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COMPARISON OF HYPNOTIC AND RELAXATION STRESS MANAGEMENT PROCEDURES WITH COMPETITIVE FENCERS

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Thesis presented to the School of Graduate Studies in partial fulfillment of the requirements for the degree of Master of Science in Kinantropology

UNIVERSITY OF OTTAWA

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ABSTRACT

The purpose of this study was to investigate the relative effectiveness of post-hypnotic and post-relaxation suggestions induced on-site with fencers before a high calibre domestic competition. Two procedures were compared: the first involved pre-competition hypnotic induction with post-hypnotic suggestion to activate self regulatory mechanisms to reduce anxiety to a desirable level, if and when such reduction was needed. The second procedure involved pre-competition relaxation with post-relaxation suggestion, the same as post-hypnotic, to see if there were any differences in self regulation of anxiety and performance between those two treatments. Subjects in each group were compared to a Control Group and also to their own baseline measurement in non-treatment condition.

Thirty fencers in four weapons (épée, sabre, men's foil and ladies' foil) were randomly assigned to three groups: Experimental Hypnotic Group (N = 11), Experimental Relaxation Group (N = 11) and Control Group (N = 11). The subjects were tested during two consecutive competitions in their weapons during the 1983 season. The first competition was used as the baseline measure, the second - as the treatment post-measure. The dependent variables being studied were: estimated level of difficulty and perceived level of anxiety, both measured on a ten point self-report scale; bout indicator, hit indicator and final placing, measured by performance results during the competitions. All subjects from all the groups were asked to fill out a pre- and post-experimental questionnaire in order to obtain

more detailed information about how the treatment was perceived and how it compared with non-treatment.

Significant differences were found between the Hypnotic Group and the Control Group in perceived level of anxiety ($p. \leq .01$) and estimated level of difficulty ($p. \leq .05$). Subjects in the Hypnotic Group reported significantly lower anxiety and lower difficulty estimates after the hypnotic treatment. There was also a significant difference between the Relaxation Group and the Control Group in the estimated level of difficulty ($p. \leq .05$). Subjects in the Relaxation Group reported significantly lower difficulty estimates after the relaxation treatment.

No overall significant differences were found between the groups in performance measures: Hit indicator, bout indicator and final placing. After looking at the data it was decided to add additional comparison, breaking the groups into high and low anxiety subjects. The analysis showed a significant difference on all the dependent variables (hit indicator, bout indicator, final placing and estimated level of difficulty) in all cases $p < .01$. Subjects with initial low anxiety had significantly lower difficulty scores and significantly better performance results measured by hit indicator, bout indicator and final placings in competitions.

Both treatments (hypnotic and relaxation) were positively received by the majority of subjects from two experimental groups. However, subjects from both groups recommended more individualization of such treatment in order to make it more effective.

CHAPTER I

INTRODUCTION AND IMPORTANCE OF THE STUDY

In the literature on the theory and practice of sport psychology, there is a great deal of research and work devoted to anxiety control. Psychological factors which are thought to have a negative influence on athletes' performance during a competition include a too high or too low level of arousal, lack of confidence, lack of concentration, poor self-image, pessimism. Choosing the right coping technique has always been a goal and a problem for sport psychologists.

Well-trained athletes should have a great deal of confidence in their skills and should be able to display these skills during important sport events. Unfortunately, with many athletes, this is not the case. The more important the competition, the more "prestigious" the opponent being met, the more nervous and less confident many athletes seem to become. Under these circumstances, many athletes rise well above their optimal level of arousal and in turn their access to an optimal performance is blocked by their mental state (Nideffer 1976, Orlick 1980, Unestahl 1980, Edmonston 1981).

Extrapolating from the literature on anxiety and performance (Martens 1971, Edmonston 1981), as well as drawing from coaches' experiences, it would appear that artistic sports which involve highly complex skills (e.g. gymnastics, figure skating) as

well as sports which require highly developed fine motor control (e.g. archery, shooting, fencing) would be particularly susceptible to increased anxiety. Coping with competition anxiety may be of special importance to athletes involved in sports requiring a high level of fine motor control.

The author's former experience as an international fencer, and National Team coach for Olympic fencing teams in Poland, Denmark and Canada leads him to believe that fencing is one of those sports where stress management appears to play an especially important role. A good fencer during an average tournament has to fight 15 to 30 bouts before reaching the finals. As time passes and the fencer advances from one round to another, stronger and stronger opponents are left in the field. Those fencers who reach finals have to fence for 6 to 12 hours during a day of competition. This requires not only an excellent physical condition but also a very strong mental determination. Even a very slight change of mood might have a disastrous effect upon the competitive results. Different strength of opponents, increasing strength of rounds, unexpected losses, mistakes by those who judge a bout, causes constant changes in the level of fencers' anxiety. Many of them go from low to high to low again (Wojcikiewicz, 1982).

A number of studies present the problem of anxiety and explore different coping techniques in order to control this anxiety (Nideffer 1976, Unestahl 1980, Edmonston 1982, Libetrau 1982). A great

majority of them are however presented as laboratory experiments where the subjects are tested away from the competitive site and the competitive environment. The results are described and eventually related to practical application, but because they have not been tested in the real situation, their application is somewhat suspect.

This study was one of the very few where the experiment was actually done on-site, during the regular competitive season, where all the measurements were taken during a "real fight" situation.

THE PROBLEM

The purpose of this study was to explore the effectiveness of two stress management procedures during fencing competition. Two procedures were compared:

- The first involved pre-competition hypnotic induction with post-hypnotic suggestion to activate self regulatory mechanisms to reduce anxiety to a desirable level if and when such reduction was needed.

- The second procedure involved pre-competition relaxation with post-relaxation suggestion (identical to the post-hypnotic one) in order to activate self-regulatory mechanisms to reduce anxiety to a desirable level if and when such need should arise.

Subjects in each group were compared to a control group and also to their own baseline measurements in non-treatment condition.

DEFINITION OF TERMS

Competition: Competition refers in this case to the national level fencing tournaments in Canada, obligatory for all of the elite and intermediate fencers in their respective weapons, sanctioned by the Canadian Fencing Association. Each of these competitions is very similar in terms of levels of difficulty since, with small variations, the same fencers participate in each of them. The average number of participants in those tournaments depends on weapon and varied as follows:

ladies' foil:	34 - 48 participants
men's foil:	36 - 51 fencers
épée:	39 - 57 fencers
sabre:	22 - 41 fencers

Weapon: There are four fencing weapons officially recognized by the International Fencing Association (FIE): for men - men's foil, sabre and épée; for women - ladies' foil.

Hit: The object of fencing combat is to score a hit on the opponent. Scoring one hit gives a point against a fencer who was hit. That means that when fencer A hits fencer B one time, B is losing 0:1.

Bout: A fencing combat during a competition. During preliminary rounds, to win, a fencer must score 5 hits on the opponent (for both men and women's events). During semi-final and final (i.e. direct elimination) the winner must score 10 hits on the opponent (for men) or 8 hits (for women).

Round : Elimination stage of a fencing competition designed to gradually eliminate weaker fencers.

Pool : A group of 5 to 7 fencers who fence round Robin among each other to be promoted to the next round (usually 3 to 4 fencers are promoted).

Direct elimination with repassage: This round is also often called the semi-finals. When there are 16 fencers left in the competition, they fence under the elimination system in order to reach the final of eight. A fencer has to win two bouts in a row to get into the final. A fencer who loses two bouts in the direct elimination is eliminated from the competition.

Repassage: A fencer who loses one bout in the direct elimination goes to the repassage - that means he or she still has a chance to reach the final if he wins his next bouts. A fencer might fence a total of 4 bouts in order to reach finals, if he goes through repassage.

Final: The last eight fencers in the competition fence a direct elimination until the winner is known. The loser of any bout is eliminated from competition.

CHAPTER II

REVIEW OF THE LITERATURE

Hypnosis

The first recorded notes about hypnotic-like states come from the fifth century B.C. when, in Egypt, invididuals came to the temples of the healing godness, Isis, where they would sleep and be cured during their sleep, in their dreams, through the intervention of gods.

The modern hypnosis era started in the 18th century with the experiments of Mesmer (1734-1815) and his theory of magnetism. Since that time, up to the 20th century, hypnosis was treated as a "different" kind of sleep. The Russian scientist - Pavlov, was the first to describe hypnosis as "partial sleep". Contemporary researchers still differ in their opinions concerning the precise definition of hypnotic trance. One group follows a so-called "dissociation theory" (Hilgard 1975, Hilgard 1979, Unestahl 1981), believing that a subject under hypnosis is "dissociated" from the surroundings except for the rapport with the hypnotizer. Hypnotized subjects are believed to not be able to resist hypnotic suggestions. Another group of scientists (Barber 1972, Spanos 1973) developed a so-called "social-psychological theory", believing that subjects under hypnosis know what is going on with them but react to hypnotic

suggestions according to a role of "being hypnotized", as long as this role is within their perception and understanding of a "good hypnotic subject".

Effects of Hypnosis Studies (outside sport)

Researchers working on hypnosis agree that physiological changes in the body during an hypnotic trance vary according to the suggested state (Benson 1975, Edmonston 1981). For example, subjects' body temperatures can be raised or lowered, sensitivity to pain reduced, etc.

Hypnosis and relaxation were compared in a number of studies. Paul (1969) compared Jacobson's progressive relaxation and hypnosis in a study to reduce anxiety in 20 female students. A self report scale and anxiety differential before and after treatment were used as measures. The study showed that both relaxation training and hypnotic induction were effective in the reduction of anxiety and stress, whether measured subjectively (by self report scales) or physiologically (by heart rate, oxygen uptake, EMG, or dioxygen exchange). An interesting finding in this study was the fact that in the physiological measures, the subjects in the hypnotic group produced the physiological effect of reduced anxiety only after the second session, while the relaxation group achieved this right after the first session (Paul 1969). Edmonston (1981) in a comment

on this finding attributed it to the fact that initial anxiety over the experimental treatment itself (the hypnotic procedure) could have kept the subjects of that group in a "prolonged state of apprehension" during the first session. Only when the subjects learned through the experience that the hypnotic procedures per se are not to be feared, could they relax physiologically as well as subjectively (Edmonston 1981).

The above studies, as well as those by Bullard and Deloster (1972) and Wolpe and Lazarus (1967), suggest that there is a positive correlation between self report scales and physiological measures such as heart-rate and EMG. The only measure which did not follow this "rule" was the skin conductance measure. Paul (1962) explained it on the basis of the possibility of an interaction between peripheral blood flow and skin conductance because of the parasympathetic nervous system brought into play by the relaxation process.

Benson et al. (1978), Walrath and Hamilton (1975) and Morse et al. (1977) reported a study on direct comparison between hypnotic techniques and meditation-induced relaxation. No significant differences were found in self-report or physiological measures when comparing meditation groups, auto-hypnosis groups and relaxation control groups. From the standpoint of autonomic arousal all three groups effectively reduced this arousal. Morse et al. (1977) concluded that when compared to the other two procedures, TM meditation "can be considered similar on both physiological and

subjective levels". However, in subjective reports with respect to "effortlessness of induction", the subjects reported meditation and hypnosis superior to simple relaxation.

The relaxation response was described in its contemporary form by Benson (1975) in his experiments with subjects using Transcendental Meditation as method of relaxation. The relaxation response was characterized by EEG-alpha, reduced oxygen consumption, reduced heart rate, reduced respiratory rate, decreased blood pressure and muscular tension, plus a feeling of pleasure, refreshment and well-being. Such a response can be achieved by any of the relaxation techniques used today, such as progressive relaxation, autogenic training, psychological relaxation, Zen, Yoga, Hypnosis per se, etc.

Many authors writing about stress management procedures agree that the element of relaxation is one of the most important in order to achieve desired results regardless of whether it is employed separately or in conjunction with other means of intervention such as visualization, self-talk, suggestion, self- suggestion, self-instruction, etc. (Railo 1982, Unestahl 1982, Benson 1975, Meichenbaum 1977, Edmonston 1981, Nitsch 1982). This applies outside of sport as well as to stress management procedures in sport.

Hypnosis in sport

A number of papers have been written in the area of hypnosis in sport, although researchers sometimes use labels other than hypnosis. Unestahl (1977, 1982) compared the state and feeling of the ideal start performance to a state of hypnosis. According to him, both states have common components such as: amnesia (athletes don't remember exactly how they behaved during performance); dissociation-concentration (total involvement in the task); pain detachment; perceptual changes (feeling of being in trance). Unestahl uses hypnosis and post-hypnotic suggestion in order to achieve specific behavioral changes when a specific response is required. He also uses the same procedure to achieve a desired general state, for example: being in a good mood, enjoying the performance, feeling satisfied, etc., when such changes in a general state are necessary.

Peterson & Unestahl (1977) conducted an experiment with 24 high school students to test the effectiveness of hypnosis on free basketball shots. The subjects were tested for a period of three weeks, during which time they made 30 free shots a day, five days a week. The Experimental Group, comprised of eight subjects highly susceptible to hypnotic induction, was given a hypnotic treatment with post-hypnotic suggestion for positive emotion after each successful attempt to score a basket. The procedure was repeated before each session. Control Group I got hypnotic induction but

without any suggestions and Control Group II did not get any treatment. Both control groups also had eight subjects each.

The researchers attempted to answer two questions:

1. Can the post-hypnotic suggestion of a positive emotion change subjects' reactions?

2. Can those changed reactions influence subjects' motor-learning process and their performance?

Subjects' reaction was measured after each attempt by self-report scale from 1 to 9, where 1 meant sad, unsatisfied, disturbed; 5 meant neutral; and 9 meant happy, satisfied. The performance was measured by the number of successful attempts (i.e. scored basket).

The researchers found that post-hypnotic suggestion had a significant effect on subjects' positive emotions, after successful shots, and on their negative emotions, after unsuccessful shots. That means that the subjects in the experimental group had significantly higher positive reactions, compared to both control groups, but also significantly stronger negative reactions. Concerning motor-learning and performance, researchers did not find any significant effects (i.e., the groups did not differ significantly in this respect).

The Soviet athletes, during their preparation for the Olympic Games, used a step-by-step approach to self-control learning, as reported by Gorbunov (1982). This process of training included the following factors: conversation - persuasion; indirect suggestion; suggestion turned into self-suggestion; relaxation ("suggested rest") plus suggestion; hypnosis ("sleep with rapport") plus suggestion; auto-training, which included self-suggestion, self-persuasion and self-hypnosis. This procedure was designed to produce a favorable mental attitude during heavy pre-Olympic training loads, reduce pre-Olympic anxiety, give the tools for self-control during the competition and enable self-mobilization. Most of all, the program was directed at allowing for top performances during high pressure situations during the Olympic Games. They wanted the athletes to remain undisturbed in high stress situations so they could demonstrate their optimal level of performance.

V. Kuzmin (1982) described hypnosis as "exceptionally important to athletes". Kuzmin has used hypnosuggestion in his work with Soviet gymnasts, weight lifters, fencers and others in order to keep them calm during stress. Following the same line, South African psychologist, Chris Libetrau (1982) says: "In recent years clinical psychologists have also started using hypnosis to review, modify, alter and rectify bad habits and problems regarding style and mentally rehearse specific skills required for improved performance...".

There are several studies reported on attempts to achieve a reduction in anxiety states by means of hypnosis, relaxation or combinations of those two methods (Naruse 1965, Garver 1977, Morgan 1982). Researchers agree that it is possible for anxiety to reach levels which are so intense that athletes at times become incapacitated (Nideffer 1982, Orlick 1980). Naruse (1965) described the effect of the following treatment on the anxiety level of elite athletes:

1. Direct hypnotic suggestion
2. Post-hypnotically produced auto-hypnosis
3. Self-hypnosis in conjunction with autogenic training
4. Autogenic relaxation

The procedure employed with Olympic athletes from a Japanese Olympic team in sports such as weight-lifting, pistol-shooting, gymnastics and volleyball was determined on an individual basis and the approach depended in great part on the athletes' personality structure. Naruse compared the athletes' anxiety to "stage fright" or "war neurosis". In the reported cases, the treatment effect was very successful, allowing the athletes to overcome and control competition anxiety. As an example, he presents a case of a gymnastics champion, male, 27 years old, who used to become introspective, depressed and nervous within a month of the sport event. He was hypnotized while in one of these depressed states and a medium trance was achieved. It was suggested that he was living far away from his usual everyday life, that he was

indifferent to the opinions of other persons, that he would remain calm until the coming event and that he would recall only his past wonderful events. This technique, called "escape from reality into happy trance", proved to be very effective with him and it was reportedly applied several times with a very successful treatment effect.

Graver (1977) attempted to manipulate the level of athletes' arousal by developing a "feeling" for each number of a numerical scale from 0 to 10, where "0" was the lowest and "10" was the highest possible level of anxiety. Those "feelings" were then employed post-hypnotically during a competition in order to enable an athlete to perform at his/her own optimal level of arousal. Graver applied the treatment on an individual basis and reported two cases where this method was very successful.

In summarizing the research on hypnosis and sport, it appears that researchers are generally in agreement that hypnosis per se does not enhance physical performance (Ito 1979, Barber and Colverly 1964, Evanse and Orne 1965, Arnold 1971, Morgan 1980, Wallace and Hoynega 1981, Morgan 1982) or increase muscular strength. Where physical performance is facilitated, it is thought to occur as a result of removing some psychological barriers rather than by influencing the muscles themselves. Hypnotic suggestions of enhanced muscular strength and endurance are sometimes effective, but they cannot be counted upon to constantly facilitate performance (Morgan 1980, Morgan 1982). On the other hand, all investigators agree that

negative hypnotic suggestions, designed to impair muscular strength and endurance, are usually effective.

The situation is similar with respect to simple and choice reaction time (which is extremely important in sports like fencing). Hypnotic suggestions to slow reaction time are almost always effective, while the results of attempts to speed it up are inconsistent (Blum and Wohl 1971, Ham and Edmonston 1971, Morgan 1980, Ito 1978). There is, however, limited evidence that suggestions of an involving, motivational nature are superior in an hypnotic state (Graver 1977, Ito 1979, Unestahl 1981, Morgan 1982).

The above review indicates that hypnosis might be a very useful tool in dealing with athletes' psychological problems before and during competitions, such as: competitive anxiety, motivation, feeling of inferiority, fears, helplessness, depression, etc. The literature also implies that hypnosis does not enhance physical performance in a direct way, nor can it increase muscular strength, endurance or athletes' reflexes.

The purpose of this study is to shed further light on the effectiveness of hypnosis and relaxation as a method of intervention with competitive athletes.

Pilot Study

During the 1981-82 fencing season, the author conducted a pilot study with 10 Ottawa-based elite fencers, using hypnosis in an attempt to manipulate the fencers' level of arousal during competition. The complete results are described in an unpublished manuscript (Wojcikiewicz, 1981). In that experiment, the subjects were given a post-hypnotic suggestion, to react with decreased anxiety or increased aggressivity during the competition, whenever certain key words were said to them by the experimenter. The subjects were later compared to their own baseline measurements.

The following procedural steps were followed during the experiment:

1. There was a pre-experimental hearing of the hypnotic induction tape in order to familiarize the group with hypnotic induction and remove any misconceptions and fears.

2. There was an on-site, pre-competition individual hypnotic induction, which included:
   - post-hypnotic suggestion with a key word for anxiety reduction;
   - post-hypnotic suggestion with another key word for increased aggressivity;
   - post-hypnotic amnesia suggestion.

3. The key words were said to the subjects during the competition by the experimenter, who was using the baseline measurements graph and on-site observations to estimate whether or not a subject might be too nervous. The "anxiety" key word was given each time a subject was visibly displaying anxiety. The "aggressivity" key word was given when a subject seemed to be apathetic on the piste, tired, or displayed lack of motivation during a fencing bout.

Post-experimental analysis of data indicated a significant increase in subjects' performance, compared to their baseline measures, based on a "bout indicator" (BI), which is the ratio between the total number of victories achieved during the tournament and the total amount of bouts fenced. There was also an improvement in the "hit indicator" (the difference between the total number of hits scored and hits received during the competition), although the difference was not statistically significant. With respect to athletes' ratings on level of anxiety, very small differences were noted and they were not statistically significant compared with baseline measurements.

On a post-experimental questionnaire, athletes all responded positively concerning the method. They rated its usefulness highly and encouraged further research.

CHAPTER III

RESEARCH METHODS

Selection of Subjects

A group of 43 male and female fencers were selected from intermediate and high level fencers in Ontario and Quebec to participate in this study. The selection included all four weapons: men's foil, ladies' foil, sabre and épée. Out of the 43 fencers who were asked to take part in the experiment, 42 agreed to participate.

All potential subjects were first made aware of the general purpose of the study (i.e. to study anxiety control with fencers) and then individually asked if they would agree to take part in this experiment. Selected fencers were then randomly assigned to three groups:

1. Experimental Hypnotic Group ..... 14 fencers
2. Experimental Relaxation Group ..... 14 fencers
3. Control Group ..... 14 fencers

Baseline Measurements

The subjects from all three groups were asked to rate their level of anxiety during the national level competition in their

respective weapons. The measurements were recorded on a self-report scale from 1 to 10 (see Appendix 2), where 1 means "no anxiety at all"; 5 means "some anxiety"; and 10 means "extremely high anxiety". The subjects were asked to rate their perceived level of anxiety at the following points of the tournament:

- general level of anxiety before the tournament;
- level of anxiety before every round of the tournament (focussing on perceived anxiety before that particular round);
- level of anxiety before every bout of the tournament until eliminated (focussing on perceived anxiety before fencing each of the opponents).

The following national level competitions were used for the baseline measurements for both experimental groups and the Control Group:

Dubonnet Fencing Tournament, Ottawa, February 1983:
Weapons: ladies' foil and men's foil.

Desjarlais Fencing tournament, Montreal, February 1983:
Weapons: épée and sabre (both weapons are fenced by men only).

Ottawa Shield Fencing Tournament, Ottawa, February 1983:
Weapons: ladies' foil, men's foil, épée, sabre.

At the same time the perceived level of anxiety was rated, fencers were also asked to rate the estimated level of task difficulty on a scale from 1 to 10 (see Appendix 2), where 1 means "very easy", 5 means "somewhat difficult" and 10 means "extremely difficult". Thus, difficulty estimates were done at the following points of the tournament:

- estimated level of difficulty of the tournament as a "whole", before the tournament started;
- estimated level of difficulty of every round of the tournament, before the beginning of every round;
- difficulty of every opponent, before every bout in the tournament.

As an example, a fencer might have rated the level of difficulty of the whole competition as "8" with a corresponding level of anxiety before that tournament of "6", the difficulty of the first round as "3" with estimated level of anxiety before that round as "5", and the difficulty of the first opponent in the first round as "4" with a corresponding anxiety of "4".

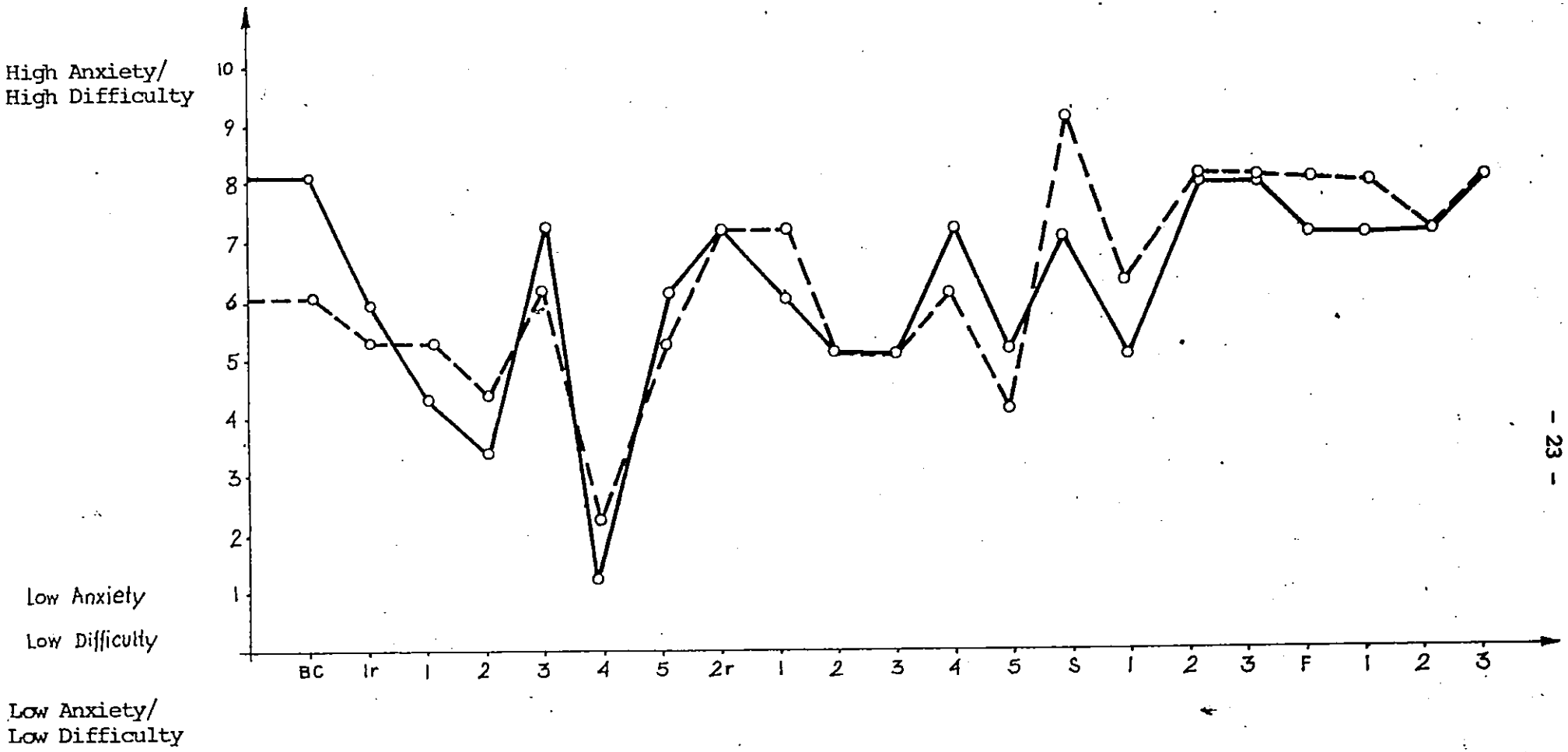
An example of an individual fencer's graph containing the obtained data for the difficulty and anxiety ratings on baseline measurements during the pilot study is presented in Table 1. The

time factor is indicated on the horizontal bar (abscissa) and corresponds with the number of measurements taken during the competition. Levels of anxiety and difficulty are marked on the vertical bar (ordinate). The graph clearly indicates that this subject experienced a great range of anxiety and perceived levels of difficulty during the competition (as was the case with virtually all subjects).

Procedures to follow for rating anxiety and level of difficulty were explained to the subjects before the competition where baseline measurements were actually taken. This occurred 20 to 30 minutes before the beginning of the first round, at which time 30 rating forms were also handed to each subject (see Appendix 2). They were asked to return completed forms as soon as they finished the competition. The importance of "not forgetting" to mark the levels before every round and every bout was emphasized. Two assistants and the experimenter circulated around the fencing site during the tournament to help with any questions and to ensure that forms were being completed at the appropriate times.

GRAPH 1

INDIVIDUAL GRAPH OF LEVEL OF ANXIETY AND PERCEIVED DIFFICULTY
OF AN EPEE FENCER TAKEN DURING PILOT STUDY BASELINE MEASUREMENTS



Low Anxiety/
Low Difficulty

Time at which rating was taken

Anxiety: - - - - - - -

Difficulty: _____

BC - before competition
1r - first round
2r - second round
S - semifinal
F - final
1,2,3, etc.. (on horizontal bar): bouts in each round

Experimental Hypnotic Group

This group initially contained 14 subjects (6 males an 8 females), assigned at random. All these subjects completed their baseline measurements. After the baseline measures were taken, one male in this group withdrew from the experiment, claiming that he did not want to go through it because he has "his own coping techique" and does not want to mix it up. One female subject was injured and did not compete anymore in the 1983 season and one female subject did not return her experimental measurements, claiming that she "lost the forms somewhere". Eleven subjects in this group completed the whole experiment.

The following procedures were applied in this group after everyone had completed their baseline measurements.

1. All subjects were familiarized with the hypnotic procedure during a group session. This session was conducted by the experimenter and included a relaxation procedure, sleep suggestion, and waking up procedure. The total duration of the hypnotic session was 12 minutes. This procedure was applied in order to remove fears about "being hypnotized" and to ensure that every subject would know exactly what to expect during the main session, before the competition. The hypnotic induction during that session was presented as follows:

"Now, relax and make yourself entirely comfortable. Relax completely, relax every muscle of your body. Relax the muscles of your legs. Relax the muscles of your arms. Make yourself perfectly comfortable. Let yourself be limp. Relax more and more, more and more. Relax completely. Relax completely. Relax completely.

Your legs feel heavy and limp.
Your arms feel heavy, heavy as lead.
Your whole body feels heavy, heavier and heavier.
You feel tired and sleepy, tired and sleepy.
You feel drowsy and sleepy, drowsy and sleepy.
Your breathing is slow and regular, slow and regular.
You feel pleasantly drowsy and sleepy as you continue to listen to my voice. Just keep your thoughts on what I am saying. Your are going to get much more drowsy and sleepy. Soon you will be deep asleep, but you'ill have no trouble hearing me. You will not wake up until I tell you to.

I shall now begin to count. On each count you'll feel yourself going down, down, down into a deep, comfortable, deep restful sleep:

one - you are going to go deeply asleep
two - down, down into a deep, sound sleep
three - more and more, more and more asleep
four, five - you are sinking, sinking into a deep, deep sleep. Nothing will disturb you. Pay attention only to my voice and the things I tell you.
six - deeper and deeper, always deeper sleep
seven, eight - you'll always hear me clearly, no matter how deeply asleep you may be
nine - deep asleep, fast asleep. Nothing will disturb you
ten - deep asleep. You will not awaken until I tell you to do so. You will wish to sleep and concentrate on things I'll be telling you. You are feeling comfortable, relaxed, thinking of nothing. Nothing but what I say. Your eyes are closed. Comfortably closed.

You are thinking of nothing, nothing but what I say. You are relaxed. Your whole body feels relaxed. Your whole body feels relaxed. As you sleep deeper and deeper let yourself imagine that you are sinking into a comfortable, white cloud. You are lying on the cloud feeling warm and comfortable. Slowly you are sinking into the cloud deeper and deeper, deeper and deeper, deeper and deeper into the soft, white cloud. As you sink deeper and deeper your mind and body feel more and more relaxed, more and more limp, comfortable and relaxed. Limp, comfortable and relaxed.

In a moment I'll wake you up. I'll count from five to one and when I reach one you will be refreshed, relaxed and wide awake.

five - you are beginning to wake up now
four - more and more alert and awake
three - refreshed, relaxed but more awake
two - almost completely awake now
one - refreshed, relaxed and wide awake

(For French version see Appendix 3.)

This session was conducted within the week before the competition where the experimental measurements were taken. The subjects were asked to lay down on the floor and to follow verbal instructions given by the experimenter.

For the experimental treatment, the main hypnotic induction was conducted 30 to 60 minutes prior to the beginning of the first round of the competition in a specially prepared room. The induction was done on an individual or group basis, depending on how many subjects were scheduled to fence that weapon at that competition. The first part of the hypnotic procedure was identical to the one previously outlined for this group. However, in the latter part of the script, some parts were omitted and some parts were added in order to limit the time of the whole on-site pre-competition hypnotic induction to 12 minutes. Omitted was: "You are thinking of nothing, nothing but what I say. You are relaxed. Your whole body feels relaxed. Your whole body feels relaxed. As you sleep deeper and deeper let yourself imagine that you are sinking into a comfortable, white cloud. You are lying on the cloud feeling warm and comfortable. Slowly you are sinking into the cloud deeper and deeper, deeper and deeper, deeper and deeper into the soft, white cloud. As you sink deeper and deeper your mind and body feel more and more relaxed, more and more limp, comfortable and relaxed. Limp, comfortable and relaxed..."

This part was replaced during the on-site session by the following suggestion. After the words: "In a moment I'll wake you up. I'll count from five to one and when I reach one you will be refreshed, relaxed and wide awake...", the researcher added:

> "Before I wake you up however, I want to give you one final suggestion that will help you in the upcoming competition. The suggestion will work for you during the whole competition.
>
> Whenever you feel nervousness or anxiety the word "RELAX" will pop into your mind, and your anxiety will disappear. When the word "RELAX" pops into your mind you will feel cool, calm and collected and will focus on distance and timing. Whenever the word "RELAX" pops into your mind, you will stop feeling anxious or disturbed and instead you will feel confident in yourself and cool and you will focus on distance and timing. Remember, whenever you feel rising nervousness and anxiety, the word "RELAX" will pop into your mind, and you will become calm, confident, cool and collected, and you will focus on distance and timing". (For French version see Appendix 3.)

After this suggestion subjects were awakened with the same procedure previously outlined for the initial group session, and asked to do their usual warm-up before the first round. Each of them was also given 30 rating forms (Appendix 2) and was asked to rate his/her level of anxiety and difficulty during the tournament in exactly the same way as it was done during the baseline measurements (i.e. before the competition, before every round and before every bout). Completed forms were collected from the subjects as soon as they finished the competition.

In this experiment, several changes were made with respect to the post-hypnotic suggestion which was previously tested in the pilot study by Wojcikiewicz in 1982:

- The suggestion was changed from experimenter controlled (i.e. where the key word was said to the subjects by the experimenter) to self controlled (i.e. where subjects were supposed to use the key word automatically whenever the need arose, or whenever they felt anxious).
- The aggressivity suggestion was removed.
- The amnesia suggestion was removed.

The above changes resulted from the following reasoning:

1. An experimenter, who says key words during a competition, does not have enough knowledge about the subject's internal anxiety, except for the moments when this anxiety is absolutely obvious and visibly displayed. It was therefore judged to be better for the key word to be used as an internal tool to activate a self-regulatory mechanism to reduce anxiety when needed.

2. Adding an aggressivity suggestion in this kind of experimental design creates too many dependent variables and may confound findings or interpretation.

3. With respect to the amnesia suggestion, it was feared that those subjects from the hypnotic group who remembered everything in spite of a suggestion "to not remember", might perceive themselves as a "bad subject" and accordingly act as such (i.e. "I remember everything, so I was not hypnotized, so other suggestions will probably also be ineffective").

Experimental Relaxation Group

This group initially consisted of 14 subjects (8 males and 6 females) assigned at random. One male subject did not return his baseline measurements, one retired from competition in the middle of the season and one female subject was eliminated from the experiment for filling in all her forms after the competition. Eleven subjects in this group completed the whole experiment.

The inclusion of an Experimental Relaxation Group was aimed at answering the following question: To what extent is a simple relaxation technique different from hypnosis in evoking a self control response in a stress provoking sport situation?

For the purpose of this study, the relaxation method described by Benson (1975) was chosen. This well documented technique for bringing on relaxation response is based on Tanscendental Meditation. Benson suggests a quiet environment, a comfortable position, an object to dwell upon (mental device) and a passive attitude.

Similar to the hypnotic group, the relaxation group was first familiarized with the relaxation procedure one week prior to competition, during a separate group session conducted by the experimenter. The subjects were asked to lie down on the floor and concentrate on the following verbal instructions:

"Lie down quietly in a comfortable position.

Close your eyes.

Deeply relax your muscles, beginning at your feet and progressing up to your face. Keep them relaxed (pause).

Breathe easy and naturally. Become aware of your breathing. As you breathe out, say the word "RELAX" silently to yourself ... Breathe in ... out ... "RELAX", in ... out ... "RELAX" ... Keep on breathing easily and naturally. Continue like this for 10 minutes until I tell you to stop. When I do so, stay on the floor and wait for further instructions. Do not worry whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude and permit relaxation to occur at its own pace. When distracting thoughts occur, try to ignore them by not dwelling upon them and return to repeating "RELAX" ..." (For French version, see Appendix 4".)

The group was then supervised during the 10 minute time by the experimenter. After 10 minutes, the subjects were asked to open their eyes and the relaxation training session was terminated.

The on-site (pre-competition) procedure with this group was organized in the same way as for the hypnotic group. The procedure was done on an individual or group basis, 30 to 60 minutes prior to the beginning of the first round of a tournament. Subjects were asked to lie down on the floor and the relaxation procedure as indicated above was administered by the experimenter. After the 10 minutes of supervised relaxation, the subjects were asked to stay on the floor with their eyes closed and the following suggetion (identical to the one used for the Hypnotic Group) was said to them:

"The time is over, stay where you are and keep your eyes closed. I am now going to give you one final suggestion that will help you in the upcoming competition. The suggestion will work for you during the whole competition.

Whenever you feel nervousness or anxiety the word "RELAX" will pop into your mind, and your anxiety will disappear. When the word "RELAX" pops into your mind you will feel cool, calm and collected and will focus on distance and timing. Whenever the word "RELAX" pops into your mind, you will stop feeling anxious or disturbed and instead you will feel confident in yourself and cool and you will focus on distance and timing. Remember, whenever you feel rising nervousness and anxiety, the word "RELAX" will pop into your mind, and you will become calm, confident, cool and collected, and you will focus on distance and timing." (For French version see Appendix 4.)

After this suggestion, a wake-up procedure almost identical to the hypnotic wake-up procedure was used. The subjects were told:

"Now I will count from five to one and when I reach one you will be refreshed, relaxed and ready to warm up:

five - you are beginning to wake up now
four - more and more alert and awake
three - refreshed, relaxed but more awake
two - practically wide awake now
one - refreshed, relaxed and wide awake"

Subjects were then asked to do their usual warm up before the first round. During the competition the subjects rated their estimated level of difficulty and perceived level of anxiety the same

way and at the same moments as was done during the baseline measurements (i.e before the competition, before every round and before every bout).

A technical problem arose during the experiment due to the fact that the groups included both French- and English-speaking subjects. The majority had French as their mother tongue and their instructions had to be given in the French language (for the French version of hypnotic and relaxation procedures, see Appendix 3 and 4). Therefore, English-speaking and French-speaking subjects had to have separate sessions. As an example, during the Governor General's fencing tournament in Ottawa, the men's foil competition was scheduled for 9:00 a.m. There were seven subjects from the Hypnotic and Relaxation groups scheduled in this weapon to receive the experimental procedure: two subjects for hypnosis in French; one subject for hypnosis in English; three subjects for relaxation in French; one subject for relaxation in English.

In order to accommodate for all these sessions, the first subjects had to come as early as 7:30 in the morning to receive their treatment, so that the subjects in the last group would still have time to do their warm up before the first round of the tournament.

Control Group

There were initially 14 subjects in the Control Group (7 males and 7 females) assigned at random. Two female subjects did not

return their first baseline measurements, one female subject did not return her second measurement. The group ended up with 11 subjects who completed all measurements (7 male and 4 female).

There was no treatment administered to this group. However, the subjects were asked to rate their diffficulty and anxiety levels at the same times and during the same competitions as the Hypnotic and Relaxation groups. The first measurements for all the groups were taken during the "Dubonnet" and "Ottawa Shield" fencing tournaments in Ottawa, and the "Tournoi Desjarlais" in Montreal. Those three tournaments were held during the month of February, 1983. The second measurements for the Control Group as well as the experimental measurements for the Hypnotic and Relaxation groups were taken during the following two competitions: "The Governor General's Fencing Tournament", 26-27 March, 1983, Ottawa, for all weapons; "The Eastern Canadian Championships", 16-17 April, 1983, Quebec City, for all weapons.

Table 1: Summary Table Outlining Measurements and Treatments for All Three Groups: Experimental Hypnotic, Experimental Relaxation and Control

	1st competition		2nd competition	
Group	treatment	measure	treatment	measure
Hypnotic	none	baseline on anxiety and perceived difficulty	hypnosis plus hypnotic suggestion	post-treatment measure on anxiety and perceived difficulty
Relaxation	none	baseline on anxiety and perceived difficulty	relaxation plus suggestion	post-treatment measure on anxiety and perceived difficulty
Control	none	baseline on anxiety and perceived difficulty	none	post-measure on anxiety and perceived difficulty

Elements to Compare

The following elements were manipulated and compared as dependent variables:

1. Estimated Level of Difficulty: This was measured on a self-report scale from 1 to 10, where 1 - means "very easy, not difficult at all"; 5 - means "somewhat difficult"; and 10 - means "extremely difficult". Measurements concerned the difficulty of the whole competition, every round of that competition and every opponent fenced during the competition.

2. Perceived Level of Anxiety: This was the major dependent variable which was included to answer the question as to whether the hypnotic and relaxation treatment had any appreciable effect on subjects' self-control during the competition. The level of anxiety was measured by subjects on a self-report scale from 1 to 10, where 1 - means "no anxiety at all"; 5 - means "some anxiety"; and 10 - means "extremely high anxiety". Measurements were taken before the whole competition, before every round of that competition and before each bout during the competition.

3. Hit Indicator (HI): This was calculated by the difference between total number of hits scored and

received during the whole competition by each of the subjects. It measured the subjects' performance in the given conditions. The higher the number, the better the performance - for example, a subject who won the bout 10:7 scored ten hits on his opponent and received seven. Therefore, his hit indicator would be plus three and his opponent would have the hit indicator of minus three.

4. Bout Indicator (BI): This is the ratio between the number of victories achieved in the whole competition and the total number of bouts fenced. It is another measure of the subjects' performance and it is expressed in decimal figures. A perfect bout indicator is 1: which means that a subject won all the bouts he/she fenced. The more these figures approach 1.0 the better is the performance. For example, a subject who fenced 13 bouts and achieved 12 victories would have a bout indicator of .923 which is obtained by dividing 12 (total number of victories) by 13 (total number of bouts).

5. Final Placing: The final outcome or ranking each subject achieved in competition, when compared to other competitions.

Questionnaires

All subjects from all groups received a pre-experimental (Appendix 5 and 6) and post-experimental (Appendix 7, 8 and 9, 10) questionnaire. The pre-experimental questionnaire was the same for

all the groups and was designed to find out whether the subjects used any kind of coping strategy during their fencing, and if "yes", what the strategy was, and how effective it was. The subjects from the Hypnotic and Relaxation groups filled out this questionnaire just before their hypnotic or relaxation training session. The subjects from the control group filled it out before their first baseline competition, and the forms were collected right after that competition.

The post-experimental questionnaire for the Hypnotic Group and the Relaxation Group was designed to assess the perceived effectiveness of the hypnotic and relaxation treatments. Subjects in those groups were asked to evaluate and rate the treatment. They were also asked about their subjective feelings concerning the potential (e.g. long term) influence of the treatment on their fencing performance, as well as for their comments concerning the treatment's procedure. The post-experimental questionnaire for the Control Group was designed to find out if the subjects in that group used any kind of strategy to deal with their anxiety during the experimental competition and, if "yes", how they evaluated its effectiveness.

The post-experimental questionnaires were distributed to each subject at the completion of the study (i.e. after handing-in their rating forms at the final competition). Subjects were asked to complete them and to return to the experimenter (without a specific

time limit being given for filling it out). Most of post-experimental questionnaires were collected on the same day after the experimental competition was over. Some subjects sent their questionnaires by mail, and some gave them back the next time they saw the experimenter.

CHAPTER IV

RESULTS

In this chapter the group means for the Hypnotic, Relaxation and Control Group are presented first. An analysis of variance based on individual mean scores comparing the baseline measurements for all the dependent variables is then presented, followed by the analysis of variances based on the differential scores between the baseline and treatment/post-measure. After looking at the data it was decided to add further comparison, breaking the groups into high and low anxiety subjects. An analysis of variance is presented for those two sub-divided groups. Finally, correlational data is presented, followed by individual questionnaire analysis.

In this study three groups were compared: Treatment 1 - Hypnosis; Treatment 2 - Relaxation; and a Control Group. The separate dependent variables included the estimated level of difficulty, perceived level of anxiety, hit indicator, bout indicator and final placing.

The group means summary for each of the dependent variables, for all three groups in the non-treatment - treatment/post- measure conditions are presented in Table 2. The individual mean scores for each of the dependent variables and each subject on the baseline and after treatment/post-measure for the Hypnotic, Relaxation and Control Group, can be found in Appendix 11, 12 and 13.

Table 2: Group means summary for each of the dependent variables for the Hypnotic, Relaxation and Control Group on the baseline and post-measure.

	BASELINE					TREATMENT/POST-MEASURE				
Group	$\overline{XD}$	$\overline{XA}$	HI	BI	Pl	$\overline{XD}$	$\overline{XA}$	HI	BI	Pl
Hypnotic	5.93	5.23	15.4	.638	9.2	5.82	4.57	13.4	.624	9.5
Relaxation	5.79	5.10	7.4	.612	12.5	5.78	5.11	12.9	.600	9.5
Control	5.07	4.46	12.8	.561	12.4	6.20	5.32	7.5	.578	11.4

$\overline{XD}$ - estimated levels of difficulty

XA - perceived levels of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

An analysis of variance comparing the three groups (Hypnotic, Relaxation and Control) on baseline measures for each of the dependent variables indicated that there were no significant differences among any of the baseline measures. The F values for each of the dependent measures were as follows: estimated level of difficulty F = .84; perceived level of anxiety F = .66; hit indicator F = .31; bout indicator F = .27; final placing F = .48. The analysis of variance can be found in Tables 3, 4, 5, 6, and 7 (See Appendix 14).

For the following data presented, the treatment is the independent variable and a differential score between baseline and treatment/post-measure is the dependent variable. Differential figures were obtained by subtracting each subject's baseline individual mean score for each of the dependent variables (i.e. difficulty, anxiety, hit indicator, bout indicator and final placing) from the corresponding mean score after treatment/post-measure.

Table 8 presents differential figures for the perceived level of anxiety. The means at the bottom of the table indicates the direction of the change between baseline measures and post- treatment measures. (The Hypnotic Group's mean of .65 indicates that the anxiety levels on the baseline were higher than those during post-treatment measures. In the case of the Relaxation Group the mean is close to zero (-.01) which indicates that the anxiety remained at about the same level for both measurements.) In the case of the Control Group the mean shows a negative figure of -.86, which indicates that the subjects experienced higher anxiety during the post-measure competitions, than on the baseline measurements.

Table 8: **Perceived level of anxiety: differential figures obtained by subtracting each subject's individual anxiety mean score on the baseline from the anxiety mean score after treatment for each group.**

No.	Hypnotic	Relaxation	Control
1.	-.25	.98	-2.59
2.	.75	-1.74	-2.42
3.	-1.26	-.40	-2.32
4.	.63	.78	-.43
5.	.53	.45	.95
6.	.74	-.27	.34
7.	.98	-.80	-1.16
8.	1.32	-1.12	-1.17
9.	1.46	.72	-.12
10.	.97	.79	-.36
11.	1.32	.48	-.17
Total sum:	7.19	-.13	-9.45
$\bar{X}$	.65	-.01	-.86

The overall simple analysis of variance (ANOVA) based on the differential score between pre- and post-measures showed a significant difference among the groups in perceived level of anxiety [$F(2,30)$ 6.79 $p. < .01$]. Post-hoc analysis (Tukey Test) showed a significant difference between the Hypnotic Group and the Control Group. The Hypnotic Group showed significantly less anxiety on the post-test when compared to the Control Group (Table 9). No significant differences were found between the Relaxation Group and the Control Group and between the the Relaxation Group and the Hypnotic Group in perceived level of anxiety measures.

Table 9: **Simple analysis of variance for the Hypnotic, Relaxation and Control Group based on differential scores between baseline and treatment/post-measure with the PERCEIVED LEVEL OF ANXIETY as dependent variable.**

Source	SS	df	MS	F
A	12.647	2	6.32	6.79[x]
S/A	27.92	30	.93	

[x] $p < .01$

Differential scores for the estimated level of difficulty are presented in Table 10. The total sum at the bottom of Table 10 indicates that in case of the Hypnotic Group the difficulty scores during the baseline measures were slightly higher compared to those for the post-treatment measures (sum of 1.19). The Relaxation Group had a sum close to zero (.06) which indicates that the scores during the baseline and post-treatment measures were similar. In case of the Control Group the total sum is -11.29 which indicates that the subjects in that group had much higher difficulty scores during the post-measure competitions, than during the baseline measures.

Table 10: Difficulty level: differential figures obtained by subtracting each subject's individual mean score on the baseline from the individual mean score after treatment/post-measure for each group. The number below indicates the mean difference in scores for subjects on baseline versus post-treatment measures.

No.	Hypnotic	Relaxation	Control
1.	-.65	-.08	-2.48
2.	.56	-.92	-2.43
3.	.27	-.77	-3.00
4.	-.31	-.29	.25
5.	-.17	.39	-1.38
6.	-.60	-.36	.56
7.	1.48	-1.24	-1.44
8.	-1.05	1.25	-2.34
9.	.94	.72	.42
10.	.29	.31	.60
11.	.43	1.05	-.05
Total sum:	1.19	.06	-11.29
$\bar{X}$	.11	.01	1.02

An analysis of variance based on the differential scores between pre- and post-measures for the estimated level of difficulty showed a significant difference among the groups with $F(2,30) = 5.35$, $p < .05$. Post-hoc Tukey Test showed a significant difference between the Hypnotic Group and Control Group. The Hypnotic Group had significantly lower difficulty socres compared to the Control Group on the treatment/post-measure. A significant difference was also detected between the Relaxation Group and the Control Group in the difficulty measures, with the Relaxation Group showing significantly lower scores compared to the Control Group on the treatment/post-measure. There was no significant difference between the Hypnotic Group and the Relaxation Group in the difficulty measure (see Table 11).

Table 11: Simple analysis of variance for the Hypnotic, Relaxation and Control Group based on differential scores between baseline and treatment/post-measure with the ESTIMATED LEVEL OF DIFFICULTY as dependent variable.

Source	SS	df	MS	F
A	10.48	2	5.24	5.35[x]
S/A	29.48	30	.98	

[x] $p < .05$

No significant differences were found between the three groups on any of the performance measures: hit indicator ($F = 1.52$), bout indicator ($F = .17$) and final placing ($F = 1.68$). Differential scores for the hit indicator, bout indicator and final placing can be found in Tables 12, 13 and 16 in Appendices 15, 16, and 17. The analysis of variance for hit indicator, bout indicator and final placing can be found in Tables 15, 16 and 17 (see Appendix 18).

For more detailed analysis subjects were grouped according to their mean anxiety scores on their baseline measurements (i.e. high or low anxiety). The scores above the median of 5.12 were classified as High Anxiety Subjects (see Tables 18, 19 and 20 in Appendix 19), the scores below the 5.12 were classified as Low Anxiety Subjects (see Tables 21, 22 and 23 in Appendix 20). An ANOVA 3 x 2 x 2 analysis of variance was done for three groups: Hypnotic, Relaxation and Control, for High Anxiety Subjects and Low Anxiety Subjects, all repeated on

baseline and treatment/post-measure. A significant difference ($p < .01$) was found between the High and Low Anxiety Subjects on all the dependent variables (see Table 24). The Low Anxiety Subjects had significantly lower difficulty scores, and significantly better hit indicators, bout indicators and final placings, which in turn indicated a significantly better performance.

Table 24: Overall F ratio for the estimated level of difficulty, hit indicator, bout indicator and final placing, after subjects were broken down into High and Low Anxiety groups.

Estimated level of difficulty:	$F(1,24) = 19.79$; $p < .01$
Hit indicator:	$F(1,24) = 26.09$, $p < .01$
Bout indicator:	$F(1,24) = 21.16$, $p < .01$
Final placing:	$F(1,24) = 15.44$, $p < .01$

A significant interaction effect was found between Baseline, Treatment and Groups, for the estimated level of difficulty: $F(2,24) = 5.20$, $p < .05$ (see Table 25) and perceived level of anxiety: $F(2,24) = 6.41$, $p < .01$ (see Table 26). This finding confirmed an indication of the previous simple analysis of variance based on the differential figures, which showed a significant treatment effect on those two dependent variables, with significant differences between the Hypnotic and Control Group in perceived level of anxiety, and between the Hypnotic and Control Group, and the Relaxation and Control Group in estimated level of difficulty. Group means for comparison between the High Anxiety Subjects and Low Anxiety Subjects can be found in Tables 27 and 28 in Appendix 21.

Table 25: **Summary of analysis of variance for subjects divided into three treatment groups (Hypnotic, Relaxation and Control) and two levels of anxiety (High Anxiety Subjects and Low Anxiety Subjects), tested on ESTIMATED LEVEL OF DIFFICULTY (dependent variable) on baseline and re-tested after treatment.**

Source	SS	df	MS	F
Between subjects				
G	7307.23	2	3653.62	.15
A	476506.84	1	476506.84	19.79^{x1}
GA	82870.24	2	41435.12	1.72
Between subjects error term	577791.73	24	24074.65	
Within subjects				
T	15073.35	1	15073.35	2.68
TG	58411.90	2	29205.94	5.20^{x2}
TA	2196.15	1	2196.15	.39
TGA	4461.30	2	2230.65	.4
Within subjects error term	134694.80	24	5612.28	

$x^1 p < .01$

$x^2 p < .05$

G - Groups: Hypnotic, Relaxation, Control

A - Anxiety: High Anxiety Subjects, Low Anxiety Subjects

T - Treatment: Baseline, Treatment/Post-measure

Table 26: Summary of analysis of variance for subjects divided into three treatment groups (Hypnotic, Relaxation and Control) and two levels of anxiety (High Anxiety Subjects and Low Anxiety Subjects), tested on PERCEIVED LEVEL OF ANXIETY (dependent variable) on baseline, and re-tested after treatment.

Source	SS	df	MS	F
Between subjects				
G	5936.23	2	2968.11	.22
A	1115752.12	1	1115752.12	83.90[x1]
GA	76679.03	2	38339.50	2.88
Between subjects error term	319127.40	24	13297.00	
Within subjects				
T	141.06	1	141.06	.02
TG	63985.83	2	31992.91	6.41[x2]
TA	1706.66	1	1706.66	.34
TGA	3072.63	2	1536.31	.3
Within subjects error term	119783.79	24	4991.00	

[x1] $p < .01$

[x2] $p < .01$

G - Groups: Hypnotic, Relaxation, Control

A - Anxiety: High Anxiety Subjects, Low Anxiety Subjects

T - Treatment: Baseline, Treatment/Post-measure

A significant interaction between the treatment and the High and Low Anxiety Subjects was also found for the hit indicator: $F(1,24) = 5.57$, $p < .05$ (see Table 29).

Table 29: Summary of analysis of variance for subjects divided into three treatment groups (Hypnotic, Relaxation and Control) and two levels of anxiety (High Anxiety Subjects and Low Anxiety Subjects) tested on HIT INDICATOR (dependent variable) on baseline, and re-tested after treatment.

Source	SS	df	MS	F
Between subjects				
G	260.33	2	130.32	.32
A	10773.60	1	10773.60	26.09[x1]
GA	1857.10	2	928.55	2.25
Between subjects error term	9909.59	24	412.9	
Within subjects				
T	11.267	1	11.267	.1
TG	315.833	2	157.917	1.48
TA	593.067	1	593.067	5.57[x2]
TGA	267.633	2	133.817	1.26
Within subjects error term	2555.2	24	106.47	

[x1] $p < .01$

[x2] $p < .05$

G - Groups: Hypnotic, Relaxation, Control

A - Anxiety: High Anxiety Subjects, Low Anxiety Subjects

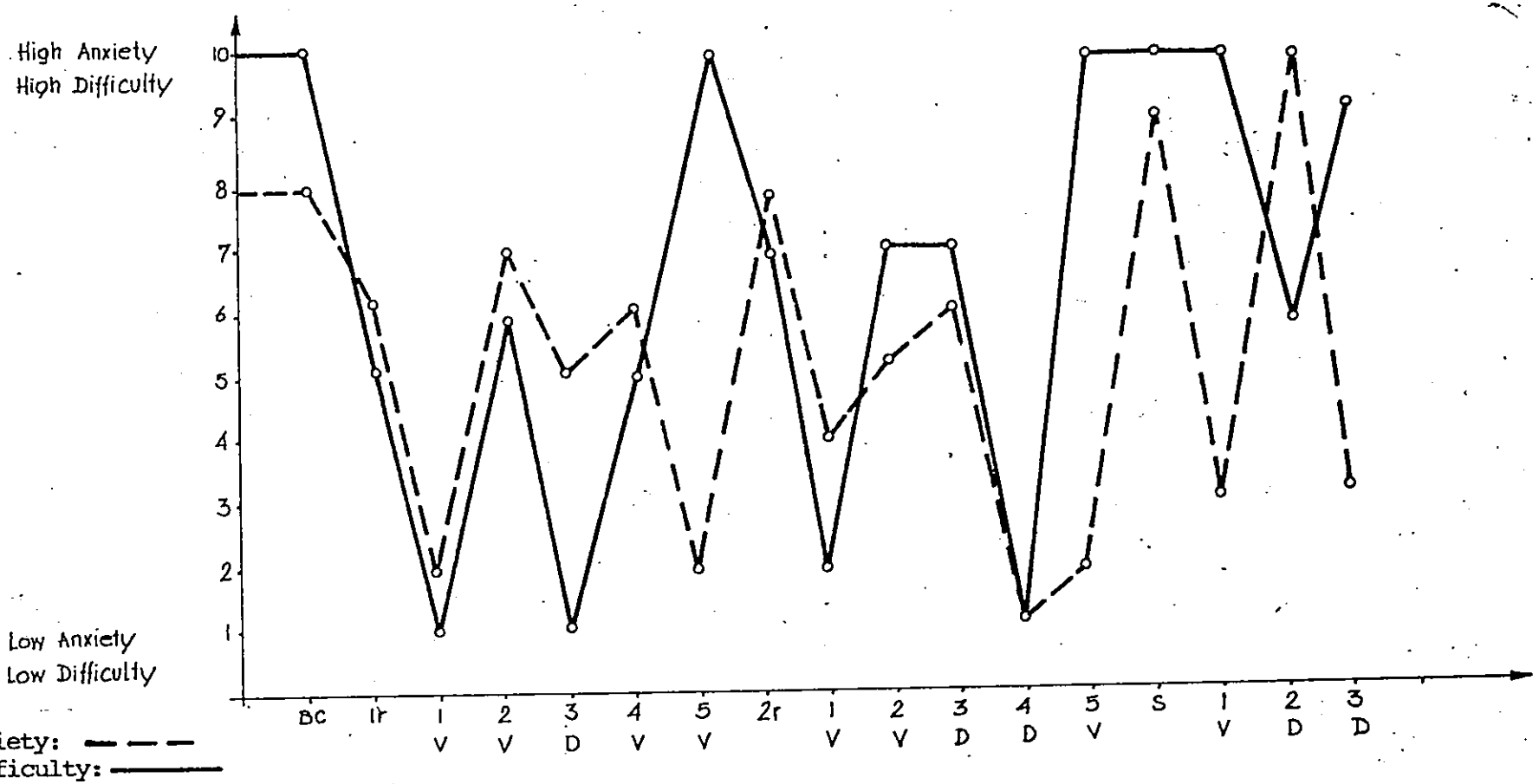
T - Treatment: Baseline, Treatment/Post-measure

In the bout indicator and final placing, a significant difference was found between High Anxiety Subjects and Low Anxiety Subjects. In both cases Low Anxiety Subjects had sigificantly better performance when compared to the High Anxiety Subjects. There was no significant interaction effect on those two dependent variables (see Table 30 and 31 in Appendices 22 and 23).

Case Presentation

An individual graph of the anxiety and difficulty changes of a sabre fencer during the baseline measurements taken at the Desjarlais Fencing Tournament in February 1983 is presented below. This individual graph has been included to show how much variation there is for an individual subject on anxiety and difficulty within the same competition. In this case the estimation of difficulty ranges between scores of 1 and 10 and the perception of anxiety ranges from 1 to 10 within the same competition. The level of anxiety jumps from high to low, to high again as does the estimated level of difficulty for opponents and rounds. Graph 2 represents a common pattern in fencers' subjective measures of anxiety and difficulty. When athletes think about the competition as the "whole", before the competition (BC), the great majority of them have relatively high ratings for anxiety and difficulty (between 6 and 8 for medium level athletes). The ratings decrease during preliminary rounds but then gradually increase, fluctuating up and down depending upon whom they meet on their way. As the competition reaches final stages, ratings are usually high, sometimes reaching the maximal numbers.

Graph 2: Individual Graph of Anxiety and Difficulty changes of a saber fencer during the baseline competition (Relaxation Group)



Anxiety: — — —
Difficulty: ————

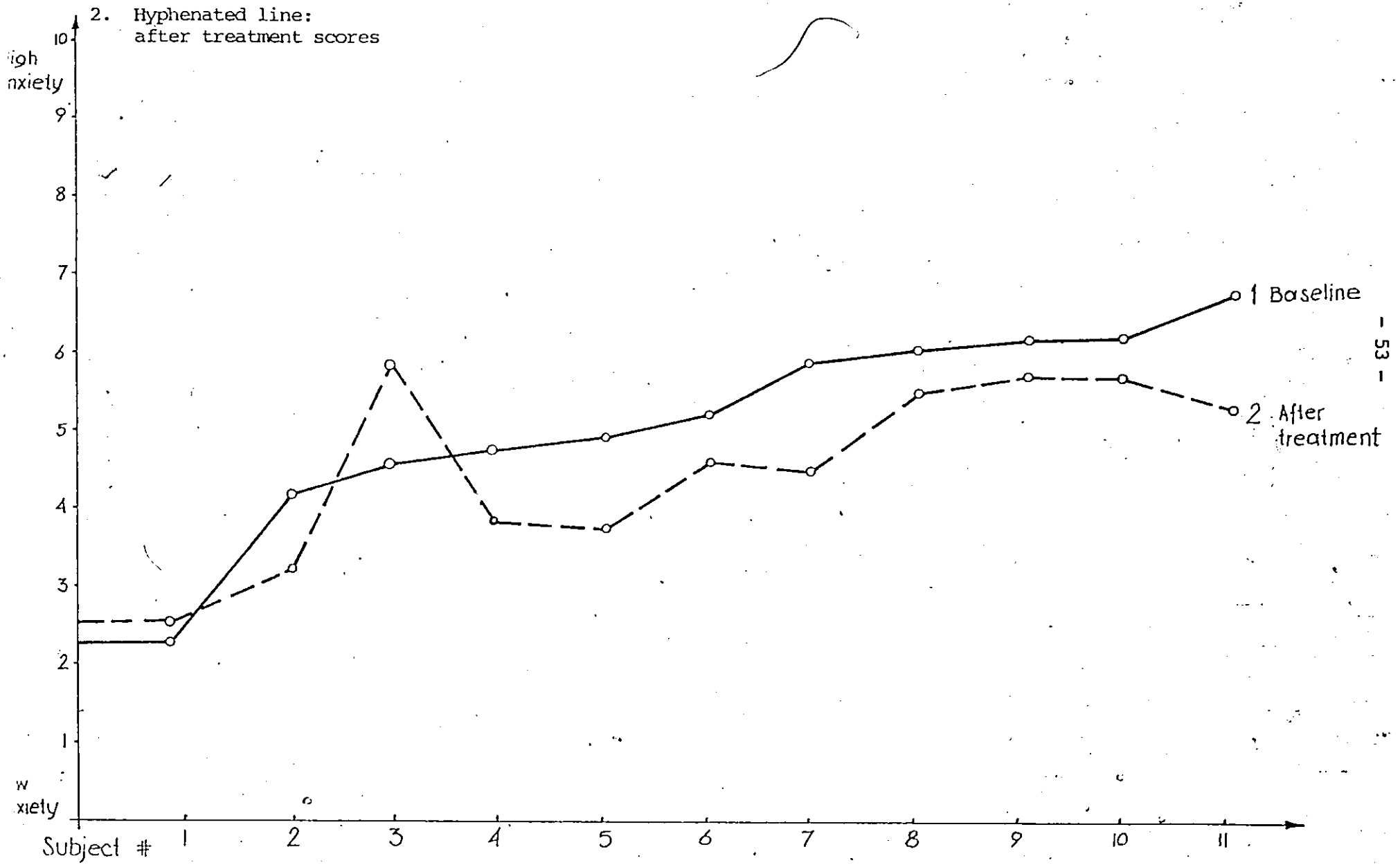
BC: before competition
1r: first round
2r: second round
S: semifinal
1, 2, 3, etc.: bouts in each round
V: victory
D: defeat

Graphs 3, 4 and 5 illustrate the changes in individual anxiety scores within each of the groups, between the baseline measure and after treatment/post-measure. The vertical bar represents the 10 point anxiety scales, the horizontal bar represents each individual subject's mean score, beginning on the left with the subject with the lowest baseline anxiety score and working upward (see Graph 3). For the Hypnotic Group individual's anxiety means range from 2.25 to 7.04 on the baseline, and from 2.50 to 5.93 after treatment; for the Relaxation Group scores range between 2.79 and 7.31 on the baseline and between 1.81 and 7.58 after treatment; for the Control Group scores range from 2.11 to 7.58 on the baseline and from 2.47 to 8.13 after the post-measure. The graphs illustrate the individual changes experienced from pre- to post-measure. In the Hypnotic Group 9 out of 11 subjects lowered their anxiety scores over the course of the study whereas in the Control Group the ratio of improvement was 2 out of 11. In the Relaxation Group 6 out of 11 subjects lowered their anxiety scores.

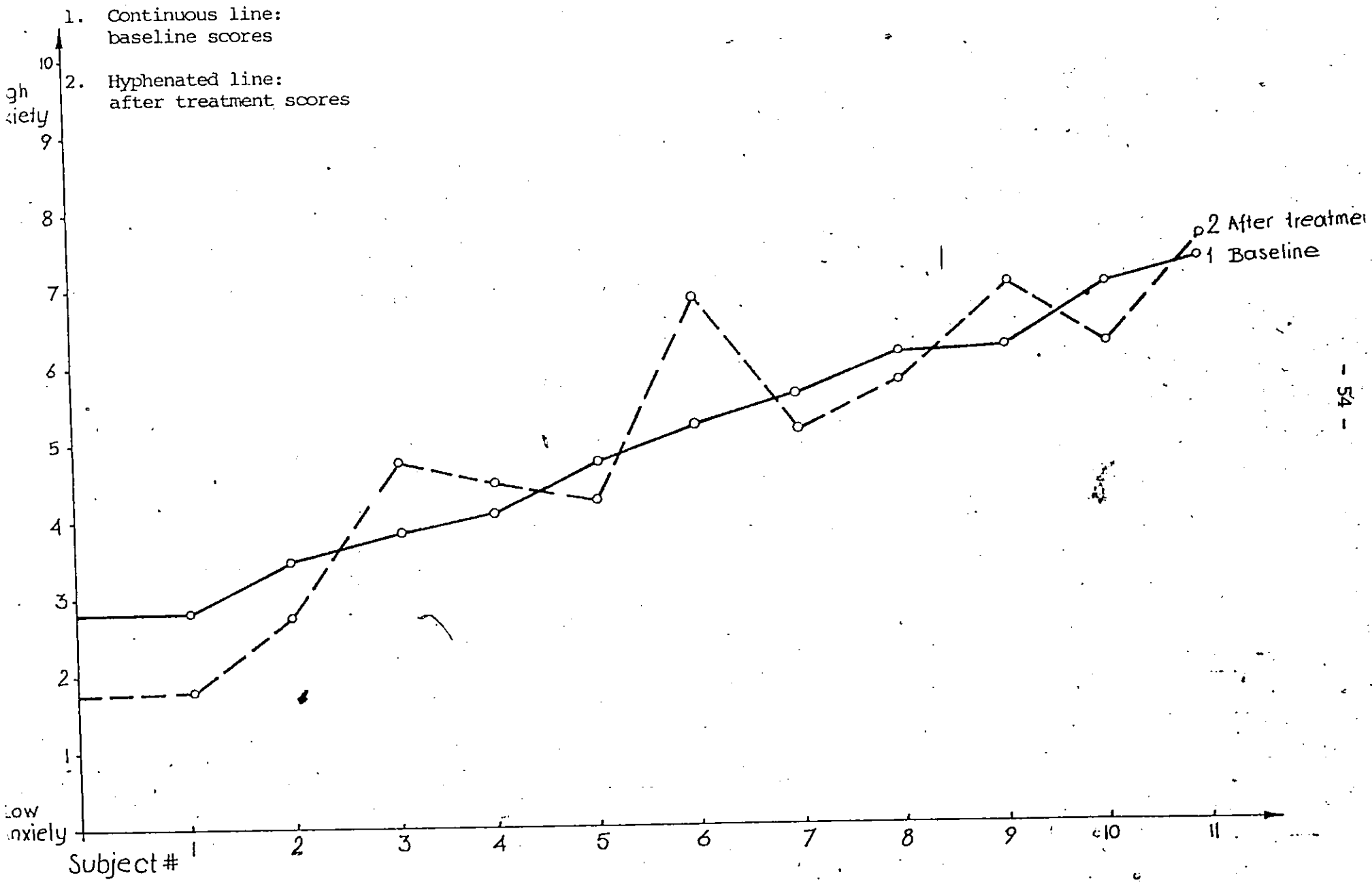
Graph 3: The estimated LEVEL OF ANXIETY. A comparison between the baseline and after treatment measurement in the HYPNOTIC GROUP. The subjects are presented here from low to high anxiety mean scores according to the baseline measure.

1. Continuous line:
   baseline scores

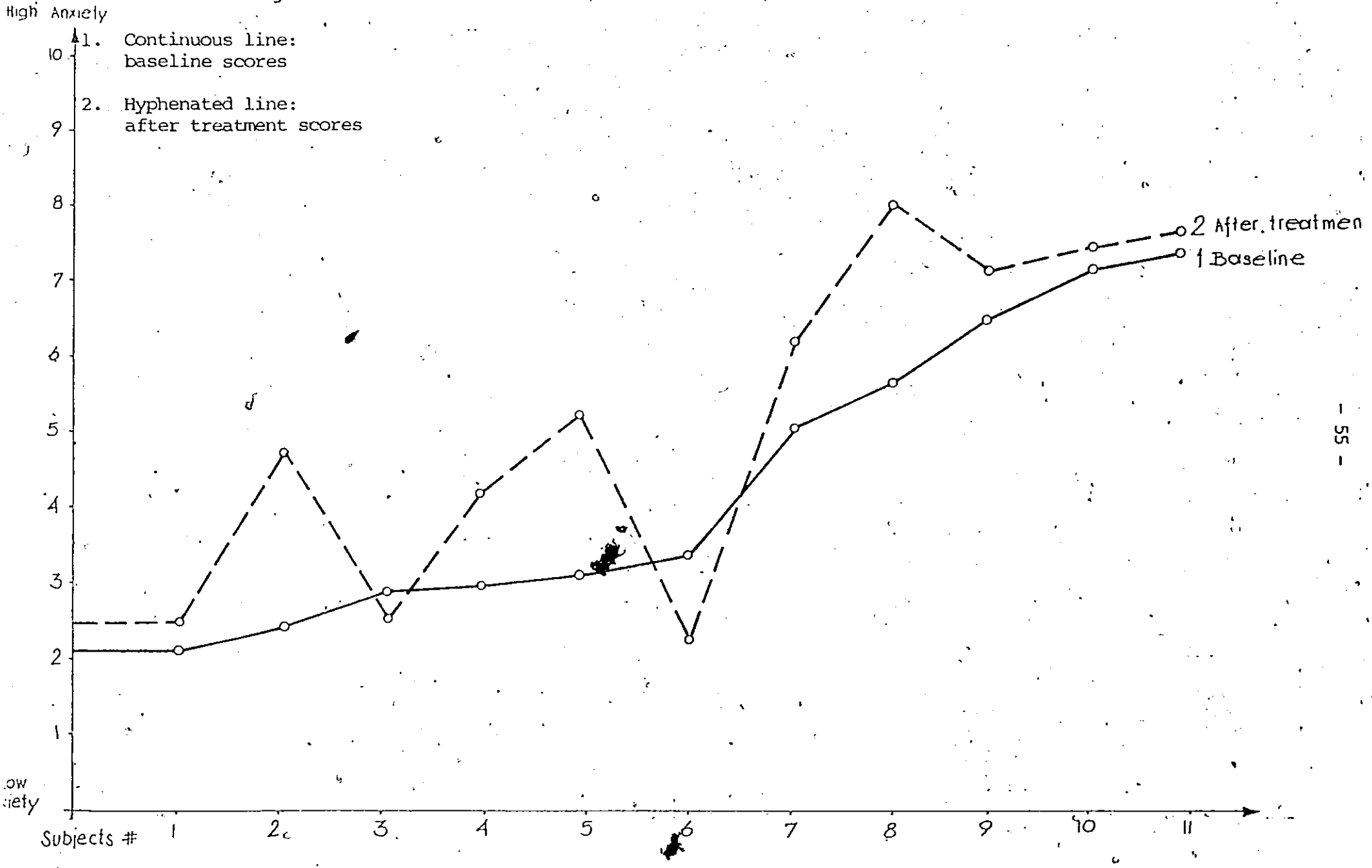
2. Hyphenated line:
   after treatment scores



Graph 4: The estimated LEVEL OF ANXIETY. A comparison between the baseline and after treatment measurement in the RELAXATION GROUP. The subjects are presented here from low to high anxiety mean scores according to the measure.



Graph 5: The estimated LEVEL OF ANXIETY. A comparison between the baseline and post-measure in the CONTROL GROUP. The subjects are presented here from low to high anxiety mean scores according to the baseline measure.



CORRELATIONS

Correlations were done between estimated level of difficulty, perceived level of anxiety, hit indicator, bout indicator and final placing on baseline measurements and post/treatment/control measurements. Correlation coefficiant range between .40 and .94. The correlations between baseline measurements and post-treatment/control measurements did not show significance. The highest correlations were found to exist between perceived level of anxiety and estimated level of difficulty (see Table 32). The overall high correlation (.84) between anxiety and perceived difficulty support the validity of the anxiety measure.

Table 32: Correlations between the estimated LEVEL OF DIFFICULTY and perceived LEVEL OF ANXIETY within the Hypnotic, Relaxation and Control Group, N = 11.

	Baseline	Post-measure
Hypnotic Group	r = .77	r = .84
Relaxation Group	r = .77	r = .94
Control Group	r = .92	r = .81

$\bar{r}$ = .84

The correlations presented in Table 32 represent the usual pattern in fencers' perceptions of their own nervousness, that is, in most cases: the more difficult is the opponent, the higher the anxiety is rating.

Correlations between the perceived level of anxiety and other dependent variables can be found in Tables 33, 34 and 35 in Appendix 24. Table 33 shows the correlations between the perceived level of anxiety and other dependent variables for all groups combined, (N = 33), Table 34 shows the correlations between the perceived level of anxiety and other dependent variables in the Hypnotic and Relaxation Groups combined, (N = 22). Table 35 presents the correlations between the perceived level of anxiety and other dependent variables in the Control Group alone (N = 11).

Full correlation Tables among ten variables for the Hypnotic, Relaxation and Control Group on baseline and treatment/post-measure can be found in Appendixes 25, 26, 27. Table 36 (Appendix 25) presents the correlations for the Hypnotic, Relaxation and Control Group combined, N = 33, Table 37 (Appendix 26) epresents the correlations for the Hypnotic and Relaxation Group combined, N = 22, and Table 38 (Appendix 27) presents correlations for the Control Group, N = 11.

Questionnaire analysis

Pre-experimental questionnaire: The purpose of this questionnaire was to determine whether any specific strategies were already being used by subjects participating in the experiment. Subjects from all groups completed the questionnaire. The subjects in the Hypnotic Group and the Relaxation Group were asked to fill out the questionnaire before the first hypnotic, or relaxation, training session, after their baseline competition. Subjects from the Control Group were given the forms before the first baseline competition and asked to return them after competition was over. The questionnaire was the same for all the groups, available in two versions: French and English (see Appendix 5 and 6).

Thirty six subjects, out of an initial sample of forty, returned the questionnaire. For the first question: "Do you use any coping strategy to control your anxiety before or during fencing tournament?", twenty subjects (56%) answered "yes" and sixteen (44%) "no".

The second question was: "If yes - what do you use?" Subjects who answered "yes" to first question usually listed several things. Their answers were classified into the following categories:

1. Distraction: ninety percent of the subjects mentionned some form of distraction as a coping strategy. This category was sub-divided into three components:

   A. physical distraction, where subjects indicated such strategies as:

- stretching exercises (1)
- large arm movements (1)
- flexibility exercises and fencing coordination foot work with change of rhythm (1)
- walking (7)

B. mental distraction, where subjects indicated such strategies as:

- talking to people (2)
- thinking about things other than fencing (1)
- joking (1)
- mental relaxation (not specified what) (1)

C. other distraction, where subjects indicated such strategies as:

- smoking a cigarette between bouts (1)
- deep breathing (6)

2. Dissociation: fifteen percent of the subjects mentioned some form of dissociation as a coping strategy.

- emptying the mind and thinking nothing (2)
- lying down and forgetting the next bout (1)
- isolating oneself (1)

3. Self-talk: twenty percent of the subjects mentionned self talk as a coping strategy.

- I try to tell myself "calm down, relax, etc." (3)
- I try to reason with myself (1)

4. Fencing-oriented thinking: twenty five percent of the subjects mentioned this as a coping strategy.

   - observing opponents in the pool and planning tactics against them (2)

   - concentrating only on the bouts (2)

5. Visualization: fifteen percent of the subjects mentioned visualization as a coping strategy.

   - visualizing a successful and ideal performance (2)

   - visualizing having fun while fencing in the competition (1)

The most commonly mentionned strategy, among those listed, was: walking (mostly away from the competition site) indicated by seven subjects (45%), and deep breathing mentioned by six subjects (30%). Many respondents indicated that there were two or three things they have done during a fencing tournament when they got nervous. For example, a female subject from the Relaxation Group described her coping strategy in a following manner:

> "When I am too nervous I close my eyes and think about other things, taking a deep breath. I walk between each bout and have a cigarette between each pool".

When asked to rate their strategy on the subsequent question (i.e. "Rate the effectiveness of your strategy on a scale from 1 to 10"), the lowest rating indicated was 3, the highest was 10, with overall mean of 6.0).

Post-experimental questionnaire (Hypnotic and Relaxation Group): The questionnaire for the Hypnotic and Relaxation Group was designed to assess how the subjects from those two groups reacted to the treatment and how they evaluated its effectiveness. For both French and English versions of the post-experimental questionnaire, for the Hypnotic and Relaxation Group and, for the Control Group - see Appendices 7 and 8. The post experimental questionnaires were distributed to the subjects one by one right after they had completed their second competition, as they returned their anxiety - difficulty ratings. Subjects were encouraged to "take their time" and to think about every answer. Most of the subjects returned the questionnaire the same day, but many kept it for a longer period of time and returned it at the next competition, or by mail. Twenty three subjects (eleven in the Relaxation Group and twelve in the Hypnotic Group) completed and returned this questionnaire. The questionnaire for the Control Group is discussed later in this chapter.

Post-experimental results for the Hypnotic and Relaxation Groups.

The first question asked was: "Did the word 'RELAX' come to your mind when you were anxious on the piste during the competition? Circle the corresponding number on the scale from 1 to 10 where 1 - means "never", 5 - means "sometimes" and 10 - means "every time I needed it".

In both groups the individual ratings ranged from 1 to 9, with a mean of 5.00 in the Hypnotic Group and 4.36 in the Relaxation Group.

In their answers to the second question: "Could you comment on what happened (or what you did) when you began to feel anxious?", some of the comments from subjects in the Hypnotic Group included the following:

> "I went to the corner and I tried to calm myself down by thinking RELAX."
>
> "I began to feel confident and I think the 'RELAX' lessened my anxiety."
>
> "It came to my mind when I felt like I needed it. I hope it will stay like this through the other competitions."
>
> "The word RELAX did not come to my mind, now that I think about it, but I formed my own key words, important for me at the moment like: fleche, concentrate, attack, etc."
>
> "The word RELAX or any other words did little to calm me down. Generally I begin to relax when a bout starts."

In the Relaxation Group subjects gave the following comments about the strategy:

> "I thought RELAX and I tried to stay so"
>
> "The word RELAX helped me to slow down and think during the bout"
>
> "I used the word RELAX but also some self-talk like: have confidence, you are getting upset for nothing...etc"
>
> "RELAX worked for me in the first rounds when I was only slightly nervous. In later rounds it was less and less effective"
>
> "I found that combining RELAX and visualization of ideal performance did calm me down".

Concerning the effectiveness of presented procedure ("How effective was the coping procedure you received in helping you with your anxiety?") in the Hypnotic Group seven subjects answered positively (58% with the average rating of 6.53), two subjects were undecided (17% with average rating of 4.00) and three gave negative answers (25% with average rating of 2.33). Here are some their responses:

Positive:

> "This method fits my personality, it's evident to me that the study should be continued in that direction, trying to improve it".
>
> "It is effective, I didn't find it as a negative experience".
>
> "It was effective to the point that my anxiety was not a big factor during most of my bouts"
>
> "I got hold of myself, I relaxed psychologically, I became conscious of my physical body, regained flexibility and power, keeping good precision and timing".

Negative:

"It didn't work but I only tried it once during the competition".

"Not very effective, because the procedure was not repeated often enough"

In the Relaxation Group only four subjects gave definitely positive answers (36% with an average rating of 6.5), two were undecided ("I don't really know") (18% with an average rating of 4.00) and five were negative (46% with an average rating of 3.00). Here are some of their comments:

Positive:

"Good method but I don't think I concentrated more than usual. It should be trained more, need experience; maturity (with method)".

" When I used it, it was helpful"

Undecided:

"Somewhat effective, but I have already my own method".

"I am not sure. I think I forgot to apply the strategy or did not have enough confidence in it".

Negative:

"I started to feel nervous after the relaxation procedure"

"It made me too relaxed"

"Not too effective because of my bad cold which consumed all my attention".

Athletes were asked to rate the overall effectiveness of this strategy on a scale from 1 to 10 (Question #4). Ratings in the Hypnotic Group ranged from 1 to 9 with a mean of 5.00. In the Relaxation Group the range was from 1 to 7, with the mean of 4.45.

On question No. 5, subjects were asked about their opinion concerning the influence of this treatment on their actual performance on the piste: positive, negative or none. In the Hypnotic Group nine subjects (75%) felt that the treatment had a positive effect and helped their performance, three subjects (25%) didn't think the treatment had any influence on performance and indicated - no difference. In the Relaxation Group four subjects (36%) indicated a positive effect on their performance, five (45%) thought it didn't make any difference and two (18%) felt that the treatment had a negative effect on them during that tournament.

In question No. 6: "Do you have any suggestions on how to improve the effectiveness of the strategy which was presented to you during the experiment?" - both groups agreed on two basic points:

1. The technique itself should be trained more often in order to be more effective.

2. The procedure and suggestions should be highly individualized.

Here are some of the more interesting comments:

"- there should be more repetitions of the strategy for a longer period of time before a tournament. Perhaps individualized key words no one else knows. The strategy would then become a more internal, personal one, to be used when you feel it's necessary to use. The word "relax" seems to be repeated to me by club-mates all around, so after a while it becomes meaningless." (Relaxation Group).

"We should do it more often including some means to practice at home. A complete detailed program tailored for fencing situations would help: for example - visualization in conjunction with key word "relax", etc." (Relaxation Group).

"I think relaxation was the base of success of this experiment, but I think it requires a consistent and regular practice to be even more effective" (Hypnotic Group).

Nine subjects (75%) in the Hypnotic and eight (73%) in the Relaxation Group would recommend the method to other fencers (question No. 7). Two from the Hypnotic Group and three from Relaxation Group had no opinion. One subject in Hypnotic Group was negative about recommending this method to the others. The comments concerning recommending the method were similar in both groups:

"yes, for those very nervous" (Relaxation)
"it had a negative effect on me, but perhabs the others can use it," (Relaxation)
"yes if adapted individually" (Relaxation)
"others should try it to see if they like it" (Hypnotic)
"no, because that depends on personality" (Hypnotic)

Ten subjects (83%) from the Hypnotic Group and seven (64%) from the Relaxation Group would agree to try this strategy again. Two from the Hypnotic group (17%) and four from the Relaxation Group (36%)

would not. When asked the question "would you use it again? Why or why not?" some of the following responses were given:

Negative:

"Not this way, but in a more personalized way" (Hypnotic)

"No, but I have discovered that it is important to have a method to relax and to avoid anxiety and I have one which helps me to concentrate. In order to do this I create a void in my mind and I leave everything in the hands of someone whom I consider superior. For me it's a source of energy. With this void during a bout I give everything of myself... then I win or I lose..." (Hypnotic - female)

"No, I was more nervous using the method than normally during the competition" (Hypnotic - female)

Positive:

"Yes, of course, it helped me to control my opponent, take my rhythm and change it easily" (Hypnotic - male)

"Yes, but in more personalized way, with my own key words" (Hypnotic - male)

"Yes, because I think there will be no really good results without psycho-physical approach to training" (Hypnotic - male)

"Yes, but I think it would be more useful on the international scene, because here in Canada I am in full control (Relaxation - male, National Team member)

"Yes, but it would be more effective if practiced more often". (Relaxation - female)

To question No. 9 : "Did you use any calming strategy besides the one presented to you during the experiment? If "yes" - what?" Eight subjects in the Hypnotic Group (67%) gave "no" as a response and four (33%) said "yes".

In the Relaxation Group, only seven subjects (64%) answered this question. Three of them gave a negative answer and four of them stated that they used something else as well. The strategies which were described by subjects in both groups as used in conjunction with the treatment were:

- walking (3)
- deep breathing (3)
- isolating and visualizing fencing movements (1)
- arm movements (1)

The last question in this questionnaire asked for "any other comments which may be of value or interest"? To this question here are some examples of comments from those who did respond.

> "I find it very encouraging that somebody is finally interested in teaching us how to control our anxiety during competition. I think the bigger champion, the better he/she should be able to control the nerves. Many fencers fence fantastic during training bouts and then they lose 40% of their technique at the competition" (Relaxation - male).
>
> "The work in this field is extremely valuable for the future" (Relaxation - female).
>
> "I had always preferred to try to keep myself "up" during a bout at a tournament. I would be afraid to relax too much" (Relaxation - female).
>
> "I did not find the word "relax" as effective as words like "confident", "distance and timing". For some reason when I felt anxious these other words came to my mind much more frequently than the word relax" (Hypnotic - female).
>
> "I think this program is very useful and could be also used to deal with fencers' technique (his weaknesses). For example, the subconscious message could also deal with parries, timing, speed, etc." (Hypnotic - male).
>
> "I find this sort of practice very important in fencing. I feel more work should be done in this area, perhaps in cooperation with a professional sport psychologist" (Hypnotic - male).

Post-experimental Questionnaire for the Control Group

This six question, questionnaire was designed to include as many questions as possible which were similar to the one given to the Hypnotic Group and Relaxation Group (see Appendix 9 and 10). Eight subjects out of seven subjects (73%) in this group returned the questionnaire.

The first question asked was, "When you were anxious on the piste during the competition, did anything come to your mind at that time which you thought might help calm you down? Circle the corresponding number on the scale from 1 to 10, where 1 - means "never", 5 - means "sometimes" and 10 - means "every time I needed it". The individual range of the answers was from 4 to 7 with the overall mean of 5.25. All subjects sometimes thought about "something" when they were anxious.

The second question concerned the influence of that strategy on their performance in competition. Six subjects concluded that it helped their performance, two felt that it didn't have any influence on what they did on the piste.

Asked to rate on a scale from 1 to 10 the overall effectiveness of the above mentioned strategy (question No. 3) the ratings ranged from 3 to 8 with a mean of 5.63.

The fourth question, "Do you have any suggestions on how to improve the effectiveness of the strategy you use during fencing competition?", yielded some of the following answers:

"One should think about the next hit only, use physical relaxation of the shoulders and the back with deep breathing, as well as make pauses during a fencing bout from time to time".

"When faced with an anxious moment I try to create a break in action to gain the time to think, to distract attention towards thoughts about pleasant nothing and think about what to do next".

"One should not lose his cool on the piste and not get angry. When that happens - deep breathing should help and relaxing muscles during a match".

"I fence better when my level of anxiety is high".

In response to question No. 5, "Would you try it again" Why, or why not?" seven subjects responded positively, one gave a negative answer.

To the question: "Would you recommend this procedure be used with other fencers?", five fencers answered "yes", two answered - "no" and one gave no response. Many subjects at this point underlined the necessity of an individualized strategy, in fact both positive and negative answers aimed at the same point:

"No, I think everybody needs a different strategy"

"Yes, but each person has their own particular pleasant experiences and images to call upon to relax and to re-focus energy and attention".

CHAPTER V

DISCUSSION

The major purpose of the experiment was to shed light on the question as to whether a post-hypnotic and post-relaxation suggestion, induced on-site just before a fencing competition, is an effective means of controlling subjects' self-perceived anxiety. The results indicate that both the hypnotic and relaxation treatment proved to be an effective means of lowering perceived level of difficulty and hypnotic treatment in lowering estimated level of anxiety, when compared to no treatment at all. On the post-treatment measure subjects in the Hypnotic Group perceived themselves as significantly calmer when compared to their colleagues in the Control Group. No significant difference was found between the Relaxation Group and the Control Group on the anxiety measure, or between the Relaxation Group and the Hypnotic Group. Thus, the hypnotic treatment was significantly better than no treatment but not significantly better than the relaxation treatment in dealing with anxiety under the given conditions.

The significant difference in anxiety which was found to exist between the Hypnotic and Control Group was due to the fact that the subjects in the Control Group rated their anxiety levels much higher during the second set of competitions compared to their baseline scores when compared to the Hypnotic subjects. These findings indicate that in fencing, competitions towards the end of

the season (in this case the Governor General's Tournament and Eastern Canadian Championships) have more "weight" and are viewed as more important by fencers, even if these competitions and the number of participants is very similar, if not identical to those at the beginning of the season.

The analysis of the high anxiety subjects and low anxiety subjects proves to be very interesting. A significant difference was found to exist between the High Anxiety and Low Anxiety sub-groups on all the dependent variables. The Low Anxiety Subjects had a significantly higher hit indicator and bout indicator, and a significantly better final placing - all consistently showing significantly better overall performance for the low anxiety group. This may be due to better fencers being less nervous during a domestic competition compared to less advanced fencers, because good fencers perceive their opponents as less difficult. It could also be that low anxious people are better fencers, which in turn affects perceived level of difficulty.

There was a significant interaction effect between anxiety (for High Anxiety Subjects and Low Anxiety Subjects) and treatment (repeated on the baseline and treatment/post-measure) in the <u>hit indicator</u>.

With respect to the estimated level of difficulty, after treatment, both the Hypnotic and Relaxation groups showed a significantly lower rating when compared to the Control Group. After the hypnotic treatment and after the relaxation treatment, subjects perceived their opponents as less difficult, when compared to their colleagues in the Control Group. In this case hypnosis and relaxation were equally effective, which is consistent with findings of previous researchers who claim close similarity between those two methods (Edmonston, 1981).

The expectation that the hypnotic and relaxation treatment might produce positive changes in subjects' performance (without accounting for high or low anxious subjects) was not confirmed by the results of this study. None of the performance measures showed significant changes according to treatment groups. The number of subjects who improved their performance was equally balanced with the number of subjects who did not improve their performance under experimental conditions. All the dependent variables measuring performance (i.e. hit indicator, bout indicator and final placing) were non significant, except when broken into high and low anxiety subjects.

These results provide support for previous studies on hypnosis, post-hypnotic suggestion and relaxation which deals with physical performance (Barber & Colverley 1964, Evans & Orne 1965,

Arnold 1971, Ito 1979, Morgan 1980, Wallace & Hoynega 1981, Morgan 1982, Edmonston 1981). These studies also found that generally these treatments can influence subjects' emotions, but they do not enhance their physical performance (except for certain individuals).

The lack of overall improvement in subjects' performance during the experiment might have been effected by the fact that the measures were taken during a national level of competition, as opposed to an international competition when anxiety is further elevated. Most of the fencers are psychologically adjusted to performing in internal competitions, because they have the opportunity to do so 12 to 15 times a year per weapon. After several years of fencing (and that was the case for subjects in this study) many fencers may already compete at, or very close to their optimal level of arousal. If this was the case, there would not be much room for manipulating change. On the other hand fencers (and generally most athletes) are much less adjusted to competing at a very high international level, especially if one considers very important meets like World Championships, Olympic Games, Pan-American Games, etc. In these cases the level of arousal is much higher and the ability to regulate emotional states and make a correct judgement very much influences the final results. In Canada, top fencers have two to three high international class competitions a year, including World Championships or Olympic Games, so they are much less adjusted psychologically than their european colleagues.

Based on the responses on the post-experimental questionnaire, the Hypnotic Group subjects were generally more positive about the treatment than subjects in the Relaxation Group. It was clear however, that the suggestion given did not surface "automatically" on the piste for at least seven subjects (31%) from the Hypnotic and Relaxation Group. The key part of the post-hypnotic and post-relaxation suggestion was the following: "...whenever you feel nervousness or anxiety the word RELAX will pop into your mind..." It was supposed to have been understood as an automatic process of self-regulation, with no active effort required on the part of the subjects in order to remember, or to think about it, during the competition. The answers to post-experimental questionnaire suggest that in spite of this kind of wording several subjects felt that they needed to do "something" in order to make the strategy work. Many felt they had to say RELAX to themselves to release the tension and there were several answers trying to justify why it didn't work: "I couldn't do it because I had a cold which consumed all my concentration...", "I was too involved and I forgot to use it...", etc.

Although overall performance effects were not evident, the hypnosis and post-hypnotic suggestion proved to be a very effective method to reduce self-perceived anxiety. The relaxation treatment (i.e. "relaxation response" technique), and post-relaxation suggestion was equally effective in reducing the estimated level of difficulty.

Since hypnosis and post-hypnotic suggestion proved to be an effective anxiety regulator, it should be recommended as a consideration for those athletes who become incapacitated because of their high anxiety, away from Canada. Further research in this area is obviously needed to find out the best way of defeating unwelcomed and disturbing emotional states.

There are also many unanswered questions about post-hypnotic and post-relaxation suggestions. How much mental training (i.e. hypnotic, relaxation or other) is a minimum dose before an international meet? What is the optimal length of one session? Can subjects with low hypnotic susceptibility use hypnosis as a treatment, or do they respond better to relaxation techniques? How can one effectively influence the level of athletes' confidence - which is believed to be a key issue in improving fencing performance at any level.

Some questions can probably be answered in the lab, but others clearly require more on-site research and especially research in high pressure situations.

In the light of the latest findings in the world of sport psychology there is little doubt that many of the necessary tools and mechanisms needed for constant improvement in any kind of sport or non-sport activity lie in the human brain. It is up to modern science

to find and activate those mechanisms, so they can be safely used for the human pursuit for excellence. The author believes that hypnosis and relaxation are future tools to facilitate sport performance and a more successful life, and that they could well replace artificial chemical drugs, bio-blockers, hormones, etc. now used in order to achieve more success and win more medals. Chemical stimulants have already done much damage to many athletes, endangering their health and even their life. A healthy future for sport cannot depend on better, more undetectable super-pills. All the sources for super-performance needed are inside the human brain. All we have to do is to find out how to use them.

Problems

This experiment was one of the first in the field of hypnosis and relaxation to be conducted on a group of highly skilled athletes under real competitive conditions. As one might expect, this caused some problems which made the task more difficult than doing a controlled lab experiment.

At the beginning many subjects felt a little hesitant about trying something completely unknown during an important competition. Some feared that it could possibly disturb their performance, and some were not sure whether or not they should go through the whole procedure. These reservations were usually expressed in private talks with the experimenter. The fact that 33 high level fencers finished the experiment and returned all their measurements, can be considered as a success in itself. The pre-competition introductory session in hypnosis and relaxation for the Hypnotic and Relaxation groups were in this case essential for gaining subjects' trust and cooperation.

Another problem encountered was ensuring that athletes filled out the difficulty - anxiety forms at the appropriate time, on-site. Many subjects had to be reminded often by the experimenter and assistants not to forget to mark their forms before every bout. This was especially true during the first baseline competitions, when the procedure was introduced for the first time. The problem nearly disappeared during the second competition, as the subjects became familiar with the procedure.

Gaining the cooperation of different personal coaches was also not an easy task. There were fencers from six different clubs and four cities involved in the experiment: two clubs from Ottawa, three from Montreal, one from Quebec City and one from Toronto. The coaches were familiarized with the procedure so they all knew what was going to be done with their fencers. Formally, none of them raised any objections and they were quite helpful in arranging the first experimental training session for the hypnotic and relaxation procedures. Later on however, it was felt that at least some of them were not too happy about the fact that some of their fencers were being influenced by somebody else (the experimenter) during a competition. At least two subjects did not finish the experiment because of negative actions from their personal coaches. In this kind of experiment it seems to be very important that personal coaches do not feel excluded from what is going on with their athletes. It would likely be best if they played some role (a greater role) in at least a part of the experiment. In this study coaches would have probably felt better if they had been consulted beforehand or more fully, perhaps by asking them to help work out the wording for the post-hypnotic and post-relaxation suggestion, by inviting them to participate in the hypnotic and relaxation training sessions, or by asking for their help in controling the experiment on-site.

Some technical problems were caused by the fact that the subjects from the Hypnotic and Relaxation Group had to go through their procedures in rooms which were not always sound-proof. In the

facilities where the competitions were conducted it was not always possible to find a place so remote from all living beings as to be completely quiet. Therefore, several times voices of people walking along the corridor and talking, or noise from a neighbouring fencing room would penetrate the "lab" and distract concentration.

The ten point scales, from 1 to 10, which were used to mark the estimated level of difficulty and perceived level of anxiety, were in some cases viewed as not allowing for a full range of feelings. For example, in the anxiety estimates it did not allow for states of complete apathy; the "I don't care anymore" feelings which are sometimes experienced by fencers during competitions. There were two subjects in this experiment who commented on the difficulty-anxiety rating forms. They felt they could have gone two or three steps below the "no anxiety at all" which was represented by "1" on the scale. Therefore, for this kind of study it would be useful to consider using a scale which accounts for these "minus" feelings. Perhaps a scale could start from minus two or minus one, and finish at plus ten. For example:

-2 -1 0 1 2 3 4 5 6 7 8 9 10

where "-2" would represent complete apathy, not caring about anything, "-1" - apathetic, tired, "0" - no anxiety at all, "5" - some anxiety, and "10" - extremely high anxiety, loss of self-control.

Another solution might be to use two separate scales and two separate ratings: one for the level of activation and one for level of worry. Orlick has found this procedure helpful in working with National Teams. Both terms are now mixed in the term "anxiety" which does not separate positive feelings needed for good performance (activation) and negative feelings disturbing performance (worry).

In spite of these difficulties, a great majority of the subjects expressed positive feelings about the study in the post-experimental questionnaire. There is much room for improvement and great need for further applied research in this domain.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The object of this study was to evaluate the effectiveness of post-hypnotic and post-relaxation suggestions induced before domestic fencing competitions to high and middle level fencers. Subjects were randomly assigned to a Hypnotic Group, Relaxation Group and Control Group with eleven subjects in each group. The subjects from all the groups were first tested in non-treatment conditions during fencing competitions early in the 1983 season. The results of these competitions were used as the baseline measurements. During the second set of competitions, later in the 1983 season, the subjects from the Hypnotic Group received a pre-competition hypnotic treatment with post-hypnotic suggestion designed to activate self-regulatory mechanisms to reduce anxiety to a desirable level, if and when such a reduction was needed. The suggestion was based on a key word, "Relax", which was supposed to "pop into mind" automatically whenever a subject felt rising anxiety. The subjects from the Relaxation Group received a pre-competition relaxation treatment, based on Benson's "relaxation response" method, with post-relaxation suggestion, identical to the suggestion for the Hypnotic Group. The subjects from the Control Group repeated the second set of competitions without any treatment.

The dependent variables being studied were: estimated level of difficulty - measured on a 10-point self-report scale; perceived

level of anxiety - measured on a 10-point self-report scale; hit indicator - measured by the difference between all the hits scored during a competition and all the hits received during the same competition; bout indicator - measured by a ratio between the total number of victories during a competition and the total number of bouts fenced during the same competition; final placing - measured by subject's final ranking in a competition.

A pre- and post-experimental questionnaire was answered by the subjects from all three groups in order to obtain more detailed evaluations of subjects' responses to treatments and to also assess the non-treatment conditions.

The data was the analyzed in the following ways:

a. by a simple analysis of variance comparing baseline measurements only for the Hypnotic, Relaxation and Control Group on each of the dependent variables;

b. by a simple analysis of variance comparing the differential between the baseline and treatment/post-measure for subjects from the Hypnotic, Relaxation and Control Group for each of the dependent variables;

c. by grouping the subjects into a High Anxiety Group, with individual anxiety scores above the overall median, and

a Low Anxiety Group, with individual anxiety scores below overall median. An analysis of variance in this case included High Anxiety Subjects, Low Anxiety Subjects, Hypnotic, Relaxation and Control Group, repeated on the baseline and treatment/post-measure - for each of the dependent variables.

d. by calculating correlations between levels of difficulty, levels of anxiety, hit indicators, bout indicators and final placings, in and between the Hypnotic, Relaxation and Control Group, on the baseline and treatment/post-measure.

e. by analyzing, categorizing and summarizing the answers to the pre- and post-experimental questionnaires for all 3 groups.

The main findings of the experiment, based on the data analysis, were the following:

- There was a significant difference ($p. < .01$) in the perceived level of anxiety between the Hypnotic Group and the Control Group (based on the analysis of the differential scores between the baseline and treatment). This difference indicated that the hypnotic treatment aimed at activating self-regulatory mechanisms

during the fencing competition had a significant effect on subjects' perceived level of anxiety, which was significantly lower for the Hypnotic Group.

- There was a significant difference ($p. < .05$) in the estimated level of difficulty between the Hypnotic Group and the Control Group, and between the Relaxation Group and the Control Group (based on the analysis of differential scores between the baseline and treatment/post-measure). The estimated level of difficulty was significantly lower in the Hypnotic Group and in the Relaxation Group, when compared with the Control Group. The findings indicated that the hypnotic and relaxation treatments were equally effective in reducing difficulty estimates during post-treatment competitions.

- No significant differences were found between the Hypnotic Group, Relaxation Group and Control Group on any of the performance measurements. An analysis of variance based on differential scores between the baseline and treatment/post-measure showed no significant differences between groups for the hit indicator, bout indicator or final placing.

- When subjects were broken down into a High Anxiety Group and a Low Anxiety Group, significant differences were found between these groups on all dependent variables. The Low Anxiety Subjects Group had a significantly lower estimated level of difficulty ($p. < .01$), a significantly higher hit indicator ($p. < .01$), a significantly higher bout indicator ($p. < .01$) and a significantly better final placing ($p. < .01$). These findings indicate that the initial level of anxiety is an important factor influencing fencers' performance during competition, and the potential effectiveness of treatment.

- The highest positive correlations were found to exist between the estimated level of difficulty and perceived level of anxiety for all groups, regardless of presence or absence of treatment.

Without treatment, the level of competition anxiety had a tendency to rise towards the end of the season. Late-season fencing competitions were perceived by the Control Group as more difficult and more important than early season competitions.

In conclusion, hypnosis with suggestion and relaxation before a competition appeared to have a measurable effect on athletes' perceptions of either anxiety, or opponent's difficulty,

or both. In fencing, where fine motor control and emotions are tied closely together, this kind of effect is very important. However, competition performance is the ultimate test and there was no significant effect in this regard (except when subjects were grouped by initial level of anxiety). Perhaps some light was shed on this in response to the post-experimental questionnaire. Subjects clearly indicated that such treatments cannot be employed without taking into consideration an athlete's individual needs and individual differences. Individualization will likely be a key to success, especially in sports where level of arousal needs to be manipulated not only down, towards relaxation, but also up, towards higher activation. In this respect, suggestions and treatments must be well suited to the athletes' needs during a competition and to their personalities. This, in turn, may be influenced by how much a sport psychologist or coach knows about the athletes' problems, needs, motivations and competition preferences (and how much the athlete knows about himself). Full cooperation and open interaction between a sport psychologist, an athlete, and a personal coach will likely lead to a correct choice of method for intervention.

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APPENDIX 1

BASIC INFORMATION ABOUT FENCING AND TOURNAMENT ORGANIZATION

To fully understand the way the whole study operated, some basic information about the organization of fencing tournaments and about the sport of fencing are necessary.

On the average, a national level fencing tournament in Canada has 30 to 50 participants per weapon (depending upon weapon). Depending on the number of entries, fencers in each weapon are divided into a certain number of pools with a minimum of four and maximum of seven fencers in each pool. For example, a tournament in épée with 41 entries would be divided into eight pools: seven pools with five fencers in each pool plus one pool of six fencers (7x5 = 35 + 6 = 41). Then fencers fence so-called "first round" or "first elimination" using the system "everybody against everybody" within each pool. In the above case - probably three fencers from each pool would be promoted to the second round or "second elimination". The fencers in each pool with the most numbers of victories are those who pass to the next round. The rest of the fencers are eliminated from the tournament. In that case 24 fencers would be left in the field and they would fence the second round again being divided into pools: four new pools with six fencers in each pool. They fence again "everybody against everybody" within each pool and the four best

fencers from each pool should be promoted to the semifinal (best 16) or - using a different name - "direct elimination with repassage. In the pools, a fencer who scores five hits on the opponent (regardless of the weapon) is the winner of the bout.

The top 16 fencers who are left in the direct elimination (semi-final) are seated from No. 1 to No. 16, according to their previous results, and then fence the first elimination bout. So, the fencer seated as No. 1 fences against No. 16, No. 2 against No. 15, etc. The fencer who wins two bouts in a row goes directly to the finals. The fencer who loses one bout still has a chance to make the final through the repassage. Losing two bouts in the semi-final eliminates a fencer from the tournament. In the semi-final (and the final) the winner must score 10 hits (men) or 8 hits (ladies' foil) on the opponent in order to win the bout.

After the semi-final there are eight fencers left in the competition and they are called "the finalists". They are seated again from No. 1 to No. 8 and fence one more elimination (this time, without repassage). The loser is eliminated from the competition, the winner moves up the ladder, until the overall winner is determined.

As an example: a competition with 41 entries would be organized in the following way:

1st round:	7 pools with 5 fencers 1 pool with 6 fencers 3 fencers from each pool promoted to second round
2nd round: (24 fencers left)	4 pools with 6 fencers in each pool 4 fencers promoted to the semi-final
3rd round: (16 fencers left)	direct elimination with repassage
Final: (8 fencers left)	direct elimination without repassage until the winner is known

The winner of this tournament would have to fence a minimum 15 bouts, assuming that he was in the pool of five fencers in the first round and that in the semi-final he had two straight victories (i.e., went to the finals without repassage). The duration of such fencing tournament would be about 6 to 7 hours. The duration of one 5 hit bout is limited to six minutes. The duration of 10 hit bouts are limited to 10 minutes (in ladies' foil - 8 hits and 8 minutes).

A P P E N D I X 2

ANXIETY AND DIFFICULTY ESTIMATIONS

NAME: .....Peter Smyth..... No: ....8..

COMPETITION: .....Governor General's.....

ROUND: before: ..... during: .....2nd.....

BOUT: before: .....3..... RESULT OF THE BOUT: 5 : 3 (V) D

ESTIMATED LEVEL OF DIFFICULTY

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

PERCEIVED LEVEL OF ANXIETY

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

Here is a sample sheet for a fencer. In this case it is sheet number 8 (eighth measurement) during the Governor General's Fencing Tournament. The measure is taken during the second round of this competition and before the third bout. This fencer won his bout with the result five to three. Before the bout he estimated the difficulty of the opponent as "6" and his own anxiety level as "8".

APPENDIX 3

GROUP HYPNOTIC

Maintenant, relaxez et mettez-vous complètement à l'aise. Relaxez complètement ... relâchez chaque muscle de votre corps. Relâchez les muscles de vos jambes. Relâchez les muscles de vos bras. Mettez-vous parfaitement à l'aise. Laissez-vous aller. Relaxez toujours plus ... de plus en plus. Relaxez complètement. Relaxez complètement. Relaxez complètement.

Vous sentez que vos jambes sont lourdes et denses. Vous sentez que vos bras sont lourds, lourds comme du plomb. Vous sentez que tout votre corps est lourd, de plus en plus lourd. Vous vous sentez fatigué et endormi, fatigué et endormi. Vous vous sentez somnolent et assoupi, somnolent et assoupi. Votre respiration est lente et régulière, lente et régulière. Vous vous sentez agréablement somnolent et assoupi au fur et à mesure que vous écoutez ma voix. Concentrez toute votre attention sur ce que je suis en train de dire. Bientôt vous serez profondément endormi, mais vous n'aurez aucune difficulté à m'entendre. Vous ne vous réveillerez pas jusqu'à ce que je vous dise de le faire.

Je vais maintenant commencer à compter. A chaque nombre, vous vous sentirez plonger profondément, toujours plus profondément, dans un confortable sommeil, dans un sommeil profond et apaisant.

un	-	vous allez tomber profondément endormi
deux	-	vous plongez dans un sommeil, un sommeil profond
trois	-	toujours plus, toujours plus endormi
quatre, cinq	-	vous êtes en train de plonger, plonger dans un profond, très profond sommeil. Rien ne vous dérangera. Ne vous occupez pas de ma voix et des choses que je vous dis
six	-	toujours plus profondément, un sommeil toujours plus profond
sept, huit	-	vous m'entendrez toujours clairement, quelle que soit la profondeur de votre sommeil
neuf	-	profondément endormi, rapidement endormi. Rien ne vous dérangera
dix	-	profondément endormi. Vous ne vous réveillez pas jusqu'à ce que je vous dise de le faire. Vous désireriez dormir et concentrer sur les choses que je vais vous dire. Vous vous sentez à l'aise, relâché, ne pensant à rien. Rien sauf ce que je vous dis. Vos yeux sont fermés. Confortablement fermés.

Vous ne pensez à rien. Rien sauf ce que je vous dis. Vous êtes relâché. Vous sentez que tout votre corps est relâché. Vous sentez que tout votre corps est relâché. A mesure que vous dormez de plus en plus profondément, imaginez que vous plongez dans un nuage, blanc et confortable. Vous êtes couché sur ce nuage, vous sentant au chaud et confortable. Lentement, vous êtes en train de plonger dans ce nuage, de plus en plus profondément. Toujours plus profondément. Toujours plus profondément dans le nuage blanc et moelleux. A mesure que vous plongez toujours plus profondément, vous sentez que votre esprit et votre corps sont de plus en plus relâchés, de plus en plus denses, confortables et relâchés. Doux, confortable et relâché.

Dans quelques instants je vais vous réveiller. Je vais compter de cinq à un et lorsque j'atteindrai un vous vous sentirez frais de dispos, relâché et parfaitement réveillé. Avant de vous réveiller, cependant, je veux vous donner une suggestion finale qui va vous aider pendant la compétition qui s'en vient. La suggestion vous sera utile pendant toute la durée de la compétition.

> "A chaque fois que vous sentirez de la nervosité ou de l'anxiété le mot "RELAXE" vous viendra à l'esprit, et votre anxiété disparaîtra. Lorsque le mot "RELAXE" viendra à votre esprit vous vous sentirez décontracté, calme et concentré, et vous porterez votre attention sur la distance, et le tempo. A chaque fois que le mot "RELAXE" vous viendra à l'esprit, vous arrêterez de vous sentir anxieux ou nerveux et à la place vous vous sentirez confiant et décontracté, et vous porterez votre attention sur la mesure et le tempo. Souvenez-vous, à chaque fois que vous sentirez de la nervosité et de l'anxiété, le mot "RELAXE" vous viendra à l'esprit, et vous deviendrez calme, confiant, décontracté et concentré, et vous porterez votre attention sur la distance et le tempo."

Maintenant, je vais vous réveiller:

cinq	-	vous commencez à vous réveiller
quatre	-	de plus en plus alerte et éveillé
trois	-	frais et dispos, décontracté mais encore plus éveillé
deux	-	presque complètement éveillé maintenant
un	-	frais et dispos, heureux et complètement éveillé

A P P E N D I X 4

GROUPE DE RELAXATION

Allongez-vous tranquilement d'une façon confortable.

Fermez vos yeux.

Relâchez profondément tous vos muscles, en commençant avec vos pieds et en progressant jusqu'à votre visage. Gardez vos muscles relâchés.

Respirez facilement et naturellement. Devenez conscient de votre respiration. Lorsque vous expirez, dites le mot "RELAXE", silencieusement à vous-même. Inspirez ... expirez ... "RELAXE", inspirez ... expirez ... "RELAXE", etc. Continuez à respirer facilement et naturellement.

Continuez comme ça pendant dix minutes jusqu'à ce que je vous dise d'arrêter. Quand je ferai ça - restez allongé tranquilement et attendez des indications supplémentaires.

Ne vous inquiétez pas si vous ne réussissez pas à atteindre un profond niveau de relaxation. Conservez une attitude passive et laissez-vous gagner progressivement par la relaxation. Lorsque certaines idées vous distraient, essayez de les ignorer en cessant de poursuivre le fil de celles-ci et recommencez à répéter "RELAXE".

Le temps est fini. Restez où vous êtes en gardant vos yeux fermés. Maintenant je veux vous donner une suggestion finale qui va vous aider pendant la compétition qui s'en vient. La suggestion vous sera utile pendant toute la durée de la compétition.

> A chaque fois que vous sentirez de la nervosité ou de l'anxiété le mot "RELAXE" vous viendra à l'esprit, et votre anxiété disparaîtra. Lorsque le mot "RELAXE" viendra à votre esprit vous vous sentirez décontracté, calme et concentré, et vous porterez votre attention sur la distance, et le tempo. A chaque fois que le mot "RELAXE" vous viendra à l'esprit, vous arrêterez de vous sentir anxieux ou nerveux et à la place vous vous sentirez confiant et décontracté, et vous porterez votre attention sur la mesure et le tempo. Souvenez-vous, à chaque fois que vous sentirez de la nervosité et de l'anxiété le mot "RELAXE" vous viendra à l'esprit, et vous deviendrez calme, confiant, décontracté et concentré, et vous porterez votre attention sur la distance et le tempo.

Maintenant je vais vous réveiller:

cinq	-	vous commenzes à vous réveiller
quatre	-	de plus en plus alerte et éveillé
trois	-	frais et dispos, décontracté mais encore éveillé
deux	-	presque complètement éveillé maintenant
un	-	frais et dispos, et complètement éveillé.

A P P E N D I X 5

PRE EXPERIMENTAL QUESTIONNAIRE (English)

Name: ..... weapon: .....

1. Do you use any coping strategy to control your anxiety before or during a fencing tournament?

yes ..... no .....

2. If "yes" - what do you use?

3. How would you rate the effectiveness of your strategy on a scale from 1 to 10 where 1 - means "totally ineffective", 5 - means somewhat effective" and 10 - means "extremely effective"?

1 2 3 4 5 6 7 8 9 10

A P P E N D I X 6

QUESTIONNAIRE PRE-EXPERIMENTAL (Français)

Nom: ..... arme: .....

1. Utilisez-vous une quelconque méthode pour contrôler votre anxiété avant ou pendant un tournoi d'escrime?

oui ..... non .....

2. Si "oui" - que faites-vous?

3. Sur une échelle de 1 à 10, comment estimez-vous l'efficacité de votre méthode où 1 - signifie "totalement inefficace", 5 - signifie "plutôt efficace" et où 10 - signifie "extrêmement efficace"?

1 2 3 4 5 6 7 8 9 10

APPENDIX 7

POST-EXPERIMENTAL QUESTIONNAIRE (English)

(Hypnotic and Relaxation Group)

Name: .....

1. Did the word "Relax" come to your mind when you were anxious on the piste during the competition? Circle the corresponding number on the scale where 1 - means "never", 5 - means "sometimes" and 10 - means "every time I needed it":

   1 2 3 4 5 6 7 8 9 10

2. Could you comment on what happened (or what you did) when you began to feel anxious?

3. How effective was the coping procedure you received in helping you with your anxiety?

4. Rate its overall effectiveness on the scale, where 1 - means "totally ineffective", 5 - means "somewhat effective" and 10 - means "extremely effective":

   1 2 3 4 5 6 7 8 9 10

5. Do you think the treatment affected your performance in any way?

   Yes, positively (helped my performance) _____

   Yes, negatively (hurt my performance) _____

   No difference in performance _____

6. Do you have any suggestions on how to improve the effectiveness of the strategy which was presented to you during the experiment?

7. Would you recommend this procedure be used with other fencers?

8. Would you use it again? Why or why not?

9. Did you use any calming strategy besides the one presented to you during the experiment? If yes - what?

10. Any other comments which may be of value or interest?

APPENDIX 8

QUESTIONNAIRE POST-EXPERIMENTAL (Français)

Groupe: Hypnotique et Relaxation

Name: .....

1. Au cours de la compétition, au moment où, sur piste, vous ressentiez quelque anxiété, le mot "RELAXE" vous est-il venu à l'esprit? Encerclez le chiffre sur l'échelle suivante, où 1 signifie "jamais", 5 signifie "quelquefois" et 10 signifie "à chaque fois que le besoin s'en fit sentir".

   1 2 3 4 5 6 7 8 9 10

2. Pourriez-vous fournir quelques commentaires sur ce qui se produisait (ou ce que vous faisiez) lorsque vous sentiez l'arrivée de cette anxiété?

3. Quel fut le rendement de la méthode qui vous fut proposée pour aider à combattre cette anxiété?

4. Evaluez son efficacité globale sur l'échelle suivante, où 1 signifie "tout à fait inefficace", 2 signifie "plutôt efficace" et 10 "extrêmement efficace":

   1 2 3 4 5 6 7 8 9 10

5. Ce traitement, selon vous, a-t-il eu quelque effet sur votre performance?

   Oui, un effet positif (ma performance fut améliorée) _____

   Oui, un effet négatif (ma performance en a souffert) _____

   Non, aucun effet sur ma performance _____

6. Pourriez-vous proposer certaines façons d'améliorer l'efficacité de la stratégie qui vous fut présentée au cours de l'expérience?

7. Recommanderiez-vous que cette procédure soit utilisée auprès d'autres tireurs?

8. L'utiliseriez-vous encore? Et pourquoi? Sinon, pourquoi pas?

9. Au cours de l'expérience, afin de retrouver votre calme, avez-vous utilisé une autre stratégie que celle qui vous était proposée?

10. Pourriez-vous soumettre tout autre commentaire qui pourrait revêtir une certaine valeur ou quelque intérêt?

APPENDIX 9

POST-EXPERIMENTAL QUESTIONNAIRE (ENGLISH)

CONTROL GROUP

NAME: .....

1. When you were anxious on the piste during the competition, did anything come into your mind at that time which you thought might help calm you down? Circle the corresponding number on the scale, where 1 - means: "never"; 5 - means: "sometimes"; and, 10 - means "every time I needed it".

1 2 3 4 5 6 7 8 9 10

2. Do you think the above-mentioned "strategy" which you tried affected your performance in any way?

Yes, positively (helped my performance) _____

Yes, negatively (hurt my performance) _____

No difference in performance _____

3. Rate its overall effectiveness on the scale, where 1 - means: "totally ineffective"; 5 - means: "somewhat effective"; and, 10 - means: "extremely effective":

1 2 3 4 5 6 7 8 9 10

4. Do you have any suggestions on how to improve the effectiveness of the strategy you use during fencing competitions?

5. Would you use it again? Why or why not?

6. Would you recommend this procedure be use with other fencers?

APPENDIX 10

QUETIONNAIRE POST-EXPERIMENTAL (FRANCAIS)

GROUPE DE CONTROLE

NOM: .....

1. Lors de la compétition, sur piste, lorsque vous avez ressenti quelque anxiété, y a-t-il quelque chose qui vous soit passé à l'esprit qui aurait pu vous calmer? Encerclez le chiffre sur l'échelle suivante, où 1 signifie "jamais"; 5 signifie "quelquefois"; et 10 signifie "chaque fois que le besoin s'en fit sentir":

   1 2 3 4 5 6 7 8 9 10

2. La stratégie mentionnée précédemment a-t-elle de quelque façon agit sur votre performance?

   Oui, de façon positive (ma performance en fut améliorée) _____
   Oui, de façon négative (ma performance en a souffert) _____
   Non, aucun effet sur ma performance _____

3. Evaluez son efficacité globale sur l'échelle suivante, où 1 signifie "tout à fait inefficace"; 5 signifie "plutôt efficace"; et 10 signifie "extrêmement efficace":

   1 2 3 4 5 6 7 8 9 10

4. Pourriez-vous proposer certaines façons d'améliorer l'efficacité de la stratégie utilisée lors de la compétition d'escrime?

5. L'utiliseriez-vous encore? Et pourquoi? Sinon, pourquoi pas?

6. Recommanderiez-vous que cette procédure soit utilisée auprès d'autres tireurs?

APPENDIX 11

Hypnotic Group Summary: The individual scores and means for each of the dependent variables and each of the subjects on the the baseline and after hypnotic treatment, N=11

		BASELINE					HYPNOSIS				
No	Weapon	$\bar{X}D$	$\bar{X}A$	HI	BI	Pl	$\bar{X}D$	$\bar{X}A$	HI	BI	Pl
1.	S	3.05	2.25	+38	.933	3	3.70	2.50	+61	.933	3
2.	LF	7.00	6.53	+29	.833	5	6.44	5.78	+17	.692	6
3.	LF	7.20	4.67	-17	.364	16	6.93	5.93	- 6	.455	15
4.	LF	5.81	5.19	0	.417	15	6.12	4.56	- 1	.500	13
5.	LF	5.59	5.94	+19	.769	9	5.76	5.41	+15	.750	8
6.	MF	6.09	6.36	- 6	.250	26	6.69	5.62	- 7	.333	16
7.	MF	5.95	4.19	+19	.625	4	4.47	3.21	+21	.714	6
8.	MF	5.32	5.00	+40	.867	3	6.37	3.68	+21	.714	4
9.	LF	7.44	7.04	-10	.421	8	6.50	5.58	- 3	.444	20
10.	S	6.00	4.68	+33	.786	5	5.71	3.71	+ 6	.445	9
11.	E	5.82	5.65	+25	.750	7	5.39	4.33	+23	.846	5
	$\bar{X}$	5.93	5.23	+15.4	.638	9.2	5.82	4.57	+13.4	.621	9.5

$\bar{X}D$ - mean of difficulty scores obtained during competitions
$\bar{X}A$ - mean of anxiety scores obtained during competitions
HI - hit indicator
BI - bout indicator
Pl - final placing in the competition
S - sabre
E - épée
LF - ladies' foil
MF - men's foil
$\bar{X}$ - overall mean

APPENDIX 12

Relaxation Group Summary: The individual scores and means for each of the dependent variables and each of the subjects on the baseline and after relaxation treatment, N = 11

		BASELINE					RELAXATION				
No	Weapon	$\bar{X}D$	$\bar{X}A$	HI	BI	Pl	$\bar{X}D$	$\bar{X}A$	HI	BI	Pl
1.	S	2.63	2.79	+44	.929	4	2.71	1.81	+45	.875	2
2.	S	6.29	5.12	- 9	.615	11	7.21	6.86	- 2	.364	11
3.	LF	5.47	3.89	+41	.857	3	6.24	4.29	+14	.750	7
4.	LF	5.06	4.88	+21	.750	6	5.35	4.10	+29	.800	2
5.	MF	5.94	6.17	-16	.429	23	5.55	5.72	- 3	.357	10
6.	LF	8.31	7.31	-12	.300	29	8.67	7.58	-16	.222	23
7.	LF	6.26	6.26	-13	.467	22	7.50	7.06	- 2	.583	12
8.	LF	6.94	3.75	- 2	.583	9	5.69	4.87	+14	.611	12
9.	E	3.89	3.39	+41	.846	7	3.17	2.67	+29	.737	6
10.	E	6.81	7.06	+ 4	.583	9	6.50	6.27	+13	.588	14
11.	S	6.05	5.48	-17	.375	15	5.00	5.00	+21	.714	6
	$\bar{X}$	5.79	5.10	+ 7.4	.612	12.5	5.78	5.11	+12.9	.600	9.5

$\bar{X}D$ - mean of difficulty scores obtained during competitions
$\bar{X}A$ - mean of anxiety scores obtained during competitions
HI - hit indicator
BI - bout indicator
Pl - final placing in the competition
S - sabre
E - épée
LF - ladies' foil
MF - men's foil
$\bar{X}$ - overall mean

APPENDIX 13

Control Group Summary: The individual scores and means for each of the dependent variables and each of the subjects on the baseline and after the post-measure, N = 11

		BASELINE					POST-MEASURE				
No	Weapon	$\overline{XD}$	$\overline{XA}$	HI	BI	Pl	$\overline{XD}$	$\overline{XA}$	HI	BI	Pl
1.	S	3.25	2.30	+38	.800	2	5.63	4.89	+ 5	.643	6
2.	S	4.82	5.71	-12	.462	12	7.25	8.13	- 8	.333	13
3.	S	2.74	3.05	+13	.643	7	5.74	5.37	+22	.786	5
4.	LF	7.56	6.63	- 5	.500	11	7.31	7.06	- 4	.500	10
5.	E	5.17	3.28	0	.467	21	6.55	2.33	- 1	.538	7
6.	E	4.76	2.84	+60	.895	1	4.20	2.50	+45	.933	1
7.	MF	3.56	2.89	+46	.867	2	5.00	4.05	+26	.714	5
8.	LF	5.43	5.14	- 8	.200	36	7.77	6.31	-11	.300	32
9.	LF	8.42	7.50	-11	.222	23	8.00	7.62	-10	.400	34
10.	E	2.16	2.11	+30	.786	2	2.76	2.47	+14	.616	10
11.	LF	8.00	7.58	-10	.333	20	8.05	7.75	+ 5	.600	3
	$\overline{X}$	5.07	4.46	+12.8	.561	12.4	6.20	5.32	+ 7.5	.578	11.4

$\overline{XD}$ - mean of difficulty scores obtained during competitions
$\overline{XA}$ - mean of anxiety scores obtained during competitions
HI - hit indicator
BI - bout indicator
Pl - final placing in the competition
S - sabre
E - épée
LF - ladies' foil
MF - men's foil
$\overline{X}$ - overall mean

APPENDIX 14

Table 3: Simple analysis of variance for the Hypnotic, Relaxation and Control Group based on individual mean scores during baseline measurements with the estimated LEVEL OF DIFFICULTY as dependent variable.

Source	SS	df	MS	F
A	4.705	2	2.352	.84
S/A	84.032	30	2.8	

F non significant

Table 4: Simple analysis of variance for the Hypnotic, Relaxation and Control Group based on individual mean scores during baseline measurements with the perceived LEVEL OF ANXIETY as dependent variable.

Source	SS	df	MS	F
A	3.748	2	1.874	.66
S/A	84.88	30	2.829	

F non significant

A P P E N D I X 14 (Cont'd)

Table 5: Simple analysis of variance for the Hypnotic, Relaxation and Control Group based on individual scores during baseline measurements with the HIT INDICATOR as dependent variable.

Source	SS	df	MS	F
A	365.639	2	182.819	.31
S/A	17522.091	30	584.069	

F non significant

Table 6: Simple analysis of variance for the Hypnotic, Relaxation and Control Group based on individual scores during baseline measurements with the BOUT INDICATOR as dependent variable.

Source	SS	df	MS	F
A	3.748	2	1.874	.66
S/A	84.88	30	2.829	

F non significant

A P P E N D I X 14 (Cont'd)

Table 7: Simple analysis of variance for the Hypnotic, Relaxation and Control Group based on individual scores during baseline measurements with the FINAL PLACING as dependent variable.

Source	SS	df	MS	F
A	80.79	2	40.4	.48
S/A	2535.09	30	84.5	

F non significant

APPENDIX 15

Table 12: Hit indicator - differential figures obtained by subtracting each subject's individual hit indicator on the baseline from the hit indicator after treatment/post measure for the Hypnotic, Relaxation and Control Group.

No.	Hypnotic	Relaxation	Control
1.	-23	- 1	33
2.	12	- 7	- 4
3.	-11	27	- 9
4.	1	- 8	- 1
5.	4	-13	1
6.	1	4	15
7.	- 2	-11	20
8.	19	-16	3
9.	- 7	12	- 1
10.	27	- 9	16
11.	2	-38	-15
Total	23	-60	58

In this case a total of +23 for the Hypnotic Group and +58 for the Control Group means less good performance during treatment/post- measure (the hit indicator was better on the baseline). The Relaxation Group has a total of -60 which means that the hit indicator was better during the after-treatment measure.

APPENDIX 16

Table 13: Bout indicator - differential figures obtained by subtracting each subject's individual bout indicator on the baseline from the bout indicator after treatment/post measure for the Hypnotic, Relaxation and Control Group.

No.	Hypnotic	Relaxation	Control
1.	0	.054	.157
2.	.141	.251	.129
3.	-.091	.107	-.143
4.	-.083	-.050	0
5.	.019	.072	-.071
6.	-.083	.078	-.038
7.	-.089	-.116	.153
8.	.153	-.028	-.100
9.	-.023	-.109	-.178
10.	.331	-.005	.170
11.	-.096	-.339	-.267
Total	.179	.133	-.188

The total of .179 and .133 for the Hypnotic and Relaxation Group means less good performance for those two groups during the after-treatment measure (the bout indicator was higher during the baseline measure). The Control Group with the total of -.188 indicated a better performance during the second measure (post-measure).

APPENDIX 17

Table 14: Final placing - differential scores obtained by subtracting each subject's final place in the baseline competition from the final place after treatment/post measure competition for the Hypnotic, Relaxation and Control Group.

No.	Hypnotic	Relaxation	Control
1.	0	2	- 4
2.	- 1	0	- 1
3.	1	- 4	2
4.	2	4	1
5.	1	13	14
6.	10	6	0
7.	- 2	10	- 3
8.	- 1	- 3	4
9.	-12	1	-11
10.	- 4	- 5	- 8
11.	2	9	17
Total	- 4	33	11

The total of -4 in the Hypnotic Group indicates that the performance improved in that group during the treatment/post-treatment measure (the numbers were higher on the second measurement). The Relaxation Group with the total of +33 and the Control Group (+11) declined in its performance.

A P P E N D I X 18

Table 15: Simple analysis of variance (ANOVA) with the differential scores for HIT INDICATOR as dependent variable for the Hypnotic, Relaxation and Control Group.

Source	SS	df	MS	F
A	667.82	2	333.91	1.52
S/A	6607.82	30	220.26	

Accept Ho, F - non significant

Table 16: Simple analysis of variance (ANOVA) with the differential scores for BOUT INDICATOR as dependent variable for the Hypnotic, Relaxation and Control Group.

Source	SS	df	MS	F
A	7268.01	2	3634.03	.17
S/A	650910.00	30	21697.00	

Accept Ho, F - non significant

A P P E N D I X 18 (Cont'd)

Table 17: Simple analysis of variance (ANOVA) with the differential scores for FINAL PLACING as dependent variable for the Hypnotic, Relaxation and Control Group.

Source	SS	df	MS	F
A	62.97	2	31.48	.70
S/A	1355.55	30	45.18	

Accept Ho, F - non significant

APPENDIX 19

Table 18: Subjects from the HYPNOTIC GROUP grouped according to their high anxiety scores on the baseline measure (over the median of 5.12).

	BASELINE					TREATMENT/POST-MEASURE				
Weapon	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl
LF	7.00	6.53	+29	.833	5	6.44	5.78	+17	.692	6
LF	5.81	5.19	0	.417	15	6.12	4.56	- 1	.500	13
LF	5.59	5.94	+19	.769	9	5.76	5.41	+15	.750	8
MF	6.09	6.36	- 6	.250	26	6.69	5.62	- 7	.333	16
LF	7.44	7.04	-10	.421	8	6.50	5.58	- 3	.444	20
E	5.82	5.65	+25	.750	7	5.39	4.33	+23	.846	5
$\overline{X}$=	6.29	6.12	9.5	.573	11.7	6.15	5.21	7.3	.594	11.3

$\overline{X}$D - level of difficulty

$\overline{X}$A - level of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

LF - ladies' foil

MF - men's foil

E - épée

APPENDIX 19 (Cont'd)

Table 19: Subjects from the RELAXATION GROUP grouped according to their high anxiety scores on the baseline measure (over the median of 5.12).

	BASELINE					TREATMENT/POST-MEASURE				
Weapon	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl
MF	5.94	6.17	-16	.429	23	5.55	5.72	- 3	.357	10
LF	8.31	7.31	-12	.300	29	8.67	7.58	-16	.222	23
LF	6.26	6.26	-13	.467	22	7.50	7.06	- 2	.583	12
E	6.81	7.06	+ 4	.583	9	6.50	6.27	+13	.588	14
S	6.05	5.48	-17	.375	15	5.00	5.00	+21	.714	6
$\overline{X}$=	6.67	6.46	-10.8	.431	19.6	6.64	6.33	+2.6	.493	13

$\overline{X}$D - level of difficulty

$\overline{X}$A - level of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

LF - ladies' foil

MF - men's foil

E - épée

S - sabre

APPENDIX 19 (Cont'd)

Table 20: Subjects from the CONTROL GROUP grouped according to their high anxiety scores on the baseline measure (over the median of 5.12).

	BASELINE					TREATMENT/POST-MEASURE				
Weapon	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl
S	4.82	5.71	-12	.462	12	7.25	8.13	- 8	.333	13
LF	7.56	6.63	- 5	.500	11	7.31	7.06	- 4	.500	10
LF	5.43	5.14	- 8	.200	36	7.77	6.31	-11	.300	32
LF	8.42	7.50	-11	.222	23	8.00	7.62	-10	.400	34
LF	8.00	7.58	-10	.333	20	8.05	7.75	+ 5	.600	3
$\overline{X}$=	6.85	6.45	-9.2	.343	20.4	7.68	7.37	-5.6	.427	18.4

$\overline{X}$D - level of difficulty

$\overline{X}$A - level of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

LF - ladies' foil

MF - men's foil

E - épée

S - sabre

APPENDIX 20

Table 21: Subjects from the HYPNOTIC GROUP grouped according to their low anxiety scores on the baseline measure (below the median of 5.12).

	BASELINE					TREATMENT/POST-MEASURE				
Weapon	$\bar{X}$D	$\bar{X}$A	HI	BI	Pl	$\bar{X}$D	$\bar{X}$A	HI	BI	Pl
S	3.05	2.25	+38	.933	3	3.70	2.50	+61	.933	3
LF	7.20	4.67	-17	.364	16	6.93	5.93	- 6	.455	15
MF	5.95	4.19	+19	.625	4	4.47	3.21	+21	.714	6
S	6.00	4.68	+33	.786	5	5.71	3.71	+ 6	.455	9
MF	5.32	5.00	+40	.867	3	6.37	3.68	+21	.714	4
$\bar{X}$=	5:50	4.16	22.6	.715	6.2	5.44	3.81	20.6	.654	7.4

$\bar{X}$D - level of difficulty

$\bar{X}$A - level of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

LF - ladies' foil

MF - men's foil

S - sabre

APPENDIX 20 (Cont'd)

Table 22: Subjects from the RELAXATION GROUP grouped according to their low anxiety scores on the baseline measure (below the median of 5.12).

	BASELINE					TREATMENT/POST-MEASURE				
Weapon	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl
S	2.63	2.79	+44	.929	4	2.71	1.81	+45	.875	2
LF	5.47	3.89	+41	.857	3	6.24	4.29	+14	.750	7
LF	5.06	4.88	+21	.750	6	5.35	4.10	+29	.800	2
LF	6.94	3.75	- 2	.583	9	5.69	4.87	+14	.611	12
E	3.89	3.39	+41	.846	7	3.17	2.67	+29	.737	6
$\overline{X}$=	4.80	3.74	+29	.793	5.8	4.63	3.55	26.2	.755	5.8

$\overline{X}$D - level of difficulty

$\overline{X}$A - level of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

LF - ladies' foil

MF - men's foil

S - sabre

A P P E N D I X 20 (Cont'd)

Table 23: Subjects from the CONTROL GROUP grouped according to their low anxiety scores on the baseline measures (below the median of 5.12).

	BASELINE					TREATMENT/POST-MEASURE				
Weapon	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl	$\overline{X}$D	$\overline{X}$A	HI	BI	Pl
S	3.15	2.30	+38	.800	2	5.63	4.89	+ 5	.643	6
S	2.74	3.05	+13	.643	7	5.74	5.37	+22	.786	5
E	5.17	3.28	0	.467	21	6.55	2.38	- 1	.538	7
E	4.76	2.84	+60	.895	1	4.20	2.50	+45	.933	1
MF	3.56	2.89	+46	.867	2	5.00	4.05	+26	.714	5
E	2.16	2.11	+30	.786	2	2.76	2.47	+14	.616	10
$\overline{X}$=	3.59	2.75	31.2	.743	5.8	4.98	3.60	18.5	.705	5.7

$\overline{X}$D - level of difficulty

$\overline{X}$A - level of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

LF - ladies' foil

MF - men's foil

E - épée

S - sabre

APPENDIX 21

Table 27: Group means for the subjects with HIGH ANXIETY, with individual mean scores over the median of 5.12 on the baseline including Hypnotic, Relaxation and Control Groups and followed by corresponding treatment/post-measure scores.

	No of s's	BASELINE					TREATMENT/POST-MEASURE				
		$\overline{X}D$	$\overline{X}A$	HI	BI	Pl	$\overline{X}D$	$\overline{X}A$	HI	BI	Pl
Hypnotic Group	6	6.29	6.12	9.5	.573	11.7	6.15	5.21	7.3	.594	11.3
Relaxation Group	5	6.67	6.46	-10.8	.431	19.6	6.64	6.33	2.6	.493	13.0
Control Group	5	6.85	6.45	- 9.2	.343	20.4	7.68	7.37	-5.6	.427	18.4

Table 28: Group means for the subjects with LOW ANXIETY, with the individual mean scores below the median of 5.12 on the baseline for the Hypnotic, Relaxation and Control Groups and followed by the corresponding treatment/post-measure scores.

	No of s's	BASELINE					TREATMENT/POST-MEASUR				
		$\overline{X}D$	$\overline{X}A$	HI	BI	Pl	$\overline{X}D$	$\overline{X}A$	HI	BI	Pl
Hypnotic Group	5	5.50	4.16	22.6	.715	6.2	5.44	3.81	20.6	.654	7.4
Relaxation Group	5	4.80	4.80	29.0	.793	5.8	4.63	3.55	26.2	.755	5.8
Control Group	6	3.59	2.75	31.2	.743	5.8	4.98	3.60	18.5	.705	5.7

$\overline{X}D$ - estimated levels of difficulty

$\overline{X}A$ - perceived levels of anxiety

HI - hit indicator

BI - bout indicator

Pl - final placing

APPENDIX 22

Table 30: Analysis of variance 3 x 2 x 2 for three groups (Hypnotic, Relaxation and Control), High Anxiety Subjects and Low Anxiety Subjects, repeated on the Baseline and Treatment/Post-Measure, with the BOUT INDICATOR as the dependent variable.

Source	SS	df	MS	F
Between subjects				
G	49570.23	2	24785.11	.53
A	990992.00	1	000992.00	21.16 x
GA	259050.64	2	129525.32	2.76
Between subjects error term	1123930.80	24	46830.45	
Within subjects				
T	12.15	1	12.15	.001
TG	4800.70	2	2400.35	.24
TA	40716.15	1	40716.15	4.02
TGA	3431.10	2	1715.55	.17
Within subjects error term	242896.41	24	10120.68	

x $p < .01$

G - Groups: Hypnotic, Relaxation, Control

A - Anxiety: High Anxiety Subjects, Low Anxiety Subjects

T - Treatment: Baseline, Treatment/Post-measure

APPENDIX 23

Table 31: Analysis of variance 3 x 2 x 2 for three groups (Hypnotic, Relaxation and Control), High Anxiety Subjects and Low Anxiety Subjects, repeated on the Baseline and Treatment/Post-Measure, with the FINAL PLACING as the dependent variable.

Source	SS	df	MS	F
Between subjects				
G	49570.23	2	24785.11	.53
A	990992.00	1	000992.00	21.16 x
GA	259050.64	2	129525.32	2.76
Between subjects error term	1123930.80	24	46830.45	
Within subjects				
T	12.15	1	12.15	.001
TG	4800.70	2	2400.35	.24
TA	40716.15	1	40716.15	4.02
TGA	3431.10	2	1715.55	.17
Within subjects error term	242896.41	24	10120.68	

x $p < .01$

G - Groups: Hypnotic, Relaxation, Control

A - Anxiety: High Anxiety Subjects, Low Anxiety Subjects

T - Treatment: Baseline, Treatment/Post-measure

A P P E N D I X 24

Table 33: Correlations between the perceived LEVEL OF ANXIETY and other dependent variables (i.e. estimated level of difficulty, hit indicator, bout indicator and final placing) for all the groups combined, N = 33, on the baseline and treatment/post-measure.

	$\overline{XD}$	HI	BI	Pl
Baseline	.86	-.70	-.65	.56
Treatment/post-measure	.86	-.73	-.66	.57

Table 34: Correlations between the perceived LEVEL OF ANXIETY and other dependent variables (i.e. estimated level of difficulty, hit indicator, bout indicator and final placing) for the Hypnotic and Relaxation Group combined, N = 22, on the baseline treatment.

	$\overline{XD}$	HI	BI	Pl
Baseline	.77	-.59	-.61	.57
Treatment/post-measure	.89	-.81	-.71	.73

$\overline{XD}$ - estimated level of difficulty

HI - hit indicator

BI - bout indicator

Pl - final placing

A P P E N D I X 24 (Cont'd)

Table 35: Correlations between the perceived LEVEL OF ANXIETY and other dependent variables (i.e. estimated level of difficulty, hit indicator, bout indicator and final placing) for the Control Group, N = 11, on the baseline and post-measure.

	$\bar{X}D$	HI	BI	Pl
Baseline	.92	-.79	-.81	.62
Treatment/post-measure	.81	-.69	-.61	.44

$\bar{X}D$ - estimated level of difficulty

HI - hit indicator

BI - bout indicator

Pl - final placing

APPENDIX 25

Table 36: Correlations among ten variables for the Hypnotic, Relaxation and Control Group combined, N = 33, on baseline and treatment/post-measure for estimated level of difficulty, perceived level of anxiety, hit indicator, bout indicator and final placing.

	1	2	3	4	5	6	7	8	9	10
1.	1.000	.857	-.642	-.636	.509	.757	.670	-.602	-.537	.499
2.		1.000	-.699	-.647	.561	.741	.784	-.608	-.553	.498
3.			1.000	.914	-.771	-.685	-.744	.762	.744	-.599
4.				1.000	-.883	-.707	-.687	.795	.780	-.733
5.					1.000	.664	.580	-.704	-.730	.701
6.						1.000	.857	-.791	-.696	.593
7.							1.000	-.797	-.663	.566
8.								1.000	.919	-.713
9.									1.000	-.762
10.										1.000

Correlated Variables:

1. $\overline{X}D$ - baseline: estimated level of difficulty
2. $\overline{X}A$ - baseline: perceived level of anxiety
3. HI - baseline: hit indicator
4. BI - baseline: bout indicator
5. Pl - baseline: final placing

6. $\overline{X}D$ - treatment/post-measure: level of difficulty
7. $\overline{X}A$ - treatment/post-measure: level of anxiety
8. HI - treatment/post-measure: hit indicator
9. BI - treatment/post-measure: bout indicator
10. Pl - treatment/post-measure: final placing

APPENDIX 26

Table 37: Correlations among ten variables for the Hypnotic and Relaxation Group combined, N = 22, on baseline and treatment for estimated level of difficulty, perceived level of anxiety, hit indicator, bout indicator and final placing.

	1	2	3	4	5	6	7	8	9	10
1.	1.000	.769	-.687	-.678	.488	.844	.830	-.823	-.704	.766
2.		1.000	-.594	-.609	.568	.744	.813	-.718	-.600	.638
3.			1.000	.928	-.781	-.599	-.782	.732	.717	-.718
4.				1.000	-.852	-.587	-.687	.781	.771	-.791
5.					1.000	.570	.693	-.714	-.743	.686
6.						1.000	.895	-.830	-.713	.726
7.							1.000	-.809	-.714	.733
8.								1.000	.908	-.829
9.									1.000	-.850
10.										1.000

Correlated Variables:

1. $\overline{X}D$ - baseline: estimated level of difficulty
2. $\overline{X}A$ - baseline: perceived level of anxiety
3. HI - baseline: hit indicator
4. BI - baseline: bout indicator
5. Pl - baseline: final placing
6. $\overline{X}D$ - treatment: estimated level of difficulty
7. $\overline{X}A$ - treatment: perceived level of anxiety
8. HI - treatment: hit indicator
9. BI - treatment: bout indicator
10. Pl - treatment: final placing

APPENDIX 27

Table 38: Correlations among ten variables for the Control Group, N = 11 on baseline and post-measure for estimated level of difficulty, perceived level of anxiety, hit indicator, bout indicator and final placing.

	1	2	3	4	5	6	7	8	9	10
1.	1.000	.921	-.634	-.725	.598	.792	.631	-.490	-.436	.401
2.		1.000	-.789	-.810	.618	.850	.854	-.614	-.592	.473
3.			1.000	.925	.779	.836	-.731	.864	.814	-.545
4.				1.000	.934	-.874	-.684	.818	.801	-.722
5.					1.000	.775	.458	-.716	-.736	.722
6.						1.000	.815	-.735	-.670	.497
7.							1.000	-.632	-.613	-.443
8.								1.000	.948	-.672
9.									1.000	-.759
10.										1.000

Correlated Variables:

1. $\overline{X}D$ - baseline: estimated level of difficulty
2. $\overline{X}A$ - baseline: perceived level of anxiety
3. HI - baseline: hit indicator
4. BI - baseline: bout indicator
5. Pl - baseline: final placing
6. $\overline{X}D$ - post-measure: estimated level of difficulty
7. $\overline{X}A$ - post-measure: perceived level of anxiety
8. HI - post-measure: hit indicator
9. BI - post-measure: bout indicator
10. Pl - post-measure: final placing