Investigation of Effects of Hypnosis, Relaxation, and Mental Rehearsal on Performance Scores of Golfers and Runners.

Julie Nelson
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INVESTIGATION OF EFFECTS OF HYPNOSIS, RELAXATION, AND MENTAL REHEARSAL ON PERFORMANCE SCORES OF GOLFERS AND RUNNERS

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INVESTIGATION OF EFFECTS OF HYPNOSIS,
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SCORES OF GOLFFERS AND RUNNERS.

A Dissertation
Submitted to the Graduate Faculty of the
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Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctorate of Philosophy
in
The Department of Psychology

by
Julie Nelson
Louisiana State University
May, 1980
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ABSTRACT

The purpose of this study was to investigate the benefit of hypnotic techniques, relaxation, and mental rehearsal for improvement in performance scores for golfers and runners. Treatments were designed to be similar to interventions reported to be successful with individual athletes yet unsupported by larger investigations. No significant results were obtained for either sport. Explanations for obtained results included an actual absence of true effect, masking of effects by continuing methodological problems in the area of athletics and hypnosis, and the lack of generalizability of positive effect. Well controlled, indepth case studies were recommended for future investigation.
INTRODUCTION

"Every game is composed of two parts, an outer game and an inner game. The outer game is played against an external opponent to overcome external obstacles, and to reach an external goal. ...(The inner game) is the game that takes place in the mind of the player, and it is played against such obstacles as lapses in concentration, nervousness, self-doubt and self-condemnation. ...all habits of mind which inhibit excellence in performance." (Gallwey, 1974)

The Problem

There are numerous case studies and subjective reports of athletes having been helped with hypnosis by psychologists, psychiatrists, and hypnotists (Garver, 1977; Kroger, 1963; Gale, 1960). These reports are often lacking in specific controls and in uniformity of measures. Further, these reports often do not precisely describe the hypnotic suggestions or the strategy which the researcher utilized in attempting to bring about behavior change. The literature covering controlled investigations and those with large numbers of subjects presents a mixed and ambiguous picture of results. While there are scattered positive outcomes, there appears to be no conclusive evidence that hypnosis is useful as a technique to improve performance in the general case. The major question then is how do individual practitioners achieve results with their athletes and how can this positive
effect be demonstrated uniformly in a group of individuals? The technique used for the case reports appears to differ from the methods utilized by the more empirical investigators. The relevant research, differences, and conclusions are reviewed in the following sections.

**Hypnosis and Athletic Performance**

Gale (1960), a medical hypnotist, described his use of hypnosis in developing both general relaxation as well as the performance skills of various athletes. He noted that this approach was oriented toward "altering mental attitudes" and that hypnosis was particularly useful in athletes who presented an inhibitory attitude. Kroger (1963) included in his book a section entitled "Hypnosis in Sports" a description of a baseball player who had become "plate shy." He described the use of sensory imagery and the re-imagining of inhibitory events which had supposedly led to a decrease in the baseball player's performance.

More recently Garver (1977) described two case studies in which he developed and implemented strategies which he termed "cognitive rehearsal" and "control of arousal level." Garver noted the history of mental practice as beneficial and stated that the performance of mental practice while under hypnosis appears to enhance the benefit and value of this technique. He also described "over" and "under-psyching" as maladaptive levels of arousal. Consequently, Garver reports that some athletes may have difficulty in achieving an arousal level sufficient to perform effectively while others may experience difficulty in relaxation. He cited two case studies in which he reports effectively modifying athletes' arousal levels and also the successful use of mental practice in a gymnast and a professional golfer.
In a very early study, Eysenck (1939) reported comprehensive case studies on so-called "tranceable" subjects and concluded that both mental and physical functions could be improved with the use of hypnosis. Eysenck used both post-hypnotic suggestion and performing practice while in the so-called trance state. He concluded that improvement of the individuals' performance was associated with the nature of the function tested, the type and attitude of the subjects, and the depth of the trance achieved. He reported that there appeared to be an inverse relationship between the benefit of hypnosis and the overall complexity of the task performed. Garver (1977) also described the need for analysis of the inverted "U" curve of arousal known as the Freeman Inverted U. This theory predicts that as arousal increases, performance will likewise increase up until an optimal level. After this level increased arousal can result in lowered performance.

Authors of more recent case studies, such as Kroger (1963) and Naruse (1965), described the athlete's benefit from hypnosis as a reduction in anxiety and inhibitory factors such as in "performance anxiety" which can occur when performing before large crowds. Thus, these investigators reported that change in attitudinal factors and reduction of inhibitory factors is often responsible for the improved performances which were observed. Self-hypnosis was described by Naruse in his work with "champion" athletes and what he termed "stage fright." He concluded that this treatment had an "excellent" effect on reducing pre-competition tensions.

Power and Learner (1961) reported a positive improvement in the teamwork of a Brazilian soccer team based on a post-hypnotic
suggestion to "work better together." The validity of these results, like others, is difficult to determine due to the lack of sufficient controls and the lack of operationalized measures.

Johnson (1960, 1961a), in his studies on hypnosis and muscular performance, concluded that hypnosis can be of benefit in assisting athletes in the improvement of general performance. However, he stated that this may occur in a variety of ways and some of these ways have "nothing to do with increasing strength or endurance." Johnson cited two case studies which he used to illustrate the manner in which hypnosis can be utilized to affect gross motor performance. In one of these studies, he reported assisting a professional baseball player in overcoming a "protracted batting slump." He noted that before being hypnotized, the player was asked to describe in detail what had gone wrong with his batting performance. The player was unable to do so in spite of apparent motivation to comply with the request. Johnson stated that in the "deep trance state" and with instructions to verbalize spontaneously at a signal, the subject was able to describe his movements in a very detailed manner. Subsequently, a number of errors that were apparently hindering his performance were discovered and worked out. Johnson stated that this athlete returned later to report that his performance had corrected itself and he had finished the season with a much improved average batting score. In a second case report, Johnson (1961b) described a professional baseball pitcher who had requested hypnotic suggestion to help him to be "more aggressive" in his performance. Johnson stated that when "regressed to childhood" this individual's verbalizations indicated that he had experienced an
especially painful interaction with his younger brother which had re­sulted in a guilt reaction and avoidance of aggressive interaction. This conflict later manifested itself in this individual's sporting activity. Hypnosis allowed the athlete to realize that aggressive be­havior need not be detrimental in many of his present sport activities.

Sport psychologists in England reported that while post­hypnotic suggestions are beneficial, they are only for a few athletes and only in very general ways. Vaneck and Cranty (1970) reported that specific suggestions can be detrimental to some athletes. They based this conclusion on their observations that the suggestion can create rigid and inflexible behaviors. Thus, hypnotic interventions can limit the individual in his or her modification of responses for new and unexpected situations. Suggestions should be carefully selected and be appropriate for the individual and his or her sport.

Rosen (1960), the chair of the American Medical Association's committee on hypnosis, has reported that there have been instances of improved performance but there have been as many instances in which the individual's performance has been lowered.

Recently, investigators have attempted to study the effects of hypnotic suggestion on performance of athletic tasks (Eskridge, 1972; Arnold, 1969; O'Donnell, 1970; and Ulrich, 1973). While these studies failed to produce any conclusive positive result, their findings differed from Rosen's observations of lowered performance. In general, the researchers have found no great difference in either direction.

It is important to note some procedural variations between these types of studies and many of the individual case studies cited
earlier. First, subjects participating in these studies were usually regular college students rather than professional athletes. Secondly, interventions were for the most part administered in groups with little or no information about specific difficulties which the subject might be experiencing. This was in contrast to the usual procedure for the case study which was frequently similar to a psychotherapy session. Finally, many variations existed in the style and type of suggestions given. For example, Ulrich (1973) investigated the use of hypnosis on archery performance and found no significant differences in his college student subjects. His suggestions for improved archery performance included such items as "Concentrate on what you are doing! Stance! Draw! Anchor! Aim and release!" Eskridge (1972), investigating placebo suggestions for high and low susceptible subjects for improving reaction time, used the suggestion "...you will notice however, that you will be able to respond to the buzzer signal much more quickly this time, than you did for the first testing. ...you will become very alert and intent upon moving as quickly as you can for the testing. You will find that nothing will distract you, you will be intent upon the testing. Your body will be alert with just the right amount of tension and just the right amount of relaxation to allow you to move very quickly in response..." Eskridge reported a difference between the "high susceptible" subjects and other subjects. The "highs" improved for all conditions, regardless of the treatment. O'Donnell used students in a beginner swimming class in college to investigate the benefit of hypnosis on performance. He found no differences after 6 weeks on measures of physiological stress, swimming skill, or
swimming anxiety. He concluded that positive hypnotic suggestion does not have a "discernible effect" on the learning of aquatic skill or the reduction of fear in beginning swimmers. O'Donnell used positive suggestions such as the following "...when you are in the water you will not be frightened or uneasy about trying new things. When you are attempting new skills you will find that you will be able to relax and perform the new skills easily..." Arnold's suggestion was "...with this combination of your abilities and your desire to perform well, the result is bound to be that you will execute the tracing and the ball bounce in a highly satisfactory manner..." He found that significant learning occurred in his groups but concluded that it was a result of practice that the subjects had experienced. Thus, hypnosis appeared not to have any effect on learning or performance of certain motor skills.

One additional area of research which is useful to include due to its similarity to the topic of athletic performance and hypnosis, is that of a technique called "visuo-motor behavior rehearsal" or VMBR (Suinn, 1972). Suinn developed this technique which is an offshoot of systematic desensitization. VMBR appears to be related to many techniques utilized in hypnosis such as muscular relaxation and mental imagery. Suinn reported to have used VMBR in training athletes and in facilitating their performances. His method consisted of relaxation and imagery training. VMBR was related to the demands of the athlete's sport and was aimed at strengthening the psychological and motor skills needed in a competitive situation. Suinn (1976) reported that imagery training which was preceded by relaxation tended to involve numerous
sensory channels and that this involvement enabled the athlete to "be there". He concluded that experiencing the conditions of competition was helpful in alleviating the athletes' difficulties. Suinn also reported this method to be successful with the Colorado State University Ski Team (1972) and in his work with the U.S. Biathlon Team in the 1976 Winter Olympics (Suinn, 1976). However, he was not able to supply statistical results. Recently, Kolonay (Note 1) tested the technique on college basketball players' foul-shooting percentage performance. She used 72 male players and found a significant increase in performance for the VMBR subjects. However, neither relaxation alone or imagery training alone resulted in significant changes.

Butt (1976) in her chapter on "Maximizing and Improving Performance" concluded that the basis of hypnosis and the post hypnotic suggestion is similar to that of the "pep talk." She noted that there may be an artificial increase in motivation and performance which is temporary, and that neither is useful in acquiring long-term habit change. In general, Butt noted that the outcomes of research studies utilizing hypnosis as a treatment have produced inconsistent conclusions. She stated that it appears that the more sophisticated and expert athlete does not benefit from hypnosis as does the novice athlete. She also commented that personality factors such as "suggestibility, self-confidence, and field dependence may be expected to interact with the hypnotic suggestion to determine its effect." She noted one example of a "true change" in an individual may occur when hypnotic techniques are utilized in changing the individual's "mental attitude." She stated however, that this occurs infrequently. Riecke's (1969)
specific suggestions were cited by Butt as necessary ingredients for any effective hypnotic procedure. One must contribute to the development of five factors which are: (1) increased motivation and the desire to train, (2) "correct errors in technique", (3) filtering out of annoying factors in the environment, (4) encouraging the competitive attitude at the appropriate time, and (5) assisting the individual in removing "mental limits."

This section has surveyed the literature dealing directly with athletic tasks and the use of hypnosis and associated techniques. The following section is a brief review of investigations which are concerned with hypnosis and more general types of performance.

Hypnosis and other types of Performance Measures

The literature on athletic performance and hypnosis is limited. Therefore, it may be useful to review some additional investigations which have to do with the use of hypnosis and attempts to improve a particular ability. There are a number of general reviews (Hull, 1933; Gorton, 1949; Crasilneck and Hall, 1959; and Reiter, in LeCron, 1952) dealing with the specific muscular and physiological functions of individuals while influenced by hypnosis. These reviewers noted that many of the studies lacked data as to the exact suggestions, the depth of the trance, and the methods of experimental control. Johnson (in Morgan, 1970) reported that the studies which encompass adequate research design, and which have an appropriate number of subjects, are favorable to improvement through the hypnotic condition. Roush (1951) used 20 subjects and required a strict analysis of the so-called
trance state. She reported statistical significance for the hypnotic state in tests which included grip strength, elbow flexion strength, and hanging by the hands. Roush assessed the behaviors under counterbalanced conditions and with hypnotic, post-hypnotic, and waking conditions. One of her suggestions was the subjects would achieve a high level of performance in their activity.

Ikai and Steinhaus (1961) reported results favorable to the improvement of individuals' strength following hypnotic training and suggestion. Their treatment resulted in a significant increase of strength in the hypnotic state. They also reported that "in every voluntarily executed, all-out, maximal effort, psychological rather than physiological factors determine the limits of performance." Unfortunately, hypnotic controls were not specified in their investigation.

Hottinger (1958) assigned 6 "good" hypnotic subjects and 6 "poor" subjects to the experimental and control groups. He found that the experimental groups improved on tests of back and leg strength, and especially on a jumping test.

An equally large number of investigators have failed to find positive results with hypnosis and performance measures. Levitt and Brady (1964) found no difference in the comparison of weight-lifting endurance in eight selected subjects considered to be "good" in suggestibility. They counterbalanced the treatments which included hypnosis, hypnosis with anaesthesia of the arm and shoulder, and waking motivational treatments.

London and Fuhrur (1961) used 32 female subjects who were divided into groups of highly suggestible and supposedly unsuggestible. They investigated hand strength, weight holding, and a tremor task.
They found that the unsuggestible subjects were superior to the suggestible subjects throughout the experiment. Hypnosis without the motivational suggestions did not appear to affect strength or endurance. And, in general, the motivational suggestions seemed as effective in the waking state as they were in the hypnotic state.

Along this same line, Orne (1959) reported that if sufficiently well motivated, subjects tend to be able to perform as well under the hypnotic conditions as in a waking condition. He investigated the responses of 9 subjects and found that they were able to hold a weight at arm's length longer in the nonhypnotic state even though his hypnotic suggestions were designed to increase performance.

Johnson (in Morgan, 1952) reported that his own theories and studies of strength, endurance, and power under the different effects of hypnotic, post-hypnotic, and nonhypnotic states have resulted in generally negative outcomes. However, Johnson noted that there are indications that endurance performance may be improved when hypnotic procedures are utilized. Interestingly, Johnson stated that the only consistent positive finding has been when negative suggestions were given. That is, when a subject is instructed to decrease the efficiency of his or her performance.

Besides investigations into strength and endurance, studies on hypnosis and motor skill performance, such as visual motor learning in digit-symbol substitution, card sorting, and hand-writing tasks have been explored. Lacy (1944) attempted to improve signature imitation writing with the hypnotic suggestion to increase this ability. Cooper and Tutell (1952) reported an attempt to improve learning and per-
formance of subordinate hand writing through hypnosis. Both of these investigations failed to find positive results. However, Hammer (1954), reported improvement in card sorting and digit substitution with post-hypnotic suggestions.

This section reviewed studies of hypnosis and performance measures which are indirectly related to the types of abilities required in athletic performance. The following section will summarize and comment on the present evidence for utilization of hypnosis in athletics.

General Comments on Hypnosis and Performance

In general, the evidence is not compelling either in favor of hypnotic procedures or against such techniques for improvement of an individual's athletic ability. The overall character of the research in this respect is a mixture of different treatments, measures, subjects, and outcomes. The strongest voice for the favorable use of hypnotic procedures in athletic performance comes from the individual case studies. These studies were often highly subjective and lacking in adequate control procedures. Thus, while these studies provided interesting speculations and information about successful intervention into specific cases, they seldom provided evidence for affirmation of theoretical concepts. The more well controlled investigations often failed to endorse the beneficial use of hypnosis. However, the method of intervention was usually a single or low frequency treatment attempt as opposed to the more intense procedure in the individual case.

The following section is a description of the goals of the present investigation, along with hypotheses and rationale.
Hypotheses and Theoretical Rationale

The present investigation focused on several issues in an attempt to determine if psychological techniques such as hypnosis, relaxation, and mental rehearsal could be effective in improving athletic performance for golfers and runners. The rationale for choosing these two sports was due to the difference in skill or complexity between the two types of performance. Hypotheses for both sports are given below.

HYPOTHESES:

1. "Athletic Potentials Technique" (APT), a procedure which includes a formal hypnotic induction, relaxation, imagery rehearsal, and hypnotic suggestions, would result in improvement in individuals' performance as measured by time and distance for runners and a traditional golf score for golfers.

The hypnotic procedure used in this investigation differed from previous experiments which administered "canned" suggestions and which may not have considered the individual needs of the subject. In contrast, it appears that many of the more successful case studies often made use of feedback in regard to the individuals' specific difficulties for corrective functioning. In accordance with systems theory (Von Bertalanffy, 1974) and Sapient Systems (Glad, Note 2) information feedback is necessary for growth and change. A lack of such information is associated with eventual entropy of the system. Thus, it appeared reasonable to assume that athletes, even those in similar events, would not exhibit similar areas of strength and weakness. A selection of suggestions may be more adequate for hypnotic intervention. Further, the use of an ongoing treatment via cassette tapes was designed as a
bridge between the more indepth treatment common in individual cases and the less intense treatments frequently seen in the group studies. This technique, APT, also included "cognitive strategies" (Barber, et al 1974) to facilitate improvement of performance. Barber has reported that very specific strategies of imagining are useful in facilitating the subjects' following of suggestions.

2. The placebo group, including procedures of relaxation and mental rehearsal, would result in improvement in individuals' performance as measured by time and distance for runners and a traditional golf score for golfers. It was hypothesized however, that this positive change would be smaller than the change for the APT group.

The rationale for the second hypothesis was based on the idea that since the placebo group would not include the formal induction of the so-called "hypnotic trance" or receive hypnotic suggestions, the effect would be less dramatic. The placebo group was also designed to control for expectancy and participation effects. It was assumed to be comparable in effect due to the finding that this procedure produced results in non-hypnotic settings (Suinn, 1976; Kolonay, Note 1) The basic similarity between the two procedures is clear upon examination.

3. Those individuals who profit from the treatment interventions (both APT and placebo groups) would differ from those who did not, in certain personality characteristics. In general, these personality characteristics were hypothesized to exist to a greater degree in individuals who profited or improved as evidenced by a positive change in performance scores. The following characteristics were chosen for testing and were operationalized by way of The Harvard Group Scale of
Hypnotic Suggestibility (Shor and Orne, 1962) and The Thematic Apperception Test (Morgan and Murray, 1935) with accompanying scoring by categories (Dreger, Notes 3 & 4; See Appendix D).

The Harvard Group Scale of Hypnotic Susceptibility allowed one total score (0-12) for so-called "suggestibility". Four categorical scores were selected to investigate possible differences between those individuals who improved in their performance (running times and distance or golf scores) and those who did not improve. Specific hypotheses are given below:

1. suggestibility; it was hypothesized that Ss who improved following hypnotic treatment in their running and golfing performance, would score higher than those who did not improve, on a measure of "suggestibility". This measure of "suggestibility" was operationalized by using the Harvard Group Scale of Hypnotic Susceptibility.

2. internal experiences, feelings, and/or thoughts of anxiety, conflict, and the opposite of the feeling of adequacy: it was hypothesized that individuals who would improve (running and golf performance) following either the hypnotic (APT) or placebo treatments would present a higher degree of internal experiences of anxiety and inadequacy than the non-improvers. This is associated with the assumption made by sports psychologists that individuals who exhibit negative, internal experiences benefit from hypnotic techniques. This benefit stems from a removal of inhibitory effects of negative emotions. In this investigation, negative emotions were measured with the individuals' score on category #4 of The Thematic Apperception Test (TAT).

3. needs for imagination, creativity, and enjoyment of work or play: it was hypothesized that individuals who benefit and improve their
performance scores with either the APT or placebo procedures, would present a higher degree of experience and need for imagination and creativity. Authors (Barber, 1974; Kroger, 1977; Gallwey, 1974) have suggested that ability to profit from hypnotic techniques and similar procedures is associated with imagination and general enjoyment of internal creativity. Thus, individuals exhibiting needs or interest in this characteristic (as measured by category #13) may profit or improve more than individuals who did not exhibit these characteristics.

4. compliance; individuals who exhibit the need or wish to comply or submit, as measured by category scores (category #19) on the TAT would benefit more from the experimental treatments. Supposedly, these characteristics would facilitate the individuals' following the direct suggestions and the indirect suggestions of both the APT and the placebo techniques. Thus, individuals high in these characteristics would be more likely to improve than individuals lower in these characteristics.

5. competition, recognition; those individuals who profited by improvement in performance measures would exhibit greater needs for competition and recognition than those who did not improve. It was assumed that individuals with strong needs in this category (category #23), would tend to use all opportunities for improvement, and therefore benefit from the available treatment procedures to a greater extent than individuals who were less competitive.

A detailed explanation of the TAT scoring categories can be found in Appendix D. Hypotheses are continued below for ratings of attitude and null hypotheses for effects of age and sex.
4) **Self ratings by the individuals of positive or negative experience in regard to their sporting activities will become more positive over the intervention period, for all individuals participating in the experimental procedures.** "Positive" experience was indicated by the individual's reporting strong enjoyment of the his or her sport, ease or willingness to practice, and indicating a "positive attitude" about the sport. "Negative" experience was indicated by the individual's reporting to dislike, having difficulty or having to put forth much effort to practice, and by indicating a "negative attitude" toward his or her sport. Rationale for this hypothesis was that expectancy, participation, and dissonance would all contribute to create a positive change in an attitude for the Ss.

5) **It was hypothesized that there would be no differential effect as a result of sex or age.** Specifically, those individuals who improved would not differ from those who did not improve on the basis of sex or age.
METHOD

Subjects

Subjects (Ss) consisted of 41 golfers (32 male, 9 female) and 50 runners (29 male, 21 female) ages 18 to 55. A total of 135 individuals volunteered and were assigned to an initial session. Twenty-two of those scheduled for an initial session did not show or dropped prior to attending that session (9 Ss in the running group and 13 Ss in the golf group). Nine Ss were dropped from the final analysis (see below). Thus, a total of 91 (50 runners and 41 golfers) Ss participated in the study. Table 1, page 19, gives the breakdown of participating Ss.

Ss were solicited through posted notices at golf courses, notices to clubs, newspaper sport columns, radio announcements, newsletters, and by word of mouth. All Ss were from the Phoenix metropolitan area. Contact between the S and the investigator occurred in three ways: (a) the individual S would hear of the program and telephone the investigator and request to be in the study; (b) the investigator would receive the S's name through a third party and be requested to telephone the S and discuss his or her participation in the study; and (c) the investigator would speak directly to a large group of individuals at a club meeting or public race, and take the S's name to telephone at a later time.

The total number of Ss (135) contacted were randomly assigned to the five groups, in either of two sports. Thus, lists of participants were developed from which the Ss were telephoned for scheduling of the initial
### TABLE 1

**Subjects Volunteering and/or Selected**

<table>
<thead>
<tr>
<th>Volunteered and assigned to 10 groups</th>
<th>135</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Extras&quot;, not needed to complete cells</td>
<td>13</td>
</tr>
<tr>
<td>&quot;No shows&quot; for initial session</td>
<td></td>
</tr>
<tr>
<td>Running group</td>
<td>9</td>
</tr>
<tr>
<td>Golf group</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
</tr>
<tr>
<td>Dropped for procedural reasons</td>
<td></td>
</tr>
<tr>
<td>Running group</td>
<td>0</td>
</tr>
<tr>
<td>Golf group</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
</tr>
<tr>
<td>Total &quot;extras&quot;, &quot;no shows&quot;, and dropped</td>
<td>(-)44</td>
</tr>
<tr>
<td>Final subject sample</td>
<td></td>
</tr>
<tr>
<td>Running group</td>
<td>50</td>
</tr>
<tr>
<td>Golf group</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
</tr>
</tbody>
</table>

session. In this manner, groups were filled randomly from the Ss originally assigned to that particular group. In the golf group, 13 Ss failed to attend the initial session. In the running group, 9 Ss failed to attend the initial session. These dropouts occurred in all groups.

After the treatment procedures had begun and during collection of post-test information, no runner Ss dropped or had to be dropped from the experiment. Six Ss were dropped from the analyses of golfers, (one in groups 3 and 5, two in groups 1 and 4) by the reason that they reported that they had not received or listened to their tapes. Two individuals' scores were unavailable (one in group 2, and one in group 3), the Ss having supposedly moved away. One S failed to record his scores (group 4).

Description of golfers

Included in the investigation were 19 golfers who frequently or regularly played on a college or university golf team. Eight individuals were participating in weekly golf lessons and had learned of the program through their golf instructor. The remaining golf Ss were community members who golfed regularly and had heard of the program via one or more of the methods listed in the beginning of this section.

Description of runners

Included in the investigation were 22 runners who frequently or regularly ran for their college or community team. Approximately 6 of the Ss were relatively new to the sport, i.e. beginners. The remaining Ss were individuals who raced or ran for enjoyment in the community runs or simply with friends or running groups.
Apparatus

1. "General Information Sheet" (Appendix A); This was the method for collecting demographic information, criteria for health, and level of weekly participation in his or her sport for each S.

2. "Data Sheet" (Appendix B); This form was used to have Ss record golf scores or running times and distances. Ss were instructed to complete this information over a period of not more than six weeks. Upon initial contact, the S was instructed to begin recording his or her scores, with pencil and paper in diary form, with dates and special conditions.

3. "Problem Identification Checklist" (Appendix C); This form was used for the individual's feedback in regard to perceived areas of difficulty in his or her sporting activity. The open-ended construction of this checklist allowed flexibility so that individual items could be included in the experimental treatments.

4. Assessment techniques; The Harvard Group Scale of Hypnotic Susceptibility- Form A (Shor and Orne, 1962) and The Thematic Apperception Test (Morgan and Murray, 1935) were used as assessment instruments. For The Thematic Apperception Test (TAT), the 10 basic cards for males and females were employed. Scoring procedures for the Harvard Group Scale were identical to those in the manual. Scoring of the TAT was accomplished with the Manual for Scoring the Thematic Apperception Test (Dreger, Notes 3 & 4). Full description of the scoring categories used in this investigation can be found in Appendix D. A brief screening for hypnosis was also used (Appendix E) to screen for any individuals who exhibit severe psycho-pathology. The items for this screening were several subtle and obvious
items of the Minnesota Multiphasic Personality Inventory (Hathaway and McKinley, 1967) which were fashioned after a screening test by Dawson and Davis (Note 5).

5. Cassette tapes were needed for each non-control S.

Procedure

The Ss, in each of two sports, were randomly assigned to five groups. These groups and the experimental manipulations are presented in Table 2 (page 23).

INDEPENDENT VARIABLES:

1. Experimental procedure (APT in Table 2) is termed "Athletic Potentials Technique" and is the primary treatment variable. This procedure consists of a formal hypnotic induction and susceptibility measure (The Harvard Group Scale), the administration of the General Information Sheet, the Problem Identification Checklist, the Data Sheet, and a brief screening procedure for participation in hypnosis. This hypnotic induction took place in small groups of 6 to 10 individuals. Following this initial session, Ss were given cassette tapes with a brief hypnotic induction, suggestions for relaxation, and imagery rehearsal. The APT tape included hypnotic suggestions for the following: (a) increased motivation, physical arousal, and the competitive "attitude", (b) increased efficiency of performance and alleviation of errors in technique, (c) removal of inhibitory factors such as anxiety, and (d) increased feelings of self-confidence and ability. These were major areas of difficulty cited by sport psychologists (Butt, 1976; Garver, 1977; and Gale, 1960). With APT, additional suggestions were given on
TABLE 2
Experimental Design

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre Treatment</th>
<th>Treatment</th>
<th>Post Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TAT and DATA COLLECTION</td>
<td>&quot;APT&quot;</td>
<td>DATA COLLECTION</td>
</tr>
<tr>
<td>2</td>
<td>TAT and DATA COLLECTION</td>
<td>NONE</td>
<td>DATA COLLECTION</td>
</tr>
<tr>
<td>3</td>
<td>DATA COLLECTION</td>
<td>&quot;APT&quot;</td>
<td>DATA COLLECTION</td>
</tr>
<tr>
<td>4</td>
<td>TAT and DATA COLLECTION</td>
<td>PLACEBO</td>
<td>DATA COLLECTION</td>
</tr>
<tr>
<td>5</td>
<td>DATA COLLECTION</td>
<td>PLACEBO</td>
<td>DATA COLLECTION</td>
</tr>
</tbody>
</table>

TAT= group administration of The Thematic Apperception Test.  
DATA COLLECTION= reporting of demographic information and performance scores.  
"APT"= Athletic Potentials Technique, which included formal hypnotic procedures, relaxation, and mental or imagery rehearsal. Also included was the administration of The Harvard Group Scale of Hypnotic Susceptibility.  
PLACEBO= procedure consisted of relaxation and imagery rehearsal.
the tapes to each individual based on his or her responses to the Problem Identification Checklist. For example, if one golfer stated that she wished to keep her elbow down, that suggestion was included on her cassette tape. That particular phrase would not have been included in other individuals' tapes. Additional examples are given in Appendix F. APT also included what has been termed "cognitive strategies" (Barber, et. al. 1974). Barber has stated that specific strategies for imagining are useful in facilitating subjects' following suggestions. Ss were instructed to listen to their tapes 3 times per week for a minimum of 3 weeks. Ss received their individual tape 3 to 5 days after the initial session.

2. Placebo procedure was the treatment variable which consisted of relaxation and imagery rehearsal training but which did not include formal hypnotic induction or suggestions. The Placebo procedure also took place in small groups of 6 to 10 individuals. This procedure lasted approximately the same time as did the hypnosis (APT) group. Ss completed the General Information Sheet, the Problem Identification Checklist, and the Data Sheet. The Ss were guided through simple muscular relaxation tasks and instructed to visualize certain scenes which were designed to be relaxing. The Ss were encourage clearly. Examples are given in Appendix G. Following this initial session, the Ss were given cassette tapes also describing relaxation procedures. The tapes included instructions for Ss to see themselves preparing for their next game or run. This mental rehearsal included instructions for Ss to see themselves as (a) motivated, (b) performing with perfect technique, (c) relaxed and free from anxiety, and (d)
feeling self-confident. Again, Ss were instructed to listen to the tapes 3 times per week for a minimum of 3 weeks.

3. Control procedure was similar to APT and Placebo groups. However, the group setting was greater in number of individuals. Ss completed the General Information Sheet, the Problem Identification Checklist, and the Data Sheet. They were told that they would participate in an initial session in approximately 3 to 4 weeks.

4. Administration of the TAT was accomplished in the group sessions with the examiner giving instructions to all Ss at the same time. Ss were told to write a brief description of what they thought was happening in the pictures, the events which led up to the scene, the thoughts and feelings of those in the picture, and what might occur later.

DEPENDENT VARIABLES:

1. The primary dependent variables for the golfers were the averages of 4 to 6 traditional golf scores. The golfers were asked to collect this information on the same course and to have their reported scores to be consecutive. The primary dependent variables for runners were the averages of 3 scores for time and distance. Runners also reported a "greatest distance" run. Upon initial contact, the Ss were instructed to begin collecting this information and to have it available for the initial session. Approximately 10 Ss failed to bring their records to the initial session. This necessitated phoning or mailing this information to the investigator in the day or two days following.

2. All Ss also reported their frequency of practice or play for the last 14 days pre and post intervention period.
3. The Ss rated themselves on 3 scales (1 to 10) of enjoyment, effort needed to practice or play, and positive or negative attitude.

4. Ss' direction of change (improved or worsened) in performance was the dependent measure for investigation of personality scores. Scores on The Harvard Group Scale of Susceptibility, and The Thematic Apperception Test (categories #4, #13, #19, and #23) were compared for "improvers" and "non-improvers".

Explanation of Design Controls

Group 1 is one experimental group. Group 2 is the control group for Group 1. Group 3 is another experimental group which was designed to control for any possible effect of personality assessment. Group 4 is the placebo group which was designed with an "equal degree of credibility or probable effect as the true experimental manipulation" (Mahoney, 1978) and thus controls for expectancy and participation. This placebo group is also offered as a control for the formal hypnotic procedures which are frequently viewed as superior to simple relaxation techniques and thus controls for the so-called formal "trance state". Group 5 is another placebo group similar to Group 3 of the experimental manipulation.

Experimenter bias was controlled for by a blind arrangement. Ss were assigned numbers and the manipulation of data was done by number. Subtle bias and demand characteristics were more difficult to control. However, verbatim accounts were taken for analysis; further, the design allows for the possibility that both the treatment and the placebo manipulations could produce some positive change. It was likely that demand characteristics would exist in both groups.
Controls for the pre-test observation (collection of scores by Ss) were not utilized due to the fact that these measures were similar to unobtrusive measures. That is, golf scores and running times and distances are often already recorded or known to the individual.

Reliability of Performance Measures

A question of design control appeared in the problem of performance measures with the specified subject sample. The study was designed for non-professional athletes who in many cases do not have objective methods for recording performance data. Thus, it is likely that unreliability in the dependent measures of performance included instrument and recording error. This would be due to each individual S being responsible for recording and presenting his or her own scores. Actual falsification is also of some concern. The time and distance scores of the runners introduced greater measurement problems of instrument error.

However, the overall utilization of the scores was estimated to be adequate. In both cases (runners and golfers), the performance scores were considered to exhibit moderate to fair reliability due to (a) the use of an average score based on 3 to 6 consecutive scores, (b) twenty-two of the golfers, and thirty-one of the runners presented scores which were independently measured (tournaments, races, formal practice scores, etc., and (c) instructions were specific to the recording methods. Finally, the scores utilized in this investigation were related to the types of scores and the method of collection which would be feasible in similar studies with this population. That is,
few investigators would be able to attain independently scored performance measures on a large sample of non-professional athletes without great expense in time and effort.

**Analysis**

Dependent variables for both groups were analyzed with the following procedures: (a) raw "change" scores were investigated with a one-way, five group analysis of variance, with the addition of a constant to create positive numbers and a normalizing of the distribution with a standard equation; (b) pre and post scores were investigated via an analysis of covariance also with the creation of positive numbers and the normalizing of scores; (c) pre and post scores were also investigated with Cattell's (1966) technique of "joint change-absolute normalization scaling"; (d) personality measures of "improved" Ss as opposed to "not improved" were analyzed using a 3 X 2 and 2 X 2 analysis of variance; (e) Chi-squares were used to test frequencies of the demographic variables of sex and age in the improved and not improved groups; (f) a discriminant analysis, direct calculation method, was used to investigate the two groups of "improved" and "worsened"; and (g) Pearson correlation coefficients were used to calculate reliability coefficients for the raters of the TAT.
RESULTS

Runners

Measures of "change" (pre minus post) were obtained on (a) average minutes per mile running times for three scores; (b) greatest distance run in the last 14 days prior to and following treatment, (c) frequency of practice each week, and (d) self ratings of attitude about running activities. Descriptive statistics of the performance variables for runners are presented in Table 3, page 30. Descriptions of treatment samples for these variables are presented in Tables 4a and 4b, pages 31 and 32. Pre and post means for the entire sample and each of the four treatment groups and control group are graphically represented in Figure 1, page 33. It can be seen that all groups experienced a positive (faster time per mile) change and that the larger improvement occurred in group 5, the "slowest" runners in pre scores.

A constant was added to the raw change scores to create positive numbers before analysis. These scores were also normalized with the standard equation \( x = \sqrt{x^2 + 0.5} \). One way analyses of variance and covariance (using normalized pre and post scores), five groups, indicated no significant differences.

Following this standard procedure, Cattell's (1966) technique of "joint change-absolute normalization scaling" was employed. This scaling method is part of Cattell's "differential R-Technique". In this way,
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time/Distance Pre scores</td>
<td>747.1</td>
<td>211.58</td>
<td>443-990</td>
<td>-1.369</td>
<td>.194</td>
</tr>
<tr>
<td>Time/Distance Post scores</td>
<td>719.5</td>
<td>215.86</td>
<td>442-990</td>
<td>-1.317</td>
<td>1.850</td>
</tr>
<tr>
<td>Frequency of Practice Pre scores</td>
<td>5.5</td>
<td>1.27</td>
<td>2-8</td>
<td>-1.400</td>
<td>1.219</td>
</tr>
<tr>
<td>Frequency of Practice Post scores</td>
<td>5.2</td>
<td>1.66</td>
<td>1-8</td>
<td>-0.741</td>
<td>-0.224</td>
</tr>
<tr>
<td>Greatest Distance Pre scores</td>
<td>9.2</td>
<td>5.27</td>
<td>0-26</td>
<td>0.779</td>
<td>1.183</td>
</tr>
<tr>
<td>Greatest Distance Post scores</td>
<td>10.7</td>
<td>6.85</td>
<td>0-26</td>
<td>0.507</td>
<td>-1.008</td>
</tr>
</tbody>
</table>

note: time/distance = minutes per mile X 100
TABLE 4a

Descriptions of Subsamples for Performance Variables by Treatments in Runner Group

Criterion Variable: **Time/Distance**

<table>
<thead>
<tr>
<th></th>
<th>PRE Mean</th>
<th>PRE Std Dev.</th>
<th>POST Mean</th>
<th>POST Std Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTIRE SAMPLE</td>
<td>747.1</td>
<td>211.58</td>
<td>719.5</td>
<td>205.86</td>
</tr>
<tr>
<td>Group 1: &quot;APT&quot;/TAT</td>
<td>726.6</td>
<td>246.19</td>
<td>694.5</td>
<td>242.63</td>
</tr>
<tr>
<td>Group 2: Control</td>
<td>763.1</td>
<td>142.99</td>
<td>748.7</td>
<td>154.72</td>
</tr>
<tr>
<td>Group 3: &quot;APT&quot;</td>
<td>733.4</td>
<td>155.18</td>
<td>719.4</td>
<td>166.66</td>
</tr>
<tr>
<td>Group 4: Placebo/TAT</td>
<td>711.0</td>
<td>321.52</td>
<td>690.2</td>
<td>312.61</td>
</tr>
<tr>
<td>Group 5: Placebo</td>
<td>801.3</td>
<td>171.92</td>
<td>744.7</td>
<td>138.25</td>
</tr>
</tbody>
</table>

(*minutes per mile X 100)

Criterion Variable: Frequency of Practice

<table>
<thead>
<tr>
<th></th>
<th>PRE Mean</th>
<th>PRE Std Dev.</th>
<th>POST Mean</th>
<th>POST Std Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTIRE SAMPLE</td>
<td>5.5</td>
<td>1.27</td>
<td>5.2</td>
<td>1.66</td>
</tr>
<tr>
<td>Group 1: &quot;APT&quot;</td>
<td>5.4</td>
<td>1.26</td>
<td>4.9</td>
<td>1.45</td>
</tr>
<tr>
<td>Group 2: Control</td>
<td>5.2</td>
<td>1.62</td>
<td>5.2</td>
<td>1.93</td>
</tr>
<tr>
<td>Group 3: &quot;APT&quot;</td>
<td>5.7</td>
<td>0.95</td>
<td>5.3</td>
<td>1.57</td>
</tr>
<tr>
<td>Group 4: Placebo/TAT</td>
<td>5.6</td>
<td>1.51</td>
<td>5.1</td>
<td>1.91</td>
</tr>
<tr>
<td>Group 5: Placebo</td>
<td>5.7</td>
<td>1.06</td>
<td>5.3</td>
<td>1.70</td>
</tr>
</tbody>
</table>
TABLE 4b

Description of Subsamples for Performance Variables by Treatments in Runner Group

Criterion Variable: Greatest Distance

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTIRE SAMPLE</td>
<td>9.2</td>
<td>10.7</td>
</tr>
<tr>
<td>Group 1: &quot;APT&quot;/TAT</td>
<td>7.7</td>
<td>9.3</td>
</tr>
<tr>
<td>Group 2: Control</td>
<td>8.4</td>
<td>8.8</td>
</tr>
<tr>
<td>Group 3: &quot;APT&quot;</td>
<td>7.1</td>
<td>9.0</td>
</tr>
<tr>
<td>Group 4: Placebo/TAT</td>
<td>9.6</td>
<td>12.9</td>
</tr>
<tr>
<td>Group 5: Placebo</td>
<td>13.0</td>
<td>13.5</td>
</tr>
</tbody>
</table>

MEAN  STD DEV. MEAN  STD DEV.
FIGURE 1
Means of Criterion Variable Time/Distance by Treatments
all pre- and post-measures were pooled into a single distribution. The entire set of scores was then normalized by calculating Z scores for all (pre- and post-) measures based on the pooled distribution. Change scores were developed by subtracting the post-Z scores from the pre-Z scores. According to Cattell (1966) this method of joint-change scaling is a successful method for managing unreliability yet retains the information contained in the change scores. Constants were added to these scores and analyses of variance and covariance were applied without significant results.

Ss' scores were analysed by "improved" (positive change in running time per mile) and "not improved" (no positive change). Of 40 treatment Ss, 25 were improved, 8 remained the same, and 7 became slower in their overall running time. The TAT category scores and The Harvard Group Scale scores were analysed in a 3 X 2 analysis of variance, and a 2 X 2 analysis of variance, respectively. No significant differences were found on personality variables between the Ss who improved and the Ss who did not improve. Discriminant analysis was calculated for both runners and golfers (see below).

Pearson correlation coefficients were calculated for each of the four categories of the TAT for two raters. Reliability coefficients obtained for runners' scores were .75, .79, .43, and .69 (categories 4, 13, 19, and 23 respectively).

There was no significant difference between expected and observed frequencies of Ss who improved and Ss who did not improve on the basis of sex or age. Age was analysed by the categories 18 to 29, 30 to 40, and 40 and older.
Golfers

Measures of "change" (pre minus post) were on (a) the average of 4 to 6 consecutive golf scores; (b) frequency of play or practice during the last 14 days prior to and after treatment, and (c) self ratings of attitude about golfing activities. Again, descriptive statistics of the performance variables for golfers are presented in Table 5, page 36. Descriptions of treatment samples for these variables are presented in Table 6, page 37. Pre and post means for the entire sample and each of the four treatment groups and control group are graphically represented in Figure 2, page 38. The means for groups 1, 2, 4, and 5, improved slightly (one to three strokes) while groups 2 and 3 remained approximately the same.

A constant was added to the change scores to create all positive numbers before analysis. These scores were also normalized with the standard equation \( x = \sqrt{x^2 + 0.5} \). One way analyses of variance, and covariance, five groups, indicated that there were no significant differences between conditions for any of these variables.

Cattell's dR technique of joint-change scaling was employed, constants added, and analyses of variance and covariance were made with no significant differences appearing.

Scores were analysed by "improved" and "not improved" and compared on personality variables. A 3 X 2 analysis of variance for the TAT scores and a 2 X 2 analysis of variance for the Harvard Group scores revealed no significant differences. Of 32 treatment Ss, 20 improved, 1 remained the same, and 11 Ss' scores became higher.
TABLE 5
Descriptive Statistics for Performance Variables in Golfer Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf scores Pre</td>
<td>788.2</td>
<td>147.01</td>
<td>617-1142</td>
<td>0.006</td>
<td>1.034</td>
</tr>
<tr>
<td>Golf scores Post</td>
<td>776.7</td>
<td>135.27</td>
<td>620-1115</td>
<td>-0.186</td>
<td>1.232</td>
</tr>
<tr>
<td>Frequency of Practice Pre</td>
<td>3.9</td>
<td>2.33</td>
<td>0-7</td>
<td>-0.138</td>
<td>-1.694</td>
</tr>
<tr>
<td>Frequency of Practice Post</td>
<td>3.4</td>
<td>2.64</td>
<td>0-7</td>
<td>0.214</td>
<td>-1.635</td>
</tr>
</tbody>
</table>

Note: golf scores = number of strokes X 10
TABLE 6

Descriptions of Subsamples
for Performance Variables by Treatments

<table>
<thead>
<tr>
<th>Criterion Variable: Golf score*</th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEAN</td>
<td>STD DEV.</td>
</tr>
<tr>
<td>ENTIRE SAMPLE</td>
<td>788.2</td>
<td>147.01</td>
</tr>
<tr>
<td>Group 1: &quot;APT&quot;/TAT</td>
<td>831.3</td>
<td>187.27</td>
</tr>
<tr>
<td>Group 2: Control</td>
<td>811.8</td>
<td>105.08</td>
</tr>
<tr>
<td>Group 3: &quot;APT&quot;</td>
<td>731.8</td>
<td>137.50</td>
</tr>
<tr>
<td>Group 4: Placebo/TAT</td>
<td>856.0</td>
<td>139.03</td>
</tr>
<tr>
<td>Group 5: Placebo</td>
<td>724.0</td>
<td>144.80</td>
</tr>
</tbody>
</table>

(*strokes X 10)

<table>
<thead>
<tr>
<th>Criterion Variable: Frequency of Practice</th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEAN</td>
<td>STD DEV.</td>
</tr>
<tr>
<td>ENTIRE SAMPLE</td>
<td>3.9</td>
<td>2.33</td>
</tr>
<tr>
<td>Group 1: &quot;APT&quot;/TAT</td>
<td>2.8</td>
<td>1.67</td>
</tr>
<tr>
<td>Group 2: Control</td>
<td>3.9</td>
<td>2.62</td>
</tr>
<tr>
<td>Group 3: &quot;APT&quot;</td>
<td>4.5</td>
<td>2.39</td>
</tr>
<tr>
<td>Group 4: Placebo/TAT</td>
<td>3.1</td>
<td>2.48</td>
</tr>
<tr>
<td>Group 5: Placebo</td>
<td>4.8</td>
<td>2.28</td>
</tr>
</tbody>
</table>
FIGURE 2
Means of Criterion Variable Golf score by Treatments

"strokes" to the nearest 10th

70 75 80 85

pre post pre post pre post pre post pre post pre post
Entire Group 1 Group 2 Group 3 Group 4 Group 5

78.8 80.2 83.1 73.1 85.6
77.6 81 81 73.6 82.7
72.4 71.5
Pearson correlation reliability coefficients for the TAT for golfers were .73, .71, .67, and 1.0 for categories 4, 13, 19, and 23.

**Discriminant Analysis**

A discriminant analysis, direct calculation method, was employed to distinguish statistically between the improved Ss and those Ss who became worse in their performance. Means and standard deviations of the personality variables are given in Tables 7 and 8, pages 40 and 41. The within groups correlation matrix of personality variables is given in Table 9, page 42. Coefficients for the discriminant functions are presented in Table 10, page 43. Finally centroids and prediction results of the derived functions are given in Tables 11 and 12, pages 44-45.

Reviewing the results of the discriminant analysis for treatment Ss only, the following can be seen in the tables: (a) Ss who "worsened" scored higher on the Harvard Group in both sports; (b) "improvers" tended to be higher on "anxiety" in both sports than "worsened" Ss; (c) with the exception of the post ratings in runners, "improvers" tended to have higher ratings (pre and post) than the "worsened" Ss, which indicated a more negative attitude; (d) the "worsened" golfers rated themselves more negatively after the treatment.

The personality variables tended to be uncorrelated with each other with the exception of the pre and post ratings. The two correlated at .57 for the golfers and .49 for the runners.

Very few similarities in the weighting coefficients between the runners and golfers suggest differences between the two groups in regard to differentiating improvers from non-improvers. In Table 11, page 44, the prediction results of the obtained discriminant function
# TABLE 7

Personality Variables for Treatment Ss (Runners) grouped by Outcome

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 (Improved) N=25</th>
<th></th>
<th>Group 2 (Worsened) N=7</th>
<th></th>
<th>Total N=32</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEAN</td>
<td>SD</td>
<td>MEAN</td>
<td>SD</td>
<td>MEAN</td>
</tr>
<tr>
<td>Anxiety*</td>
<td>1.065</td>
<td>0.686</td>
<td>0.855</td>
<td>0.253</td>
<td>1.019</td>
</tr>
<tr>
<td>Imagination*</td>
<td>0.759</td>
<td>0.129</td>
<td>0.978</td>
<td>0.716</td>
<td>0.807</td>
</tr>
<tr>
<td>Compliance*</td>
<td>0.707</td>
<td>0.0003</td>
<td>0.707</td>
<td>0.0002</td>
<td>0.707</td>
</tr>
<tr>
<td>Competition*</td>
<td>0.707</td>
<td>0.0003</td>
<td>0.707</td>
<td>0.0002</td>
<td>0.707</td>
</tr>
<tr>
<td>Pre ratings (sum)</td>
<td>7.200</td>
<td>3.969</td>
<td>5.286</td>
<td>4.192</td>
<td>6.781</td>
</tr>
<tr>
<td>Post ratings (sum)</td>
<td>6.880</td>
<td>3.296</td>
<td>8.857</td>
<td>5.757</td>
<td>7.312</td>
</tr>
</tbody>
</table>

*TAT categories
TABLE 8

Personality Variables for Treatment Ss (Golfers) grouped by Outcome

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 (Improved) N=20</th>
<th>Group 2 (Worsened) N=11</th>
<th>Total N=31</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEAN</td>
<td>SD</td>
<td>MEAN</td>
</tr>
<tr>
<td>Anxiety*</td>
<td>.904</td>
<td>.386</td>
<td>.818</td>
</tr>
<tr>
<td>Imagination*</td>
<td>.931</td>
<td>.395</td>
<td>.731</td>
</tr>
<tr>
<td>Compliance*</td>
<td>.707</td>
<td>.0003</td>
<td>.707</td>
</tr>
<tr>
<td>Competition*</td>
<td>.755</td>
<td>.216</td>
<td>.707</td>
</tr>
<tr>
<td>Pre ratings (sum)</td>
<td>9.050</td>
<td>5.414</td>
<td>6.546</td>
</tr>
<tr>
<td>Post ratings (sum)</td>
<td>7.550</td>
<td>3.220</td>
<td>5.000</td>
</tr>
</tbody>
</table>

*TAT categories
### TABLE 9

**Within Groups Correlation Matrix of Personality Variables for Treatment Ss**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvard</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>.1626</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imagination</td>
<td>.1004</td>
<td>.2617</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance</td>
<td>.0001</td>
<td>.0006</td>
<td>.0008</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td>.0001</td>
<td>.0006</td>
<td>.0008</td>
<td>1.0000</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre ratings</td>
<td>-.0982</td>
<td>-.0082</td>
<td>-.0281</td>
<td>.0001</td>
<td>.0001</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Post ratings</td>
<td>-.0640</td>
<td>-.0944</td>
<td>-.1983</td>
<td>.0001</td>
<td>.0001</td>
<td>.4920</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

| Golfers |
|---------|---------|---------|---------|---------|---------|--------|--------|
| Harvard | 1.0000  |         |         |         |         |        |        |
| Anxiety | -.1790  | 1.0000  |         |         |         |        |        |
| Imagination | -.1188  | .0429   | 1.0000  |         |         |        |        |
| Compliance | .0000   | .0006   | .0007   | 1.0000  |         |        |        |
| Competition | .0651   | .0343   | -.1324  | .0011   | 1.0000  |        |        |
| Pre ratings | .2463   | .0613   | .2533   | -.0004  | .1550   | 1.0000 |        |
| Post ratings | .2193   | .0959   | -.0180  | -.0002  | .2226   | .5710  | 1.0000 |
TABLE 10

Discriminant Function Coefficients (Treatment Ss) for Outcome Groups

<table>
<thead>
<tr>
<th></th>
<th>Runners</th>
<th>Golfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvard</td>
<td>0.32658</td>
<td>0.21962</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-0.33329</td>
<td>-0.05819</td>
</tr>
<tr>
<td>Imagination</td>
<td>0.56225</td>
<td>-0.53647</td>
</tr>
<tr>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td></td>
<td>-0.14496</td>
</tr>
<tr>
<td>Pre ratings</td>
<td>-0.57012</td>
<td>0.14656</td>
</tr>
<tr>
<td>Post ratings</td>
<td>0.67898</td>
<td>-0.82320</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Runners</th>
<th>Golfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvard</td>
<td>0.06965</td>
<td>0.05061</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-0.53759</td>
<td>-0.17006</td>
</tr>
<tr>
<td>Imagination</td>
<td>1.61855</td>
<td>-1.61641</td>
</tr>
<tr>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td></td>
<td>-0.83558</td>
</tr>
<tr>
<td>Pre ratings</td>
<td>-0.14147</td>
<td>0.02975</td>
</tr>
<tr>
<td>Post ratings</td>
<td>0.17239</td>
<td>-0.26071</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.35317</td>
<td>3.45266</td>
</tr>
</tbody>
</table>

Note: missing values were dropped from analysis due to causing singularity in the within groups covariance matrix.
TABLE 11

Centroids and Prediction Results of Discriminant Function
using Personality Variables for Treatment Ss

Runners

Centroids of Outcome Groups in Reduced Space

<table>
<thead>
<tr>
<th>Group</th>
<th>Centroid of Group 1 (Improved)</th>
<th>Centroid of Group 2 (Worsened)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.27629</td>
<td>.98674</td>
</tr>
</tbody>
</table>

Prediction Results

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>No. of Cases</th>
<th>Improved</th>
<th>Worsened</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Predicted Group Membership</td>
<td>Group 1 (Improved)</td>
</tr>
<tr>
<td>Improved</td>
<td>25</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>88.0%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Worsened</td>
<td>7</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28.6%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Ungrouped (no change)</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50.0%</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

Percent of 'Grouped' cases correctly classified:

84.38% (or 27 of 32 Ss)
<table>
<thead>
<tr>
<th>Actual Group</th>
<th>No. of Cases</th>
<th>Predicted Group Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1 (Improved)</td>
<td>Group 2 (Worsened)</td>
</tr>
<tr>
<td>Improved</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>65.0%</td>
<td>35.0%</td>
</tr>
<tr>
<td>Worsened</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>18.2%</td>
<td>81.8%</td>
</tr>
<tr>
<td>Ungrouped (no change)</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>33.3%</td>
<td>66.7%</td>
</tr>
</tbody>
</table>

Percent of 'Grouped' cases correctly classified: 70.97% (or 22 of 31 Ss)
for runners is calculated at a correct classification of 27 out of 32 Ss (84.38%). Individuals who did not change were not included in the calculations. Thus, the "no change" or "ungrouped" Ss functioned as another test of the value of the function, logically dividing those individuals equally into each of the two groups. The prediction results for the golfers are given in Table 12, page 45, correctly classifying 22 of the 13 Ss (70.97%). Likewise, as a test, those individuals who did not change were divided into the two other groups, as equally as possible (1 into the "improved" and 2 into the "worsened" group).

Percentages are reported by the computer. However, it is recognized that percentages with such small N's are not generally adequate for interpretation.
DISCUSSION

Summary Statement

The results of this investigation failed to support the primary hypotheses that individuals could improve their running and golfing performance with APT (hypnotic procedures) and to a lesser degree, improve with the techniques of relaxation and mental rehearsal. This lack of a positive finding is similar to the results of other studies engaging groups of individuals found in the literature (Eskridge, 1972; Arnold, 1969; O'Donnel, 1970; and Ulrich, 1973). However, the results of this study are in contrast to the reports of individual case investigations (Garver, 1977; Kroger, 1963, Johnson, 1961a; and Naruse, 1965). The results also failed to support the hypothesis that hypnotic techniques are more beneficial than relaxation and mental rehearsal for the same period of time. Finally, no significant variation between personality scores of "improvers" and others, suggests that those individuals who improved did not exhibit different characteristics associated with their improvement.

The methods utilized in this investigation were designed in an attempt to bridge between the more indepth individual treatments of case studies and those techniques used in most experimental group settings. Thus, this attempt was to supply an intermediate ground for investigation.
The information which was obtained from this investigation will be discussed briefly below.

**Findings of Change**

It can be observed from comparison of the group means (Figures 1 and 2) that positive change in performance did occur to an extent. However, this change was not significant. Likewise, there was unexpected positive change in the control group of the runners and unexpected negative change (very small, i.e. one half stroke) in the placebo/TAT group of the golfers. Furthermore, although many individuals experienced an improved performance, the frequency of "improvers" was not significant over the entire treatment population.

Nonetheless, a tendency, especially in the golfers is suggested. In viewing figures 1 and 2 in the results section, it can be observed that the groups which exhibited the higher mean scores initially, were among those that had the greatest improvement. This might add some evidence to the proposition that individuals who are not as skilled, may have more "room for improvement". Also, the fluctuation in standard deviations in many of the groups (the golfer control group dramatically decreased in this measure) may suggest some beginning change processes which were not stabilized over the time period for this investigation.

**Personality Variables**

In regard to the discriminant analyses, it is offered that the obtained coefficients may provide some understanding, and later
a possible beginning of selection procedures, as to those athletes and individuals who will improve with hypnosis and related psychological techniques. The analyses suggest that improvers and non-improvers do differ somewhat and discrimination between the groups may be possible. This analysis was an exploratory one and was employed to contribute to information along the line of investigation, rather than to serve as a workable tool at the present time. Even though the classification ratios into the two groups was high in runners and moderate in golfers, caution should be exercised in concluding that selection could occur on the basis of the personality variables. The variables and scores were limited and the lack of similarity in the coefficients between the golfers and runners suggests caution in interpretation. Since no significant differences were obtained from the direct measures (Harvard, TAT, and ratings) the information from discriminant analysis is presented only as descriptive, not for prediction.

However, some tendencies seem to appear. In this regard, the slight tendency for improvers to score higher on the anxiety measure of the TAT points to the possibility of "optimal anxiety" in facilitating performance. It is interesting that individuals who became worse appeared to score higher on the Harvard, a result which is contrary to the theory of hypnotic susceptibility. Furthermore, it is interesting that the "ungrouped cases" were classified approximately evenly into the two groups due to the actual fact of "no change" in these Ss. This suggests additional evidence that differentiating the "improvers" from those Ss who became worse, is feasible. These results suggest avenues for future research. In the next section, explanations as to lack of significant results will be explored.
True Absence of Effect

The first and simplest explanation for the results obtained in this study is that there exist no treatment effects for either the hypnotic procedures (APT) or techniques of mental rehearsal and relaxation. In this case, positive results obtained by investigators which are cited in the literature would be explained as artifacts falling into the categories of experimenter bias, expectancy effect, and demand characteristics. Many reports of significant change come from individual practitioners. It is possible that subjective biases such as experimenter and demand characteristics would operate to a greater degree in the uncontrolled, individual, case situation. Checking the performance and scores of the individuals in the present study, and hearing the Ss' statements about perceived changes, it is understandable that investigators indicate dramatic results with specific athletes. To illustrate this point, some of the more interesting, but less scientific, comments from the Ss are offered below. These reports are not to be confused with results. These comments may contribute to understanding the discrepancy of reports in this area.

One male subject, who previously golfed at a 72 average, began scoring between 64 and 69 consistently. He called the investigator and attributed this change to his participation in the experiment. Further, it happened that he won a well known tournament and thus was greatly enthusiastic about the treatment.

Another woman golfer stated she was "burning up the course." Her pre and post measures indicated that she had decreased her average score by 8 strokes, a considerable improvement.
A number of young women who were participating in the study were runners on a community college team. The coach of that team later reported that they "had had their best meet of the year."

An older man in the study stated that he had been setting his "all time best times" in running since beginning his participation.

There were numerous additional reports of "It's really helping!" and "This is so nice, I'm really relaxed." It is easy to see how these types of reports can be encouraging, suggestive, and misleading as to the generalizability of benefit in the treatment.

If in fact, the null hypothesis is true in this case, a problem contributing to the discrepant findings in the area of hypnosis and athletics is the possibility that many more negative results go unpublished than do positive results. The general interest and publicity for the effective use of psychological treatment methods for improving athletic performance encourage a situation of expectancy.

**Methodological Difficulties**

A second group of explanations for lack of results is that of methodological difficulties. There are a number of problems in both the (a) experimental design, such as specificity of treatment modalities and target users, possibility of differential gradients of effect, and adequacy of controls, and (b) statistical phenomenon, such as the dilemmas with change scores, regression effects, and multiple sets of unreliability.

**Experimental design** Problems which became apparent during the period of this study included the following: (a) possibility of differential attrition, both a real loss of Ss and an unknown loss of Ss' compliance and cooperation; (b) demand characteristics; (c) possibility of differential effects of Ss' environment, such as physical training
programs, illnesses, fatigue, etc.; d) treatment lacking sufficient power as designed, i.e. too short a treatment period and/or too low a frequency of contact with Ss, too long a treatment period and the consequent fading of effect; and e) inconsistent and unpredictable responses (internal, cognitive) to standard taped messages and group sessions. In other words, the same stimulus may be differentially responded to by the Ss. Their responses and therapeutic "hits" or "misses" are unpredictable.

The following sections will discuss the last two problems in more detail.

Treatment Lacking Sufficient Power:

One of the attempts of this investigation was to develop a treatment that was sufficiently powerful to produce an effect. It is possible that the procedures in this study simply lacked power. The minimum length of time which the S listened to the cassette tape was two weeks before beginning to collect post treatment data. Some individuals completed data collection shortly afterward, in the next 5 days. Other individuals collected data for the maximum period of 6 weeks. Thus, in some cases, a fading of effect or too limited a treatment period may have existed. Some Ss reported becoming bored and disinterested in the tapes after the two weeks. In another setting, such as a clinical setting, this disinterest would be managed by developing a new tape which would engage the individual in the treatment once again. One subject in this investigation stated that the initial group session was a useful experience for him but that he just could not relax with the tape. Frequently, individual sessions may be necessary to elicit behavioral changes.
Differential Response to Treatment:

One of the major problems in this area is similar to what Meichenbaum (1977) stated as a necessary requirement for developing treatment methods. Specifically, he cited the importance of successfully analyzing tasks prior to developing the treatment procedures. He noted that the nature of the presenting problem (or the aspect of behavior to be changed) is not always apparent. Often investigators seek to bring about an effect or change without understanding that which influences the behavioral act. In the case of athletic behavior, it may be necessary to better understand the individual's cognitive processes and structures and how those are associated with actions. The athletic task can be analyzed, as any other task, into the cognitive elements, the behavioral acts, and the environmental and self consequences of those acts. It may be helpful to study these processes in depth and develop a greater understanding about an individual's thoughts, feelings, and his or her associated behaviors. Environmental and individual consequences may also be included in this task analysis.

It was interesting to observe how very negative and critical Ss appeared to be in their response to the problem checklist. Overall, Ss reported dissatisfaction with almost every aspect of their performance. One woman golfer stated afterward that in listening to her tape, she was simply unable to see herself performing without errors. She stated that it had become natural to think of her mistakes and criticize the mental picture of her errors.

The treatment procedure used in this investigation was designed to take into account aspects of the individual. Thus, some emphasis toward addressing specific problems of individuals was included in
the treatment procedures. However, whether this handling of the individual needs of Ss was effective in itself is not known. The results would suggest that this attempt was unsuccessful and that a more complex situation exists for most individuals.

Statistical Phenomena  A major difficulty encountered in any study which attempts to assess change is the systematic relatedness of such scores to random error of measurement. Thus, authors have indicated that raw change scores can lead to fallacious conclusions and are notoriously unreliable. Bereiter (in Harris, 1963) summarizes the three major dilemmas of change scores.

The first dilemma, the "over-correction-under-correction dilemma" is associated with a spurious negative element in the correlation between a pretest score and the observed gain on the same test. Bereiter concluded that this dilemma is a result of failure to correct for the unreliability in pretest scores.

The second dilemma is the "unreliability-invalidity dilemma". The basis of this problem is the fact that as the correlation between pretest and post test goes up, the reliability of the difference between scores goes down. This situation creates a problem due to the fact that as the correlation goes down, the less confidence one has that the tests measure the same thing. Bereiter concluded that this dilemma is a false one. He stated that the meaningfulness of change scores does not depend on measuring the "same thing".

The third problem is what Bereiter called the "physicalism-subjectivism dilemma", which he considered to be the only true dilemma. This dilemma appears as a choice of scale, at times, and is related to
the problem of developing and using objective measures related to some true underlying psychological change. The problem is particularly troublesome with change scores in that the "cost of being wrong (in assuming a particular function) is much greater in dealing with change scores than with correlational" data. Bereiter recommends that subjective dimensions, despite drawbacks, are necessary in order to make interpretable comparisons.

The obvious difficulties in measures of change include the well known paradoxical regression effect and the multiple errors of measurement (unreliability) in the two sets of scores (Lord, in Harris, 1963). Cronback and Furby (1970) summarized their observations by disposing of change scores. They suggest that investigators "frame their questions in other ways".

In this investigation, there is little doubt that these statistical difficulties were operating to some degree and may in fact have clouded possible differential effects. The rationale, however, for using change measures was based on several facts. First, the main dependent variables in this study, i.e. golf scores and time/distance for runners, were not single measurements. The pretest and post-test scores were the mean of scores over time. Consequently, these scores would be more reliable, reducing the error of measurement, than single scores. Consequently, a more adequate estimate of true scores was obtained by a "baseline" procedure.

Secondly, these change scores were not analyzed directly. In the analysis of variance, the tests of significance were based upon population and group variances. Thus, an indirect approach for assessing differences was utilized rather than a direct assessment of the change
scores. Further, in this design, it would be assumed that the unreliability of the scores would occur randomly in all groups, thus reducing the influence of measurement error.

The third rationale proposed for using change as an appropriate measure was based on the use of "joint-change absolute normalization" scaling procedures devised by Cattell (1966) for use with factor analytic (dR Technique) investigation. Alternate analyses were based on this technique of scaling. In this method, the mean change score of all individuals is equal to the difference of group means. Further, this score is in "units reflecting a normalized standardization over the whole range of our experience of measurement of that variable" (Cattell, 1966). This scaling method, then provides a better estimate, in Cattell's opinion, than many of the statistical procedures proposed for managing the problems of change scores.

Finally, one additional rationale is offered for staying with change measures for the analyses of variances in this study. In agreement with Cattell, the laws and relationships governing change variables may have gone unrecognized due to the assumptions about the true nature of the scores. Thus, the appropriateness of many statistical procedures in the change field may be questionable and contributing to "muddying the waters".

Unrelated to the basic problems of change scores but specific to the needs of the present investigation was the use of change to group individuals for personality inquiry and classification.

In summary, the methodological and statistical difficulties
in an investigation such as this are no doubt great. It is a new intermediate area, difficult to control. It is plausible that problematic statistical properties have clouded true effects. However, in the opinion of the present investigator, this has not been the case in this study, or at least, it is not the major issue. Besides adjusting for change score difficulties with scaling procedures, the basic design of this investigation assisted in the management of the problems of change. More importantly, it is very likely that the major problems were in the treatment strategies. That is, the difficulties occurred back in the oven, not with the seasoning at the table, these problems being mainly a function of lack of basic information in the field of athletics as to specific treatment modalities and specificity of treatment focus.

The Problem of Individuality

A third explanation for the lack of positive results proposes that psychological treatments for athletic behaviors do work for certain individuals. However, the effects are not generalizable to all individuals and are usually not significant in randomly selected groups.

Overlap between this problem and the difficulties in methodology in this area exists at the present time. In this investigation it was not possible to know whether the treatment was lacking in power in regard to length of time, frequency, etc., or whether it is possible that only certain individuals would be benefited by the techniques. A total of 45 individuals (from 72 treatment Ss) in this investigation
improved to a degree. Many were pleased with their change. It is suggested that selection of those 45 individuals could occur based upon some trait. Instead of looking at variables across Ss, as in this study, it may be necessary to understand the individual across variables. Thus, a more effective approach for additional research may be to investigate by way of a series of controlled case studies. A change in perspective, from variable-centered to person-centered (Korchin, 1976), from normative to ipsative (Cattell, 1946), or from nomothetic to idiographic (Allport, 1937) is suggested.

In this way, athletes who benefit from psychological interventions may be studied to assist us in understanding how they benefit. Recommendations include study of those individuals who are known to have profited, investigation into how change occurred, indepth consideration of the variables in the personality, and how these variables interact with and are associated with treatment variables.

Indepth case studies would add to the information base and eventually allow the possibility of generalization to some degree. Methodological problems may also be better understood from a controlled, case study approach. Once these difficulties are managed effectively, a more accurate answer to the effectiveness of psychological interventions for athletes is possible.
REFERENCES


Morgan, P. and Murray, H. The Thematic Apperception Test. Los Angeles, Calif., Western Psychological Services, 1935.


Suinn, R. M. Visuo-motor Behavior Rehearsal for Adaptive Behavior in Counseling Methods, Crumbolts, J. and Thorenson, C. (Ed.s)


REFERENCE NOTES


APPENDIX A

GENERAL INFORMATION

NAME________________________________________________SEX__DATE OF BIRTH_____

ADDRESS______________________________________________________________

RACE______WEIGHT_______HEIGHT________MARITAL STATUS_____________________

Since this experiment involves athletic performance and exertion, it is necessary that you are in adequate physical health.

PHYSICAL HEALTH: EXCELLENT_____GOOD_____FAIR_____POOR______NOT SURE

Please list any major health problems which you may have ________________

______________________________ Difficulties in the past year?

______________________________ Have you had a physical in the past 18 months?

______________________________ I state that I am in good health and I am responsible for my health care during this program.

______________________________ signed

Your sport is GOLF or RUNNING? How many times per week do you practice or play?

Do you consider yourself a serious golfer or runner?

yes no

0 1 2 3 5 6 7 other____

What is your average score, handicap, time for a certain distance, or time per mile? ______________________________________________________________

PLEASE READ CAREFULLY AND SIGN. FEEL FREE TO ASK QUESTIONS.

I CONSENT to be a part of this study involving runners and golfers, hypnosis, relaxation, and some additional information. I understand that my participation is completely voluntary and that I can withdraw at any time I wish. I also understand that my identity will be anonymous and none of my personal information will be revealed.
APPENDIX B

DATA SHEET

GOLF SCORES (LAST SIX CONSECUTIVE SCORES) DATE

1.
2.
3.
4.
5.
6.

How many times have you golfed during the past 14 days? _________ The past 7 days? _________

Please rate the following from 1 to 10 as to how you experience your golfing at this time.

I enjoy golfing very much

It takes great effort for me to practice or play

I have a very positive attitude about my game

I dislike golfing

It takes no effort for me to practice or play

I have a very negative attitude
APPENDIX B

DATA SHEET

RUNNING TIMES AND DISTANCES (PLEASE RECORD 3 CONSECUTIVE RUNS & DATES)

1.
2.
3.

How many times have you run (practice and training races included) during the last 14 days? _____ During the last 7 days? _____ What has been the most frequent distance which you have run and the greatest distance you have run in the last 14 days? _________________________________

Please rate the following from 1 to 10 as to how you experience your running at this time.

I enjoy it very much

I dislike it

It takes almost no effort for me to practice

It takes much effort

I have a very positive attitude about running

I have a very negative attitude
APPENDIX C

PROBLEM IDENTIFICATION FORM

PLEASE CHECK ANY OF THE FOLLOWING DIFFICULTIES WHICH ARE TRUE FOR YOU.

1. I sometimes lack motivation_____; energy________; the "competitive attitude"__________; psychological arousal__________; when participating or competing in my sport.

2. I sometimes get tense______, anxious______, or nervous______, in practice or competition and this causes a problem for me.

3. I need more self-confidence______ and positive attitudes______ as far as my sporting performance goes.

4. I have difficulties in my form or technique_________. Specifically, these are________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

   In order to correct these I would need to____________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

5. I have some other areas that I wish to work on. These are_______
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
APPENDIX D

TAT NORMS BY CATEGORIES: * (from Dreger, 1978)

Category- Needs, Press, Inner states, and Defense mechanisms

4. -Adeq (Helpless, weak, inadequate, impotent, inferior)
   Anx (Anxious, fearful, apprehensive, worried, dreading)
   Conf (Confused, puzzled, bewildered, uncomprehending)
   Conf1 (In conflict, undecided, uncertain)
   -Cert (The opposite of- To be decided, certain, assured, determined)
   Dist (Disturbed, upset, deeply moved, emotional turmoil, troubled)
   p Lost (Hero loses way, either from disorientation or external forces operating on him)
   p Brag (Bragging; To boast or brag. Physical or verbal exhibitionism)
   M-F (Masculine-feminine confusion, inadequate sexual identity)
   Disc (Discrepancy: Discordant elements exist together in a situation)
   Ambiv (Ambivalent, not just undecided, but having two even opposing, feelings and/or attitudes toward object)
   n Frus (Frustrated)
   Tens (Tense, expectant, waiting)

Mean= 1.83 Var.= .56 S.D.= .75

13. n Aes (Aesthetic: To enjoy art, music, or literature, to appreciate the beauties of nature)
   n Creat (Creation: To strive for self-actualization through building, creating, constructing; to express one's deeper nature through painting, composing, writing, etc.
   n Play (To play games, to engage in activities for sheer amusement, to go to a party, to make jokes, laugh, wisecrack; to enjoy oneself)
   n Work (Work: To enjoy work for its own sake. To exercise talents or abilities; to enjoy the utilization of skill)
   Imag (Imagination. Hero has dreams, imaginings, not necessarily abnormal or unreal)
   n Adv (Adventure: to seek adventure, to be restless, on the
move, craving new sights, new places. Desire to travel, to visit strange and new places, to go exploring; to crave excitement, thrills, to engage in feats of daring)

Mean = 1.19  Var. = .38  S.D. = .62

19. n Compl (Compliance: To accede to the wishes, suggestions, or exhortations of someone else, to be anxious to please, quick to agree to cooperate. To obey or follow out orders because of a willingness to please and where that which is requested by the other individual either has a positive value for the hero or is a matter of indifference to him. To follow the leadership of an admired individual willingly, to conform to a group code or mores)

n Subm (Submission: To comply unwillingly. To submit to insult, injury, blame, punishment or defeat without much opposition, to give in, to obey commands and orders which are contrary to the wishes of the individual)

n Remun (Renunciation: To give up a desired object as a means of avoiding disappointment or frustration. To deny a wish as a means of avoiding frustration. Resigning oneself to an unpleasant state of affairs)

Mean = 1.00  Var. = .18  S.D. = .43

23. n Comp (Competition: To win; to equal or excel others; to strive after higher status than someone else)

n Recog (Recognition: To seek or enjoy applause, praise, renown, approval; basking in the appreciation of others. To be conspicuous, attract attention, perform or speak in public, dramatize oneself in front of other, to exhibit oneself (not exhibitionism as in n Dirty)

n Stat (Status: To strive for or enjoy social status or position. To be a respected member of the social or occupational community. No competitive element indicated)

Ambit (Ambitious, striving, success-oriented)
Disd (Proud, haughty, disdainful -without specified object-)
Pomp (Pomposity, be a "stuffed shirt")

Mean = .87  Var. = .11  S.D. = .33

*Norms based on Poisson Distribution (Score = $\sqrt{x + 0.5}$)
Adults over 16
Please circle the following items which are true for you.

Someone has been trying to rob me.
I am troubled by attacks of nausea and vomiting.
I frequently find myself worrying about something.
I often think, "I wish I were a child again".
Everything tastes the same.
I don't seem to care what happens to me.
I am sure I am being talked about.
I am entirely self-confident.
I often feel as if things were not real.
I certainly had more than my share of things to worry about.
At times I hear so well it bothers me.
APPENDIX F

EXAMPLE TREATMENT SUGGESTIONS

APT

1. Increased motivation, physical arousal, increased "competitive attitude";

"Visualize yourself being very enthusiastic and full of energy. Everyone has had the experience of energy and enthusiasm and arousal. Like a child who can't remain still, a very excited child. You may be so enthusiastic and energetic that you find it difficult to be still. You already know how to be motivated and aroused about your golf (running). Most people can remember being very excited about some important part of their lives. Soon, you will be surprised at how motivated and interested you become."

2. Increased efficiency of performance and alleviation of errors in technique;

"You can see yourself running along the course. Visualize your running form as perfect and smooth in your image. (pause) See yourself flowing easily and perfectly through the movements. Faster and stronger. Faster. Stronger. It might seem as if you were very light in weight, hollow. And you move so fast and easily over the course. You can become faster now, or whenever you wish to become stronger."

3. Removal of inhibitory factors such as anxiety;

"You feel very good about yourself. You have enjoyed what you've done and you can experience a relaxed and pleasant feeling of satisfaction. Visualize an important and supporting person whom you know, coming over to you out of the crowd and affectionately greeting
APPENDIX G

OUTLINE OF RELAXATION PROCEDURE
AND MENTAL REHEARSAL

"Now I want you to begin to relax your body so that you can think clearly about improving your athletic abilities. We'll begin by picking an imaginary point on your head and beginning to relax. Now relax the muscles in your scalp... Relax the muscles in your neck and face. You will be able to feel the tensions flow out of these areas as you begin to relax. (continue through the entire body then work back up by having the subject tense and relax these areas once again.) Now continue to relax. You will notice that your breathing is steady and regular as you relax fully. Drifting, relax, relax."
This process continues for 10 to 15 minutes.

"Now that you are fully relaxed, I want you to begin to imagine yourself at the track (golf course) preparing for the race (game). I want you to go over in your mind, 'practice' in your mind, the entire performance. With this practice and mental rehearsal, you will be imagining a perfect performance. If at anytime you become aware of difficulties, you can correct these difficulties and improve. When you have completed your mental rehearsal, you will be rested and ready to go on with other activities. Now, see yourself going through the motions, perfectly, naturally, smoothly. Very good."
you. See yourself as confident, relaxed, smiling, but as also energetic. You have done well... and can continue."

4. Increased feelings of self-confidence and ability;

"You feel very confident and relaxed. Everyone has had the feeling of success and confidence, of physical and mental strength. There has been a time like that for you, no doubt. (long pause) Picture yourself enjoying what is happening for you and bring that feeling back to the images of your running (golf)."

"We all have potentials we are unaware of and we usually don't know how they will eventually be recognized and expressed. You can express your hidden potentials when the time is best for you to do so. You may be surprised and delighted by your success."

5. Direct suggestions for improvement:

"You will find that you are able to concentrate and enjoy your game more than in the past. Each time you listen to the tape, you will have new and delightful improvements in all parts of your game. You'll hit the ball further and with more accuracy than before."
VITA

Julie Nelson was born in Coushatta, Louisiana and received her B.S. and M.A. from Louisiana State University in 1973 and 1976. She will receive her Ph.D. in Clinical Psychology, with a minor area of Industrial-Organizational Psychology from L.S.U. She completed her requirements and training in January, 1980, which included (a) an internship at the Psychology Group (Baton Rouge, La.) and the Arizona State Hospital (Phoenix, Az.); and (b) teaching Introductory and Adolescent Psychology at L.S.U. She has developed areas of interest and ability in neuropsychology, hypnotherapy, and in the political/legal problems facing psychologists.

She has one child, Cass, age 16 months at this writing.
Candidate: Julie Nelson

Major Field: Psychology

Title of Thesis: Investigation of Effects of Hypnosis, Relaxation, and Mental Rehearsal on Performance Scores of Golfers and Runners

Approved:

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

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Date of Examination: January 31, 1980