have been developed to allow athletes to practice their skills mentally or remove mental blocks which interfere with the athlete's performance. Peter Cahill (1987) asserted that the human mind can not perceive the dissimilarity between reality and imagination.

Using the concept that the mind does not distinguish between mental imagery and reality, Chuck Norris would mentally practice fighting his opponents once a week. On Sundays Norris would not train physically, but he would visualize the techniques that a particular opponent would use against him in a tournament. Norris would then visualize himself overcoming his opponent with techniques which would work against that particular opponent. Norris found that in actual bouts he defeated many of his opponents using the same techniques he had mentally practiced. Norris developed his ability to mentally practice to the point that during a tournament when he would have to compete against an opponent he had previously not seen, he would watch the athlete compete and then would mentally fight that person. Norris could then step into the ring and often win using the same technique he had just mentally rehearsed (Norris, 1975).

John Andre (Andre & Means, 1986) contended that the effects of mental practice on physical performance has been studied by researchers for more than 70 years. Cybernetic



training was introduced by Roan (1978) in his article, "Introduction to Mental Training for the Competition Athletes." W. P. Morgan (1972) explored the use of "Hypnosis and Muscular Performance." Cognitive behavior training was studied by Horton and Shelton (1978).

Jacobson (1938) introduced progressive relaxation with a book entitled Progressive Relaxation. The sentic cycle was investigated by Benson (1975) in The Relaxation Response. Other methods such as autogenic training (Lee & Hewitt, 1987), Zen (Nideffer, 1976), yoga (Nideffer, 1976), transcendental meditation (Nideffer, 1976), and biofeedback (Nideffer, 1976) have all been used to improve physical performance (Lanning & Hisanga, 1983).

Richard Suinn (1972), Department of Psychology at Colorado State University, published a case report involving a client who was a doctoral candidate. The doctoral candidate was obviously capable, but he had failed his oral exams twice even while under the influence of tranquilizers. Suinn developed visuo-motor behavior rehearsal and visualization to help the candidate.

Visuo-motor behavior rehearsal required the candidate to be relaxed and then to mentally visualize himself being quizzed by his examiners. The key to success was that the candidate experienced the stress of an actual examination along with the accompanying mental blocks. The candidate was taught to slowly break down the mental blocks and gain

control of the situation. After the practice sessions the candidate was eventually able to pass his oral examination (Suinn, 1972).

Noting the possibilities of visuo-motor behavior rehearsal, Richard Noel (1980) studied its effects on tennis performance. As a master's thesis Kolonay (1977) studied the effectiveness of visuo-motor behavior rehearsal in increasing the accuracy of shooting free-throws in basketball. Robert Weinberg, Thomas Seabourne, and Allen Jackson (1981) conducted a study at North Texas State University to ascertain if the use of visuo-motor behavior rehearsal would improve karate performance more than the use of visualization or relaxation used separately.

Traditionally, martial artists are taught meditational techniques in order to work toward developing the state of "mushin" or state of no mind. The emphasis is on acquiring a relaxed state of concentration. The skilled martial artist will react to the relevant cues and ignore the rest. The state of "mushin" is to facilitate this process of discrimination. However, the degree of arousal the individual needs is usually not directly addressed. The individual is expected to discover this for himself. The use of visualization is usually not directly addressed by teachers of the martial arts effectively.

This study replicated the Weinberg, Seabourne, and Jackson (1981) study at North Texas State University in an

effort to add to the body of knowledge in this field of study.

#### Statement of the Problem

The purpose of the study was to determine if mental rehearsal, combined with relaxation techniques, improves Tang Soo Do performance greater than mental rehearsal or relaxation techniques used separately.

#### Significance of the Study

Traditional martial arts embraced the concept of teaching by not teaching. Stated in another way, the martial arts teachers taught the basics of the art by demonstration. The students imitated their teacher with little or no verbal instruction. The main principle is that when the student discovers for himself why the technique is taught as is, the student would have a greater understanding of the technique than if it had been verbally explained to him. Although this appears inefficient, one must remember that the goal of traditional martial arts is self-development and not competition. In the orient the student studies the martial arts as a lifetime commitment. Time is not the pressing element of the study.

However martial arts tend to adapt themselves to the culture in which they are introduced. In the United States physical activity tends to involve itself in sport and winning. To develop this further, some Americans study the martial arts to compete in tournaments. These competitors

expect to be taught those techniques which are the most expedient to help them obtain their goal of winning. The information obtained from this study will hopefully benefit those teachers of the martial arts who seek more effective ways of teaching their competing students.

#### Delimitations

The study was limited to the following:

1. The study was limited to members of the Memphis State Karate Club at Memphis State University during the fall semester of 1989.
2. The subjects of the experiment met twice a week for six weeks for practice.
3. The study addressed anxiety and its relation to Tang Soo Do performance. The study did not address ability as a facilitating factor between the mind and the body.

#### Definitions

Definitions of terms contained in the study are as follows:

Anxiety--"A general fear foreboding, a personality trait marked by a lower threshold to stressful events" (Cratty, 1984, p. 286).

Arousal--"The mind-body tension that compliments optimal performance" (Ogilvie & Howe, 1984, p. 31).

Choking--"The rapid shallow breathing that results from high anxiety that can rob one of stamina" (Tutko & Tosi, 1976<sup>b</sup>, p. 34).

Concentration--". . . the ability to focus on an object or experience as it is taking place" (Nelson, 1988, p. 16).

Confidence--"Putting oneself into the state of mind and body most conducive to achieving his or her best" (Tutko & Tosi, 1976<sup>a</sup>, p. 107).

Hypnosis--"The uncritical acceptance of suggestion by a subject who is in a trance" (Blucher & Llewellyn, 1982, p. 108).

Imagery--"Imagining the specific situation in which you must perform" (Taylor, 1981, p. 91).

Mental fitness--"The state of optimal preparedness" (Taylor, 1981, p. 93).

Mental preparation--"Achieving a psychological state conducive to successful sports performance" (Blucher & Llewellyn, 1982, -. 108).

Mental Rehearsal--"Entering a state of relaxation to prepare the inner world (one's mind) to match the other world (the athletic event) and in the process, prime one-self internally to relate only to that which contributes something of substance to their anticipated performance" (Garfield, 1985<sup>b</sup>, p. 64).

Motivation--"A tendency to carry out a particular set of behaviors" (Howe, 1986, p. 1).

Optimum Performance--"The highest possible performance for an individual or team limited by physiological and physical parameters" (Howe, 1986, p. 2).

Peak performance--"the ability to reach into oneself and draw upon sources of energy and inspiration that usually transcends every-day experience" (Garfield, 1985<sup>a</sup>, p. 61).

Relaxation--"an antithetical response to fear, anxiety, and other negative emotions, as one can not feel relaxed and anxious at the same time" (Nelson, 1988, p. 16).

Sparring--the motions of attack and defense with arms and legs as a part of training.

Stress--"an internal reaction, an intervening variable between situations and performance" (Cratty, 1984, p. 288).

Tang Soo Do--way of the China hand. A Korean martial art similar to karate.

Tension--"an overt muscular contraction caused by an emotional state or by increased effort" (Cratty, 1984, p. 288).

Transcendental meditation--"induced physiological changes inversely related to anxiety including reduced heart beat and respiration, decreased blood pressure and relaxation of muscles" (Taylor, 1981, p. 91).

Visualization--"creating pictures, sounds and sensations to add to one's mental rehearsal, enriching it" (Garfield, 1985<sup>b</sup>, p. 65).

Visuo-motor behavior rehearsal (VMBR)--a strategy of mental training developed by Richard Suinn. It consists of

relaxation, visualization under stress, and skill performance during simulated stress (Suinn, 1972).

#### Basic Assumptions

The following basic assumptions of the study are:

1. The Spielberger, Gorsuch and Lushene trait anxiety inventory is a valid and reliable measure of trait anxiety.
2. The basic skills test is a valid and reliable measure of Tang Soo Do skills.
3. The Marten's competitive short form is a valid and reliable measure of the subjects practicing their mental strategy.

#### Hypotheses

For the purposes of this study, the following hypotheses have been developed:

1. There is no difference for state trait anxiety among the groups.
2. There is no difference for heart rates among the groups.
3. There is no difference for the basic skills among the groups.
4. There is no difference for combinations among the groups.
5. There is no difference for the sparring among the groups.
6. There is no difference in state anxiety among the groups.

7. There is no difference in pre-competition anxiety among the groups.

#### Background for the Study

Legend traces the beginnings of the oriental martial arts to a Buddhist monk named Bodhidharma (Daruma Taishi). Bodhidharma traveled from India to China on foot and alone to teach Zen Buddhism to the Chinese. Distressed by the poor physical condition of his disciples, Bodhidharma began to teach his disciples a method of self-defense to build up their physical condition. These self-defense exercises were later to spread throughout China with many martial arts schools being established.

From China, organized martial arts spread throughout the Orient. Later they found their way to the island of Okinawa. Okinawa was controlled by the Japanese, who made it illegal to possess weapons. In this environment, empty-handed techniques were refined. During the 1920's, several Okinawan martial arts masters introduced their arts to Japan. These arts are today collectively called karate--way of the empty hand.

Korea was invaded by the Japanese in 1910. The Japanese made the practice of traditional Korean martial arts illegal. Many of the Koreans went to Japan, Okinawa, and China to study the martial arts. One of these young Koreans was Hwang Kee. After the Japanese surrender in 1945, Hwang Kee returned to Korea to found the Tang Soo Do



Moo Duk Kwon school of martial arts in Seoul, South Korea. Tang Soo Do was a combination of native Korean martial arts and Chinese martial arts. There are similarities between karate and Tang Soo Do.

Tang Soo Do puts more emphasis on kicking techniques than karate. Tang Soo Do was first brought to the United States by United States servicemen who had been stationed in Korea. Later, Korean masters would come to the United States to teach their art.

The primary emphasis of physical training is the development of skill in hyungs. Hyungs are pre-arranged series of techniques which are arranged in a set pattern. Hyungs could be described as traditional martial arts dances. One's skill in hyungs can not be strong unless one has been solidly trained in the basics. Basics consist of stances, blocks, strikes, punches and kicks. Because of the increased emphasis being placed on sparring, some teachers of Tang Soo Do have developed combinations to bridge the gap from basics to free-sparring. Combinations are basic techniques put together in such a manner to enhance one's ability to smoothly flow from one technique to the next.

This study used performance of basic skills, combinations, and free-sparring as measures of Tang Soo Do skill. Hyungs were not included because this study is to examine the effects of various types of mental training on free-sparring competition in tournaments.

## CHAPTER 2

### Review of Related Literature

Sports have become highly competitive in today's world. Coaches and athletes continually strive to improve athletic performances. Coaches have begun to recognize the importance of psychological preparation of athletes. Meditation and hypnotic suggestion have been employed in recent Olympic competitions with mixed results. It appears that the mixed results of the psychological techniques are due to a lack of conceptual framework that allows us to know when and how much of a technique should be used (Nideffer, 1976).

Coaches often want their athletes "psyched up." They believe that if the athlete is not excited, his performance will be careless or flat. A relaxed athlete is a sign of impending failure to this type of coach (Nideffer, 1976). However, we know that too much stress is detrimental to peak athletic performance. This means that there must be a level of arousal that will produce maximum results for a particular individual performing a particular skill. Michele Kort (1986) refers to this state as "optimal arousal."

Kort (1986) described the optimal arousal state as varying from individual to individual and from the various

sports. For optimal arousal to be present the emotional level must be synchronized to the activity. Robert Weinberg pointed out that higher levels of arousal are required for gross motor tasks while low levels of arousal are required for fine motor tasks (Weinberg & Genuchi, 1980).

Bruce Ogilvie (1984) insisted that the purpose of a mental workout is to create a harmonious state between the body and the mind. In the martial arts this harmony of the mind and body is referred to as "Mushin." Mushin means having the state of "no mind" or, put more poetically, the mind is like "a still mill pond reflecting the moon." The mind is relaxed reflecting that which comes against it. To be "one with the opponent" means to be very relaxed while reflecting the opponent's intensity. To reach such a state one would have to be a highly skilled performer. The more confident athlete is relaxed but very focused on the task at hand, ignoring irrelevant cues.

Jim Taylor (1981) declared that there should be enough anxiety for competition but not too much to detract performance. Alan Lee (Lee & Hewitt, 1987) maintained the stress of competition can "psych people out" or it can "psych people up" (p. 223) making them better performers. Robert Niedffer (1976) suggested that in performance of skills muscle tension must be controlled. The use of the terms anxiety, stress, and tension have often been used and definitions for these terms are dependent upon the

researcher's viewpoint and approach. The meanings of the terms have changed somewhat over the years in conjunction with increased knowledge in the field (Cratty, 1973).

Anxiety is generally accepted today as a personality trait. It is an individual's general foreboding with a noticeable lower threshold to stressful events. State anxiety refers to a temporary condition brought on by a specific stimuli. Trait anxiety refers to a stable dimension of one's personality (Cratty, 1973). The Taylor Scale of Manifest Anxiety and an anxiety scale from the Institute of Personality and Ability Testing have been the most often used instruments for measuring anxiety. Cratty charged that these scales have been used incorrectly to evaluate transitory conditions. However, Cratty reports that The State Trait Anxiety Inventory by Spielberger, Gorsuch and Lushene claim to measure both state and trait anxiety (Cratty, 1973).

Two other types of anxiety have been linked with physical performance. Harm anxiety is associated with one's fear of physical injury during performance of the event. Failure anxiety is the fear that one will not perform up to standard during execution of the event. Failure anxiety may often be stronger than harm anxiety (Cratty, 1973).

Stress has been studied for more than 30 years by Hans Selye (1956). The basis of Selye's stress theory is identification of a general adaptation syndrome to

stressors. Selye noted that common stressors are disease, injury, fatigue, pain, thirst, threat, frustration, and aging. Adaptation to stressors is usually separated into the three categories of alarm stage, resistance stage, and the exhaustion stage. Although the term stress was formerly used to describe the stressor, the term stress is currently being used to describe the stage between the situation and the performance. Stress is usually evaluated by taking cardiovascular and respiratory measures. Some researchers use adrenal secretions and changes in blood cells as indications of stress (Cratty, 1973). Tension is a term used to refer to an overt muscular contraction resulting from an emotional condition or to increased physical effort (Cratty, 1973).

Since there is an optimal level of arousal for peak performance, the ability to relax can be an important asset to those athletes who become tense. Autogenic training was developed by a German physician named Johannes Schultz. The book Autogenic Training was written by Wolfgang Luthe to outline Schultz's relaxation techniques. Schultz discovered that when he hypnotized his patients, the patients shared the common experience of being very relaxed. Schultz developed standard relaxation exercises, which people could perform alone to reduce anxiety, from his experiences with his patients (Nideffer, 1976).

Steven Danish (Danish & Hale, 1983) declared that Jacobson's progressive relaxation procedure is one of the oldest and most popular of the relaxation techniques. Jacobson described and promoted progressive relaxation in his book Progressive Relaxation, published in 1938. The book Autogenic Training by Luthe did not reach the United States until 1959 (Nideffer, 1976). The subjects were taught by Jacobson to tense various parts of the body and then relax them. They then repeated the procedure tensing only half as hard the following time. The theory is that the subject will eventually be able to recognize muscle tension and then be able to reduce the excess tension (Cratty, 1973).

Hypnosis has also been used to enhance athletic performance. Hypnosis has been used to treat fear, increase visual imagery, increase confidence by reliving past success, increase relaxation, reduce pain, and increase concentration (Nideffer, 1976). Hypnosis can be divided into four phases. The first phase or induction is the words given to the subject to prepare him for the hypnotic state. Phase two is the hypnotic state in which the suggestions are given. Phase three is bringing the subject out of the hypnotic state. Phase four is the post-hypnotic state. Often suggestions given in phase two are supposed to affect the subject in phase four (Nideffer, 1976).

Although one might be very enthusiastic about the use of hypnosis for mental preparation of athletes, there are problems associated with its use. Only 10 percent of the population is capable of manifesting all of the phenomena of hypnosis. Eighty percent of the population can manifest some of the phenomena and 10 percent will have no response to hypnosis, whereas 45 percent of athletes are able to use autogenic training beneficially. The next major problem is the lack of competent hypnotists. Although a coach could learn to induce a hypnotic state on a susceptible athlete, only a competent hypnotist could be prepared for possible ramifications of the suggestions given (Nideffer, 1976).

John Andre (Andre & Means, 1986) proclaimed that for almost seventy years the relationship between mental practice and physical performance has been researched. Andre added that a substantial amount of the research is weak methodologically. However, under certain circumstances Andre affirmed that mental practice is a performance enhancer, because muscles react to the mental images as if the movement were an act of the conscious. Robert Singer (1977) affirmed this position when he claimed that mental imagery is more than a picture in the mind, because of the measurable physiological responses that can accompany mental imagery.

Suinn (1976) argued that the mental image acts as a self-fulfilling prophesy. Suinn also noted that the

difference between a dream and mental imagery is that the mental image is under conscious control. Robert Woolfolk (Woolfolk, Murphy, Gottesfeld, & Aitken, 1985), in line with Suinn's self-fulfilling prophesy, elaborated that imagery which entails a successful outcome is a more effective enhancer of performance than mental imagery of the skill alone.

Steven Danish (Danish & Hale, 1983) recognized mental imagery as being internal and external. To perform external imagery, one imagines that one is on the sideline watching oneself perform the skill. To perform internal imagery, one imagines the scene as it appears to the performer as he executes the skill. One would actually experience muscle contractions when practicing internal imagery. In regard to karate free fighting, external imagery would be how the match appears from the stands. Internal imagery would be one's imagined reactions to the opponent's actions as seen from one's own eye view.

Danish (Danish & Hale, 1983) contends that external imagery is best used by a beginner who is trying to learn the skill. Internal imagery is to be used after external imagery has been used to visually correct technique flaws. Richard Noel (1980) argued that imagery was most appropriate for highly skilled athletes and lower skilled athletes could gain more from actual practice than from imagery. Bruce Ogilvie (1984) concurred with Noel by exhorting that imagery



could not make up for a lack of basic skill development. Peter Cahill (1987) indicated that results from mental practice are not immediate. Daily practice of 20-40 minutes duration is needed in conjunction with physical practice.

Steven Danish (Danish & Hale, 1983) has enunciated that confidence, consistency and strategy can result from proper mental preparation. That arousal state appropriate for competition can be achieved by practice of visualization and mental rehearsal was announced by Michele Kort (1986), while Eileen Nelson (1988) exclaimed that mental imagery goes far beyond its usage in the field by most professionals.

In 1978 L. R. T. Williams, at the University of Otago, Duendin, New Zealand, carried out a study to determine if transcendental meditation changes the acquisition of fine perceptual-motor skills by way of mirror tracing. The study results indicated that there was not significant difference of fine perceptual-motor skills acquisition between those who used transcendental meditation and those who did not (Williams, 1978).

McNeill Horton, Jr. and Kenneth Shelton (1978) studied the effects of cognitive strategies on intercollegiate wrestlers at The Citadel, Charleston, South Carolina, in 1978. The study was performed with four wrestlers who were determined not to be achieving their full potential. The wrestlers were instructed on irrational beliefs and

relaxation techniques. After the treatment the wrestlers demonstrated a 44 percent level of improvement compared to their pre-treatment records.

The relationship between competitive trait anxiety, state anxiety and golf performance was examined by Robert Weinberg and Marvin Genuchi (1980) at North Texas State University. Ten golfers with low competitive trait anxiety, ten golfers with medium competitive trait anxiety, and ten golfers with competitive trait anxiety were the subjects. The results indicated that sports involving fine motor coordination are performed best with low anxiety levels.

Wayne Lanning and Bruce Hisanga (1983) studied the relationship between a program designed to reduce competition anxiety and athletic performance. The program used twenty-four female volleyball players from a high school on Oahu, Hawaii in 1983. The subjects were chosen because they had at least fifteen service attempts. They were pre-tested with SCAT and assigned to a treatment or a control group. The treatment group received seven 30 minute sessions of Jacobson's relaxation training. The results indicated a significant level of improvement for the treatment group.

In 1985, Jeffrey Brandon and Roger Poppen (1985) compared Behavior Relaxation Training, meditation and attention focusing as relaxation training procedures. Thirty-three subjects were chosen, and four dependent

measures were used as relaxation measures. The four measures were the Behavior Relaxation Scale, E.M.G., skin conductive level, and a self-report. The results indicated that Behavior Relaxation Training, meditation and attention focusing are effective for relaxation training. It should also be noted that meditation and attention focusing are common martial arts training techniques.

Carolyn Wood (1986) studied the effect of meditation and relaxation on the physical performance of fine motor and gross motor tasks. Wood's study was conducted as part of a Ph.D. dissertation at the University of Oregon in 1986. Wood could find no significant difference in the performance of gross or fine motor skills between those who meditated and those who did not.

The use of progressive relaxation and hypnosis to increase a beginner's ability to learn basic tennis skills was studied by Scott Greer and Rugh Engs (1986) at Indiana University. Ninety students were assigned equally to either progressive relaxation, hypnosis, or to a control group. The results indicated that progressive relaxation and hypnosis were not more effective than traditional methods of tennis instruction. The findings of this study concurred with Richard Noel and Bruce Ogilvie that beginners are better off concentrating on physical practice.

Andrzej Wojeikiewicz and Terry Orlick (1978) studied the effects of post-hypnotic suggestion and relaxation with

suggestion on fencing performance at the University of Ottawa in 1987. The results show a significant difference between the hypnotic group and the control group for perceived level of anxiety. There was a significant difference between the hypnotic and relaxation groups to the control group in regard to estimated level of task difficulty. There were no significant differences found on performance measures.

Robert Woolfolk, Shane Murphy, David Gottesfeld, and David Aitkens (1985) investigated the effect of imagery instruction on putting a golf ball at Rutgers University in 1985. Fifty subjects were assigned to either a positive outcome with performance, negative outcome with performance, performance only, positive outcome only, negative outcome only, and control group. Results indicate that imagining a positive outcome has greater influence on performance than mental rehearsal of the task movements. Results also indicate that negative imagery may be more powerful in its effect to damage performance than positive imagery in improving performance.

Robert Weinberg, Allen Jackson, and Thomas Seabourne (1985) examined the effects of specific versus non-specific mental preparation on strength and endurance performance. Twenty-four volunteers performed four performance tasks under four different mental preparation conditions. The four experimental conditions were imagery, preparatory

arousal condition, psych-up condition, and control condition. The four performance tasks were sit-ups, push-ups, pull-ups, and broad jumps. The results indicated no differences between any of the mental preparations.

John Andre and John Means (1986) investigated the effects of slow-motion rate of imagery on the putting stroke in Frisbee golf. The subjects were the psychology majors at the University of Montana. The subjects were randomly assigned to either a standard mental practice group, slow-motion mental practice group, and a control group. There were no significant differences between the treatment groups and the control group. The experimenters pointed out that the results were not consistent with the body of knowledge in the field.

Alan Lee and Jay Hewitt (1987) analyzed the effects of visual imagery in a flotation tank to improve gymnastic performance and reduce physical symptoms. Forty-four female gymnasts were the subjects of the study. The skill levels of the subjects were novice and intermediate. The subjects were assigned to either the visual imagery on the mat, visual imagery in the flotation tank, or the control group. The dependent variables were performance scores at a state meet and a physical systems check list. Although the visual imagery flotation group performed the best, it did not reach the appropriate level of significance.

Richard Noel (1980) of California State College studied the effect of visuo-motor behavior rehearsal (VMBR) on tennis performance. Fourteen male tennis players were recruited as subjects for the study. They were all classified as a high ability or a low ability player. Players were randomly assigned to either the VMBR or control group. The VMBR group used Jacobson's relaxation techniques and the visualization of arriving to the match, warming up and practicing the serve. The dependent variable was a tabulation of the percentage of good first and second serves during the first set of a tournament match. Results indicated performance improvement of high ability VMBR players, but not to a level of significance. There was a deterioration of performance for lower ability VMBR players, possibly indicating that high ability performers are more effective in the use of mental practice. Players of lower ability might be able to benefit more from physical practice than mental rehearsal.

Jeffrey Gray, Marilyn Haring, and Mark Banks (1984) explored the effects of preparatory arousal manipulation and the rehearsal strategy on physiological arousal, self-reported state anxiety, image vividness, and control and personal expectations for future performance. The subject was a college varsity football player preparing for a bowl game. Three sessions were conducted the week before the game. The mental rehearsal consisted of either active or

sedentary and either a recovery from errors or a mastery strategy. Each session contained a combination of rehearsal strategies that was different each session. A relaxation procedure was used during the second session. The subject's anxiety was measured by the Marten's Sport anxiety test and skin conductance. Image control and vividness were checked by Switras' survey of mental imagery. Efficiency expectations were determined by the subject's estimation of the coach's rating of the subject. Results indicated that physiological arousal increased during mental rehearsal. It appears that there might be a range of arousal most conducive to mental rehearsal. The results from the skin conductance test were in conflict with the Sport Competition Anxiety Test, indicating the anxiety test did not mirror increases in arousal. Relaxation also appeared to lower image vividness.

Thomas Seabourne, Robert Weinberg, and Allen Jackson (1985) considered the effects of individualized practice and training of visuo-motor behavior rehearsal in enhancing karate performance. The subjects were students from two karate classes. One class was designated as the VMBR group, while the other class was designated as the placebo control group. The VMBR group initially performed poorer with their karate skills, but the VMBR group performed significantly better than the control group on trials two and three.

Robert Weinberg, Thomas Seabourne, and Allen Jackson (1987) investigated the effects of preceding imagery by arousal or relaxation on the quality of imagery and performance of karate skills and muscular endurance. The subjects were students enrolled in a self-defense class. The students were matched based on their abilities and then they were assigned at random to either the arousal-imagery, relaxation-imagery, or control group. The dependent variables were karate techniques, muscular endurance (sit-up test for one minute and three minute roundhouse wall kick drill), and state anxiety measured by the competitive state anxiety inventory and Thayer's adjective checklist. The experiment lasted for sixteen weeks. The results indicated that the relaxation-imagery group performed significantly better than the other groups on the measurements of karate skills. Nothing reached a level of significance.

The effects of individualized, non-individualized, and package intervention strategies on karate performance were explored by Thomas Seabourne, Robert Weinberg, and Allen Jackson (1984). The subjects were forty-three male college students enrolled in a beginning karate class. The subjects were assigned to a group by random selection. The four groups were the individually tailored mental strategy group, a group (Yoked) whereby the subject was given the same strategy as a counterpart in the individually tailored group, a group (Package) using Suinn's "Seven Steps to Peak



Performance," a placebo group which studied early Chinese writings, and a control group which had no particular mental strategy. The results indicate that the individualized and package groups performed significantly better than the other groups on karate performance. No other significant differences were found.

Robert Weinberg, Thomas Seabourne, and Allen Jackson (1981) explored the effects of visuo-motor behavior rehearsal, relaxation and imagery on karate performance. Subjects were assigned at random to a VMBR, relaxation, imagery, or attention placebo group. The subjects were given trait anxiety tests at the beginning and end of the testing period. State anxiety was measured prior to physical performance of karate skills. The results indicated that all subjects demonstrated a lowering of trait anxiety. The VMBR and relaxation groups displayed a lower state of anxiety level than the imagery and attention placebo group. The results of the physical performance tests disclosed that the VMBR group had a better physical performance than the other groups.

In summation, it should be noted that although Brandon and Poppen (1985) found meditation effective for invoking relaxation, that does not necessarily transfer to improved performance. L. R. T. Williams (1978) found that Trancendental Meditation did not enhance performance. Carolyn Wood (1986) could find no significant difference of

the effects of meditation-relaxation on the performance of fine and gross motor skills, and Greer and Engs (1986) found that relaxation and hypnosis did not facilitate the learning of beginning tennis skills more than traditional methods. Wojcikiewicz and Orlick (1978) found that post-hypnotic suggestion and relaxation techniques lowered anxiety, but did not improve performance.

However, Lanning and Hisanga (1983) found that improved performance can result from a lowered anxiety in volleyball. Weinberg and Genuchi (1980) found that sports that require fine motor skills and coordination are best performed at lower levels of anxiety. It appears that the athlete's level of arousal must be at the level appropriate for the task at hand. If the level of arousal does not match the demands of the task, peak performance can not be reached. The mission of mental preparation is to prepare the athlete to meet those demands.

Carron (1965) conducted a study on the effects of introducing shock stress on the performance of a balancing task using high anxious and low anxious college males. Carron found that if the tasks were of a low level of difficulty, the high anxious subjects performed better. The low anxious subjects performed best on tasks of a higher level of difficulty. Carron also found that previous experience with the task reduced the effects of stress.

Oxendine (1970) listed five levels of arousal appropriate for sport skills. The normal state is labeled as zero. The levels increase up to level five, which is extremely excited. Wrestling and judo are at level four. Boxing is listed as a level three skill. Oxendine indicated that a boxer who loses control is at risk from a boxer who remains at the optimal arousal level. One might assume that the arousal level for karate free sparring is similar to that of boxing.

It would appear that anxiety reduction and optimal arousal are necessary components of mental fitness. If the athlete is too tense, physical performance will be negatively affected and injury could result (Lee & Hewitt, 1987). Eileen Nelson (1988) suggests that athletes who are mentally fit and perform at peak level have a high level of intensity with a deep sense of inner calmness. Nelson also indicates that concentration should be characterized by an awareness of being loose and confident. Nelson described concentration as "the effortless effort of not trying" (p. 16).

Visualization and mental rehearsal appear to enhance the arousal state. Although Lee and Hewitt (1987) could find no significant level of improvement in gymnastic performance using imagery in a flotation tank, it appears the body of research supports mental imagery or rehearsal as an effective technique in improving physical performance.

Weinberg, Seabourne, and Jackson (1987) found that imagery was enhanced by preceding it with relaxation. However, Gray, Haring, and Banks (1984) found that arousal induction was associated with higher levels of image vividness than preceding it with relaxation. Weinberg, Jackson, and Seabourne (1985) studied the effects of specific versus non-specific mental preparations and found performance significantly better than the control group. However, there was no difference found between the different mental preparations. Horton and Shelton (1978) preceded mental strategy with relaxation but did not find it to improve physical performance to a level of significance.

Andre and Means (1986) could find no significant difference in the rate of imagery in mental practice. Seabourne, Weinberg, and Jackson (1985) found that individuals with a personalized mental strategy performed karate combinations and sparring significantly better than individuals with non-individualized strategies. Robert Woolfolk (Woolfolk, Murphy, Gottesfeld, & Aitken, 1985) found that depiction of the outcome of the performance to be more important than visualization of the performance. Thoughts of a negative outcome appeared to affect performance more than any other strategy, albeit in a negative way. It appears, therefore, that a mental fitness program should contain a personal anxiety evaluation, a program of relaxation or arousal, mental rehearsal with a

positive outcome and the implementation of the mental strategy into a stressful situation similar to the event.

Seabourne, Weinberg, and Jackson (1984) found that VMBR, when used as a mental strategy for karate, lowered state anxiety significantly and improved physical performance. Richard Noel (1980) applied VMBR to the performance of tennis. Noel found that highly skilled players improved while less skilled players' performances declined when using VMBR. Weinberg, Seabourne, and Jackson (1981) compared VMBR to relaxation and imagery used separately to enhance karate performance. The VMBR and the relaxation group had significantly lower pre-competitive state anxiety. The VMBR group had a significantly better performance in sparring.

The application of the mental strategy to a stressful situation appears to aid transfer of learning to an actual situation. If the individual has confidence in his mental strategy, proven in a similar situation he would probably be less apt to choke during the actual situation. If the individual is skilled in the basics of the activity, motivated, is relaxed, has the optimal arousal level, and has practiced an appropriate mental strategy, performance should go from the optimum level to the peak level.

## CHAPTER 3

### Methods

The purpose of this study was to determine if mental rehearsal, combined with relaxation techniques, improves Tang Soo Do performance more than mental rehearsal or relaxation techniques used separately. It was conducted during the fall semester of 1989 at Memphis State University. The study was a replication of the Robert S. Weinberg, Thomas G. Seabourne and Allen Jackson study of the "Effects of Visuo-motor Behavior Rehearsal, Relaxation and Imagery on Karate Performance" conducted at North Texas State University.

#### Subjects

The subjects were selected from male and female members of the Memphis State Karate Club, with ages ranging from 18 to 35, and whose skill levels varied from beginner to black belt. The subjects were required to sign an informed consent form before their participation in the study (see Appendix A). Initial ability for each subject was determined by performance of basic skills and combinations. The subjects met twice a week for a six week period of time, and were required to turn in their daily manipulation checks once a week.

### Groups

The subjects were assigned to one of four groups: the mental rehearsal-relaxation group (VMBR), mental rehearsal group, relaxation group, or placebo group. The assignments were based on the scores of the basic skills and combinations tests. The experimenter was unaware of the identity of the subjects as the assignments were made, and remained so throughout the study. There were initially eight subjects in each group, each group with equivalent initial skill level.

### Tests

The subjects' performance was rated by an uninvolved black belt using a five point Likert scale (see Appendix B). In the Weinberg, Seabourne and Jackson study interrater reliability for all subjects for skill, combinations, and sparring was .90, .95, and .92, respectively. The subjects' performance of sparring was determined by averaging points scored in each one minute bout in a round-robin, no-contact tournament. The subjects were divided into a "light" or "heavy" group with the "heavy" group being six feet tall or taller (see Appendixes C and D).

The Spielberger, Gorsuch and Lushene trait anxiety inventory and the Spielberger, Gorsuch and Lushene state anxiety inventory were administered at the beginning and end of the study to determine if there were any changes in state or trait anxiety (see Appendixes E and F). Marten's

competitive short form (see Appendix G) was administered immediately prior to the pre- and post-round-robin tournaments to determine if there were any changes in pre-competition anxiety. Each subject also took his own resting heart rate, to determine if there were any changes in heart rate, using standard procedures developed by Pollack, Broida and Dendrick.

### Procedures

During the first meeting, the researcher explained the purpose of the study, and all who agreed to participate in the study signed an informed consent form (see Appendix A). The subjects then completed the Spielberger, Gorsuch and Lushene trait anxiety inventory (see Appendix E), and the Spielberger, Gorsuch and Lushene state anxiety inventory (see Appendix F) which took approximately 15 minutes.

The last item for the first meeting was a determination of initial skill of each subject by administering the basic skills and combinations tests (see Appendix B). The subjects were rated by an uninvolved black belt using a five point Likert scale. In the Weinberg, Seabourne and Jackson study, interrater reliability for basic skills and combinations was .90 and .95, respectively. For example, if the subject was being tested on the side kick, the subject performed the kick ten times consecutively and received a score from one to five for each kick. The total score was subsequently averaged to get a final score. The basic



skills consisted of performing skills considered essential to Tang Soo Do performance. Each of the individual skills scores was combined to derive an average score for basic skills. Combinations are more difficult, because they are various individual skills linked together. The scores for the combinations were computed on the same basis as the basic skills.

During the second meeting the subjects took their own resting heart rate using standard procedures developed by Pollack, Broida and Dendrick. The researcher, unaware of the identity of the subjects, assigned each subject to one of the four groups based on the scores on basic skills and combinations. To control for any initial ability differences, they were matched according to their performance during the first meeting and assigned to the groups during the second meeting.

Each group was taken into a separate room and given instruction for practice of its mental strategy by the uninvolved black belt instructor. The instructor read the home practice handout (see Appendixes H-K) which was given to each subject and answered any questions before leading them through an actual practice session. The subjects were instructed to practice their mental strategy for twenty minutes a day for the six weeks duration of the study. The subjects were instructed to answer questions about the effectiveness of their mental strategy. These daily

questions or manipulation check questions for each group are found in Appendixes L-N.

The measure of free-sparring ability was taken the second week of practice. The subjects' performance of sparring was determined by averaging the number of points scored in each one minute bout in a round-robin tournament. The subjects were divided into a "light" or "heavy" group with the "heavy" group being six feet or taller (see Appendixes C and D). The Marten's competitive short form was administered immediately prior to the round-robin tournament (see Appendix G).

The posttest measures were taken during the sixth week of the study. The posttest measures of anxiety began with each subject completing the Spielberger, Gorsuch and Lushene trait anxiety inventory and the Spielberger, Gorsuch and Lushene state anxiety inventory. The Marten's short competitive form of pre-competition anxiety was also given. The subjects took their resting heart rate using the Pollack, Broida and Dendrick procedure. In the post-round-robin tournament, the subjects were given three minutes between each bout to practice their mental strategy. During the last meeting the black belt instructor re-evaluated the subjects' basic skills and combinations. All measures were computed on the same basis as the pretests.

### Analysis of Data

Means and standard deviations were calculated for the dependent variables. A one-way analysis of variance (ANOVA) was computed to determine differences between pre- and post-data between groups. The 0.05 level was used to determine significant differences.

## CHAPTER 4

### Analysis

The purpose of this study was to determine if mental rehearsal combined with relaxation techniques improves Tang Soo Do performance more than mental rehearsal or relaxation techniques used separately. In this study the independent variable was the mental strategy used by the subjects to improve their Tang Soo Do performance. The dependent variables were the subjects' performances of skills and their anxiety levels.

#### Basic Skills

The means and standard deviations for basic skills are found in Table 1. The mean for the relaxation group's pre-basic skills score was .5011, while the post-mean was .6254 and the standard deviation was 1.469. The mean for the visualization group for pre-basic skills was .4287, with a standard deviation of .0985. A mean score of .5398 and a standard deviation of .0856 was recorded as visualization post-measures. The pre-VMBR mean was .4808, with a standard deviation of .0980. The post-VMBR mean was .5602, with a standard deviation of .1328. The placebo mean for pre-basic skills was .5125, with a standard deviation of .2569. The post-mean for the placebo group was .5758, with a standard deviation of .2145.

Table 1  
Means and Standard Deviations  
of Basic Skills

	Group	N	Mean	Standard Deviation
Pre	Relaxation	8	.5011	.0909
	Visualization	6	.4287	.0985
	VMBR	5	.4808	.0980
	Placebo	4	.5125	.2569
Post	Relaxation	8	.6254	.1469
	Visualization	6	.5398	.0856
	VMBR	5	.5602	.1328
	Placebo	4	.5758	.2145

A one-way ANOVA was used to determine if the groups' performances differed from one another enough to reject the null hypothesis of no difference for the basic skills among the groups. Table 2 shows that among the groups the measures of basic skills taken during the pretest had an F probability of .7297, while the post-measures had an F probability of .7200. The F probability for the pre- and post-measures did not reach the .05 level of significance necessary to reject the null hypothesis of no difference for basic skills among the groups before or after the introduction of the mental strategy.

#### Combinations

In Table 3 the mean for the relaxation group pre-combinations is .4939, with a standard deviation of .1098, while the post-mean was .6350 with a standard deviation of .1582. The visualization group had a mean of .4032 and a standard deviation of .1048 for pre-measures, while the group completed the study with a mean of .5268 and a standard deviation of .1104. The VMBR group had a pre-mean of .4718 and a standard deviation of .1101 as compared to the post-mean of .5224 and a standard deviation of .1657. A mean of .4473 with a standard deviation of .2412 was computed for the placebo group for the pre-measures, while the post-measures revealed a mean of .5415 with a .2045 standard deviation.

Table 2  
Analysis of Variance of the Basic Skills

	Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	Computed F Ratio	F Probability	One-way
Pre	Between Groups	3	.0236	.0079	.4361	.7297	No significant difference at 0.05 level
	Within Groups	19	.3429	.0180			
	Total	22	.3665				
Post	Between Groups	3	.0282	.0094	.4503	.7200	No significant difference at 0.05 level
	Within Groups	19	.3964	.0209			
	Total	22	.4246				

Table 3  
Means and Standard Deviations  
of the Combinations

	Group	N	Mean	Standard Deviation
Pre	Relaxation	8	.4939	.1098
	Visualization	6	.4032	.1048
	VMBR	5	.4718	.1101
	Placebo	4	.4473	.2412
Post	Relaxation	8	.6350	.1582
	Visualization	6	.5268	.1104
	VMBR	5	.5224	.1657
	Placebo	4	.5415	.2045



A one-way ANOVA was used to determine if the groups' performances differed from one another to reject the null hypothesis of no difference for combinations among the groups. Table 4 shows that among the groups the measures of combinations taken during the pretest had an F probability of .6738, while the post-measures had an F probability of .5115. The F probability for the pre- and post-measures did not reach the .05 level of significance necessary to reject the null hypothesis of no difference for combinations among the groups before or after the introduction of the mental strategy.

#### Sparring

In Table 5 a mean score of 2.3581 points per match during pre-round-robin tournament for the relaxation group with a standard deviation of .8028 is shown. The relaxation group had a mean score of 2.315 points per match during the post-round-robin tournament with a standard deviation of .8977. The visualization group had a mean score of 2.115 and a standard deviation of 1.3622 for the pre-round-robin tournament, while the post-round-robin mean was 2.0823 with a standard deviation of 1.5767. The VMBR group had a pre-mean of 2.4088 with a standard deviation of .6173, while the post-mean was 2.4652 with a standard deviation of .6827. The placebo control group had a pre-mean of 2.3735 with a standard deviation of 1.0391, while the post-mean was 2.207 with a standard deviation of .8594.

Table 4  
Analysis of Variance of the Combinations

	Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	Computed F Ratio	F Probability	One-way
Pre	Between Groups	3	.0297	.0099	.5198	.6738	No significant difference at 0.05 level
	Within Groups	19	.3624	.0191			
	Total	22	.3921				
Post	Between Groups	3	.0592	.0194	.7954	.5115	No significant difference at 0.05 level
	Within Groups	19	.4713	.0248			
	Total	22	.5305				

Table 5  
Means and Standard Deviations  
of the Sparring

	Group	N	Mean	Standard Deviation
Pre	Relaxation	8	2.3581	.8028
	Visualization	6	2.1150	1.3622
	VMBR	5	2.4088	.6173
	Placebo	4	2.3735	1.0391
Post	Relaxation	8	2.3150	.8977
	Visualization	6	2.0823	1.5767
	VMBR	5	2.4652	.6827
	Placebo	4	2.2070	.8594

A one-way ANOVA was used to determine if the groups' performances differed from one another enough to reject the null hypothesis of no difference for the sparring among the groups. Table 6 shows the F probability among the groups for pre-sparring is .9553, while the F probability among the groups for the post-sparring is .9447. The F probability for the pre- and post-measures did not reach the .05 level of significance necessary to reject the null hypothesis of no difference for sparring among the groups or after the introduction of the mental strategy.

#### Pre-competition Anxiety

Prior to the sparring, each subject took the Marten's competitive short form as a measure of competition anxiety. In Table 7 the mean level of pre-competition anxiety for the relaxation group was 18.625 with a standard deviation of 4.7491, while the post-measures revealed a mean of 18.25 and a standard deviation of 4.7132. Table 7 also shows the visualization group had a pre-mean of 20.1667 and a standard deviation of 6.0139, while the post-mean was 21.0 with a standard deviation of 5.8992. A mean of 25.2 with a standard deviation of 4.4385 was determined for the pre-VMBR measures; however, the mean lowered to 24.6 with a standard deviation of 5.2249 during the posttesting. The placebo group had a pre-mean of 20.75 and a standard deviation of 2.2174, while the post-mean was 21.0 with a standard deviation of 4.1633.

Table 6  
Analysis of Variance of the Sparring

	Source of Variation	Degree of Freedom	Sum Squares	Mean Squares	Computed F Ratio	F Probability	One-way
Pre	Between Groups	3	.3116	.1039	.1064	.9553	No significant difference at 0.05 level
	Within Groups	19	18.5533	.9765			
	Total	22	18.8649				
Post	Between Groups	3	.4338	.1446	.1240	.9447	No significant difference at 0.05 level
	Within Groups	19	22.1506	1.1658			
	Total	22	22.5844				

Table 7  
Means and Standard Deviations  
of Pre-competition Anxiety

	Group	N	Mean	Standard Deviation
Pre	Relaxation	8	18.6250	4.7491
	Visualization	6	20.1667	6.0139
	VMBR	5	25.2000	4.4385
	Placebo	4	20.7500	2.2174
Post	Relaxation	8	18.2500	4.7132
	Visualization	6	21.0000	5.8992
	VMBR	5	24.6000	5.2249
	Placebo	4	21.0000	4.1633

A one-way ANOVA was used to determine if the groups' performances differed from one another enough to reject the null hypothesis of no significance for pre-competition anxiety among the groups. Table 8 indicates the F probability among the groups for the pre-competition anxiety was .1470, while the post-F probability was .2206. The F probability for pre- and post-measures did not reach the .05 level of significance necessary to reject the null hypothesis of no difference for pre-competition anxiety among the groups before or after the introduction of the mental strategy.

#### Trait Anxiety

Table 9 shows the relaxation group had a pre-mean of 40.125 with a standard deviation of 12.1236, while the post-mean was 35.75 with a standard deviation of 9.13. The visualization group had a pre-mean of 37.833, while the post-mean was 32.5 with a standard deviation of 10.4259. The VMBR group had a pre-mean of 40.6 with a standard deviation of 16.6373, while the post-mean was 34.0 with a standard deviation of 6.3246. The placebo group's pre-mean was 46.25 with a standard deviation of 7.6322, while the post-mean was 42.5 with a standard deviation of 3.6968.

A one-way ANOVA was used to determine if the groups' performances differed from one another enough to reject the null hypothesis of no difference for trait anxiety among the groups. One can find in Table 10 the F probability

Table 8  
Analysis of Variance of Pre-competition Anxiety

	Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	Computed F Ratio	F Probability	One-way
Pre	Between Groups	3	137.0460	45.6820	2.0080	.1470	No significant difference at 0.05 level
	Within Groups	19	432.2583	22.7504			
	Total	22	569.3043				
Post	Between Groups	3	124.6043	41.5348	1.6082	.2206	No significant difference at 0.05 level
	Within Groups	19	490.7000	25.8263			
	Total	22	615.3043				



Table 9  
Means and Standard Deviations  
of Trait Anxiety

	Group	N	Mean	Standard Deviation
Pre	Relaxation	8	40.1250	12.1236
	Visualization	6	37.8333	7.5476
	VMBR	5	40.6000	16.6373
	Placebo	4	46.2500	7.6322
Post	Relaxation	8	35.7500	9.1300
	Visualization	6	32.5000	10.4259
	VMBR	5	34.0000	6.3246
	Placebo	4	42.5000	3.6968

Table 10  
Analysis of Variance of Trait Anxiety

	Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	Computed F Ratio	F Probability	One-way
Pre	Between Groups	3	175.2112	58.4037	.4275	.7356	No significant difference at 0.05 level
	Within Groups	19	2595.6583	136.6136			
	Total	22	2770.8696				
Post	Between Groups	3	260.8696	86.9515	1.2441	.3215	No significant difference at 0.05 level
	Within Groups	19	1328.0000	69.8947			
	Total	22	1588.8696				

among the groups was .7356 for pre-trait anxiety, while post-F probability was .3215. The F probability for pre- and post-measures did not reach the 0.05 level of significance necessary to reject the null hypothesis of no difference for trait anxiety among the groups before or after the introduction of the mental strategy.

#### State Anxiety

In Table 11 one can find the pre-mean for the relaxation group to be 38.625 with a standard deviation of 13.3517, while the post-mean was 34.0 with a standard deviation of 13.2665. The pre-mean for the visualization group was 38.833 with a standard deviation of 8.4004, while the post-visualization mean was 38.0 with a standard deviation of 9.9398. The VMBR pre-mean was 38.8 with a standard deviation of 17.6692, while the post-mean was 42.6 with a standard deviation of 13.8311. The pre-placebo mean was 39.75 with a standard deviation of 4.7871, while the post-placebo mean was 32.25 with a standard deviation of 9.059.

A one-way ANOVA was used to determine if the groups' performances differed from one another enough to reject the null hypothesis of no significant difference for state anxiety among the groups. By examining Table 12 one can find the F probability among the groups for pre-state anxiety to be .9990, while the post-F probability is .5395. The F probability for the pre- and post-measures did not

Table 11  
Means and Standard Deviations  
of State Anxiety

	Group	N	Mean	Standard Deviation
Pre	Relaxation	8	38.6250	13.3517
	Visualization	6	38.8330	8.4004
	VMBR	5	38.8000	17.6692
	Placebo	4	39.7500	4.7871
Post	Relaxation	8	34.0000	13.2665
	Visualization	6	38.0000	9.9398
	VMBR	5	42.6000	13.8311
	Placebo	4	32.2500	9.1059

Table 12  
Analysis of Variance of State Anxiety

	Source of Variation	Degree Freedom	Sum of Squares	Mean Squares	Computed F Ratio	F Probability	One-way
Pre	Between Groups	3	3.5678	1.1893	.0077	.9990	No significant difference at 0.05 level
	Within Groups	19	2918.2583	153.5925			
	Total	22	2921.8261				
Post	Between Groups	3	321.5283	107.1761	.7432	.5395	No significant difference at 0.05 level
	Within Groups	19	2739.9500	144.2079			
	Total	22	3061.4783				

reach the 0.05 level of significance necessary to reject the null hypothesis of no difference for state anxiety among the groups before or after the introduction of the mental strategy.

#### Heart Rates

In Table 13 one finds the pre-mean heart rate for the relaxation group to be 89.265 with the standard deviation of 7.8365, while the post-heart rate mean was 90.25 with a standard deviation of 6.3415. The visualization group had a pre-mean of 78.833 with a standard deviation of 10.3037, while the post-mean was 81.3333 with a standard deviation of 8.5713. The pre-heart rate for the VMBR group was 89.8 with a standard deviation of 5.2631, while the post-VMBR mean was 90.2 with a standard deviation of 5.2631. The placebo group had a pre-mean heart rate of 90.5 with a standard deviation of 7.8528, while the placebo post-mean was 89.5 with a standard deviation of 6.5574.

A one-way ANOVA was used to determine if the groups' performances differed from one another enough to reject the null hypothesis of no significant difference for heart rates among the groups. By an examination of Table 14 one can find the F probability among the groups for pre-heart rates to be .0719, while the post-F probability among the groups is .0980. The F probability for the pre- and post-measures did not reach the 0.05 level of significance necessary to reject the null hypothesis of no difference for heart

Table 13  
Means and Standard Deviations  
of Heart Rates

	Group	N	Mean	Standard Deviation
Pre	Relaxation	8	89.6250	7.8365
	Visualization	6	78.8333	10.3037
	VMBR	5	89.8000	5.2631
	Placebo	4	90.5000	7.8528
Post	Relaxation	8	90.2500	6.3415
	Visualization	6	81.3333	8.5713
	VMBR	5	90.2000	5.2631
	Placebo	4	89.5000	6.5574

Table 14  
Analysis of Variance of Heart Rates

	Source of Variation	Degree Freedom	Sum of Squares	Mean Squares	Computed F Ratio	F Probability	One-way
Pre	Between Groups	3	543.4917	181.1639	2.7394	.0719	No significant difference at the 0.05 level
	Within Groups	19	1256.5083	66.1320			
	Total	22	1800.0000				
Post	Between Groups	3	339.2797	113.0932	2.4181	.0980	No significant difference at the 0.05 level
	Within Groups	19	888.6333	46.7702			
	Total	22	1227.9130				



rate among the groups before or after the introduction of the mental strategy.

#### Manipulation Check

Manipulation checks were used to determine if the subjects were practicing their mental strategy and to determine how well the subjects thought their strategy was working. Table 15 shows the results of the relaxation group. Question one asked how long the subject's mantra was present. On a Likert scale of one to eleven the subject selected how long his mantra was present. The relaxation group mean for the present study was 5.8, while the Weinberg mean for relaxation was 5.6.

Question two asked how relaxed the subjects were on an eleven point Likert scale. The mean for the relaxation group in the present study was 7.1, while the Weinberg mean for relaxation was 7.2. The last question, for the relaxation group, asked how high the subjects perceived their metabolism to be on an eleven point Likert scale. The present study's mean was 4.1, while the Weinberg mean was 3.6.

The first manipulation check for the visualization group can be found in Table 16. The first question asks the subjects how vivid were their images on an eleven point Likert scale. The present study's mean answer was 6.9, while the Weinberg mean was 6.5. Question two asked how much difficulty they have in controlling their images on an

Table 15  
Manipulation Check Questions for Relaxation

Questions	<u>Weinberg Study</u>		<u>Present Study</u>	
	Mean	VMBR Mean	Mean	VMBR Mean
During a 20 minute relaxation period how long was your "ing" (mantra) present? (1) never present, (11) always present	5.6	6.4	5.8	4.7
How relaxed were you? (1) not relaxed at all, (11) extremely relaxed	7.2	8.3	7.1	6.0
Describe your perceived breathing rate, heart rate, metabolism, etc. (1) extremely low, (11) extremely high	3.6	3.7	4.1	4.2

Table 16  
Manipulation Check Questions for Visualization

Questions	Weinberg Study		Present Study	
	Mean	VMBR Mean	Mean	VMBR Mean
How vivid were your images? (1) not vivid at all, (11) extremely vivid	6.5	5.4	6.9	6.2
When you are trying to picture something mentally, how much difficulty do you have in getting the image to do what you want it to? (1) not difficult at all, (11) extremely difficult	6.4	6.7	3.2	5.6
During your imagery did you try to get inside your body and experience the sensations involved, or do you try to get outside your body and view yourself as a spectator might? (1) exclusively external, (11) exclusively internal	6.2	5.3	4.4	4.5

eleven point Likert scale. The present study's mean was 3.2, while the Weinberg mean was 6.4. The last question dealt with whether the image was internal or external. The lower number on the scale indicates the image was more external. The present study's mean was 4.4, while the Weinberg mean was 6.2

The VMBR group manipulation questions were a combination of the relaxation and visualization questions. One can find the results in Table 17. The VMBR mean for relaxation question one was 4.7 for the present study, while the Weinberg mean was 6.4. The present study mean for relaxation question three was 4.2, while the Weinberg mean was 3.7.

The VMBR mean for visualization question in the present study was 6.2, while the Weinberg mean was 5.4. The mean for visualization question two in the present study was 5.6, while the Weinberg mean was 6.7. For visualization question three, the present study mean was 4.5, while the Weinberg mean was 5.3.

There were only two questions for the placebo group, and they can be found in Table 18. The first question asks the subjects how worthwhile reading the quotes are on an eleven point Likert scale. The lower the number, the lower the value. The present study mean was 7.5 for question one, while the Weinberg mean was 9.5. Question two asks the subjects to indicate how long they spent thinking about

Table 17  
Manipulation Check Questions for VMBR

Questions*	<u>Weinberg Study</u>	<u>Present Study</u>
	Mean	Mean
Relaxation Question One	6.4	4.7
Relaxation Question Two	8.3	6.0
Relaxation Question Three	3.7	4.2
Visualization Question One	5.4	6.2
Visualization Question Two	6.7	5.6
Visualization Question Three	5.3	4.5

\*Refer to manipulation check questions for relaxation (Table 15) and manipulation check questions for visualization (Table 16) for the exact questions.

Table 18  
Manipulation Check Questions for Placebo-control

Questions	<u>Weinberg Study</u>	<u>Present Study</u>
	Mean	Mean
Are reading these quotes worthwhile to you? (1) not at all, (11) very much so	9.5	7.5
How long today did you spend thinking about your quotes today? (in minutes)	7.7	15.3

their quotes. The present study mean was 15.3 minutes, while the Weinberg mean was 7.7 minutes.

In the measures of performance none of the groups reached a level that was significant. For the performance of base skills and combinations, the relaxation group, although it was not significant, did improve its performance. The other three groups scored fewer points. One may wonder why the relaxation, visualization, and placebo groups appear to digress in performance. One explanation may be as the subjects became more skillful part of that skill could be in the area of defense. If the subjects became more defensively skillful, it would become more difficult to score points. Also, it should be noted in Table 11 the post-means for state anxiety have lowered in all groups except the VMBR group. The VMBR actually increased by four points. It may be the level of arousal for the VMBR group was higher.

By consulting Table 7, one can observe the level of pre-competition anxiety was highest, pre and post, for the VMBR group. This is in opposition to the Weinberg, Seabourne, and Jackson study (1981) which found the VMBR and relaxation groups had significantly lower pre-competitive state anxiety. In Table 19 one can see the VMBR group had a significantly better performance in sparring in the Weinberg study, while having a lower state anxiety (Weinberg, Seabourne, and Jackson, 1981).

Table 19  
Means and Standard Deviation for Performance Measures for the  
Weinberg, Seabourne, and Jackson Study and  
the Present Study

		Pretest						Posttest					
		<u>Basics</u>		<u>Combinations</u>		<u>Sparring</u>		<u>Basics</u>		<u>Combinations</u>		<u>Sparring</u>	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Weinberg, Seabourne, and Jackson Study	Relaxation	4.2	.86	5.0	.70	5.2	.70	5.6	.54	6.4	.89	6.2	.44
	Visualization	4.2	.83	5.2	.83	5.4	.54	5.8	.83	6.6	1.13	6.6	.89
	VMBR	4.7	.48	5.0	.47	5.5	.70	6.0	.81	6.6	1.17	7.2	.42
	Placebo	4.1	.73	5.2	.42	5.4	.66	5.9	.56	6.0	.66	6.3	.48
Present Study	Relaxation	5.0	.09	4.9	.10	2.3	.80	6.2	.14	6.3	.15	2.3	.89
	Visualization	4.2	.09	4.0	.10	2.1	1.36	5.3	.08	5.2	.11	2.0	1.57
	VMBR	4.8	.09	4.7	.11	2.4	.06	5.6	.13	5.2	.16	2.4	.68
	Placebo	5.1	.25	4.4	.24	2.3	1.03	5.7	.21	5.4	.20	2.2	.85



In the present study, results indicated there were no significant differences among the groups for heart rate (see Table 14). This lack of significance may be due in part to the method of taking the heart rates. The subjects in the present study were instructed to practice their mental strategy for three minutes and then take their heart rates. This was done immediately prior to the post-round-robin tournament. This method was not used in the Weinberg, Seabourne, and Jackson (1981) study. However, this was suggested as an improvement. Although there were significant changes in state anxiety in the Weinberg study (Weinberg, Seabourne, & Jackson, 1981), there were not significant changes in heart rate, as one might expect. In Table 20 one can see the heart rates in the present were higher than in the Weinberg study.

The manipulation check indicated the subjects were practicing their mental strategies. It appears the subjects had moderate success in the practice of their mental strategy. It should be pointed out the placebo group indicated their mental strategy was a worthwhile endeavor. This is in concurrence with the Weinberg study (see Table 18).

Table 20  
Means and Standard Deviations for Heart Rate and Trait Anxiety  
for the Weinberg, Seabourne, and Jackson Study  
and the Present Study

		Pretest				Posttest			
		<u>Trait Anxiety</u>		<u>Heart Rate</u>		<u>Trait Anxiety</u>		<u>Heart Rate</u>	
		M	SD	M	SD	M	SD	M	SD
Weinberg, Seabourne, and Jackson Stuey	Relaxation	41.6	14.2	74.4	19.2	36.6	12.0	73.2	16.6
	Visualization	49.4	13.6	71.2	9.0	43.6	13.6	78.0	8.2
	VMBR	44.7	12.5	73.1	11.2	41.2	11.5	72.7	9.6
	Placebo	46.3	14.3	70.8	8.3	44.1	14.1	70.2	8.5
Present Study	Relaxation	40.1	12.1	89.6	7.8	35.7	9.1	90.2	6.3
	Visualization	37.8	7.5	78.8	10.3	32.5	10.4	81.3	8.5
	VMBR	40.6	16.6	89.8	5.2	34.0	6.3	90.2	5.2
	Placebo	46.2	7.6	90.5	7.8	42.5	3.6	89.5	6.5

## CHAPTER 5

### Summary and Recommendations

#### Summary

The purpose of this study was to determine if mental rehearsal, combined with relaxation techniques, improved Tang Soo Do performance more than mental rehearsal or relaxation techniques used separately. The dependent variables were the physical performance of skills and anxiety levels. The independent variables were the mental strategies used by the subjects to improve their performance. The following null hypothesis were developed:

1. There will be no difference for state anxiety among the groups.
2. There will be no difference for trait anxiety among the groups.
3. There will be no difference for pre-competition anxiety among the groups.
4. There will be no difference for heart rates among the groups.
5. There will be no difference for the basic skills among the groups.
6. There will be no difference for the combinations among the groups.

7. There will be no difference for the sparring among the groups.

Subjects were assigned to the relaxation, visualization, VMBR or placebo groups based on their performance of the basic skills and combinations. The subjects were matched to the groups to control for initial ability differences. The researcher was unaware of the subjects' identities as assignments were made. Each group was given a mental strategy to practice twenty minutes a day for six weeks. The groups met twice a week for the duration of the study. Anxiety measures, heart rates, and sparring scores were determined. The last week of the study all measures were repeated.

The data were analyzed using a one-way ANOVA. The results supported the null hypotheses that no significant differences were found among the groups for any of the measures.

Oxendine (1970) indicated there are five levels of arousal appropriate for sports skills. Individuals vary as to their natural levels of arousal. The athlete's level of arousal must be at the level appropriate for the skill to be performed. The present study did not take into account individual differences. Future research should test the individual's skill and level of anxiety and then place the individual in a mental strategy which will help him/her perform at peak level. As the individual develops, so must

the mental strategy. Future studies need to address ability as a variable which may facilitate the relationship between the cognitive domain and physical performance.

#### Recommendations

It is recommended, based on this study, that future studies involving the effects of VMBR on performance should be longer in duration than six weeks. A longer study would allow the subjects more time to develop their visualization techniques. Although many martial arts students are taught relaxation techniques, the visualization techniques are often underdeveloped. It is also recommended that future studies involve highly skillful subjects. In the present study subjects of all levels were used. The beginners had little success with the visualization and VMBR techniques because they were still struggling with the fundamentals.

Implications for the classroom are that, in working with beginning students, relaxation without visualization may be the best mental strategy. When the students have a firm grasp of the fundamentals, VMBR could be employed after the students' anxiety levels have been determined. The correct level of relaxation and visualization should be determined for each individual. This may require trial and error. If an individual's level of arousal appears too low, a minimal amount of meditation, coupled with drills which raise one's level of arousal and the liberal use of aggressive visualization, may be what is needed. If an

individual's level of arousal appears too high, a high amount of relaxation, coupled with drills which require precision and control along with visualization which emphasizes those qualities, may be what is needed for the particular individual. The final recommendation is for the teacher to learn what type of assistance the individual needs, and then see he receives it.

## Appendixes

Appendix A  
Informed Consent



### Informed Consent

In consideration of being permitted to participate in this research project conducted by Clifton Johnson of Memphis State University Physical Education Department, I, \_\_\_\_\_, do hereby agree to assume all the risks and responsibilities relative thereto.

Further, I hereby represent to MSU that I am physically capable of participating in this research project involving karate free-sparring and understand that MSU strongly encourages participants to consult a physician prior to participation.

And, I hereby recognize the risks of illness and injury inherent in any exercise program, and I am participating in this research project upon the express agreement and understanding that I do for myself, my heirs, and personal representative agree to defend, hold harmless, indemnify, release, and forever discharge MSU and the researcher from and against any and all rights, claims, demands, and actions or causes of action--including attorney's fees and court costs--on account of damage to personal property, personal injury, or death which may result from my participation in this research project.

I also certify that I have been informed of possible dangers and risks which may arise in connection with this

research project and that I alone am responsible for exercising full care and responsibility for my person.

By my signature below, I hereby confirm my understanding of this informed consent holding MSU harmless, and acknowledge that MSU does not carry health and accident insurance to cover participants of this research project and that MSU strongly encourages participants to obtain full insurance coverage prior to participation in this project.

I hereby execute this assumption of risk to induce MSU to permit me to participate in this research project. I will be participating voluntarily.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Appendix B  
Skills Test

## Skills Test

Identification No. \_\_\_\_\_ Date \_\_\_\_\_

Score \_\_\_\_\_ Group \_\_\_\_\_

Grading Code A=5, B=4, C=3, D=2, F=1/A=excellent, B=superior, C=average, D=poor, F=can not perform. The subject will perform a total of ten repetitions of a skill. Five will be performed on the right and five repetitions will be performed on the left. The grader will score each repetition.

<u>Reverse Punch</u>	<u>Low Block</u>	<u>Middle Block</u>	<u>High Block</u>
1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____	2. _____
3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____	5. _____
6. _____	6. _____	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____
8. _____	8. _____	8. _____	8. _____
9. _____	9. _____	9. _____	9. _____
10. _____	10. _____	10. _____	10. _____
total _____	total _____	total _____	total _____

<u>Front Kick</u>	<u>Round Kick</u>	<u>Side Kick</u>
1. _____	1. _____	1. _____
2. _____	2. _____	2. _____
3. _____	3. _____	3. _____
4. _____	4. _____	4. _____
5. _____	5. _____	5. _____
6. _____	6. _____	6. _____
7. _____	7. _____	7. _____
8. _____	8. _____	8. _____
9. _____	9. _____	9. _____
10. _____	10. _____	10. _____
total _____	total _____	total _____

Combination I (backfist, rev punch, F kick)	Combination II (slide side kick, bf, rp)	Combination III (r kick, rp, ridge- hand)
1. _____	1. _____	1. _____
2. _____	2. _____	2. _____
3. _____	3. _____	3. _____
4. _____	4. _____	4. _____
5. _____	5. _____	5. _____
6. _____	6. _____	6. _____
7. _____	7. _____	7. _____
8. _____	8. _____	8. _____
9. _____	9. _____	9. _____
10. _____	10. _____	10. _____
total _____	total _____	total _____

Appendix C

Brackets for Round-robin Tournament  
"Heavy" Group

Brackets for Round-robin Tournament  
"Heavy" Group

	1	2	3	4	Rounds		6	7	8	9	10
					5						
Bouts	XK	XJ	XI	XH	XG	XF	XE	XD	XC		XB
	AJ	KI	JH	IG	HF	GE	FD	EC	DB		CA
	BI	AH	KG	JF	IE	HD	GC	FB	EA		DK
	CH	BG	AF	KE	JD	IC	HB	GA	FK		EJ
	DG	CF	BE	AD	KC	JB	IA	HK	GJ		FI
	EF	DE	CD	BC	AB	KA	JK	IJ	HI		GH

Appendix D

Brackets for Round-robin Tournament  
"Light" Group



Brackets for Round-robin Tournament  
"Light" Group

	<u>1</u>	<u>2</u>	<u>3</u>	<u>Rounds</u> <u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Bouts	AH	AG	AF	AE	AD	AC	AB
	BG	HF	GE	FD	EC	DB	CH
	CF	BE	HD	GC	FB	EH	DG
	DE	CD	BC	HB	GH	FG	EF

Appendix E

Spielberger, Gorsuch and Lushene  
Trait Anxiety Inventory

Name \_\_\_\_\_

Date \_\_\_\_\_

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then decide which of the four responses reflects how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel. Record your choice in the space to the left of each statement.

A = not at all  
B = somewhat  
C = moderately so  
D = very much so

- \_\_\_ 1. I feel pleasant.
- \_\_\_ 2. I am nervous and restless.
- \_\_\_ 3. I feel satisfied with myself.
- \_\_\_ 4. I wish I could be as happy as others seem to be.
- \_\_\_ 5. I feel like a failure.
- \_\_\_ 6. I feel rested.
- \_\_\_ 7. I am "calm, cool, and collected."
- \_\_\_ 8. I feel that difficulties are piling up so that I cannot overcome them.
- \_\_\_ 9. I worry too much over something that really doesn't matter.
- \_\_\_ 10. I am happy.
- \_\_\_ 11. I have disturbing thoughts.
- \_\_\_ 12. I lack self-confidence.
- \_\_\_ 13. I feel secure.
- \_\_\_ 14. I make decisions easily.
- \_\_\_ 15. I feel inadequate.
- \_\_\_ 16. I am content.

- \_\_\_\_17. Some unimportant thought runs through my mind and bothers me.
- \_\_\_\_18. I take disappointments so hard that I cannot put them out of my mind.
- \_\_\_\_19. I am a steady person.
- \_\_\_\_20. I get in a state of tension or turmoil as I think over my recent concerns and interests.

## Key — 6: STAI--Trait

Subject \_\_\_\_\_

For items on the positive anxiety direction (marked below as "+") use:

not at all	somewhat	moderately so	very much so
= 1 point	= 2 points	= 3 points	= 4 points

For items in the negative anxiety direction (marked below as "-") use:

not at all	somewhat	moderately so	very much so
= 4 points	= 3 points	= 2 points	= 1 point

- |               |               |
|---------------|---------------|
| 1. _____ (-)  | 11. _____ (+) |
| 2. _____ (+)  | 12. _____ (+) |
| 3. _____ (-)  | 13. _____ (-) |
| 4. _____ (+)  | 14. _____ (-) |
| 5. _____ (+)  | 15. _____ (+) |
| 6. _____ (-)  | 16. _____ (-) |
| 7. _____ (-)  | 17. _____ (+) |
| 8. _____ (+)  | 18. _____ (+) |
| 9. _____ (+)  | 19. _____ (-) |
| 10. _____ (-) | 20. _____ (+) |

Sum = \_\_\_\_\_

Appendix F

Spielberger, Gorsuch and Lushene  
State Anxiety Inventory

Name \_\_\_\_\_

Date \_\_\_\_\_

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then decide which of the four responses reflects how you feel right now, that is at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which best describes your present feelings. Record your choice in the space to the left of each statement.

A = not at all  
B = somewhat  
C = moderately so  
D = very much so

- \_\_\_ 1. I feel calm.
- \_\_\_ 2. I feel secure.
- \_\_\_ 3. I am tense.
- \_\_\_ 4. I am regretful.
- \_\_\_ 5. I feel at ease.
- \_\_\_ 6. I feel upset.
- \_\_\_ 7. I am presently worrying over possible misfortunes.
- \_\_\_ 8. I feel rested.
- \_\_\_ 9. I feel anxious.
- \_\_\_ 10. I feel comfortable.
- \_\_\_ 11. I feel self-confident.
- \_\_\_ 12. I feel nervous.
- \_\_\_ 13. I am jittery.
- \_\_\_ 14. I feel "high strung."
- \_\_\_ 15. I am relaxed.
- \_\_\_ 16. I feel content.
- \_\_\_ 17. I am worried.

- \_\_\_18. I feel over-excited and "rattled."
- \_\_\_19. I feel joyful.
- \_\_\_20. I feel pleasant.



## Key — 6: STAI--State

Subject \_\_\_\_\_

For items on the positive anxiety direction (marked below as "+") use:

not at all	somewhat	moderately so	very much so
= 1 point	= 2 points	= 3 points	= 4 points

For items in the negative anxiety direction (marked below as "-") use:

not at all	somewhat	moderately so	very much so
= 4 points	= 3 points	= 2 points	= 1 point

- |               |               |
|---------------|---------------|
| 1. _____ (-)  | 11. _____ (-) |
| 2. _____ (-)  | 12. _____ (+) |
| 3. _____ (+)  | 13. _____ (+) |
| 4. _____ (+)  | 14. _____ (+) |
| 5. _____ (-)  | 15. _____ (-) |
| 6. _____ (+)  | 16. _____ (-) |
| 7. _____ (+)  | 17. _____ (+) |
| 8. _____ (-)  | 18. _____ (+) |
| 9. _____ (+)  | 19. _____ (-) |
| 10. _____ (-) | 20. _____ (-) |

Sum = \_\_\_\_\_

Appendix G  
Marten's Short Form for  
Competitive Anxiety

**PLEASE NOTE:**

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**These consist of pages:**

94-95, Appendix G

**U·M·I**

Key - 4: Sports Competition Anxiety Test  
(Forms A & C)

Subject \_\_\_\_\_

For all the following items except #6 and #11 use:

hardly ever = 1    sometimes = 2    often = 3

For items #6 and #11:

hardly ever = 3    sometimes = 2    often = 1

2. \_\_\_\_\_

3. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_ \*

8. \_\_\_\_\_

9. \_\_\_\_\_

11. \_\_\_\_\_ \*

12. \_\_\_\_\_

14. \_\_\_\_\_

15. \_\_\_\_\_

Sum \_\_\_\_\_

**Appendix H**  
**Placebo Mental Strategy Handout**

An important aspect of karate is understanding its tradition. Karate is an art and to improve your performance you must develop yourself spiritually as well as physically and mentally. Tang Soo Do or Way of the China Hand was founded by Grandmaster Hwang Kee. Grandmaster Hwang Kee indicates that there are 5 requirements and 11 points of emphasis on mental training and 5 requirements and 10 points of emphasis on physical ability. To achieve maximum performance, the following set of quotations must be understood and should be practiced daily for the entire 6-week period.

#### 5 Requirements and 11 points of Emphasis on Mental Training

##### Requirements

1. oneness with nature
2. complete answers of environment
3. experience
4. conscience
5. culture

##### Emphasis

1. reverence for nature
2. physical control (Ki-Aup)
3. courtesy
4. modesty
5. thankfulness
6. self-sacrifice
7. courage
8. strength inside the mildness outside
9. endurance
10. reading ability

## 5 Requirements and 10 Points of Emphasis on Physical Ability

### Requirements

1. contact with natural surroundings
2. contact with diverse physical conditions
3. suitable nourishment
4. suitable exercise
5. suitable rest

### Emphasis

1. vocal exhalation and thoracic strength (Ki Hap)
2. focus of sight
3. continuous balance during movement
4. flexibility of the body
5. correct muscle tone for maximum power
6. high and low speed technique
7. exactness of technique
8. adjustment for proper distance
9. proper breathing for endurance
10. conditioning of hands and feet

Appendix I  
Visualization Mental Strategy Handout



An important aspect of successful karate performance is the ability to imagine yourself performing the correct movements. One reason imagery is effective in enhancing performance is that electrical impulses are sent out by the nervous system to the musculature and thus it prepares you to perform the desired movement. Jack Nicklaus has stated that his good shots are 10% seeing, 40% setup and stance, and 50% having a good, clear mental image of the shot. While doing imagery, it is important to see yourself performing from your own perspective rather than that of a spectator. In addition, the image needs to be clear as well as being under your control. Always imagine a positive outcome. It is important that these procedures be followed every day for 10 minutes.

Appendix J  
VMBR Mental Strategy Handout

An important aspect of karate is the ability to relax especially in competitive situations. The relaxation response can be elicited by using an effortless and comfortable technique practiced 10 minutes a day. While sitting down in a quiet, comfortable place you will think of the sound "ing" and repeat this over and over for the 10-minute period. That sound eventually disappears and the mind experiences more subtle levels of thought as well as providing a release of muscular tension. The only requirements to achieve the relaxation response are a comfortable posture, a quiet environment, a passive attitude (if other thoughts occur let them pass through and return to repeating "ing") and a constant sound repeated over and over to minimize your attention to external stimuli. It is important that these procedures be followed every day.

Another important aspect of successful karate performance is the ability to imagine yourself performing the correct movements. One reason imagery is effective in enhancing performance is that electrical impulses are sent out by the nervous system to the musculature and thus it prepares you to perform the desired movement. Jack Nicklaus has stated that his good shots are 10% seeing, 50% setup and stance, and 50% having a good, clear mental image of the shot. While doing imagery, it is important to see yourself performing from your own perspective rather than that of a spectator. In addition, the image needs to be clear as well

as being under your control. Always imagine a positive outcome. It is important that these procedures be followed every day for 10 minutes. You should always practice relaxation for ten minutes before practicing the imagery for ten minutes.

Appendix K  
Relaxation Mental Strategy Handout

An important aspect of karate is the ability to relax especilly in competitive situations. The relaxation response can be elicited by using an effortless and comfortable technique practiced 20 minutes a day. While sitting down in a quiet, comfortable place you will think of the sound "ing" and repeat this over and over for the 20-minute period. That sound eventually disappears and the mind experiences more subtle levels of thought as well as providing a release of muscular tension. The only requirements to achieve the relaxation response are a comfortable posture, a quiet environment, a passive attitude (if other thoughts occur let them pass through and return to repeating "ing") and a constant sound repeated over and over to minimize your attention to external stimuli. It is important that these procedures be followed every day.

Appendix L  
Visualization Manipulation Check

Identification No. \_\_\_\_\_ date \_\_\_\_\_ to \_\_\_\_\_

Monday

1. How vivid were your images?

1 (not vivid at all) 2 3 4 5 6 7 8 9 10 11 (extremely  
vivid)

2. When you are trying to picture something mentally, how  
much difficulty do you have in getting the image to do  
what you want it to?

1 (not difficult at all) 2 3 4 5 6 7 8 9 10 11  
(extremely difficult)

3. During your imagery did you try to get inside your body  
and experience the sensations involved, or do you try to  
get outside your body and view yourself as a spectator  
might?

1 (exclusively internal) 2 3 4 5 6 7 8 9 10 11  
(exclusively external)

Tuesday

1. How vivid were your images?

1 (not vivid at all) 2 3 4 5 6 7 8 9 10 11 (extremely  
vivid)

2. When you are trying to picture something mentally, how  
much difficulty do you have in getting the image to do  
what you want it to?

1 (not difficult at all) 2 3 4 5 6 7 8 9 10 11  
(extremely difficult)



3. During your imagery did you try to get inside your body and experience the sensations involved, or do you try to get outside your body and view yourself as a spectator might?

1 (exclusively internal) 2 3 4 5 6 7 8 9 10 11

(exclusively external)

### Wednesday

1. How vivid were your images?

1 (not vivid at all) 2 3 4 5 6 7 8 9 10 11 (extremely vivid)

2. When you are trying to picture something mentally, how much difficulty do you have in getting the image to do what you want it to?

1 (not difficult at all) 2 3 4 5 6 7 8 9 10 11

(extremely difficult)

3. During your imagery did you try to get inside your body and experience the sensations involved, or do you try to get outside your body and view yourself as a spectator might?

1 (exclusively internal) 2 3 4 5 6 7 8 9 10 11

(exclusively external)

### Thursday

1. How vivid were your images?

1 (not vivid at all) 2 3 4 5 6 7 8 9 10 11 (extremely vivid)

2. When you are trying to picture something mentally, how much difficulty do you have in getting the image to do what you want it to?  
1 (not difficult at all) 2 3 4 5 6 7 8 9 10 11  
(extremely difficult)
3. During your imagery did you try to get inside your body and experience the sensations involved, or do you try to get outside your body and view yourself as a spectator might?  
1 (exclusively internal) 2 3 4 5 6 7 8 9 10 11  
(exclusively external)

#### Friday

1. How vivid were your images?  
1 (not vivid at all) 2 3 4 5 6 7 8 9 10 11 (extremely vivid)
2. When you are trying to picture something mentally, how much difficulty do you have in getting the image to do what you want it to?  
1 (not difficult at all) 2 3 4 5 6 7 8 9 10 11  
(extremely difficult)
3. During your imagery did you try to get inside your body and experience the sensations involved, or do you try to get outside your body and view yourself as a spectator might?

1 (exclusively internal) 2 3 4 5 6 7 8 9 10 11  
 (exclusively external)

### Saturday

1. How vivid were your images?  
 1 (not vivid at all) 2 3 4 5 6 7 8 9 10 11 (extremely vivid)
2. When you are trying to picture something mentally, how much difficulty do you have in getting the image to do what you want it to?  
 1 (not difficult at all) 2 3 4 5 6 7 8 9 10 11 (extremely difficult)
3. During your imagery did you try to get inside your body and experience the sensations involved, or do you try to get outside your body and view yourself as a spectator might?  
 1 (exclusively internal) 2 3 4 5 6 7 8 9 10 11 (exclusively external)

### Sunday

1. How vivid were your images?  
 1 (not vivid at all) 2 3 4 5 6 7 8 9 10 11 (extremely vivid)
2. When you are trying to picture something mentally, how much difficulty do you have in getting the image to do what you want it to?

Appendix M  
Relaxation Manipulation Check

Identification No. \_\_\_\_\_ date \_\_\_\_\_ to \_\_\_\_\_

Monday

1. During a 20-minute relaxation period how long was your  
"ing" present?  
1 (never present) 2 3 4 5 6 7 8 9 10 11 (always present)
2. How relaxed were you?  
1 (not relaxed at all) 2 3 4 5 6 7 8 9 10 11 (extremely  
relaxed)
3. Describe your breathing rate, heart rate, metabolism,  
etc.  
1 (extremely low) 2 3 4 5 6 7 8 9 10 11 (extremely high)

Tuesday

1. During a 20-minute relaxation period how long was your  
"ing" present?  
1 (never present) 2 3 4 5 6 7 8 9 10 11 (always present)
2. How relaxed were you?  
1 (not relaxed at all) 2 3 4 5 6 7 8 9 10 11 (extremely  
relaxed)
3. Describe your breathing rate, heart rate, metabolism,  
etc.  
1 (extremely low) 2 3 4 5 6 7 8 9 10 11 (extremely high)

Wednesday

1. During a 20-minute relaxation period how long was your  
"ing" present?  
1 (never present) 2 3 4 5 6 7 8 9 10 11 (always present)

2. How relaxed were you?

1 (not relaxed at all) 2 3 4 5 6 7 8 9 10 11 (extremely relaxed)

3. Describe your breathing rate, heart rate, metabolism, etc.

1 (extremely low) 2 3 4 5 6 7 8 9 10 11 (extremely high)

#### Thursday

1. During a 20-minute relaxation period how long was your "ing" present?

1 (never present) 2 3 4 5 6 7 8 9 10 11 (always present)

2. How relaxed were you?

1 (not relaxed at all) 2 3 4 5 6 7 8 9 10 11 (extremely relaxed)

3. Describe your breathing rate, heart rate, metabolism, etc.

1 (extremely low) 2 3 4 5 6 7 8 9 10 11 (extremely high)

#### Friday

1. During a 20-minute relaxation period how long was your "ing" present?

1 (never present) 2 3 4 5 6 7 8 9 10 11 (always present)

2. How relaxed were you?

1 (not relaxed at all) 2 3 4 5 6 7 8 9 10 11 (extremely relaxed)

3. Describe your breathing rate, heart rate, metabolism, etc.

1 (extremely low) 2 3 4 5 6 7 8 9 10 11 (extremely high)

Saturday

1. During a 20-minute relaxation period how long was your "ing" present?

1 (never present) 2 3 4 5 6 7 8 9 10 11 (always present)

2. How relaxed were you?

1 (not relaxed at all) 2 3 4 5 6 7 8 9 10 11 (extremely relaxed)

3. Describe your breathing rate, heart rate, metabolism, etc.

1 (extremely low) 2 3 4 5 6 7 8 9 10 11 (extremely high)

Sunday

1. During a 20-minute relaxation period how long was your "ing" present?

1 (never present) 2 3 4 5 6 7 8 9 10 11 always present)

2. How relaxed were you?

(not relaxed at all) 2 3 4 5 6 7 8 9 10 11 (extremely relaxed)

3. Describe your breathing rate, heart rate, metabolism etc.

1 (extremely low) 2 3 4 5 6 7 8 9 10 11 (extremely high)

Appendix N  
Placebo Manipulation Check



Identification No. \_\_\_\_\_ date \_\_\_\_\_ to \_\_\_\_\_

Monday

1. Are reading these quotes worthwhile to you?  
1 (not at all) 2 3 4 5 6 7 8 9 10 11 (very much so)
2. How long did you spend thinking about your quotes today?  
(in minutes)

\_\_\_\_\_

Tuesday

1. Are reading these quotes worthwhile to you?  
1 (not at all) 2 3 4 5 6 7 8 9 10 11 (very much so)
2. How long did you spend thinking about your quotes today?  
(in minutes)

\_\_\_\_\_

Wednesday

1. Are reading these quotes worthwhile to you?  
1 (not at all) 2 3 4 5 6 7 8 9 10 11 (very much so)
2. How long did you spend thinking about your quotes today?  
(in minutes)

\_\_\_\_\_

Thursday

1. Are reading these quotes worthwhile to you?  
1 (not at all) 2 3 4 5 6 7 8 9 10 11 (very much so)
2. How long did you spend thinking about your quotes today?  
(in minutes)

\_\_\_\_\_

Friday

1. Are reading these quotes worthwhile to you?  
1 (not at all) 2 3 4 5 6 7 8 9 10 11 (very much so)
2. How long did you spend thinking about your quotes today?  
(in minutes)

---

Saturday

1. Are reading these quotes worthwhile to you?  
1 (not at all) 2 3 4 5 6 7 8 9 10 11 (very much so)
2. How long did you spend thinking about your quotes today?  
(in minutes)

---

Sunday

1. Are reading these quotes worthwhile to you?  
1 (not at all) 2 3 4 5 6 7 8 9 10 11 (very much so)
2. How long did you spend thinking about your quotes today?  
(in minutes)

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on-campus memo:



To: Clifton L. Johnson/ Glen Reeder

From: Michael Principe, Chair  
MTSU Research Ethics Committee

Subject: I.R.B. Review

Date: July 31, 1990

I have reviewed the materials for the proposed investigation "The Effects of VMBR on Tang Soo Do Performance." While I understand that the research has already been completed, the investigation is unproblematic enough to warrant retroactive approval. I give this approval through the expedited review procedures authorized in 46.110 of 45 CFR Part 46.

I have kept a copy of your proposal and permission memorandum for our files. If this is a problem contact me.

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