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THE EFFECTS OF COGNITIVE-AFFECTIVE STRESS MANAGEMENT TRAINING ON ELITE ARCHERS

By

Michael J. Greenspan

A DISSERTATION

Submitted to
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ABSTRACT

THE EFFECTS OF COGNITIVE-AFFECTIVE STRESS MANAGEMENT TRAINING ON ELITE ARCHERS

By

Michael J. Greenspan

An experiment was conducted to investigate the effects of cognitive-affective stress management training (SMT), as compared to additional physical practice (AP), on elite archers' competitive performance, precompetitive anxiety, competitive heart rate, self-confidence, dysfunctional automatic thoughts, mood states, concentration skills, motivational levels, and team focus. Members (N=8) of the National Archery Association's National Training Program were matched on archery performance and then randomly assigned to one of two groups: SMT (Smith & Rohsenow, in press) or AP with the National Training Program's coach. The groups met for one hour per week for 6 weeks and were then reversed to permit the examination of any effects due to the order in which the interventions were presented and to expose all participants to each intervention. Assessments took place after 6 weeks (post-test), 12 weeks (reversal post-test), and 6 months (follow-up). Analyses largely failed to indicate a consistent pattern of results which would have been predicted by theory or previous research. No significant between groups differences were found for archery performance; however, an effect size of 2.108 suggested

while both groups improved over the first 6 weeks, the SMT group improved somewhat more than the AP group. No other statistically significant and interpretable differences were present after the first 6 weeks. The initial gains in performance made by the SMT group, though statistically nonsignificant, were largely maintained after the groups were reversed. Due to a methodological error, no tests of the durability of effects on performance were conducted. Analyses also revealed that neither group of archers practiced their SMT skills significantly more at follow-up than they did at the pre-test. Results are discussed in terms of subject sample issues, utilization of appropriate assessment tools, and treatment appropriateness. Lastly, suggestions for future research and practice are presented.

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CHAPTER I

INTRODUCTION

This experiment investigated the effects of cognitive-affective stress management training (SMT) on the competitive performance, pre-competitive anxiety and self-confidence, mood states, cognitive appraisal processes, competitive heart rate, and general psychological skills relevant to the sport of elite athletes. In addition, this experiment investigated not only the outcome of SMT, but also the process by which it had an effect on elite athletes.

In an attempt to help individuals deal with the numerous sources of potentially severe stress in competitive athletics, sport psychologists have typically applied cognitive-behavioral theories and therapies which have been borrowed from "mainstream" psychology and modified to address the athletic experience. Vealey (1988), in her content analysis of published psychological skills training approaches, found 100% employed imagery, 93% utilized relaxation training, and 93% were based on "thought control," or cognitive restructuring techniques. The sources of athletes' stress which these programs have been designed to manage include fear of evaluation and failure, uncertainty about playing time and recognition, spectators' behaviors, and conflicts with coaches, teammates, and opponents (see Gould, Horn, & Spreemann, 1983; Passer, 1981).

Greenspan and Feltz (1989), argued that a great deal of the research evaluating psychological skills training programs has not used athletes (those competing on a regular and organized basis) as research participants nor their performance in competition as the dependent variable. This is problematic, they indicated, because practitioners who utilize results from analog studies to enhance the performance of athletes in competition are relying upon questionable and unproven generalizations. For example, Weinberg, Gould, and Jackson (1980) tested the effectiveness of various "psych-up" strategies on the ability of undergraduate volunteers to balance on a stabilometer, perform on a Cybex Orthotron, or perform a speed-of-movement ball-snatch task. Although such a study had great heuristic value, no data exist to support the application of its results to field settings. In addition, the differences in the cognitive strategies employed by "more" and "less" successful athletes have been supported by numerous studies (Gould, Weiss, & Weinberg, 1981; Greenspan, Murphy, Tammen, & Jowdy, 1989; Highlen & Bennett, 1979; Mahoney & Avener, 1977; Mahoney, Gabriel, & Perkins, 1987; Meyers, Cooke, Cullen, & Liles, 1979) and make generalizations regarding cognitive processes and treatments from one group to the other particularly questionable.

Greenspan and Feltz (1989) conducted a review of the few studies evaluating psychological interventions with athletes and concluded that all of the interventions could be classified as behavioral, relaxation-based, or those relying upon cognitive restructuring techniques. As Vealey

(1988) found, relaxation and cognitive restructuring techniques were the most prevalent elements of educational sport psychology training programs. Greenspan and Feltz (1989) found relaxation-based interventions were typically applied on an educational basis. Although the Greenspan and Feltz (1989) review contained 11 studies classified as cognitive restructuring interventions, only one intervention (Kirschenbaum & Bale, 1980) used a cognitive approach in an educational, or preventive, fashion. Consequently, another inadequacy in the sport psychology intervention literature is that cognitive restructuring techniques are most often employed in an educational fashion, yet almost all of the studies evaluating their efficacy have involved the application of the techniques on a remedial basis. Again, one must unfortunately return to the issue of the validity of certain generalizations, namely using an educational technique that has been evaluated only as a remedial, or curative, intervention. A need exists, therefore, to assess the effects of an educational cognitive restructuring intervention utilized in a preventive fashion on athletes' performance during competition.

In addition, Greenspan and Feltz (1989) suggested that future research evaluate the effects of sport psychology interventions on non-performance aspects of research participants. Psychological skills relevant to sport, mood states, motivation, and cognitive appraisal processes are examples of such non-performance variables. Concern for the athlete as more than just a sport performer is a central construct in sport psychology; consequently, research should

help sport psychologists understand how their services affect athletes' lives. In addition, Landers (1983) was critical of the inadequate amount of "theory testing" in present day sport psychology. Therefore, the testing of certain intervention theories which contain non-performance processes, e.g., cognitive appraisal processes, as major constructs and/or mediating variables seems to be warranted.

One of psychology's newest cognitive restructuring programs is Cognitive-Affective Stress Management Training (SMT) (Smith, 1980, 1984; Smith & Rohsenow, in press). Although SMT was initially developed as a clinical intervention, it has been successfully used on an educational basis with athletes performing a contrived, though sport-specific, task (Ziegler, Klinizing, & Williamson, 1982) and a practice service reception drill in volleyball (Crocker, Alderman, & Smith, 1988). In addition, Ziegler et al. (1982) found SMT superior, though not significantly so, to Meichenbaum's (1977) stress inoculation training in enhancing cross country runners' cardiovascular efficiency, which was believed to be positively correlated with the ability of the runners to manage stress.

SMT was chosen as the intervention to be evaluated for a number of reasons. First, as mentioned above, a research base has started to develop documenting SMT's effectiveness with certain athletic populations. This was important in obtaining permission from the National Archery Program's coach and director to use the program's archers in the study. Secondly, Smith and Rohsenow (in press) have made available a detailed intervention manual which facilitated

evaluation of this experiment's integrity. In addition, the detailed intervention manual will allow any future replications of this research to be much more feasible, accurate, and replicative, in the true sense of the word. Lastly, SMT was believed to be sufficiently time efficient to be easily adapted to the schedules of elite athletes.

SMT is a 6 week cognitive-behavioral program that provides for the learning and rehearsal of relaxation and cognitive coping skills. These skills are combined into an integrated coping response that can be utilized in stressful situations to prevent or control negative emotional responses and to facilitate task-oriented behavior (Smith, 1980, 1984; Smith & Rohsenow, in press). SMT contains three stages: education and conceptualization, skill acquisition and rehearsal, and skill application. This program is unique in that a major structural component during the latter part of the skill rehearsal phase is induced affect (Sipprelle, 1967). This involves having the athletes imagine stressful athletic situations that generate excessive levels of physical and cognitive anxiety. The athlete then uses physical relaxation, then cognitive restructuring by itself, and then the integrated response (physical relaxation with cognitive restructuring) to cope with the induced anxiety. Smith and Rohsenow (in press) have published a detailed intervention manual which should greatly facilitate uniformity in application and research. However, before SMT is utilized in more athletic settings and in an educational fashion, it should, as Landers (1989) has suggested, continue to be subjected to evaluation in field settings

until sufficient evidence exists supporting its effectiveness.

Competitive archers, due to the nature of their sport, comprise one population that could especially benefit from SMT. The precision and steadiness requirements for proper execution of a skill are influential in determining the optimal arousal level for that skill (Landers & Boutcher, 1986). Sports such as archery use very precise motor skills that require one to be able to limit unwanted muscle activity. Consequently, athletes performing these sports can tolerate very little anxiety without risking a decrease in competitive performance (Oxendine, 1970). In addition, Landers, Boutcher, and Wang (1986, p. 242), in their study of psychological and physiological predictors of archery performance, found that "those athletes who worried less over past performance, were competent in using visual imagery, and possessed high confidence levels, were the most successful." Clearly, the skills taught in most stress management programs appear to have great value to competitive archers.

Statement of the Problem

This experiment was designed to investigate the effects of SMT on elite archers' competitive performance; precompetitive somatic anxiety, cognitive anxiety, and anxiety control abilities; competitive heart rate; self-confidence; cognitive appraisal processes; mood states; and general psychological skills relevant to archery. This

experiment also attempted to understand the relationships between weeks of training in SMT and the dependent variables listed above. The third purpose of this experiment was to assess the maintenance of effects due to SMT over time.

Hypotheses

To fulfill the purposes of this research, several hypotheses were formulated. These hypotheses were expressed directionally where theories and results from past literature suggest directionality. Those hypotheses for which direction was unpredictable were stated in an exploratory manner under the following section, entitled "Exploratory Research Questions."

1. SMT will, over a 6 week period, enhance elite archers' competitive performance relative to the competitive performance of archers receiving additional archery practice.
2. SMT will, over 6 weeks, reduce elite archers' precompetitive somatic anxiety, precompetitive cognitive anxiety, and will increase elite archers' ability to manage anxiety in comparison to those archers receiving additional archery practice.
3. SMT will, over 6 weeks, reduce the competitive heart rate of elite archers in comparison to those archers receiving additional archery practice.
4. SMT will, over 6 weeks, increase elite archers' precompetitive self-confidence relative to the

precompetitive self-confidence of those archers receiving additional archery practice.

5. SMT will, over 6 weeks, decrease elite archers' automatic thoughts in comparison to those archers receiving additional archery practice.

Exploratory Research Questions

1. Over a 6 week period, what will the effects of SMT and additional archery practice be on elite archers' mood states?
2. Over a 6 week period, what will the effects of SMT and additional archery practice be on the concentration, motivation, and team emphasis of elite archers?
3. How will the relationships between SMT and all of the dependent variables vary over a 6 week period?
4. How will the order in which elite archers are exposed to SMT and additional archery practice affect this experiment's dependent variables?
5. How well will intervention effects due to SMT and additional archery practice be maintained after 5 months?

Delimitations

Due to the ability level of the research participants, results from this research can not be generalized to those athletes performing below the elite or national level. The fact that this experiment utilized a cognitive restructuring

intervention on an educational, or preventive, basis makes generalizations to remedial cognitive interventions and interventions not based on cognitive restructuring questionable. Lastly, due to the fact that archery is a closed, or self-paced sport, generalization of results to open, or reactive, sports is not suggested.

Definitions

The following operational definitions apply to this experiment:

Automatic thoughts-- score on the Automatic Thoughts Questionaire (ATQ; Hollon & Kendall, 1980)

Cognitive anxiety-- score on the cognitive anxiety subscale of the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Burton, Vealey, Bump, & Smith, 1983)

Elite athlete-- an individual identified by a sport's national governing body as appropriate for special training camps or international competitions.

Mood states-- total mood disturbance score on the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971).

Psychological skills relevant to sport-- scores on the following subscales of the Psychological Skills Inventory for Sports-2 (PSIS-2; Mahoney et al., 1987): anxiety control, concentration, self-confidence, motivation, and team focus.

Self-confidence-- scores on the self-confidence subscales of the CSAI-2 and the PSIS-2.

SMT-- cognitive-affective stress management training (Smith, 1980, 1984; Smith & Rohsenow, in press).

Social desirability-- score on the Marlowe-Crowne Social Desirability Scale-Short Form (Reynolds, 1982).

Somatic anxiety-- score on the somatic anxiety subscale of the CSAI-2.

Basic Assumption

Despite the fact that social desirability was assessed, the self-report instruments used in this experiment have all of the limitations of most self-report measures.

Limitations

1. Although Lacey, Bateman, & Van Lehn's (1953) principle of "autonomic response stereotypy," suggests multiple physiological measures of anxiety are necessary if one is to collect meaningful information, that was not possible in this experiment. For financial and practical reasons, heart rate was the only physiological measure of competitive anxiety included in this experiment.

2. The fact that the same self-report questionnaires were administered eight times over an 8 month period may be considered a threat to this experiment's internal validity (see Campbell & Stanley, 1963).

3. The sample size (N=8) in this experiment limited the

statistical power of the analyses employed and increased the risk of committing a Type II error.

CHAPTER II

REVIEW OF THE LITERATURE

Sport psychology intervention research has five areas which are directly relevant to this research. Consequently, the review of pertinent literature in this chapter was organized into these five sections: (a) effects of mental practice, (b) effects of relaxation-based interventions, (c) effects of behavioral interventions, (d) effects of cognitive restructuring interventions, and (e) methodological factors and considerations.

The field of applied sport psychology, often considered to date back to Ogilvie's seminal work in 1966, has been characterized by the application of theories and techniques from "traditional" or "mainstream" psychology to the sport setting in an attempt to enhance the performance of competitive athletes. Sport psychologists have tended to modify theories from psychology so they apply to the athlete and the sport setting. Consequently, as Morgan (1980) and others have noted, trends in sport psychology have tended to parallel those in general psychology.

The sport psychology services of the 1980s and early 1990s reflect and represent theories developed as modes of counseling and psychotherapy. In particular, the theories and techniques of behavior therapy, e.g. cognitive-behavioral theory and therapy, due to their time-limited and more structured mode of delivery have lent themselves most favorably to sport psychology. Consistent with counseling psychology's emphasis on positive aspects of growth and adjustment, as well as prevention, these therapies have most

often been applied on an educational basis.

Counseling psychology's strategies typically focus on stimulating development and facilitating coping with environmental demands (Fretz, 1982); certainly, the same focus exists today for sport psychology. As sport psychology has matured, it has more and more come to view the athlete within a holistic and developmental framework; consequently, sport psychologists have often turned to the counseling psychology literature for guidance. The recent increase in attention to injury rehabilitation, eating disorders, and career termination, areas well known to many counseling psychologists, serves as evidence of sport psychology's commitment to the developing individual, not just the competing athlete.

One aspect of sport psychology which closely parallels counseling psychology is the emphasis on enhancement of functioning. Sport psychology has traditionally attempted to enhance individuals' functioning in the athletic environment while counseling psychology has focused more on emotional and vocational development. As counseling psychology has shown a commitment to the evaluation of its approaches, sport psychology has followed and placed a premium on outcome research.

Greenspan and Feltz (1989) provided a comprehensive review of research on sport psychology services which have been evaluated with athletes. Greenspan and Feltz concluded sport psychology services may be most adequately categorized into those that are primarily relaxation-based, those representing traditional behavior modification approaches,

and those primarily relying upon cognitive restructuring principles. In addition, Greenspan and Feltz reported mental practice and mental preparation techniques are components of many psychological skills training programs; however, over time mental practice and mental preparation have been used more selectively.

Effects of Mental Practice

A body of research has developed in an attempt to scientifically evaluate the services sport psychologists provide. In particular, a substantial body of literature has developed testifying to the efficacy of mental practice in enhancing motor performance (see reviews by Corbin, 1972; Feltz & Landers, 1983; Richardson, 1967; Weinberg, 1982). Although over the years various techniques have been referred to as mental practice, Richardson (1967) provided the following definition: "Mental practice refers to the symbolic rehearsal of a physical activity in the absence of any gross muscular movements" (p. 102). This definition, though comprehensive, is sufficiently limiting to adequately determine what is, and what is not, mental practice. Consequently, it is clear that although numerous studies of cognitive restructuring and relaxation-based interventions include mental practice, they also contain other potentially influential treatment elements. Biddle (1985) emphasized the point that many studies claiming to investigate the effects of mental practice have actually evaluated treatment packages comprised of mental practice and other therapeutic

components.

Feltz and Landers (1983), in the most recent review of the mental practice literature, conducted a meta-analysis of 60 studies and reported an overall effect size of .48, suggesting mentally practicing a motor skill had a moderate effect on improving performance. Feltz and Landers found mental practice to have a particularly strong effect, however, on cognitive tasks like peg board tests or maze learning. Feltz and Landers also concluded that if mental practice is to have as strong an effect on more pure motor and strength tasks, more time must be spent mentally practicing.

Biddle (1985), in an attempt to clarify Feltz and Landers' (1983) findings, proposed an important distinction between mental practice and mental preparation, e.g., preparatory arousal or "psyching up." Biddle (1985) argued that a qualitative difference between mental practice and mental preparation exists, with the former being more involved in symbolic representation and reinforcement of previously learned motor skills, whereas mental preparation is best utilized as a more immediate performance enhancing strategy. In addition, Biddle (1985) cited studies by Ryan and Simons (1981, 1983) and Wrisberg and Ragsdale (1979) to support the symbolic learning explanation of mental practice proposed by Sackett (1934). These studies compared the effects of mental practice on tasks high in cognitive components and on tasks high in motor components, e.g., a balance stabilometer task, and found mental practice enhanced the cognitive tasks only. Their results are

consistent with Sackett's (1934) theory that posits mental practice provides the opportunity to rehearse the sequence of movements as symbolic components of a task. Consequently, mental practice can only facilitate motor performance to the extent that a task contains cognitive components, or elements.

As sport psychology has matured, and continued to borrow from mainstream psychology, cognitive-behavioral sport psychology programs have grown both in prevalence and quality. In contrast, traditional mental practice techniques have come to be employed far less often, particularly when the programs are used with athletes performing tasks high in motor and strength elements.

Effects of Relaxation-Based Interventions

A large body of literature that evaluates the effectiveness of educational relaxation-based techniques in sport also exists. Relaxation-based interventions utilize relaxation typically for one of two reasons. In the past, relaxation was most often used in an attempt to create a physical and mental "state of relaxation" in which an individual was more likely to engage in, and benefit from, mental practice. As mental practice techniques have decreased in popularity and cognitive-behavioral interventions have increased in both number and quality, relaxation has more often been used as a tool with which one can cope with competition-related anxiety. An example of the latter usage is the component package of relaxation with

cognitive restructuring and in vivo rehearsal used by Hamilton and Fremouw (1985) to improve collegiate basketball players' free-throw accuracy. Regardless of purpose, variants of progressive muscle relaxation are typically used because athletes are believed to prefer the more active (tensing and releasing) nature of that form of relaxation (Suinn, 1986).

Neiss (1988) conducted a far less restrictive review of relaxation studies than did Greenspan and Feltz (1989) and considered any studies of relaxation-based interventions in sport. Neiss (1988) acknowledged that relaxation treatments are typically "treatment packages: Visualization and/or other cognitive techniques are combined with one or more relaxation techniques and often other elements as well" (p. 141). Neiss (1988), therefore, divided his review into separate sections for the following types of relaxation treatments: biofeedback, visuo-motor behavior rehearsal (VMBR), and relaxation with cognitive techniques.

Neiss (1988) reviewed five studies (Cummings, Wilson, & Bird, 1984; De Witt, 1980; French, 1978; Griffiths, Steel, Vaccaro, & Karpman, 1981; LeVine & Irvine, 1984) that employed biofeedback and concluded those studies provided minimal support for the ability of biofeedback training to enhance motor performance. He did note, however, that those individuals with an external locus of control are likely to benefit more from biofeedback than other forms of relaxation training. Neiss (1988) also reviewed five studies of VMBR (Bennett & Stothart, 1980; Hall & Erffmeyer, 1983; Noel, 1980; Weinberg, Seabourne & Jackson, 1981, 1982) and

found their methodologies to be inadequate in terms of controlling expectancy effects. Consequently, Neiss (1988) did not believe any reasonable conclusions regarding the effectiveness of VMBR could be reached. Lastly, Neiss (1988) reviewed five more studies (Griffiths, Steel, Vaccaro, Allen, & Karpman, 1985; Lanning & Hisanaga, 1983; Meacci & Price, 1985; Meyers, Schleser, & Okwumabua, 1982; Stanton, 1982) that evaluated the effects of relaxation with other cognitive techniques. All reported some positive results, yet Neiss (1988) concluded the evidence supporting the effects of relaxation treatments on motor performance was tentative at best. Neiss (1988) also concluded that lacking appropriate placebos for relaxation, the research offered only tentative support for the notion that relaxation treatments reduced anxiety beyond what could be attributed to expectancy. In addition, Neiss (1988) noted that studies using administration of treatment in a group format should add the curative factors of group therapy to the treatment factors being studied. His review appears to have neglected a number of relevant studies and his conclusions regarding the efficacy of relaxation training in enhancing motor performance seem overly conservative and somewhat inconsistent with the current existing body of research.

Traditionally, relaxation techniques have been considered to be cognitive interventions. Greenspan and Feltz (1989), however, argued that since relaxation techniques typically do not involve a deliberate attempt to restructure cognitions, they need not necessarily be considered cognitive interventions. Greenspan and Feltz,

in their review of intervention studies that used athletes as the research participants and their performance in competition as the dependent variable, found that 18 of the 23 interventions meeting their selection criteria contained relaxation as part of a multi-component treatment package. As Table 1 shows, only nine interventions were classified by Greenspan and Feltz as primarily relaxation-based interventions. The other nine studies (those classified as cognitive restructuring) typically began with some type of explanation/education session which was then followed by relaxation training, visualization, and then some type of coping procedure such as positive self-instruction (Greenspan & Feltz, 1989).

Of the nine studies classified by Greenspan and Feltz (1989) as relaxation-based, two-thirds employed Suinn's (1972) visual-motor behavior rehearsal (VMBR), a procedure involving relaxation training (usually progressive muscle relaxation) followed by rehearsal using imagery. Greenspan and Feltz (1989) reported that due to some studies' methodological deficiencies it was possible to infer causality in only four (Mumford & Hall, 1985; Weinberg et al. 1981, 1982) of the nine interventions classified as relaxation-based; of those four, only two (Weinberg et al. 1981, 1982 #2) reported positive results. In addition, however, the five studies for which inferring causality was questionable all reported positive results. It was believed, therefore, that a trend existed supporting the efficacy of relaxation-based interventions. Consequently, Greenspan and Feltz (1989) appear to have been justified, though somewhat

TABLE 1
Summary of Characteristics of Intervention Studies

Study	N	Sex	Sample	Task	Treatment Groups	Number of Sessions	Length of Sessions	Control	Manipulation Check	Results
RELAXATION										
Hall & Erffmeyer (1983)	10	F	Collegiate athletes	Free-throw accuracy, self-paced	1. VMBR (relaxation & imagery rehearsal) 2. VMBR followed by exposure to videotaped modeling	10	20 min	pre-post	minimal	2 > 1 in improvement in free-throw accuracy
Lee & Hewitt (1987)	36	F	Regional competitors (youth)	Gymnastic performance, self-paced	1. Visualization in floatation tank 2. Visualization, in group setting, out of floatation tank 3. Simple control group	6	40 min	simple	none	1 > 2, 3 in meet scores
Mumford & Hall (1985)	59	M&F	Sectional & national	Skating figures, self-paced	1. Internal visual imagery 2. External visual imagery 3. Internal kinesthetic imagery 4. Exposure to films related to, but not of, skating figures	4	50 min	motivat-ional	none	1 = 2 = 3 = 4 in skating figures as rated by professional judges
Nideffer & Deckner (1970)	1	M	Collegiate athlete	Shot-putting, self-paced	Progressive relaxation	1	10 min	none	none	Steady increase up to 1 ft. over 1 month period
Noel (1980)	6	M	Collegiate level	Tennis serving accuracy, self-paced	1. VMBR 2. Simple control group	10	30 min	pre-post, simple	minimal	1 > 2 in first serve accuracy; 1 = 2 in second serve accuracy
Suinn (1972)	6	F	Collegiate level	Ski-racing, reactive	VMBR	?	?	pre post	none	Subjective reports of benefit; also "more wins"
Weinberg, Seabourne, & Jackson (1981)	32	M	University Karate Club	Sparring performance, reactive	1. VMBR 2. Relaxation only 3. Imagery only 4. Attention-placebo control group	12	30 min	motivat-ional	detailed	1 > 2, 3, 4 in sparring performance, as rated by "blind" experimenter

Summary of Characteristics of Intervention Studies (cont.)

Study	N	Sex	Sample	Task	Treatment Groups	Number of Sessions	Length of Sessions	Control	Manipulation Check	Results
Weinberg, Seabourne, & Jackson (1982)	18	M	University Karate Club	Sparring performance, reactive	1. VMBR 2. Strength training; VMBR during final session only (control)	12	30 min	motivational	detailed	1 = 2 in sparring performance at end of 6 week training period
	14	M	University Karate Club	Sparring performance, reactive	1. VMBR 2. Strength training; VMBR during initial session only (control)	12	30 min	motivational	detailed	1 > 2 in sparring at end of 6 week training period
BEHAVIORAL										
Heward (1978)	9	M	"semi-pro" athletes	Baseball batting efficiency (EA), reactive	Performance contingent monetary rewards	14	4-6 at bats	single-S	NA	Players improved 22% in batting efficiency average (EA) after reinforcement phase; EA did not decrease during baseline phase two
Kirschenbaum, Ordman, Tomarken, & Holtzbauer (1982)	67	F	League bowlers	Bowling performance, self-paced	1. Instruction & (+) self-monitoring 2. Instruction & (-) self-monitoring 3. Instruction only 4. No-contact control group	<15	1 game	motivational	minimal	1 = 2 = 3 = 4
Komaki & Barnett (1977)	5	M	Pop Warner	Execution of 3 football plays, reactive	Checklist use with contingent feedback & modeling	24	1-4 trials	single-S	NA	Overall performance increased after each intervention phase was introduced, as rated by "non blind" coaches
COGNITIVE RESTRUCTURING										
Dewitt (1980)	6	M	Collegiate athletes	Football performance, reactive	EMG feedback, relax., systematic desensitization	12	1 hr	pre-post	none	Sig. improvement on performance as rated by "non-blind" coaches
	12	M	Collegiate athletes	Basketball performance, reactive	1. EMG & HR feedback, relaxation combined with imagery & cognitive restructuring 2. "Contact" control group	11	1 hr	pre-post, simple	none	1 > 2 as rated by "blind" managers

Summary of Characteristics of Intervention Studies (cont.)

Study	N	Sex	Sample	Task	Treatment Groups	Number of Sessions	Length of Sessions	Control	Manipulation Check	Results
Fenker & Lambiotte (1987)	28	M	Collegiate athletes	Football performance, reactive	Relaxation and imagery of readiness & coping, centering, establishing a performance, not goal, orientation	@50	10 min or occasionally 1 hour	none	adequate	Higher game "grades" assigned by "non-blind" coaches; the team's "best season in 20 years"
Hamilton & Fremouw (1985)	3	M	Collegiate athletes	Free-throw accuracy, self-paced	Relaxation with cog restructuring and in vivo rehearsal	?	@15 hrs total	single-S	none	Sig. improvement (overall mean improvement of 72.5%), as predicted by multiple baseline design
Heyman (1987)	1	M	Amateur boxer	Boxing performance in "noisy" arenas, reactive	Hypnosis with "noise" stopping, systematic desensitization	3;18	30 min; 1 hour	single-S	minimal	Sig. higher ratings of both offense & defense in noisy fights by boxer & "non-blind" coach; increased number of punches thrown during noisy, post-intervention fights
Kirschenbaum & Bale (1980)	1	M	Collegiate player	Golf performance, self-paced	Self-regulation training consisting of relaxation, planning, imagery, & (+) self-monitoring & self-statements	?	1 round	none	minimal	Improved, on average, one stroke per 18 holes of golf
	3	M	Collegiate players	Golf performance, self-paced	Self-regulation training consisting of relaxation, planning, imagery, & (+) self-monitoring & self-statements	?	20 min of relaxing	single-S	minimal	Improved, though n.s. (1 or 2 strokes), as predicted by multiple baseline design
Mace, Eastman, & Carroll (1987)	1	M	Olympic athlete	Pommelled-horse performance, self-paced	Stress-inoculation training	12	?	none	none	Improved performance, relative to other gymnasts, in a number of meets
Meyers & Schleser (1980)	1	M	Collegiate player	Basketball shooting, reactive	Relaxation, systematic desensitization, & coping imagery & self-instruction	7	?	none	none	Sig. increased field goal %, points per game, & % of team scoring; number of shots taken decreased

Summary of Characteristics of Intervention Studies (cont.)

Study	N	Sex	Sample	Task	Treatment Groups	Number of Sessions	Length of Sessions	Control	Manipulation Check	Results
Meyers, Schleser, & Okuumabua (1982)	1	F	Collegiate athlete	Free-throw accuracy, self-paced	Relaxation, systematic desensitization, & coping imagery & self-instruction	23	@30 min	single-S	none	Increased and decreased sig., as predicted by reversal design
	1	F	Collegiate athlete	Field-goal accuracy, reactive	Relaxation, systematic desensitization, & coping imagery & self-instruction	15	@30 min	none	none	Improved from 37% to 52%

lenient, in concluding that relaxation-based interventions appeared to be successful in improving the performance of athletes. Clearly, however, further research on the effects of relaxation treatments with athletes is needed.

Effects of Behavioral Interventions

At present, there is an insufficient amount of outcome research to determine the effectiveness of behavioral approaches in enhancing the competitive performance of athletes. This is likely due to the fact that traditional behavioral approaches, e.g. behavior modification through operant conditioning, have most typically been used in the sport setting to modify target behaviors, such as increasing desirable coaching behaviors (Allison & Ayllon, 1980; Hume, Martin, Gonzalez, Cracklen, & Genthon, 1985; Rushall & Smith, 1979), increasing adherence to practice and/or exercise programs (Epstein, Wing, Thompson, & Griffin, 1980; Jarvie & Thompson, 1985; Libb & Clements, 1969; McKenzie & Liskevych, 1983; McKenzie & Rushall, 1974; Rushall & Pettinger, 1969; Wysocki, Hall, Iwata, & Riordan, 1979), or increasing numbers of practice behaviors or repetitions (McKenzie & Rushall, 1974; Vogler & Mood, 1986). Consequently, Greenspan and Feltz (1989) were able to locate only three published studies (Heward, 1978; Kirschenbaum, Ordman, Tomarken, & Holtzbauer, 1982; Komaki & Barnett, 1977) that evaluated the effectiveness of behavioral interventions in enhancing the performance of athletes in competition.

Heward (1978) evaluated the effectiveness of operant conditioning in enhancing the batting performance of a semi-professional baseball team. Using a reversal, or A-B-A-B design, Heward (1978) found offensive performance was significantly higher in those games in which players could earn monetary rewards for performing at certain levels. Performance was so much better during the reward phases of the study that by the end of the study there was some question as to whether or not players were starting to keep their own records and offer their own monetary rewards for performing at certain levels.

Kirschenbaum et al. (1982) randomly assigned 67 "relatively skilled" league bowlers to a no-contact control group, instruction with negative self-monitoring, instruction with positive self-monitoring, or a group exposed only to instruction. Contrary to their hypotheses, none of the treatment groups improved more than the control group.

The only other study to evaluate the effectiveness of behavioral interventions with athletes was conducted by Komaki and Barnett (1977). They evaluated a behavioral approach to improving desired play execution in the offensive backfield of a youth football team. The intervention consisted of behavioral specification and positive reinforcement of frequently run offensive plays. Although the intervention improved performance, the trained observers were either involved in or aware of the experimental manipulation. In summary, although performance did increase in two of the three studies, the relatively

small number of studies available makes it difficult to reach any conclusions regarding the utility of behavioral interventions in enhancing athletic performance during competition.

Effects of Cognitive Restructuring Interventions

Vealey (1988) found that 93% of the psychological skills training programs published in the sport psychology literature contain "thought control," or cognitive restructuring techniques. These techniques include stress inoculation training (Meichenbaum, 1977), cognitive-affective stress management training (Smith, 1980; Smith & Rohsenow, in press), and cognitive restructuring (Ellis, 1962). Clearly, cognitive restructuring techniques are utilized as often as any other sport psychology service.

The research evaluating the effectiveness of cognitive restructuring interventions on athletic performance appears to be less equivocal than the research evaluating relaxation-based and behavioral interventions. Whelan, Meyers, Berman, Bryant, and Mellon (1988), in their meta-analysis of 60 cognitive-behavioral interventions, found "moderate support" for the use of such interventions to enhance athletic performance in sporting events and on laboratory tasks. In addition, Greenspan and Feltz (1989) found that positive results were reported in all 11 cognitive restructuring interventions included in their review. Four (Hamilton & Fremouw, 1985; Heyman, 1987; Kirschenbaum & Bale, 1980; Meyers et al., 1982) of those 11 interventions possessed

methodology adequate to allow the authors to infer causality. Positive results were also reported in the two interventions (De Witt, 1980) for which inferring causality was questionable. Greenspan and Feltz (1989) also found that the five cognitive restructuring case studies they reviewed (Fenker & Lambiotte, 1987; Kirschenbaum & Bale, 1980; Mace, Eastman, & Carroll, 1987; Meyers & Schleser, 1980; Meyers et al., 1982) each reported positive results; however, it is unclear to what extent case studies have contributed to the knowledge base in this area. Clearly, cognitive restructuring interventions appear to be effective in enhancing the competitive performance of athletes.

Although cognitive restructuring interventions, applied on a remedial basis, appear effective, a large gap in the research in this area still exists. Sport psychology training programs typically utilize cognitive restructuring components on an educational basis. Only one (Kirschenbaum & Bale, 1980) cognitive restructuring intervention has been experimentally evaluated on an educational or preventive basis. Kirschenbaum and Bale (1980) provided self-regulation training consisting of relaxation, planning, imagery, and positive self-monitoring and self-statements to three collegiate golfers in a multiple baseline study. Although, Kirschenbaum and Bale (1980) reported positive results, as predicted by a multiple baseline design, more research is needed to determine if cognitive restructuring programs are as effective on a preventive basis as they are on a remedial basis.

In summary, cognitive restructuring techniques appear

to be as prevalent as, and more effective than, most other sport psychology services. However, essentially all evaluations of cognitive restructuring interventions in sport have used the training programs on a remedial basis. Consequently, very little information exists regarding the effectiveness of cognitive restructuring interventions used in an educational, or preventive, manner.

Theoretical Model of SMT

Smith and Rohsenow (in press) posited a conceptual model of stress that hypothesizes interactive relationships among situational factors, and cognitive, physiological, and behavioral responses. As shown in Figure 1, each of these components, in turn, are believed to be influenced by, and interact with, motivational and personality variables.

Situational factors may be either internal, e.g. short-term goals, or external, e.g. an unusually good opponent, and are conceived of as the relationship between personal resources and environmental demands. Stress and anxiety are hypothesized to occur when demands on the individual exceed one's resources. Typically, emotions are believed to result directly from situational factors; however, Ellis (1962) has emphasized the role thoughts and cognitive appraisal processes play in the emotional response. Thought processes essentially create the reality to which individuals respond by influencing the following: one's appraisal of the situational demands, one's appraisal of his or her personal resources, one's appraisal of the potential nature and likelihood of certain consequences, and one's appraisal of

MODEL OF STRESS

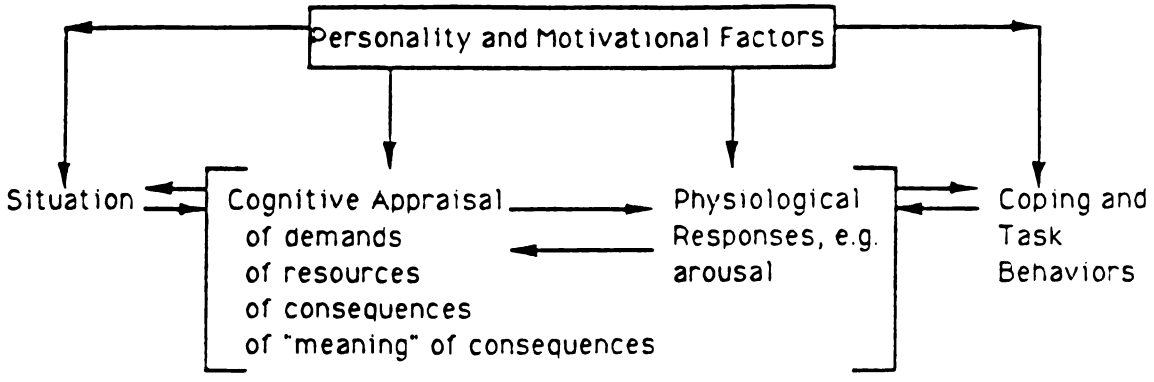


FIGURE 1.

A conceptual model of stress showing interactive relationships among situational, cognitive, physiological, and behavioral components. Motivational and personality variables are believed to affect and interact with each of the components (Smith & Rohsenow, in press).

the personal meaning of those consequences (Smith & Rohsenow, in press).

Smith and Rohsenow (in press) believe when appraisal indicates the threat of psychological or physical harm or danger, physiological arousal occurs as part of the mobilization of resources to deal with the situation. Arousal, in turn, provides feedback regarding the intensity of affect experienced, thereby contributing to the appraisal process. In many settings, e.g. sport, this is important as arousal plays such a critical role in motor skill functioning.

The fourth component of the model addresses behaviors intended to help the individual cope with the situation. These coping behaviors are believed to be influenced by the demands of the situation, the individual's personal resources, the appraisal processes outlined above, and the individual's physiological responses to the situation. Lastly, each of these four components are influenced by one's predispositions to seek out certain situations and goals, and to perceive, think, and respond emotionally and behaviorally in certain ways (Smith & Rohsenow, in press).

Although this model dictates that interventions designed to reduce stress could target any one of the four components and still affect all of them, SMT focuses mainly on the physiological arousal and cognitive appraisal components. Muscular relaxation, which is believed to be incompatible with emotional arousal and which has been shown to be highly effective in preventing and reducing physiological arousal (Delman & Johnson, 1976), is taught as

a coping response to reduce arousal. Smith and Rohsenow (in press), however, indicate that modifying cognitive processes is really the model's key component because the other components are all mediated by one's appraisal processes. Smith and Rohsenow (in press) take the position that stress responses are not triggered directly by the situation, but instead are the result of what individuals tell themselves about the situation and their ability to cope with it. This internal dialogue is often based on irrational beliefs regarding the severity of the consequences of failure or disapproval by others. Consequently, these irrational beliefs and the entire appraisal process are SMT's primary intervention targets.

A modified version of Jacobson's (1938) progressive muscle relaxation is utilized to control the physiological component of one's response to stress so that one's arousal does not exceed the level necessary for optimal performance of a certain task. This relaxation technique involves practicing the tensing and releasing of the body's major muscle groups. This is repeatedly paired with the mental command "relax" until the individual can relax the entire body at once with just the internal cue. The program's cognitive coping skill training begins with a didactic presentation of the role internal dialogue plays in emotional responses. Cognitive restructuring is then introduced to help the participants identify, rationally evaluate, and replace dysfunctional and irrational ideas that underlie their appraisal processes (Smith & Rohsenow, in press). Eventually, the relaxation and cognitive coping

skills are combined into an integrated coping response which is to be employed in response to stressful situations. In addition, the integrated coping response is intended to reduce the individual's tendency to perceive situations as being stressful.

Effects of SMT

SMT has been successfully applied to a variety of populations, including medical students (Holtzworth-Munroe, Munroe, & Smith, 1985), problem drinkers (Rohsenow, Smith, & Johnson, 1985), test-anxious college students (Smith & Nye, 1989), and athletes (Crocker et al., 1988; Ziegler et al., 1982). Smith (1984) and Smith and Ascough (1985) also report the efficacy of SMT in a number of nonexperimental studies. Holtzworth-Munroe et al. (1985) randomly assigned 40 first and second year medical students who volunteered for treatment to either SMT or a no-treatment control group. Differences, though not statistically significant, were reported on self-report measures of stress, general anxiety, depression, test anxiety, and self-esteem. In addition, at follow-up (10 weeks), the SMT group reported significantly less test anxiety than at pre-test.

Rohsenow et al. (1985) randomly assigned students who reported excessive drinking to SMT or a no-treatment control group. Research participants in the SMT group reported significantly less daily drinking at post-test and the first follow-up (10 weeks); however, drinking rates returned to near baseline levels after 5 months. In addition, SMT was associated with significantly decreased daily anxiety

ratings at post-test; however, these changes were no longer significant at the two follow-up assessments.

In an attempt to compare two similar treatments, Smith and Nye (1989) randomly assigned test anxious college students to SMT, stress inoculation training (SIT) (Meichenbaum, 1977), or a no-treatment control condition. The two treatments differed mainly in that during the rehearsal phase SIT used covert rehearsal whereas SMT utilized induced affect. Smith and Nye (1989) found both treatments produced significant reductions in test anxiety, however, only SMT resulted in significantly improved academic performance. Of note is that state anxiety was inversely related to the SMT group's academic performance but not to the academic performance of those in the SIT group. In addition, SIT produced greater generalizability to trait anxiety. Smith and Rohsenow (in press) interpreted these results as suggesting the two treatments may promote the acquisition and use of different types of coping skills. SMT's induced affect may have more situationally specific effects while SIT's covert rehearsal may produce more widely adaptive, though less specific, coping skills.

Smith (1984) reported the first successful utilization of SMT with a competitive athlete. Smith (1984) used SMT to enhance the competitive performance of a youth figure skater experiencing significant precompetitive anxiety. Though only a case study, it suggested that SMT warranted more systematic evaluations. Such systematic evaluations (Crocker et al., 1988; Ziegler et al., 1982), though still preliminary, also supported the utility of SMT with athletes.

Ziegler and her colleagues compared the effects of a control condition, SMT, and SIT on college distance runners' cardio-respiratory efficiency, which is believed to be related to a competitive runner's ability to manage stress. Contrary to other investigations of SMT, subjects (in both groups) were exposed to electromyographical relaxation training instead of progressive muscle relaxation, though no rationale for the deviation from the norm was presented. At post-test, significant differences in cardio-respiratory efficiency during a 20 minute submaximal treadmill run existed between the treatment groups and the control group but not between the two treatment groups. Although that study suggested the utility of SMT with competitive athletes, actual performance in a non-contrived competition was not assessed.

Crocker et al. (1988) examined the effects of SMT on the performance of national-level youth volleyball players in a service reception drill. In addition, SMT's effect on the players' pre-competitive anxiety, competitive trait anxiety, and thoughts when viewing a videotaped poor volleyball performance were assessed. Crocker et al. (1988) assigned 31 players selected for the 1987 Alberta Canada Games Team to either an eight week SMT program or a waiting-list control group on the basis of geographic region. For "practical reasons," players from the northern part of Alberta were assigned to the treatment group whereas players from the southern part of Alberta were assigned to the waiting-list control group. Compared with the control group, at post-test those in the SMT group produced fewer negative thoughts in response to viewing the videotaped stressful

volleyball performance. In addition, performance on the practice service reception drill was significantly higher for the SMT group. No significant decreases in either competitive trait or state anxiety were observed, however.

Crocker et al. (1988) hypothesized that the 8 week period SMT entailed may not have been long enough to produce changes in trait anxiety and that the precompetitive period may be inappropriate for measuring state anxiety as the anxiety may not be experienced until competition begins. Although, neither possible explanation is supported sufficiently with research, the appropriateness of assessing competitive anxiety before competition is an interesting notion that deserves separate empirical study. In summary, this quasi-experiment supported the effectiveness of SMT in the athletic setting; however, the use of a contrived performance task limits the findings' generalizability.

At this point, evidence exists suggesting the potential of SMT in a variety of settings and with a variety of populations. However, recent attempts to evaluate SMT's effects with athletes, though promising, are far from conclusive. Although each of the studies reported to date has used competitive athletes as the research participants, not one has systematically evaluated SMT's effects on performance in non-contrived competition. If sport psychologists are to use this technique, SMT's effects on athletes' performances in actual competitions must be evaluated.

Methodological Factors and Considerations

A number of methodological issues particular to outcome research need to be addressed in future sport psychology research. The issues of concern involve the appropriateness of subject populations, the selection of dependent variables, the maintenance of treatment effects, the utilization of intervention checks, and the integrity of treatments provided. Much of the intervention research in sport psychology has not used athletes as the research participants, nor their performance in competition as the dependent variable. Consequently, practitioners utilizing results from such studies must rely upon unproven and questionable generalizations. According to Owen and Lee (1987), although it is often easier to obtain samples of students than to assess sport performers, the generalizability of findings from one group to the other is somewhat questionable and even among athletes there are differences between elite and sub-elite competitors in their use of cognitive strategies. These differences, as discussed in Chapter I, have been found in a number of studies. In addition, one must also be careful not to generalize results from a study using athletes to "non-athletes" or to those athletes competing in sports with significantly different motor, cognitive, and/or strength demands. For example, generalizing results from a closed, or self-paced, skill such as archery to an open, or reactive, skill such as playing defense in football or basketball may be questionable.

Greenspan and Feltz (1989) suggested that future

intervention research should assess the effects of psychological skills training programs on non-performance areas as well as performance. Those sport psychology outcome studies which utilize performance as a dependent variable often neglect to investigate the program's effects on other dimensions of the research participants' lives. For example, psychological skills training programs may affect athletes' levels of confidence, motivation, concentration, precompetitive anxiety, etc. If an intervention improves individual performance at post-test, yet the athletes feel they are less motivated or able to concentrate, there may be significant ramifications in the future. Conversely, if an intervention fails to increase performance at post-test but increases athletes' self-confidence and motivation while decreasing pre-competitive anxiety, performance may improve in the future. Presently, however, one can only speculate about such relationships due to the lack of research addressing the relationships between various dependent measures over time.

Another significant issue which sport psychology outcome research has failed to address is the issue of maintenance of treatment effects (Greenspan & Feltz, 1989). There are those psychotherapy researchers (Latimer & Sweet, 1984) who believe that if psychotherapeutic gains are not maintained for at least 6 months, the value and effectiveness of the intervention producing those gains are questionable. In addition, Galassi and Galassi (1984), in the absence of research indicating critical times for follow-up assessments, make the following recommendation: "for most

behaviors, in addition to a short-term follow-up (after about one month), routine follow-ups every 6 months for the first 18-24 months following termination would result in a significant gain in transfer and maintenance knowledge." Such a position is certainly applicable to sport psychology intervention research, as well. It is also important for intervention research in counseling and sport psychology to examine the relationships among psychological skills training programs and dependent variables, e.g., performance, motivation, and self-confidence, over time. For example, De Witt (1980) found a component treatment package based on cognitive restructuring principles to be effective in improving collegiate basketball players' performance and in reducing their EMG levels and heartrates at post-test. Examining the relationships between those dependent measures at a follow-up assessment would have provided important information regarding the long-term utility of the intervention provided.

Basham (1986) and Kazdin (1986) have suggested that outcome studies utilize comparative, as opposed to placebo designs. Basham (1986) and Neiss (1988) point out that it is exceedingly difficult to develop a placebo treatment that adequately controls for expectancy effects. Comparing new treatments against those previously believed to be "most effective" also accelerates the pace by which sport psychology's knowledge base grows as two treatments are evaluated simultaneously.

Few outcome studies in sport psychology contain intervention checks. Greenspan and Feltz (1989) reported

only three (Weinberg et al., 1981, 1982) of the 23 interventions they reviewed contained detailed intervention checks. It is difficult to dispute that there are differences in how individuals experience sport psychology services, particularly mental practice, cognitive-restructuring training programs, and relaxation-based interventions. Greenspan and Feltz (1989), therefore, took the position that increased prevalence of detailed intervention checks would likely prove fruitful in identifying factors thought by athletes to be more believable and/or efficacious. In addition, intervention checks of sufficient detail have the potential to shed light on which, if any, treatment elements and components athletes find less believable and/or efficacious.

Lastly, the issue of treatment integrity, or representativeness of the treatment delivered, is critical. Kazdin (1986) suggested it is the first issue that should be addressed once a comparative design is decided upon. This issue is of great importance as individual treatments in numerous comparative studies have been dismissed by critics for not representing the treatment as it is typically practiced or as it appears in a treatment manual. Although Kazdin (1986) recognized that there are no routinely accepted ways to evaluate a treatment's integrity, he suggested two possible alternatives. One alternative involves audiotaping the treatment sessions and having the taped sessions rated for integrity along some criteria by blind observers who have read the treatment manual. The other option Kazdin (1986) described is having someone who

is recognized as an authority on the treatment listen to the audiotapes and subjectively rate the representativeness of the treatment delivered.

The present research focused on the effects of cognitive affective stress management training (SMT) (Smith, 1980, 1984; Smith & Rohsenow, in press), an educational sport psychology intervention based on cognitive restructuring principles. In addition to evaluating SMT's effects on competitive performance, this research, as suggested by Greenspan and Feltz (1989), assessed the effects of SMT on athletes' precompetitive anxiety and confidence, mood states, and general psychological skills relevant to sport. This research is also unique in that it evaluated the integrity of the treatment delivered, assessed the maintenance of treatment gains over time, and attempted to understand the relationships between time, or number of psychological skills training sessions, and each of the dependent variables identified above.

CHAPTER III

METHOD

Subjects

Eight male and female resident members of the National Archery Training Program at the United States Olympic Training Center were the research participants in this experiment. Subjects ranged in age from 14 to 20 and included only those members of the National Training Program giving informed consent to participate. As the training program's coach and director was the legal guardian for all archers under 18 years of age, her written permission (see Appendix A for a copy of the permission form signed by the training program's coach and director) served as parental/guardian consent for those archers.

Design

The study employed a 2 X 8 (Group X Trials) factorial design with repeated measures on the trials factor. In addition, after four trials, the groups were reversed, allowing each subject to be exposed to both treatment conditions (groups). Initially, the research participants took part in an intra-team archery competition in which performance and heart rate were recorded. Prior to that competition, each archer completed four questionnaires assessing various psychological states and skills. This initial assessment served as the study's pre-test. The research participants were then "matched" into "equivalent" pairs according to their archery performance with one person in each pair randomly assigned to one of two treatment

conditions and the other assigned to the second treatment condition. The two groups were then exposed to two different intervention programs 1 hour per week for 6 weeks. One group received a psychological skills training program based on SMT (Smith & Rohsenow, in press) while the other group received 1 extra hour of archery practice with the training program's coach and director. The same four questionnaires were completed every other week for the next 6 weeks before intra-team competitions in which archers' performances and heart rates were recorded. After the fourth intra-team competition, the groups were switched and the same assessment protocol took place for the next 6 week period. Lastly, 5 months after the last bi-weekly competition, an eighth and follow-up assessment took place.

Measures

Initially, all research participants completed the Marlowe-Crowne Social Desirability Scale-Short Form (M-C) (Reynolds, 1982). The dependent measures in this study were the three scales of the Competitive State Anxiety Inventory-2 (CSAI-2) (Martens et al., 1983); the total mood disturbance score on the Profile of Mood States (POMS) (McNair et al., 1971); the five scales of the Psychological Skills Inventory for Sports-2 (PSIS-2) (Mahoney et al., 1987); the Automatic Thoughts Questionnaire (ATQ) (Hollon & Kendall, 1980); archery performance; and heart rate prior to, and during, competition. The M-C was utilized to assess social desirability as a response tendency on self-report measures. This tendency has been well documented and

continues to be a methodological consideration in research (Reynolds, 1982). This experiment's utilization of a number of self-report measures made assessing social desirability important. The CSAI-2 was chosen because it provides a multidimensional assessment of precompetitive anxiety, a key factor in a precise fine motor skill like archery which involves the control of unwanted muscular activity. As suggested by Greenspan and Feltz (1989), an attempt was made to assess the effects of sport psychology services on non-performance "areas." Consequently, the POMS and PSIS-2 were chosen to assess mood states and general psychological skills relevant to sport. The ATQ was selected to assess the prevalence of certain types of cognitions, namely automatic thoughts, which are believed to be mediating factors in SMT. The archery performance measure, as in a national competition, consisted of each archer's total score for 60 arrows shot from 25 meters. Lastly, heart rate was assessed in an attempt to acquire a labor efficient, yet valid and reliable, physiological measure of precompetitive and competitive anxiety.

Marlowe-Crowne Social Desirability Scale-Short Form. The M-C is a 13-item self-report questionnaire that utilizes a true-false response format and is designed to measure the influence of social desirability on self-report instruments. The M-C's 13 items describe culturally approved behaviors that have a low incidence of occurrence. Scores well above the mean (5.67 out of a possible 13) suggest the respondent's self-reports may be excessively influenced by social desirability, however, no cutoff point has been

suggested in the literature. This instrument has been shown to be a valid and internally consistent measure of social desirability (Reynolds, 1982) (see Appendix B for a copy of the M-C and its scoring key).

Competitive State Anxiety Inventory-2. The CSAI-2 is a 27-item self-report inventory designed to measure cognitive anxiety, somatic anxiety, and self-confidence. The CSAI-2 utilizes a 4-point likert-type scale and consists of three nine item scales. The minimum and maximum scores on each scale are 9 and 36. For the purpose of clarity, cognitive anxiety is often referred to in lay terms as "mental worry," while somatic anxiety is often referred to as "physical tension." This questionnaire has been shown to be a valid and reliable multi-dimensional measure of state anxiety (Gould, Petlichkoff, & Weinberg, 1984; Martens et al., 1983). Intercorrelational findings have supported the conception that the CSAI-2 is a multi-dimensional anxiety measure with independent subscales that share between 16% and 29% of the common variance (Gould et al., 1984). In addition, results reported by Murphy, Greenspan, Tammen, and Jowdy (1989) on the CSAI-2 from 297 athletes training at the United States Olympic Training Center support the statistical independence of the CSAI-2's three scales (see Appendix C for a copy of the CSAI-2 and its scoring key).

Profile of Mood States. The POMS is a 65-item self-report adjective checklist-like inventory measuring the following identifiable affective or mood states: tension, depression, anger, vigor, fatigue, and confusion. The POMS utilizes a 4-point likert-type scale and consists of six

subscales ranging from 7 to 15 items each. The minimum and maximum scores for each subscale are as follows: tension (0/36), depression (0/60), anger (0/48), vigor (0/32), fatigue (0/28), confusion (0/28).

Numerous psychometric evaluations have shown the POMS to have high factorial, concurrent, and predictive validity (McNair et al., 1971), construct validity (Kochansky, 1981), convergent validity (Reddon, Marceau, & Holden, 1985), and internal consistency (McNair et al., 1971; Norcross, Guadagnoli, & Prochaska, 1984); however, the POMS' discriminant item validity, though still acceptable, has not been as pronounced (McNair et al., 1971; Norcross et al., 1984; Reddon et al., 1985). The POMS' test-retest reliability coefficients are high enough (r=.65 to .74) to be acceptable yet not too high to make the POMS inconsistent with its stated purpose of measuring transient, affective states. In addition, Eichman (1978) and Weckowicz (1978), in their reviews of the POMS for Buros' (1978) Eighth Mental Measurements Yearbook, report that the POMS has considerable face validity, is simple and easy to use, and is particularly useful for evaluating the effects of psychological interventions and treatments. Morgan, Brown, Raglin, O'Connor, and Ellickson (1987) also suggest the use of a total mood disturbance score (the POMS is copyrighted by Educational & Industrial Testing Service, San Diego, CA 92107 and its reproduction is strictly prohibited).

Psychological Skills Inventory for Sports-2. The PSIS-2, a 39-item self-report questionnaire, was initially developed to measure the following psychological skills

believed to be relevant to exceptional athletic performance: anxiety control, concentration, confidence, mental preparation, motivation, and team focus. Mahoney et al. (1987) reported that omnibus, individual item, discriminant, regression, factor, and cluster analyses all revealed significant differences among elite, pre-elite, and collegiate athletes. Initial psychometric evaluations (Lesser & Murphy, 1988; Greenspan, Murphy, Tammen, & Jowdy, 1989) suggest that the instrument shows relatively high convergent and discriminant validity. A preliminary analysis of the PSIS's test-retest reliability by Lesser and Murphy (1988) suggested it was satisfactory ($\underline{r}$ >.60) for the confidence and motivation scales only. Their results, however, were based on data collected from only 34 individuals and their two PSIS administrations were 3 months apart, a period long enough to allow numerous processes to influence and/or change the athletes' responses on the second administration. Greenspan et al. (1989), in data on their sample of 1,080 athletes, reported that significant differences among elite, national, collegiate, and recreational athletes were found on all but the mental preparation scales of the PSIS. Consequently, they suggested that the 6 items comprising the mental preparation scale be removed from the original 45 items on the PSIS. Hence, the creation of the 39-item PSIS-2.

The PSIS-2 utilizes a 5-point likert-type scale and consists of five scales ranging from 6 to 10 items each. the minimum and maximum scores for each scale are as follows: anxiety control (0/40), concentration (0/24), confidence

(0/36), motivation (0/28), team emphasis (0/28). The PSIS-2 was selected because of the promise it has shown in identifying athletes' psychological "strengths and weaknesses" relative to their competitors. More psychometric evaluations of the PSIS-2, particularly in the area of internal consistency, are certainly warranted (see Appendix D for a copy of the PSIS-2 and its scoring key).

Automatic Thoughts Questionnaire. The ATQ, a 30-item self-report questionnaire, was initially developed to measure the frequency of occurrence of automatic negative thoughts (negative self-statements) associated with depression. The ATQ utilizes a 5-point likert-type scale and scores on the ATQ can range from 30 to 150. The ATQ has been found to have satisfactory split-half reliability (.91-.97) and internal consistency (.94-.98) (Harrell & Ryon, 1983; Hollon & Kendall, 1980), as well as high concurrent and construct validity (Dobson & Breiter, 1983; Harrell & Ryon, 1983; Hollon & Kendall, 1980; Ross, Gottfredson, Christensen, & Weaver, 1986). Literature (Harrell & Ryon, 1983; Holland & Kendall, 1980) has shown the ATQ to also be sensitive to negative self-statements (dysfunctional automatic thoughts) in anxious and nonclinical populations. The negative self-statements the ATQ is designed to measure the frequency of are hypothesized by Smith and Rohsenow (in press) to be the result of one's cognitive appraisal processes and therefore are believed to function as mediating factors in one's responses to stress. The ATQ was selected as the best available instrument to test Smith and Rohsenow's hypothesis that if SMT is to be effective, one's

negative self-statements must decrease. The ATQ, along with the CSAI-2, POMS, and the PSIS-2, will be utilized as both an outcome and a process measure (see Appendix E for a copy of the ATQ).

Archery Performance. The archery performance measure in this experiment was a standard method of scoring used in National Archery Association sanctioned competitions. Sixty arrows were shot from 25 meters in 10 groups of 6 arrows each. The score obtained for each of the arrows (minimum of zero, maximum of 10) was recorded after each group of six arrows. A score of 600 was the highest possible total score. All archers in this experiment shot "together," meaning, within the same pre-set time period. Also consistent with National Archery Association sanctioned events and also competitions in a sport such as golf, the athletes competed for the best score, not against each other in an elimination format, such as in tennis tournaments (see Appendix G for a copy of the archery score sheet used).

Heart Rate. Heart rate readings in this experiment were taken using a Uniq CIC Heartwatch model #8799. This unit required each archer to wear a small non-invasive monitor under his/her shirt and a computerized wristwatch which received and stored the heart rate data transmitted by the monitor. The monitor was held in place on the chest by a thin (less than 1 in. in width) velcro strap. Measures were taken every 5 sec. for 70 min. from the beginning of each competition.

Equipment

During the archery performance assessments, archers provided their own equipment. The National Archery Association, through the National Training Program, provided the indoor archery facility and targets. All weekly archery practice sessions and performance assessments took place at one of the two facilities at which the archers routinely practiced. The experimenters provided the archers with the heart rate monitors to be worn during the eight intra-team competitions.

Intervention Checks

An intervention check was developed (see Appendix G) for each week (session) of the intervention program. These intervention checks required each archer to respond to a number of questions regarding how he/she experienced, and was affected by, each component of that week's intervention session.

Treatment Integrity

Treatments utilized in research studies may not always faithfully represent how the treatments are used in clinical practice and vice versa. Treatments can depart from the intended procedures in many ways including abbreviating the number or duration of treatment sessions (Kazdin, 1986). Kazdin (1986) argued, however, that the availability of detailed treatment manuals would likely lead to a significant increase in the standardization of services delivered and researched. In addition, Kazdin (1986) noted

that the most effective way to evaluate a treatment's integrity, or "faithfulness," is to evaluate audiotapes or videotapes of treatment sessions. Kazdin (1986) did, however, acknowledge that to date there is no uniform or fixed procedure for evaluating a treatment's degree of integrity. In an attempt to address this salient issue, all SMT sessions were audio-taped and 2 weeks' sessions [the same two (Weeks 2 and 5) from each 6-week SMT training period] were then selected at random. Those audiotapes were then evaluated by the primary developer of SMT and rated on a 1 to 7 scale (from "not at all similar" to "exactly as manual dictates") according to how faithfully they represented what the treatment manual (Smith & Rohsenow, in press) dictated for the selected sessions. In addition, the primary developer of SMT then evaluated how similarly the treatments were delivered to the two groups of archers. He rated the two separate administrations of sessions two and five on another 1 to 7 scale (from "not at all similar" to "exactly the same") (see Appendix H for a copy of the rating scales and form).

The Sport Psychology Consultant

A fully licensed psychologist on staff at the United States Olympic Training Center in Colorado Springs, Colorado closely supervised his research and clinical assistant's administration of the SMT. The sport psychology consultant, who was present at roughly 10 of the 12 SMT sessions, is a trained behavior therapist and considers his professional orientation to be behavioral and/or cognitive-behavioral.

The research and clinical assistant, a doctoral student in counseling psychology with experience in stress management training, served as the primary group leader for all 12 weekly SMT sessions. The sport psychology consultant was able to attend four of the six meetings with each group. Two months before the beginning of the study, the detailed SMT manual (Smith & Rohsenow, in press) and the procedures to be followed were presented to the sport psychology consultant and the research and clinical assistant. Ten days before the beginning of the study, the principle investigator met with the sport psychology consultant and the research and clinical assistant and rehearsed the administration of SMT. Any inconsistencies with the treatment manual were identified, discussed, and remedied at this time. Additionally, the sport psychology consultant met with the research and clinical assistant prior to each SMT session to review the material to be presented.

Procedure

Explanation of experiment. The principle investigator, sport psychology consultant, and research and clinical assistant explained the general nature of this experiment to the training program's coach and director, from whom consent was essential and obtained (see Appendix A for the rationale and "consent" form provided). The research and clinical assistant then explained to the archers, at the program's first team meeting, that the Sport Psychology Department at the Olympic Training Center was interested in evaluating the services provided to athletes and in learning more about how

athletes feel before competition. It was further explained that as part of this research, the Sport Psychology Department wanted to collect some information from the archers on how they felt just before they competed in bi-weekly intra-team competitions and how those feelings affected their performance. In addition, the archers were informed that those choosing to participate would be chosen at random to receive for 6 weeks either 1 extra hour per week of archery practice or 1 hour per week of SMT. Lastly, the archers were informed that after 7 weeks, the treatment groups would be switched and the same assessment protocol (bi-weekly assessments for 6 weeks) would be repeated. In addition, the archers were informed that 5 months later, just before they left the Olympic Training Center, a follow-up assessment would take place. Informed consent to participate in this experiment was then sought from the individual archers. (see Appendices J and K for the rationale and informed consent forms provided). Those not wishing to take part in the study were informed that they were still expected to attend weekly meetings of one of the two groups and to take part in the bi-weekly intra-team competitions, although the data collected on, or for, those individuals would not be used in the study.

Assessments. During the first week, the first intra-team archery competition (pre-test) took place (the competitions occurred in the exact same format every other week for the next 13 weeks). Beginning 30 minutes before this competition, those athletes having granted consent (all eight archers in the National Program) were asked by the

research and clinical assistant to complete the ATQ, PSIS-2, POMS, and then the CSAI-2. The order in which the inventories were completed was randomized for all eight assessments for the ATQ, PSIS-2, and the POMS; however, the CSAI-2 was always administered last (see Appendix K for the order of presentation of the ATQ, PSIS-2, and the POMS). The CSAI-2 was not included in the randomization because it was intended to measure a state-contingent emotional reaction--anxiety and it was important that the time between its administration and competition be standardized (within 10 minutes of competition). In addition, temporal changes on the CSAI-2 prior to competition (2 days up to 10 minutes before competition) have been well documented (Gould et al., 1984; Krane & Williams, 1987). The POMS was intended to assess a mood state that is more transient than a personality trait but the mood state it is intended to measure is more stable than a momentary mood state produced by a particular event, consequently, it was appropriate to alternate its presentation with the PSIS-2 and the ATQ.

The POMS was administered with the following set of standard instructions printed on the top:

> Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE space under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY. The numbers refer to the following phrases:
>
> 0= Not at all
>
> 1= A little

2= Moderately

3= Quite a bit

4= Extremely

The ATQ, PSIS-2, and the CSAI-2 were administered with the standard instructions printed on the top. After the archers completed the questionnaires, the archery competition began. The competitions consisted of each of the program members shooting 60 arrows from 25 meters in 10 groups of 6 arrows, just as in a National Archery Association sanctioned competition. The score for each arrow was recorded by the archer on a score sheet provided by the National Training Program's coach and director (see Appendix F for a copy of the actual score sheet). The total score for all arrows was then calculated by each archer and verified by the coach. At each assessment, after completing the questionnaires and shortly before the archery performance phase of the assessment, the archers put on the heart rate monitor and wristwatch. Prior to the first assessment, the archers had been instructed in the use of the heart rate monitors by the research and clinical assistant.

A matching procedure according to then current archery score performance was utilized before randomly assigning archers to the two treatment conditions: SMT and archery practice (AP). Archers' average scores were ranked from highest to lowest and then paired off in the following order: first and second, third and fourth, fifth and sixth, and seventh and eighth. One of the two archers in each pair was then assigned to a treatment condition via a coin flip

and the other archer in the pair was assigned to the second treatment. This matching procedure was utilized to ensure an even distribution on archery performance.

During the second week, at the team meeting, the archers were informed of which condition each had been randomly assigned to and those in the archery practice group went with the program's coach and director to the nearby archery facility for the first extra hour of archery practice. Those in the SMT condition remained in the Sport Psychology Lab, where all meetings were held, and began the first SMT session. An intra-team competition (assessment) took place every other week for the next 12 weeks in the same format as the initial assessment. As mentioned above, after the fourth assessment (the first post-test), the groups were switched. The only modification in procedure involved the announcement of prizes for archery performance prior to the first post-test (the fourth assessment). Concern had been expressed by the National Training Program's coach and director that the archers were habituating to the competitive nature of the intra-team competitions. Awards were based on archery performance over the entire eight assessment "tournament" and ranged from dinner for two at a local restaurant for first place to a National Archery Association pin for eighth place (see Appendix L for a complete listing of the prizes awarded).

Archery practice. Each week for 2 6-week blocks, the archers assigned at random to the archery practice condition proceeded directly (except for the first week) to the archery facility on complex at the Olympic Training Center.

There they received one hour of archery practice however the training program's coach and director wished to structure it. Practice emphasized the biomechanical aspects of shooting and focused on those aspects of archery performance that the entire program had been concentrating on that week. The archery practice sessions were no more than typical daily practice sessions.

Stress Management Training(SMT) general format. The SMT program was administered according to the general guidelines in the SMT treatment manual (Smith & Rohsenow, in press). Some modifications were made to reflect the specific environmental and cognitive demands of archery and to minimize the homework assignments.

Session 1. Orientation and relaxation training. The nature of stress was discussed as was the nature of coping with stress. Training began in progressive muscle relaxation which served as a physical coping response.

Session 2. Continuation of relaxation training and discussion of the role of mental processes in coping with stress.

Session 3. Practice in the use of relaxation to control emotional responses induced during the session through imagining of stressful situations. Development of coping responses.

Session 4. Practice in using relaxation and stress-reducing

self-statements to control emotional reactions induced through imagination.

Session 5. Continued practice in use of coping skills, with emphasis on application to actual performance situations. Combining of mental and relaxation coping skills into an "integrated coping response."

Session 6. Additional stress management principles and strategies. Training in the use of a meditation technique having stress-reducing properties.

Stress Management Training(SMT) detailed procedure.

Session 1

SMT training began with a discussion of how stress is to be defined and its undesirable and desirable consequences. The research and clinical assistant then provided the archers with a handout detailing the model of stress presented in Smith and Rohsenow (in press) (see Appendix M for diagram). The research and clinical assistant discussed this theory and explained that it follows from this model that there are a number of different ways to intervene: changing the situation, changing one's behavioral responses, controlling one's level of emotional arousal, and/or using cognitive reappraisal. The research and clinical assistant then elaborated on each of these, emphasizing the last two options. Muscle relaxation was suggested as the ideal way to control emotional arousal itself because one can't be aroused and relaxed at the same

time. Cognitive reappraisal was explained as learning to identify automatic thoughts and beliefs and learning to replace them with more productive self-statements; examples of automatic thoughts were given at this time. Throughout the SMT program, the research and clinical assistant focused on using age-appropriate language and minimizing what might be perceived as "psychological jargon."

The research and clinical assistant next reviewed the aspects of the program she was to emphasize, as follows: a) You will learn to recognize tension and use it as a cue for coping, b) You will learn a relaxation skill that you can use to prevent or reduce a stress reaction, c) You will learn to recognize your stress-producing beliefs or self-statements and replace them with stress-reducing self-statements, d) You will practice these skills while imagining yourself in stressful situations, e) You will learn a meditation-like relaxation skill so you can relax on a daily basis if you so desire, and f) You will only get out of this program what you put into it--it will be very important to do the homework assignments given to help you acquire these skills.

Relaxation training was initiated to give the archers a skill they could quickly apply in stressful situations to prevent and control their anxiety. The research and clinical assistant asked the archers to get comfortable on the floor of the lab, dimmed the lights, provided low background music, and guided the archers through a 15-minute progressive muscle relaxation exercise (Jacobson, 1938) (see Appendix N for instructions). The archers were then given a

copy of the instructions that were used to introduce them to progressive relaxation and were asked to practice this skill once a day for the next week. The research and clinical assistant emphasized the importance of this, stating it would only take 15 minutes per day at first and much less by the end of the week if they practiced. The research and clinical assistant also discussed some places and times they might be able to practice. Following this, the research and clinical assistant provided the archers with a handout (see Appendix O), describing the SMT program.

Session 1 finished with a brief discussion of the importance of confidentiality. The research and clinical assistant emphasized that she would keep any information expressed in the group strictly confidential, and that it was important that the archers not talk about anything they learned about other group members with others, including, and especially, teammates. Further, the research and clinical assistant explained that since the department was trying to evaluate the effectiveness of its work, it was important that they not share any of the techniques learned in the group with other team members. The archers were at this point reminded that the groups would be switching programs soon so all team members would be exposed to the stress management training. Lastly, the archers completed a brief intervention check which addressed how they experienced and were affected by this session (see Appendix G).

Session 2

Session 2 began with a brief check of how the relaxation training was going. The research and clinical assistant then supportively confronted those who had not practiced, emphasizing how critical practicing was and that it would soon take only a few minutes if they practiced. The research and clinical assistant elicited possible practice sites from those not practicing and suggested more times and locations for those already practicing regularly.

The research and clinical assistant then began a discussion of mental control of emotions by having someone describe a recent stressful archery situation. As the archers had difficulty identifying recent stressful archery situations (it was the off-season), school-related stressful situations were also used. The research and clinical assistant asked the archers questions such as how did you feel?, what thoughts went through your head? The research and clinical assistant tried to elicit stress-producing self-statements and pushed the archers to finally arrive at the distressing beliefs producing the thoughts. The next 40 minutes consisted of a largely didactic presentation based on a five-page handout taken from Smith and Rohsenow (in press) describing Ellis' (1962) A-B-C model of emotions, strategies for identifying stress-producing self-statements, and ways to utilize stress-reducing thoughts (see Appendix P for handout).

Ellis' (1962) model emphasized that one's thoughts, or self-statements(B), not the situations(A) one is in, cause emotional reactions(C). The archers were instructed to use

upsetting feelings as a cue to ask themselves "What was I telling myself in order to be so upset?" or "What must I have believed about that situation in order to feel that way?" The discussion of stress-reducing thoughts involved the following five types of questions the archers could ask themselves:

1) First, the archers were asked to recognize that they can change how they react. The following internal dialogue was presented as an example, "I am making myself upset by my thoughts. How can I change them?"
2) The archers were asked to rationally evaluate the likelihood of the feared consequence. For example, they might ask themselves "How likely is it that if I don't win this competition none of my teammates will want to be seen with me?"
3) The archers were asked to seriously ask themselves "What if the feared event does occur?" A response might be "Well, I'd be very hurt, but I'd find new friends. My life would not end."
4) The archers were asked to ask themselves "What is the absolute worst thing that would happen to me in that situation?"
5) Lastly, the archers were asked to question their "shoulds," "musts," and unrealistic expectations. An example might be, "Why must I shoot perfectly every time?"

The archers were reminded to reward themselves each time they successfully handled stress, or even realized they

had used one of the questions they were being taught to identify stress-producing thoughts. Each archer was asked to think of a personally salient reward and how they might administer the reward as a way to reinforce adherence to the SMT program.

The research and clinical assistant then guided the archers through a 5 to 10 minute relaxation procedure and then reminded them to practice each day as a homework assignment. In addition, the archers were asked to finish reading the four-page handout used in this session and to use some of its principles during daily archery practices. Lastly, the archers completed the brief intervention check designed for Session 2.

Session 3

Session 3 began with a brief check on how the relaxation practice was going. The research and clinical assistant continued to praise those who were doing it and supportively confronted those who were not. The importance of practicing was again emphasized. The research and clinical assistant then asked each archer about his/her thoughts regarding the handout distributed last session.

The research and clinical assistant then asked each archer to think of a recent stressful situation and to describe it to the group. It was important that at this point, the research and clinical assistant reminded the archers that the program was designed to get them to begin to cope with their emotions before and during competition, and in other stressful situations, and that they might not

be successful at first. They needed to practice the cognitive methods, just as they needed to practice their archery skills. Like any new skill, it might seem awkward at first but as they practice, it would become easier and easier. The research and clinical assistant then asked "how did you feel when (A) occurred?," "What was your emotional reaction(C) to (A)?," "What must you have told yourself (B) about (A) to produce (C)?," "Instead of (B), what could you have told yourself about (A) that might have prevented (C)?"

The research and clinical assistant next conducted a 30-minute relaxation procedure that involved an induced affect exercise. The research and clinical assistant presented the exercise in a fashion similar to the format suggested by Smith and Rohsenow (in press). The archers were informed that they were going to use a method that would allow them to practice coping with performance stress by imagining a stressful archery or personal/school situation vividly. They were then to use their relaxation to cope with it. The research and clinical assistant then instructed them to "close your eyes and think of a stressful archery situation you were in recently. Vividly imagine yourself in that situation. You can see what's going on and hear what's being said." The research and clinical assistant suggested feelings in the situation with a series of statements such as: "Now, while you are in that situation, you will begin to notice a little feeling deep down inside. Let that feeling grow stronger and stronger." "Feel that feeling. Just let it grow--stronger and stronger, stronger and stronger. Really let yourself feel that feeling. Let yourself go, let

yourself experience that feeling, don't worry, in a little while, you'll see how you can control even a very strong feeling with your relaxation skill." The research and clinical assistant was watching for any physical signs of affect, including faster breathing, swallowing, muscle twitches, etc., and verbally reinforced any that were noticeable. The research and clinical assistant also kept reminding them to see themselves in the situation. This continued for 15 minutes.

The affect reduction phase then began with the following instructions: "Now, while continuing to see yourself in the situation, I want you to <u>experience</u> how you can turn off that feeling with the coping skills you're learning. While continuing to imagine that situation, I'd like you to take a series of long, slow breaths. As you exhale, tell yourself to 'relax' and just let the anxious feeling melt away." The research and clinical assistant reminded them they were in the situation but also were experiencing deep relaxation, calmer breathing, and feelings of heaviness and warmth. At this point, the research and clinical assistant asked the archers to tell themselves the catastrophizing self-statements again and rekindle those feelings of anxiety. The research and clinical assistant then repeated the affect induction procedure for 5 minutes and then repeated the affect reduction procedure for 5 more minutes. This experience was followed by a discussion of the experience in which the research and clinical assistant reinforced any positive behaviors, feelings, thoughts, and experiences.

The archers' homework from this session was to continue to practice their relaxation, though for much shorter time periods and to continue to practice replacing stress-producing self-statements with stress-reducing self-statements during daily archery practices and throughout each day. This session finished with the short intervention check designed for Session 3 (see Appendix G).

Session 4

The research and clinical assistant began Session 4 by checking in detail on the archers' progress with their relaxation training and their cognitive restructuring exercises. A 10-minute "relaxation as coping skill" lecture began with the research and clinical assistant providing a description of how the archers could use relaxation while they were experiencing stress. The research and clinical assistant explained how, through practicing their relaxation, they would learn to feel deeply relaxed fairly quickly so that they could use it when they needed it. The research and clinical assistant went over their relaxation exercise (#8-Appendix N) which is structured like this:

> While sitting, or standing, in a totally relaxed position, take a series of short breaths, about one per second, until your chest is filled and tense. Hold this for about 5 seconds, then exhale slowly while thinking silently to yourself the word "relax." Most people can produce a deeply relaxed state by doing this. Repeat this exercise two or three times.

The archers were then encouraged to use this technique before stressful practices, competitions, and personal/ school situations; the preparation time before shooting was given as an example of an excellent time to practice this technique. Relaxing and breathing deeply and slowly they were told, can reduce the amount of tension one feels during these stressful preparation periods. The research and clinical assistant then presented another type of relaxation, called differential relaxation, which can be used while actually shooting. It involves concentrating on relaxing only the muscles that aren't required to shoot effectively, for example, hands clenching, forehead getting furrowed, etc. This will reduce the overall stress level, making it easier to cope with the situation (the research and clinical assistant demonstrated relaxing as opposed to being tense, when speaking to groups of athletes). The research and clinical assistant then ended this mini-presentation by asking the archers to try these two types of relaxation during the following week.

The research and clinical assistant then guided the archers through a 30-minute affect induction exercise which involved the archers using stress-reducing self-statements, instead of relaxation, to cope with the feelings of stress. This exercise began with the research and clinical assistant asking the archers to think of a different stressful situation (to prevent habituation) than the one used the previous session and then to close their eyes and vividly imagine themselves in that situation. The research and clinical assistant did, for 5 to 10 minutes, repeatedly

suggest that they feel the feelings getting stronger and she also verbally reinforced any signs of affect. The affect reduction phase then involved the research and clinical assistant asking the archers to "continue to think about that situation, but say to yourself one of your stress-reducing self-statements." This was repeated for roughly 5 minutes with the research and clinical assistant occasionally reminding them to keep thinking of the stress-reducing thoughts while in the situation. The research and clinical assistant then instructed them to repeat the catastrophizing self-statements again and to try to rekindle the same feelings of anxiety. The affect induction procedure outlined above was then repeated for 5 minutes. Lastly, the archers were instructed to, for 2 to 3 minutes, use their stress-reducing self-statements to reduce their affect. This exercise ended with a brief "process" discussion in which the research and clinical assistant reinforced and encouraged the archers whenever possible. The homework for the next session included practicing their different (#8 on Appendix N and differential) relaxation techniques and stress-reducing self-statements during the week. Session 4 ended with the archers completing the brief intervention check designed for this session (see Appendix G).

Session 5

Session 5 began with the research and clinical assistant checking to see how using relaxation and cognitive structuring before and during stressful situations was going. At this point, the research and clinical assistant

introduced the concept of the "integrated coping response" which involved combining the stress-reducing self statements, the relaxation, and the deep controlled breathing all together at once to fight stress. The research and clinical assistant informed the archers that combined, these techniques are often more effective than either technique alone because it is often quite difficult to use stress-reducing self-statements if one is "wired" or tense and it is also difficult to get deeply relaxed physically if one is continually telling oneself some catastrophizing statement. The research and clinical assistant diagrammed, on a blackboard, a schematization of the integrated coping response (see Appendix Q for diagram) which instructs the individual to "on inhalation, silently tell yourself a stress-reducing self-statement such as, 'I don't like missing, but I can certainly stand missing.' At the peak of inhalation say, 'so,' and on exhalation say, 'relax'." The diagram and explanation were followed by the research and clinical assistant demonstrating the entire process to them, saying the self-statements out loud while miming inhalation and exhalation and relaxation. The archers were allowed to personalize their integrated coping responses by substituting a word of their choice to replace "relax," if so desired.

An induced affect exercise in which the archers were asked to utilize the "integrated coping response" was led by the research and clinical assistant for the next 30 minutes. The affect induction phase was structured exactly as before and then the affect reduction phase was structured by the

research and clinical assistant with the following instructions:

> "Now, I'll show you how quickly you can turn it off, and we can turn it off quickly. As you take a deep slow breath in, say a stress-reducing self-statement, hold it, then say to yourself 'relax' while you exhale....again....inhale..... hold....relax! Keep doing this on your own....."

The research and clinical assistant instructed the archers to "tell yourself that catastrophizing self-statement again and really rekindle those feelings.... again.... inhale, self-statement...hold....exhale and relax!" The research and clinical assistant then "processed" this exercise with the archers, checking on their subjective estimates of progress.

The homework for this session was to continue practicing relaxation and cognitive restructuring during practices and competitions by using the "integrated coping response." Session 5 ended with the archers completing the brief intervention check designed for this session (see Appendix G).

Session 6

Session 6 began with the research and clinical assistant checking with each archer to see how their attempts at using the "integrated coping response" during archery practices and competitions was going. The research and clinical assistant then briefly reviewed the theory and

principles behind the SMT program, e.g., Ellis' (1962) A-B-C theory of emotions. In addition, the research and clinical assistant briefly introduced, through demonstration, a thought stopping technique. She asked each group member to repeatedly think "I'm no good, I'm no good, I'm no good" and then yelled "STOP" loudly at the group to demonstrate how difficult it is to maintain a train of thought in the face of such a distraction. She instructed them to first try it somewhere they can yell out loud but then to gradually fade out their voice until they can just think the word STOP loudly to themselves. After they think STOP, they should replace the negative thoughts with pleasant thoughts, they were told.

This session ended with a 10 minute "relaxation response" exercise (Benson, 1975). The research and clinical assistant instructed the archers to: "Sit quietly in a comfortable position and close your eyes. Relax your body until all your muscles are loose and try to become aware of your breathing. Each time you breathe out, say the word 'one,' or a similar short word, silently to yourself. Breathe in...out/'one,' in... out/'one,'...etc." After 10 minutes, they were instructed to open their eyes and sit quietly for a moment before standing up. The research and clinical assistant provided a handout detailing this procedure (see Appendix R) and briefly reviewing self-desensitization, thought stopping, and meditation (see Appendix S). This session ended with the archers completing the brief intervention check designed for Session 6.

Two days after Session 6, the first post-test

(assessment number four) occurred in the same format as the three previous bi-weekly intra-team competitions. The groups were then switched and the same treatment and assessment protocol took place for the next 6 weeks. At the 5 month follow-up assessment, the assessment protocol followed throughout the experiment was repeated for the last time.

During the data analysis phase of this research, the principle investigator became aware that one of the archers had scored well within the clinically depressed range on the ATQ (Hollon & Kendall, 1980). Due to the severity of the reported symptoms, the sport psychology consultant was then notified of the situation. The sport psychology consultant subsequently approached the archer and referred that individual for counseling.

CHAPTER IV

RESULTS

This chapter will first address preliminary considerations and analyses necessary before the testing of the research hypotheses and exploratory research questions. This chapter will then report the results of analyses conducted on the effects of SMT, on the effects of the order of presentation of SMT and AP, and on the durability, or maintenance, of any treatment effects present.

Effectiveness of Matching Procedure

Since no archer scored two standard deviations above the mean on the M-C, the questionnaire responses for each archer were believed to be valid and were included in the statistical analyses. A Bartlett-Box test for homogeneity of variance between groups for each dependent measure at the pre-test was calculated to determine if the matching procedure employed resulted in significant ($p=.10$) inequality between groups. If homogeneity of variance was not found for a dependent measure, all of the assumptions of analysis of variance (ANOVA) would not have been met for that variable, making ANOVA inappropriate in testing for differences. ANOVA is typically robust with respect to violations of the assumption of homogeneity of variance; however, when a small number of subjects exists, as in this research, ANOVA loses its robustness against such violations. If homogeneity of variances was not present, analysis of covariance (ANCOVA) was employed in testing for differences between groups and the pre-test scores for the

variable served as the covariate.

Results indicated a significant lack of homogeneity of variance between groups at the pre-test on the following dependent variables: archery performance, $F(1,7)= 4.999$, $p<.10$; anxiety control, $F(1,7)= 6.485$, $p<.10$; and total mood disturbance (POMS Total), $F(1,7)= 3.275$, $p<.10$. Total mood disturbance on the POMS (POMS Total) was utilized to minimize the number of dependent measures and subsequent analyses. This was acceptable only because the POMS scales, with the exception of vigor, were so highly correlated (.38-.80); all correlations were significant at $p=.01$ and all but 1 of the 10 correlations were significant at $p=.001$.

Next, t tests were conducted on the pre-test data to test for significant differences between groups in social desirability, how much each group's members practiced relaxation training, how much they practiced replacing stress producing thoughts with stress reducing thoughts, and the amount of formalized psychological skills training they had been exposed to in the past. Since these variables were not specified as dependent measures, tests of homogeneity of variance were not indicated. Results indicated no significant differences at the .10 alpha level between groups in social desirability, the frequency with which group members used relaxation training or cognitive restructuring, and the amount of formal sport psychology services to which group members had previously been exposed. Both groups' means for social desirability were within one point of the average for adolescents and both groups reported using cognitive restructuring and relaxation

techniques between "NOT AT ALL" and "SOMEWHAT" during the 2 weeks preceeding the research. Whereas the members of the SMT group reported having "OFTEN" used sport psychology techniques in past competitions, the members of the AP group reported, on average, having "SOMETIMES" to "OFTEN" used such techniques.

Integrity and Face Validity of Treatment

The representativeness, or integrity, of the treatment delivered was to be assessed by the principle developer of SMT. Due to poor sound quality on the tapes of the sessions, however, he did not believe an accurate evaluation was possible. To test if the SMT was believable and if the subjects followed the program both during and between treatment sessions, however, the detailed intervention checks (see Appendix G) were examined. These intervention checks employed zero (NEVER) to four (ALWAYS) Likert-type scales. Subjects in the SMT group clearly found the treatment engaging and believable and responded, on average, that they usually ($\underline{M}$ = 3.14) were able to carry out the detailed instructions of the group leader during the session. Subjects reported similar success rates at being able to carry out the group leader's instructions each week, with means ranging from 2.8 per question for Session 3 to 3.4 per question for Sessions 1 and 6. The SMT group members reported usually ($\underline{M}$ = 3.1) practicing their relaxation on a daily basis during the previous week. The group also reported usually ($\underline{M}$ = 3.12) using some of the mental toughness principles during the previous week's intra-team

competition and usually ($\underline{M}$ = 3.0) practicing stress-reducing thoughts and/or the integrated coping response during the previous week's archery practices.

The participants were also able during the sessions to usually or always use the SMT techniques to cope successfully with their self-induced anxiety. In particular, means of 3.66, 3.25, and 3.0 were calculated for the following intervention check questions: "Telling myself to 'relax' during today's imagery exercise helped me cope with feeling stressed," "During today's imagery exercise, thinking of my stress-reducing self-statements helped me cope with the feelings of stress," and "During today's imagery exercise, I was able to use the 'integrated coping response' to cope with the strong emotions." Although informal feedback to the group leaders suggested the remedial nature of the program may have made it less applicable than if the SMT had a more educational, or preventive, focus, the treatment possessed adequate face validity.

Examination of results from a question which was intended to serve as a "contamination check" suggested the question was not completely understood by the research participants. Scores at the pre-test for the question, "Over the past two weeks, I've learned some of the techniques the other sport psychology 'group' has been taught" averaged 2.25, ranging from "SOMEWHAT"(2) to "MODERATELY SO"(3) for the SMT group, and 2.0, ranging from "NOT AT ALL"(1) to "VERY MUCH SO"(4) for the AP group. As the SMT did not begin until after the pre-test, the data collected with this

question is questionable and consequently was not subjected to statistical analyses.

Effects of SMT: Analysis of Research Hypotheses

Having established that the treatment was believable and engaging, tests of the treatment's effects were conducted. Because all eight research participants were measured on a number of occasions, the most appropriate analysis for each variable was either a 2 X 4 (Treatment X Competition) ANOVA with repeated measures across time (Competitions at Weeks 1, 2, 4, and 6) or a 2 X 3 (Treatment X Competition) ANCOVA with repeated measures across time (competitions at Weeks 2, 4, and 6). Any ANCOVA used had only three measures over time because pretest (Week 1) scores for each variable were used as covariates. The decision to use ANOVA or ANCOVA was based on the results of the Bartlett-Box test for homogeneity of variances conducted on each dependent measure at the pre-test. A multivariate analysis of variance would have been preferable given the number of dependent variables assessed, but this was not appropriate given the size of the subject sample. To control for elevation in the experimentwise Type I error rate, an alpha level of .01 was selected for all ANOVAs and ANCOVAs unless stated otherwise. As each variable was addressed individually, the results for each variable will be discussed separately.

Archery Performance

The first hypothesis posited that SMT would, over 6 weeks, enhance elite archers' competitive performance relative to the competitive performance of archers receiving additional archery practice. Table 2 presents each group's mean scores for archery performance across time. The 2 X 3 (Treatment X Competition) repeated measures ANCOVA for performance revealed no statistically significant changes between groups over time.

Table 2
Archery Performance for Each Group Across Time

	Group			
	SMT		AP	
Time	M	SD	M	SD
1	519.5	12.8	496.3	62.4
2	531.0	8.0	516.8	38.7
3	548.0	2.2	524.3	44.1
4	547.8	8.7	523.3	15.8

Further inspection of the data revealed that whereas three members of the AP group scored at, or above, 520 on the pre-test, one member scored below 410. It was learned that this archer had been encouraged by a coach just before the start of this research to "switch" from right-handed shooting to left-handed shooting. Removal of her archery performance data only (her scores on all other inventories were well within expected ranges) resulted in different results (see Table 3 for adjusted scores). No statistically significant results were found; however, there was an effect

Table 3
Adjusted Archery Performance for AP Group

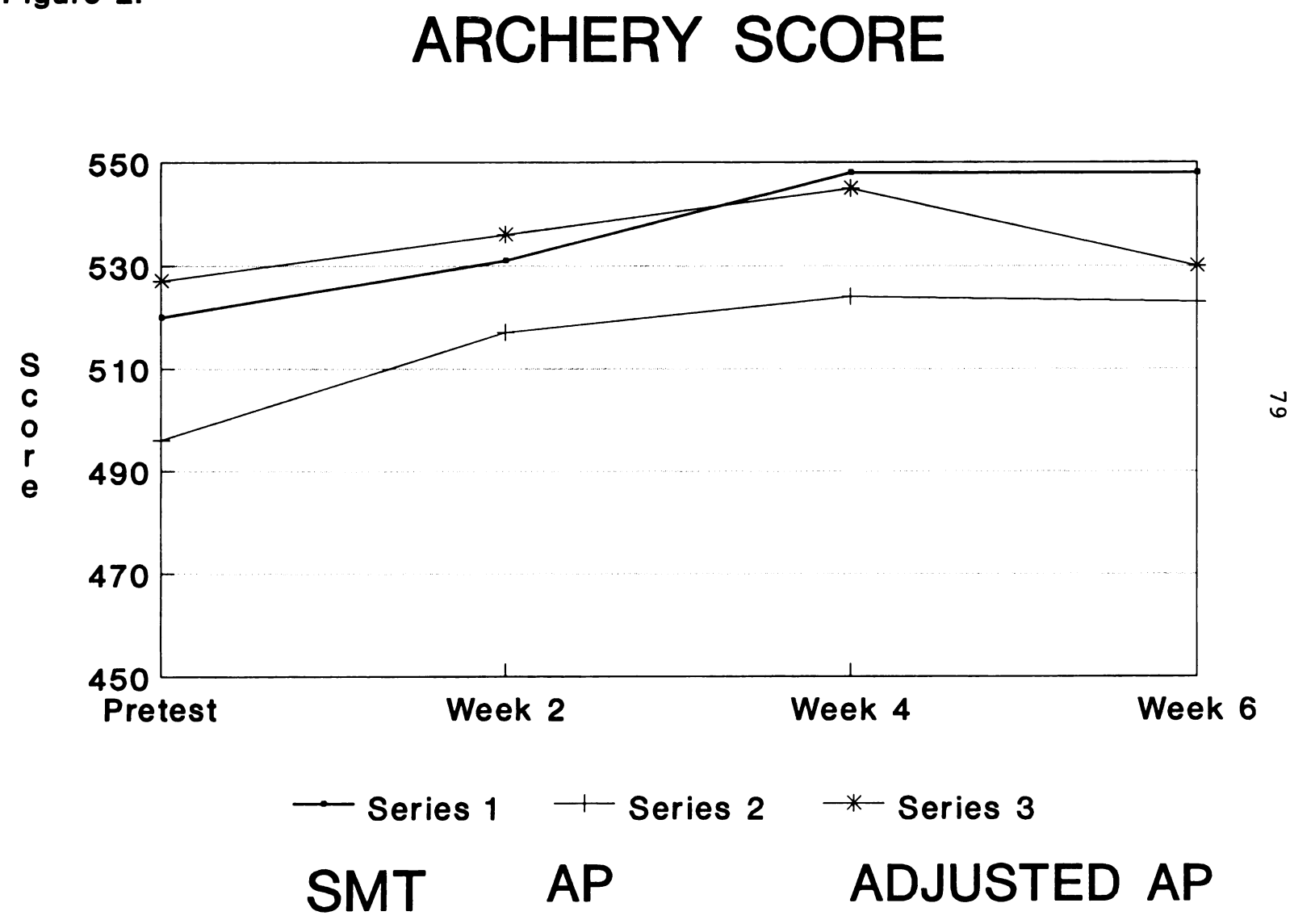
	Group			
	SMT		AP	
Time	M	SD	M	SD
1	519.5	12.8	527.0	13.0
2	531.0	8.0	535.7	10.1
3	548.0	2.2	545.7	12.7
4	547.8	8.7	530.3	8.3

size difference between groups at post-test, using Glass' (1977) formula, of 2.108. In addition, effect sizes of 2.21 and .25 were calculated between pre-test and post-test scores for the SMT and AP groups, respectively. This indicated that whereas both groups improved over time, the SMT group showed greater improvement. As Figure 2 graphically illustrates, improvement over time was present for each member of the SMT group but not for each member of the AP group.

Precompetitive Anxiety and Anxiety Control

The second hypothesis posited that SMT would, over 6 weeks, reduce elite archers' precompetitive anxiety and increase elite archers' ability to control anxiety in comparison to those archers receiving additional archery practice. Table 4 presents each group's mean scores on the cognitive anxiety and somatic anxiety scales of the CSAI-2 and on the anxiety control scale of the PSIS-2 over time. A 2 X 4 ANOVA conducted for cognitive anxiety and one for somatic anxiety revealed no significant differences between

Figure 2.


ARCHERY SCORE
550
530
510
490
470
450
Score
Pretest
Week 2
Week 4
Week 6
Series 1
Series 2
Series 3
SMT
AP
ADJUSTED AP

groups over time. This revealed that there were no treatment-related significant changes in this sample on measures of precompetitive state anxiety. A 2 X 3 ANCOVA revealed no significant interaction effect but a significant main effect for group, $F(1,5)= 19.86$, $p<.01$, on the anxiety control scale. This indicated that when initial differences were controlled for, the SMT group reported a greater ability to control anxiety throughout the first 6 weeks of the experiment.

Table 4
Precompetitive Anxiety Across Time

		Group			
		SMT		AP	
Scale	Time	M	SD	M	SD
Cognitive Anxiety	1	14.0	1.4	11.5	2.4
	2	11.8	2.0	14.5	4.5
	3	12.0	2.2	11.8	2.4
	4	12.0	1.8	14.3	2.6
Somatic Anxiety	1	14.0	1.4	12.3	2.0
	2	13.5	2.9	12.5	2.5
	3	11.5	2.6	11.8	1.7
	4	11.8	1.5	13.3	2.2
Anxiety Control	1	22.5	1.3	21.5	8.3
	2	20.5	1.9	20.0	2.9
	3	23.5	1.3	20.0	2.4
	4	25.8	3.4	21.0	2.3

Heart Rate

The third hypothesis stated that SMT would, over 6 weeks, decrease the competitive heart rate of elite archers in comparison to the competitive heart rate of elite archers receiving AP. The archers indicated on their heartwatches

when each of the 10 series of 6 arrows in each competition began and ended. Mean heart rates were then computed for each of the 10 2 to 3 minute "periods" of actual shooting. As suggested by S. Murphy (personal communication, August 10, 1990), the average heart rates for the 1st, 5th, and 10th periods for each archer in each competition were then selected and an overall mean heart rate for each archer in each competition was computed. The 2 X 4 ANOVAs conducted on 1st, 5th, 10th, and mean heart rates all indicated no significant main or interaction effects.

Table 5
Heart Rate Over Time

		Group	
		SMT	AP
Scale	Time	M	M
Heart Rate	1	121.25	117.00
	2	115.00	104.00
	3	118.00	114.00
	4	112.25	108.25

Self-Confidence

The fourth hypothesis stated that SMT would, over 6 weeks, enhance the precompetitive self-confidence of elite archers relative to the precompetitive self-confidence of elite archers receiving additional archery practice. Table 6 reflects the data obtained on the confidence scale of the PSIS-2 and on the self-confidence scale of the CSAI-2. A 2 X 4 ANOVA for each scale revealed a significant main effect for time, or competitions, on the PSIS-2 confidence scale only, $F(1,3)= 4.89$, $p\leq.01$, as both groups became more

self-confident over time. It is worth noting at this point that the PSIS-2's confidence scale is believed to be more of a trait measure of self-confidence in sport, whereas the CSAI-2's self-confidence scale may be more of a state measure of self-confidence.

Table 6
Precompetitive Self-Confidence Over Time

		Group			
		SMT		AP	
Scale	Time	M	SD	M	SD
Confidence	1	21.8	1.7	23.8	4.5
(PSIS-2)	2	24.3	0.5	23.3	5.0
	3	24.8	3.7	25.5	4.2
	4	28.0	5.5	25.5	6.9
Self-Confidence	1	25.0	3.7	29.5	2.4
(CSAI-2)	2	25.0	4.9	27.8	5.7
	3	26.5	1.0	29.3	4.4
	4	26.0	0.8	27.8	4.0

Automatic Thoughts

The fifth, and last, hypothesis stated that SMT would, over 6 weeks, decrease elite archers' negative automatic thoughts in comparison to those archers receiving additional archery practice. The data obtained on the ATQ are summarized in Table 7. A 2 X 4 ANOVA indicated no significant difference between groups for the frequency over time with which each groups' members used negative self statements.

Table 7
ATQ Scores for Each Group Across Time

		Group			
		SMT		AP	
Scale	Time	M	SD	M	SD
ATQ	1	50.8	11.1	50.5	6.9
	2	54.8	6.9	51.8	9.6
	3	54.8	9.5	52.3	3.0
	4	53.3	7.9	51.5	12.9

Effects of SMT: Analysis of Exploratory Research Questions

Mood States

Having tested the hypotheses delineated in Chapter I, the exploratory research questions, presented on pages 7 and 8, were addressed. Table 8 presents the scores obtained for total mood disturbance score (see Morgan et al., 1987) on the POMS. A 2 X 3 ANCOVA was used to answer the first

Table 8
Total Mood Disturbance Scores for Each Group Across Time

		Group			
		SMT		AP	
Scale	Time	M	SD	M	SD
Total Mood Disturbance					
	1	43.5	43.7	13.0	12.7
	2	47.8	26.0	21.5	47.9
	3	48.8	32.3	7.3	13.4
	4	31.5	24.3	12.3	8.7

research question addressing the effects of SMT on mood states. This analysis revealed no statistically significant main effects or interaction, indicating that there were no

statistically significant treatment-related changes in mood states in this sample over time.

Concentration, Motivation, and Team Focus

A 2 X 4 ANOVA on each of the remaining scales of the PSIS-2 was used to answer the second exploratory research question regarding the effects of SMT on elite archers' concentration, motivation, and team focus. The data, which are summarized in Table 9, contained no significant differences between groups on the concentration, motivation, or team focus scales.

Examination of Trends

Trends in the data over time were then examined to test the exploratory research question addressing the model's premises that SMT first influences one's arousal-coping skills and then one's cognitive-appraisal skills. SMT's emphasis on relaxation training first followed by cognitive restructuring suggests that those variables most sensitive to physiological arousal would be affected initially and then after cognitive restructuring is introduced, effects on variables more sensitive to cognitive appraisal processes would be affected. Consequently, somatic anxiety, automatic thoughts, and cognitive anxiety were examined over time. Graphic representation of the data collected on each of these scales, as shown in Figures 3, 4 and 5, revealed no such hypothesized relationships or trends in the data. In addition, no such trends were present in the heart rate data collected.

Table 9
PSIS-2 Scores for Each Group Across Time

		Group			
		SMT		AP	
Scale	Time	M	SD	M	SD
Concentration					
	1	14.3	3.2	13.5	2.0
	2	15.5	1.3	12.5	3.9
	3	16.8	3.0	12.8	3.0
	4	16.0	2.7	14.5	3.0
Motivation					
	1	16.3	2.9	20.8	1.0
	2	17.0	2.2	20.0	2.0
	3	19.5	4.0	20.0	0.8
	4	20.3	2.6	20.3	2.1
Team Focus	1	16.3	4.3	15.8	2.2
	2	16.3	2.5	17.8	2.2
	3	16.5	3.4	17.5	2.1
	4	15.8	1.7	17.5	0.6

Figure 3.

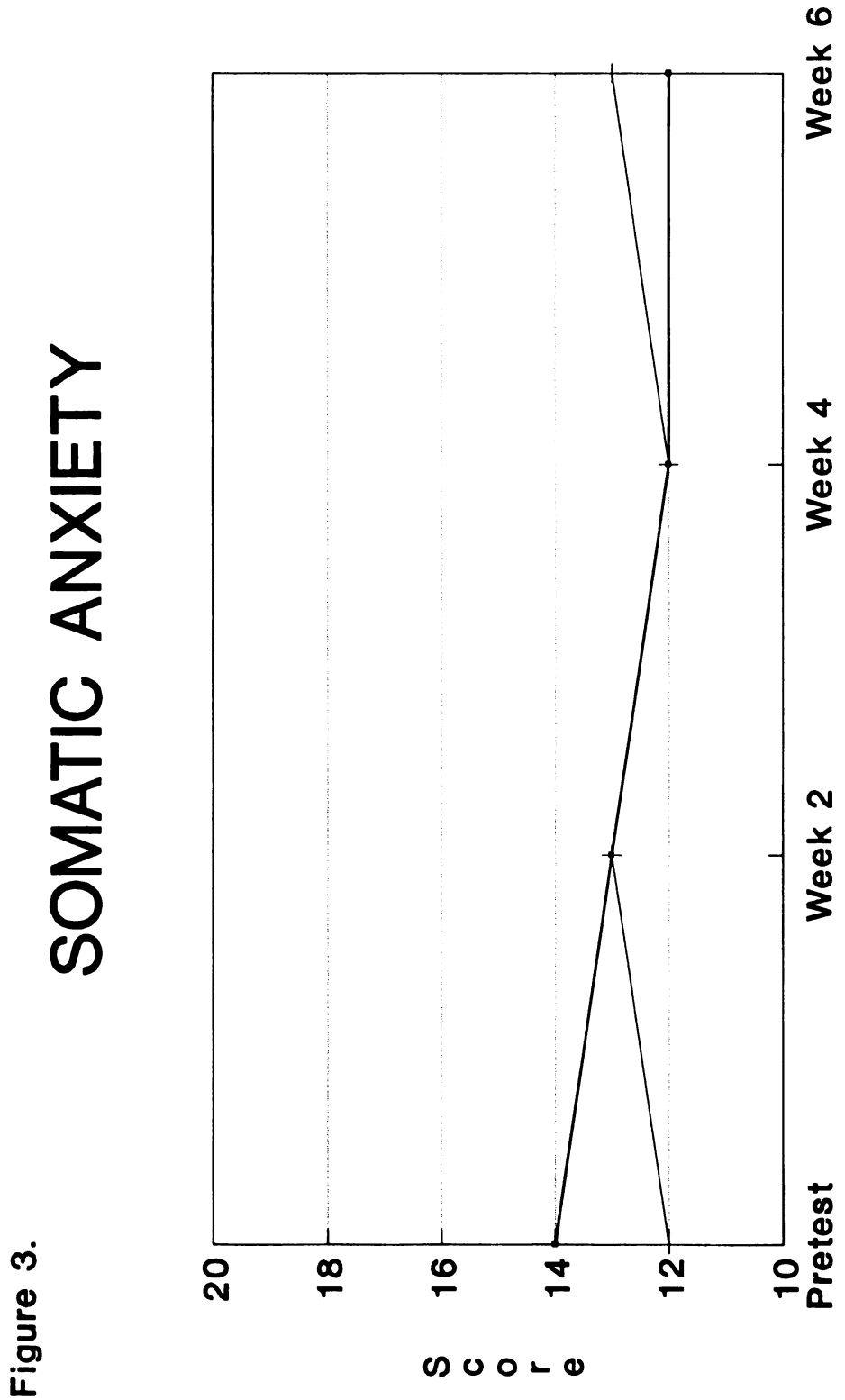

SOMATIC ANXIETY
Score
20
18
16
14
12
10
Pretest
Week 2
Week 4
Week 6
SMT
AP

Figure 4.

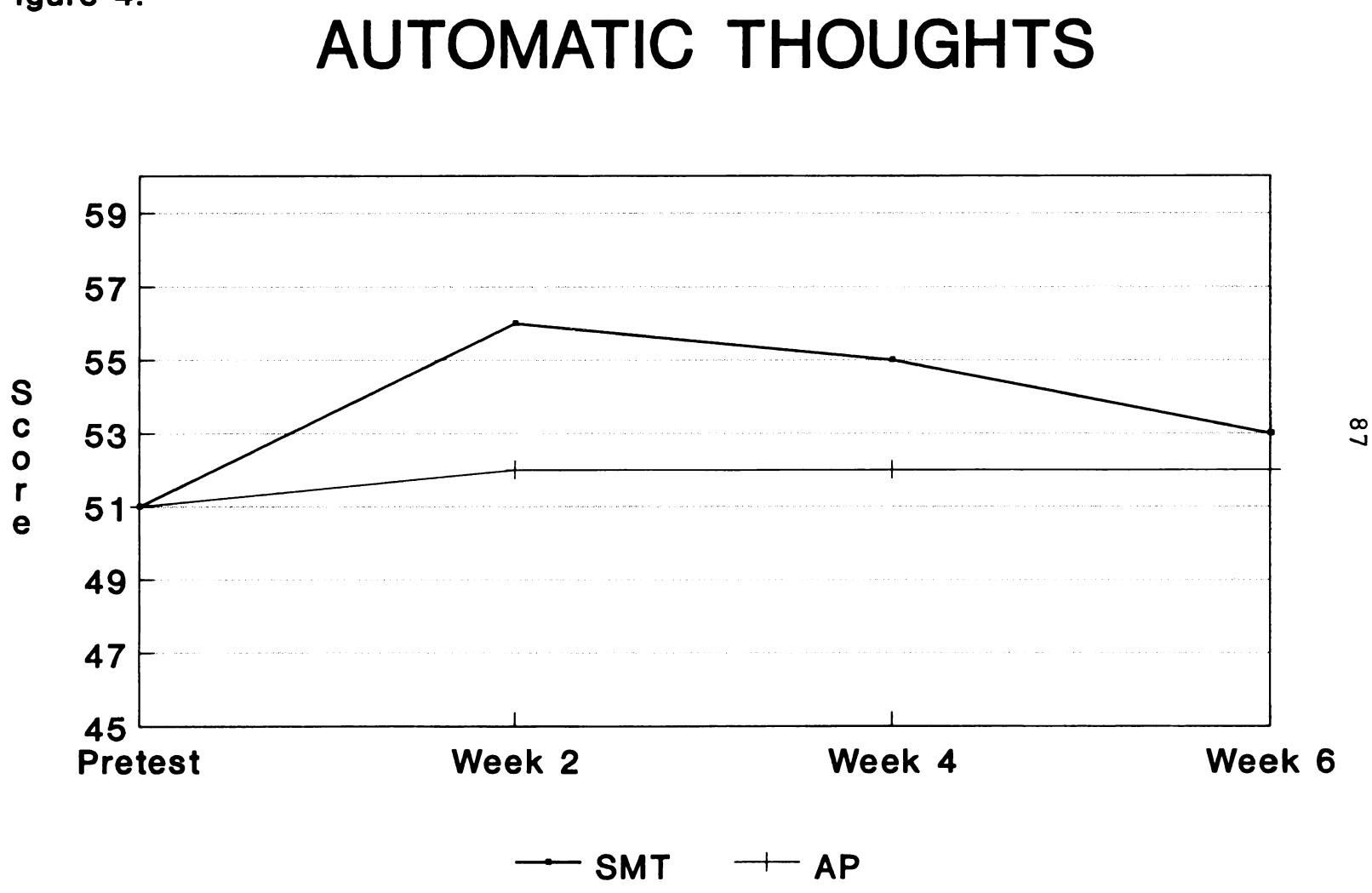
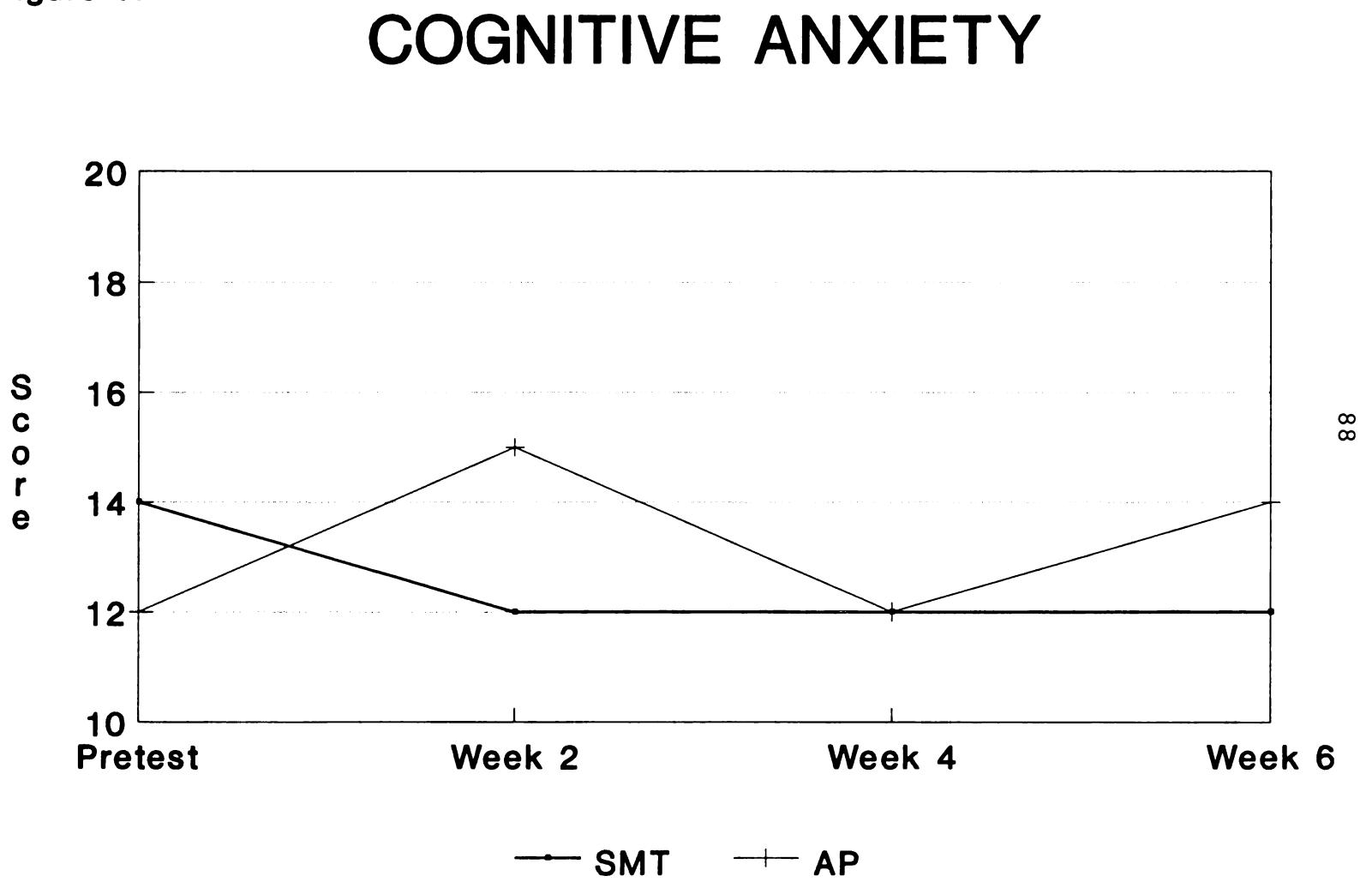

AUTOMATIC THOUGHTS
Score
59
57
55
53
51
49
47
45
Pretest
Week 2
Week 4
Week 6
SMT
AP

Figure 5.


COGNITIVE ANXIETY
Score
20
18
16
14
12
10
Pretest
Week 2
Week 4
Week 6
SMT
AP

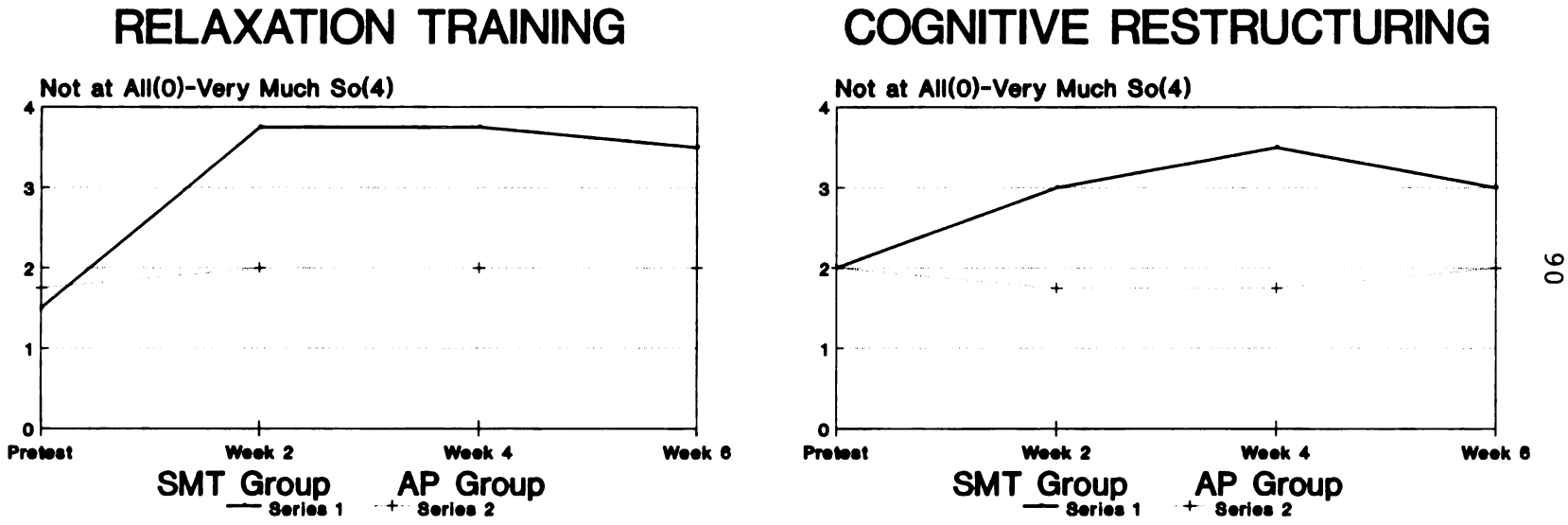
Expected trends were found for the amount the two groups practiced relaxation training and cognitive restructuring. As Figure 6 reflects, the amount the AP group practiced stayed at pre-test levels, whereas the SMT group's members increased the amount they practiced relaxation training from between "NOT AT ALL" and "SOMEWHAT" to "VERY MUCH" in the first two weeks of the SMT. Figure 6 also shows that the amount the two groups practiced cognitive restructuring did not fit the model quite as precisely. A clear trend in the expected manner, however, was evident as the AP group's members failed to increase the amount they practiced cognitive restructuring, whereas the SMT group's members showed a steady increase up to "MODERATELY" practicing their cognitive restructuring skills. Inspection of the intervention checks, however, failed to reveal consistent relationships between the intervention checks and any dependent variables. The amount SMT group members reported practicing relaxation training at Weeks 2, 3, and 4, though, was significantly correlated with archery performance, mean $\underline{r}$= .89, $\underline{p}$<.01.

Effects of Order of Intervention Presentation

As described in Chapter III, the groups were reversed following the 6 week treatment and the SMT group received AP whereas the AP group received SMT. The group which initially received SMT and then AP will be referred to as "Block 1" whereas the group which received SMT after initially receiving AP will be referred to as "Block 2." To test the fourth exploratory research question addressing the effects

Figure 6.

AMOUNT SUBJECTS PRACTICED



of receiving SMT and then AP as opposed to AP and then SMT, one way ANOVAs or ANCOVAs were conducted for each variable at the reversal's post-test (Week 12). ANCOVAs were used for those variables violating the homogeneity of variance assumption of ANOVA. One of the members of Block 2 injured his knee while training a few weeks before the reversal post-test and was not able to shoot in the reversal post-test. He did, however, fill out all of the questionnaires as he had been attending weekly SMT sessions and was to resume shooting shortly thereafter.

At the reversal's post-test, removal of the performance data for the archer who had "switched" shooting hands revealed a 12 point, though statistically non-significant, difference between blocks. A between groups effect size (Glass, 1977) of 7.80, however, indicated the advantage achieved by the members of Block 1 in the initial 6 weeks of the experiment was maintained and still present after the groups were reversed and exposed to the other treatments. No significant differences existed between blocks on any other variables, indicating no statistically significant order effects were present.

Two one way ANOVAs over time (pre-test, initial post-test, reversal post-test, and follow-up) were conducted for each block for the amounts participants reported practicing relaxation training and cognitive restructuring. The amount the members of Block 1 reported practicing cognitive restructuring and relaxation training both differed significantly over time, $F(3,11)= 7.07$, $p<.01$, and $F(3,11)= 11.27$, $p<.01$, respectively. No significant differences over

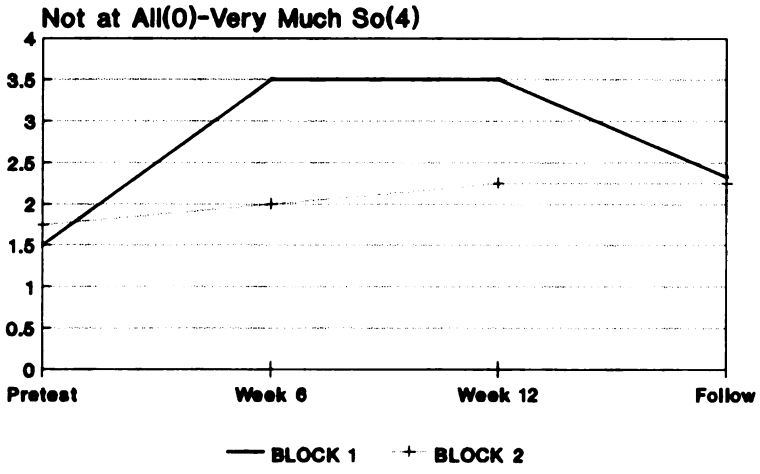
time were present for the amounts the members of Block 2 reported practicing their SMT skills.

Post hoc pairwise comparisons at $p=.01$ were then conducted for Block 1 between the pre-test, initial post-test (Week 6), reversal post-test (Week 12), and follow-up for the amounts participants reported practicing relaxation training and cognitive restructuring. As Figure 7 shows, Block 1's members reported significant differences in how much they practiced both relaxation training, $t(22)= 5.37$, $p<.01$, and cognitive restructuring, $t(22)= 3.43$, $p<.01$, between the pre-test and reversal post-test. Block 1's members, however, reported no significant difference in how much they practiced relaxation training or cognitive restructuring between the initial post-test and the reversal post-test. Significant differences were present between initial post-test and follow-up, $t(22)= -2.9$, $p<.01$, and between reversal post-test and follow-up, $t(22)= -2.09$, $p<.01$, in how much Block 1's members practiced their relaxation training. No difference was found between pre-test and follow-up, however. In addition, a significant difference between initial post-test and follow-up, $t(22)= -2.9$, $p<.01$, was found for how much members of Block 1 practiced cognitive restructuring. This indicated Block 1's members, despite significant positive changes during the SMT, did not practice their SMT skills significantly more often at follow-up than they did at the start of the experiment. In addition, Block 1 showed slightly greater adherence to relaxation training than to cognitive restructuring. Block 2's members, in contrast, never

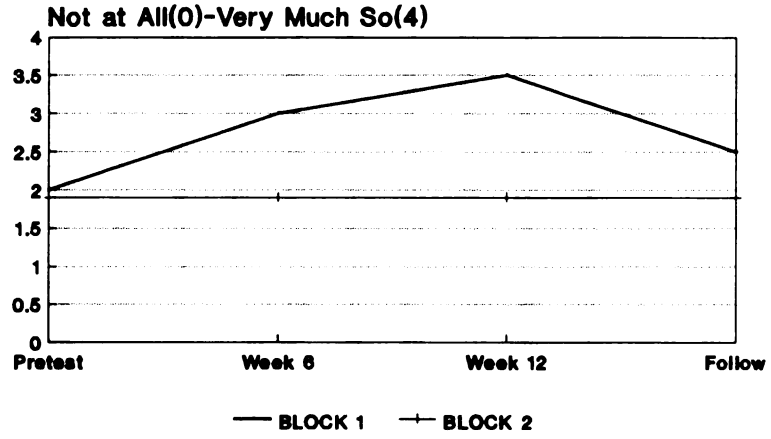
Figure 7.

AMOUNT SUBJECTS PRACTICED

RELAXATION TRAINING



COGNITIVE RESTRUCTURING



significantly changed the amount they practiced.

Maintenance of Effects

As described in the methods section, the follow-up assessment (intra-team Competition 8) took place 5 months after the reversal post-test. One of Block 1's members, after acquiring mononucleosis, left the Olympic Training Center prior to the follow-up assessment. To test the last exploratory research question addressing the durability of treatment effects, either a 2 X 4 (Block X Competition) ANOVA with repeated measures across time (pre-test, initial post-test, reversal post-test, follow-up) or a 2 X 3 (Block X Competition) ANCOVA with repeated measures across time (initial post-test, reversal post-test, follow-up) was computed. Each ANCOVA used the pre-test scores on that variable as its covariate.

Neither main effects for block or competitions nor a Block X Competition interaction effect were calculated on performance scores because the archers were mistakenly allowed to shoot from a number of further distances on the post-test. Further, the males and females shot from different distances and Block 1 was left with two females and one male whereas Block 2 had one female and two males. Consequently, scores on the post-test were all considerably lower and would have resulted in incorrect computations of the main and interaction effects.

The 2 X 4 ANOVAs conducted for cognitive anxiety, heart rate, and somatic anxiety, as in most of the previous analyses, revealed no significant effects for treatment,

competitions, or the interaction of treatment and competitions. A 2 X 3 ANCOVA conducted on the anxiety control scale of the PSIS-2, however, revealed a significant, $F(2,10)= 7.68$, $p<.01$, interaction effect. Post hoc pairwise comparisons between Blocks 1 and 2 at initial post-test and reversal post-test approached significance ($p>.06$ and $p>.08$, respectively), whereas the same comparison at follow-up was not significant. This revealed that the differences observed earlier in the experiment were no longer present. Post hoc ANCOVAs for each block across time (initial post-test, reversal post-test, follow-up) revealed no significant changes.

A 2 X 4 ANOVA was conducted on the confidence scale of the PSIS-2 and another was conducted on the confidence scale of the CSAI-2. The analyses showed that the time effect present earlier on the PSIS-2 was no longer statistically significant. Although the groups tended to continue to report greater confidence over time on the PSIS-2, no significant results were found on either scale.

A 2 X 4 ANOVA conducted on the data collected with the ATQ, as in previous analyses, revealed no significant effects. This indicated that there were no significant changes in archers' frequency of dysfunctional thoughts throughout the experiment.

A 2 X 3 ANCOVA for total mood disturbance, as measured by the POMS revealed no significant main or interaction effects. This indicated no statistically significant treatment-related changes in mood states were observed during this experiment.

A 2 X 4 ANOVA was conducted for each of the remaining scales of the PSIS-2 (concentration, motivation, and team focus), and all revealed non-significant main and interaction effects. This indicated that SMT resulted in no significant changes between initial post-test and reversal post-test in archers' concentration, motivation levels, or team focus. An initial advantage to Block 2 in terms of motivation was erased by the initial post-test and never re-appeared.

Table 10 summarizes all of the analyses conducted on data collected in this experiment. There were eight analyses conducted for the five research hypotheses and two of the analyses revealed statistically significant differences. There were 27 analyses conducted for the five exploratory research questions and one of the analyses revealed a statistically significant interaction.

Table 10
Summary of Results

A. Analysis of Research Hypotheses (Treatment X Competition)

Dependent Variable	Type of Analysis	Result
1. Archery Performance	2 X 3 ANCOVA	n.s.
2. Cognitive Anxiety	2 X 4 ANOVA	n.s.
3. Somatic Anxiety	2 X 4 ANOVA	n.s.
4. Anxiety Control	2 X 3 ANCOVA	group effect
5. Heart Rate	2 X 4 ANOVA	n.s.
6. PSIS-2 Confidence	2 X 4 ANOVA	time main effect
7. CSAI-2 Confidence	2 X 4 ANOVA	n.s.
8. Automatic Thoughts	2 X 4 ANOVA	n.s.

B. Analysis of Exploratory Questions (Treatment X Comp)

Dependent Variable	Type of Analysis	Result
1. Mood States	2 X 3 ANCOVA	n.s.
2. Concentration	2 X 4 ANOVA	n.s.
3. Motivation	2 X 4 ANOVA	n.s.
4. Team Focus	2 X 4 ANOVA	n.s.
5. Trends	Visual Inspection	none
6. Order Effects		
a.Archery Performance	2 X 2 ANCOVA	n.s.
b.Cognitive Anxiety	2 X 3 ANOVA	n.s.
c.Somatic Anxiety	2 X 3 ANOVA	n.s.
d.Anxiety Control	2 X 2 ANCOVA	n.s.
e.Heart Rate	2 X 3 ANOVA	n.s.
f.PSIS-2 Confidence	2 X 3 ANOVA	n.s.
g.CSAI-2 Confidence	2 X 3 ANOVA	n.s.
h.Automatic Thoughts	2 X 3 ANOVA	n.s.
i.Mood States	2 X 2 ANCOVA	n.s.
j.Concentration	2 X 3 ANOVA	n.s.
k.Motivation	2 X 3 ANOVA	n.s.
l.Team Focus	2 X 3 ANOVA	n.s.
7. Maintenance of Effects		
a.Cognitive Anxiety	2 X 4 ANOVA	n.s.
b.Somatic Anxiety	2 X 4 ANOVA	n.s.
c.Anxiety Control	2 X 3 ANCOVA	sig interaction
d.Heart Rate	2 X 4 ANOVA	n.s.
e.PSIS-2 Confidence	2 X 4 ANOVA	n.s.
f.CSAI-2 Confidence	2 X 4 ANOVA	n.s.
g.Automatic Thoughts	2 X 4 ANOVA	n.s.
h.Mood States	2 X 3 ANCOVA	n.s.
i.Concentration	2 X 4 ANOVA	n.s.
j.Motivation	2 X 4 ANOVA	n.s.
k.Team Focus	2 X 4 ANOVA	n.s.

Table 10 (cont.)

Dependent Variable	Analysis	Result
Amounts Ss Practiced SMT Skills		
Block 1		
8a. Relaxation Training	ANOVA	sig
b. Cog Restructuring	ANOVA	sig
Block 2		
c. Relaxation Training	ANOVA	n.s.
d. Cog Restructuring	ANOVA	n.s.
Post Hoc Pairwise Comparisons for Relaxation Training		
Block 1		
9a.Comp 1 vs. Comp 4	T-test	sig
b.Comp 4 vs. Comp 7	T-test	n.s.
c.Comp 1 vs. Comp 8	T-test	n.s.
d.Comp 4 vs. Comp 8	T-test	sig
e.Comp 7 vs. Comp 8	T-test	sig
Pairwise Comparisons for Cognitive Restructuring		
Block 1		
9f.Comp 1 vs. Comp 4	T-test	sig
g.Comp 4 vs. Comp 7	T-test	n.s.
h.Comp 1 vs. Comp 8	T-test	n.s.
i.Comp 4 vs. Comp 8	T-test	sig
j.Comp 7 vs. Comp 8	T-test	n.s.

CHAPTER V

DISCUSSION

This experiment examined the effects of cognitive-affective stress management training (SMT), in comparison to additional archery practice (AP), on elite archers. It was hypothesized that SMT, relative to AP, would enhance archery performance and archers' ability to control anxiety, while reducing archers' precompetitive anxiety and competitive heart rate. SMT was also hypothesized to increase the self-confidence of archers while reducing their negative automatic thoughts. This chapter is organized into the following sections: Discussion of research hypotheses, discussion of exploratory research questions, issues related to intervention research with elite athletes, conclusions, suggestions for future research, and implications for practice.

Effects of SMT: Discussion of Research Hypotheses

The results largely did not support the hypotheses. The absence of a consistent pattern of results in this experiment suggests the need for closer scrutiny of subject sample, measures utilized, and treatment appropriateness. Discussions of meaningful, though statistically nonsignificant, results are intended to indicate potentially important findings, not true treatment-related changes as findings of statistical significance would. In addition, such "important" findings are only discussed when calculations of effect sizes support the meaningfulness of the difference.

After removing the archery data for an archer who had just switched from right-handed shooting to left handed shooting, SMT did not have a statistically significant effect on archery performance. The archer mentioned above had her data removed from the AP group data because her significantly lower score at pre-test, and subsequent significant progress over time, artificially made it appear as if the AP group had experienced a significant treatment-related change. The results indicating SMT did not have a statistically significant effect on athletic performance are inconsistent with previous research (Crocker et al., 1988; Ziegler et al., 1982) evaluating SMT on a remedial basis.

No main or interaction effects were found on either measure of precompetitive anxiety. The only previous research examining the effects of SMT on state anxiety (Crocker et al., 1988) also failed to find significant effects, though trends were present, even for some fairly state-anxious athletes. In addition, no interpretable interactions or main effects were found for self-confidence, heart rate, or automatic thoughts.

Effects of SMT: Discussion of Exploratory Questions:

This experiment was also designed to explore the effects of SMT on the mood states, concentration skills, motivational levels, and team focus of elite archers. The results indicated no statistically significant treatment-related changes in mood states, concentration, motivation, or team focus over time.

Presence of Trends

Another purpose of this research was to examine the relationships between SMT and a number of the dependent variables discussed above over time. This was largely an attempt to address Landers' (1983) concern over the paucity of theory testing in this field. More specifically, this research intended to test the model's premises that SMT first influences one's physical relaxation skills and then one's cognitive appraisal processes. The results, in general, did not support these premises. In addition, no support was lent to the implicit hypothesis that influencing one's cognitive appraisal processes would enhance one's archery performance.

One finding of note is that the archers in this experiment were more likely to practice relaxation training than cognitive restructuring. Perhaps the regimented and premeditated nature of relaxation training, in which one utilizes a block of time each day for an "exercise" or "training," resulted in greater adherence. Creating an exercise "routine" has been shown to enhance adherence (Dishman, 1990); perhaps the inclusion of cognitive restructuring exercises into relaxation training would result in increased practicing of both sets of skills.

Order Effects

As described above, the groups were reversed after the 6 weeks of the SMT program. The post-reversal data were collected to facilitate the examination of any effects due to the order in which the archers were presented the SMT and

AP programs. The group which first received SMT and then AP will be referred to as "Block 1," whereas the group which initially received AP and then SMT will be referred to as "Block 2." The results of the analyses comparing the two blocks of subjects at the reversal post-test indicated a 12 point, though statistically non-significant, difference in archery performance. It appeared, however, that the initial gains made by Block 1 were largely maintained after the intervention reversal. In addition, it appeared that only the members of Block 1 made clear gains from pre-test to reversal post-test. This suggested exposing elite archers to SMT initially and then providing additional archery practice was somewhat more beneficial to competitive performance than AP followed by SMT.

Maintenance of Effects

The last purpose of this experiment was to examine the durability, or maintenance, of any treatment effects over a 5 month period. As previously discussed, no true test of the durability of the treatment effect on archery performance was possible. The analyses of the follow-up data failed to reveal any consistent and therefore interpretable findings. Although the members of Block 1 adhered to practicing relaxation training longer than to practicing cognitive restructuring, neither skill was practiced more after 5 months than at the start of the experiment. The members of Block 2, on the other hand, never increased significantly the amount they practiced either set of skills over baseline levels.

The fact that the members of Block 1 were not practicing their SMT skills more after 5 months than they did before the experiment is not surprising considering much of the adherence literature (Dishman, 1990). A possible explanation which is rarely considered in such instances, though, is that mastery of the skills may have been developed by that time, resulting in less practice required. As this phenomenon was not directly assessed, however, its likelihood can not be evaluated at this time. Future research could make an enormous contribution, however, through closer examination of both explanations for reduced adherence.

Issues Related to Intervention Research with Elite Athletes

Subject Sample

It is possible that a number of Type II errors were committed in the statistical analyses of this research. Due to the small sample size, statistical power, or the ability to detect true differences, was low (.20). This is most likely why statistical differences between groups were not detected. As research with elite populations typically involves small sample sizes, identifying a priori at what point a statistically nonsignificant difference would be meaningful to the participants, is strongly suggested. Consultation with the National Training Program's coach and director, after the experiment, revealed that a 10 point improvement over a 6 week period would be meaningful to most archers and coaches at the elite level.

In addition to a priori estimates of what amount of

change would be considered as meaningful by the participants, utilizing effect sizes, as suggested by Glass (1977), would help researchers evaluate the importance of results which are statistically nonsignificant due to inadequate statistical power. For example, analyses of the archery performance data failed to reach statistical significance. Effect size calculations of the same data, however, suggested the results were somewhat meaningful. Employing both procedures, though not remedies for low levels of statistical power, would likely reduce the number of Type II errors made by intervention researchers.

Measurement Issues

Preliminary tests of the SMT model posited by Smith and Rohsenow (in press) failed to support the premises that SMT initially influences one's arousal control abilities and then one's cognitive appraisal processes. The premise that influencing one's cognitive appraisal processes would enhance one's archery performance was also not supported. It is not clear, however, if the ATQ was a valid and reliable measure of stress-producing thoughts and dysfunctional appraisal processes. It is possible that the selection of the ATQ as an indicator of disruptive, negative, or stress-producing cognitive appraisal processes was incorrect. Researchers investigating the effects of SMT may want to examine and, if necessary, improve upon the assessment of cognitive appraisal processes. To date, though, no researchers have identified a more effective means of measuring cognitive appraisal processes.

In addition, one must question the utility of the CSAI-2 with such an elite population. A lack of effect on either of the CSAI-2 anxiety scales was likely due to ceiling effects as both groups scored below the 10th percentile at the pre-test on cognitive anxiety and somatic anxiety. In addition, neither SMT, nor AP, increased archers' scores on the self-confidence scale of the CSAI-2. This was also possibly due to ceiling effects. Both groups initially scored above the 90th percentile for self-confidence on the CSAI-2, making any significant positive changes difficult. It is not uncommon for elite athletes to report relatively high levels of self-confidence and relatively low levels of precompetitive anxiety. Consequently, the development of a more change sensitive precompetitive anxiety measure may be warranted.

Treatment Appropriateness

The issues related to the appropriateness of the prescription of a remedial treatment for stress-related difficulties with certain populations are of great significance. In addition to more sensitive measures, practitioners may want to assess psychological skills relevant to athletes' sports before selecting interventions. As was the case in this experiment, many athletes reporting low levels of precompetitive anxiety are likely to feel a remedial SMT program to be inapplicable. Although SMT had some beneficial effect in this experiment, data collected after the reversal of interventions strongly suggested the inappropriateness of SMT for one group of the archers in

this sample. Utilizing an intervention which is designed to alleviate difficulties has the potential in both sport and non-sport settings to jeopardize the consulting or treatment relationship through what may be perceived by the client as "over pathologizing." Lastly, utilizing a cognitive intervention that suggests individuals accept that they do not always perform perfectly has the potential to alienate elite athletes. Elite athletes may resist such an intervention for fear that it could interfere with the attainment of their goals. Sport psychology as a field could benefit greatly by following counseling psychology's example and emphasizing and researching a prescriptive approach to service provision.

Conclusions

Effects of SMT

The few statistically significant results in the data analyses of the stated hypotheses and exploratory research questions appeared to be somewhat random rather than results which could be solidly connected to, and easily explained by, sound theory and previous research efforts. The results of this experiment indicated that cognitive-affective stress management training (SMT) on an educational basis, relative to additional archery practice (AP), did not significantly enhance the competitive performance of elite archers. A difference of practical meaning (Rosenthal, 1990) was, however, observed at the post-test. In addition, this positive effect was present 6 weeks after the interventions were concluded and then reversed, suggesting SMT followed by

AP may have been slightly more beneficial than AP followed by SMT. Due to a procedural error, no conclusions regarding the durability of SMT's somewhat positive effect on competitive performance can be offered. No other consistent patterns in this experiment's results were present. Lastly, at follow-up, neither block of subjects reported practicing either set of SMT skills with more regularity than at the beginning of the experiment. Consequently, one can reasonably conclude that the evidence supporting the use of SMT on an educational basis is limited.

Suggestions for Future Research

All types of intervention research will benefit from careful planning which takes into consideration statistical power, treatment integrity, and the maintenance of effects. As discussed above, intervention research with elite athletes often has inadequate statistical power due to small sample sizes. Large groups of elite athletes, however, are rarely available; consequently, evaluating the effects of interventions on skilled, though often more accessible athletes, e.g., high school or collegiate athletes, is suggested. In addition, utilizing repeated measures designs with numerous assessments over extended periods of time will increase researchers' chances of detecting existing true differences. It would also be advisable for researchers to find out and specify, in advance, what amount of change, if still statistically nonsignificant, would be considered meaningful by participants. This could be particularly valuable in research utilizing small sample sizes, because

limited statistical power levels results in an elevated risk of making Type II errors.

More specific to advancing explanations of effects in this experiment, research evaluating the effectiveness of different stress management programs on athletes differing in levels of motivation, trait anxiety, and baseline state anxiety would be a significant advance. In addition, replication of this research with a larger number of subjects would offer more powerful tests of this experiment's hypotheses.

With respect to testing a model such as SMT, theory testing would be enhanced if more sensitive measures of cognitive appraisal processes are developed and more sophisticated and multiparameter measures of competitive arousal are utilized. In addition, measures which are more sensitive to small changes in elite athletes' psychological states need to be developed. It will also be important for such instruments to be able to assess elite athletes without concern for ceiling effects.

Implications for Practice

The results of research regarding the effectiveness of SMT are not clear at this time. What is clear, though, is that if athletes do not believe SMT to be necessary and/or potentially beneficial, SMT is almost certain to be ineffective. There is little evidence to suggest that SMT, when applied on an educational basis and in a group format, is effective in reducing precompetitive anxiety. Consequently, alternative methods of implementation or

different interventions, e.g., relaxation training, are suggested when no difficulties with competitive stress are reported. When difficulties due to competitive stress are present, however, sufficient evidence exists suggesting the use of SMT.

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APPENDICES

APPENDIX A

USOC Department of Sport Psychology

Dear Coach Myricks:

I am a psychology intern at Arizona State University and former research assistant to Dr. Shane Murphy. I am currently involved in a number of USOC research projects designed to improve sport psychologists' services.

It has repeatedly been shown that how an athlete responds to stress can significantly influence his or her performance, particularly in a sport like archery. The stress management training (SMT) programs that have often been provided, although typically reported as being helpful by athletes and coaches, have just started to undergo the research necessary to see if they really are effective. The study we are proposing involves evaluating the effectiveness of an SMT program with archers. More specifically, how they feel before, and perform during, competition. In addition, comparing SMT to extra archery practice would evaluate how time-efficient and effective SMT is. The SMT program we would like to use has been shown to be effective with national team volleyball players, cross country runners, and figure skaters, however, performance during actual competitions was never assessed, only performance in volleyball drills, treadmill runs, practice figures, etc.

The study would involve the resident members of the National Training Program taking part in an intra-team archery competition every other week for 13 weeks. Before each of these competitions, which all will have the same format as national competitions, the archers would put on heart rate monitors and fill out three short questionnaires. In addition, the program members would meet for one hour per week for weeks 2 through 13 with Dr. Murphy for SMT or with you for extra archery practice. The archers will be chosen completely at random to be in one group or the other. After the 6th week, the groups would be switched so everyone was exposed to the SMT and the extra archery practice. Five months later, a follow-up assessment (intra-team competition) will take place. All program members will be informed, verbally and in writing, that participation in this study is voluntary and they may withdraw their consent at any time. Consent will also be requested from parents of those archers under 18 years of age. In addition, results, in group format, will be made available to you upon completion of the study.

This study could greatly improve the services we provide to the National Training Program in Archery, and other sports, for that matter, and feel it involves minimal risk to any archers who take part. Therefore, we feel both the archery and sport psychology programs at the USOC can only benefit from this study.

I am very grateful for your help. If you have any questions, please feel free to call me at (602) 965-6146.

Thank You,

Michael Greenspan, M.A.

"I give permission for my program to take part in this study under the above stated conditions."

NATIONAL COACH'S SIGNATURE

APPENDIX B

Marlowe-Crowne Short Form

Name:_____
Date:_____

Please read each statement carefully and decide whether you feel that it is mostly true as applied to you or mostly false. Answer true to positively stated questions if they are true as often or more often than stated.

1. It is sometimes hard for me to go on with my work if I'm not encouraged.	T	F
2. I sometimes feel resentful when I don't get my way.	T	F
3. No matter who I'm talking to, I'm always a good listener.	T	F
4. There have been occasions when I took advantage of someone.	T	F
5. I'm always willing to admit it when I make a mistake.	T	F
6. I sometimes try to get even rather than forgive and forget.	T	F
7. I am always courteous, even to people who are disagreeable.	T	F
8. I have never been irked when people expressed ideas very different from my own.	T	F
9. There have been times when I was quite jealous of the good fortune of others.	T	F
10. I am sometimes irritated by people who ask favors of me.	T	F
11. I have never deliberately said something that hurt someone's feelings.	T	F
12. On a few occasions, I have given up doing something because I thought too little of my ability.	T	F
13. There have been times when I felt like rebelling.	T	F

Marlowe-Crowne Social Desirability Scale-Short Form Scoring Information

The Marlowe-Crowne Social Desirability Scale-Short Form (M-C) has one scale: social desirability, which ranges from 0 to 13. One point is awarded for each question answered in the indicated manner:

1: F
2: F
3: T
4: F
5: T
6: F
7: T
8: F
9: F
10: F
11: T
12: F
13: F

APPENDIX C

CSAI - 2

NAME:_____ SEX: M F DATE:_____

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

NOT AT ALL = 1 SOMEWHAT = 2
MODERATELY SO = 3 VERY MUCH SO = 4

1.	I am concerned about this competition	1	2	3	4
2.	I feel nervous	1	2	3	4
3.	I feel at ease	1	2	3	4
4.	I have self-doubts	1	2	3	4
5.	I feel jittery	1	2	3	4
6.	I feel comfortable	1	2	3	4
7.	I am concerned that I may not do as well in this competition as I could	1	2	3	4
8.	My body feels tense	1	2	3	4
9.	I feel self-confident	1	2	3	4
10.	I am concerned about losing	1	2	3	4
11.	I feel tense in my stomach	1	2	3	4
12.	I feel secure	1	2	3	4
13.	I am concerned about choking under pressure	1	2	3	4
14.	My body feels relaxed	1	2	3	4
15.	I'm confident I can meet the challenge	1	2	3	4

16. I'm concerned about performing poorly	1	2	3	4
17. My heart is racing	1	2	3	4
18. I'm confident about performing well	1	2	3	4
19. I'm worried about reaching my goal	1	2	3	4
20. I feel my stomach sinking	1	2	3	4
21. I feel mentally relaxed	1	2	3	4
22. I'm concerned that others will be disappointed with my performance	1	2	3	4
23. My hands are clammy	1	2	3	4
24. I'm confident because I mentally picture myself reaching my goal	1	2	3	4
25. I'm concerned I won't be able to concentrate	1	2	3	4
26. My body feels tight	1	2	3	4
27. I'm confident of coming through under pressure	1	2	3	4
28. Over the past two weeks, I practiced muscle relaxation training	1	2	3	4
29. Over the past two weeks, I practiced replacing stress-producing thoughts with stress-reducing thoughts	1	2	3	4
30. Over the past two weeks, I've learned some of the techniques the other sport psychology "group" has been taught	1	2	3	4

Competitive State Anxiety Inventory-2
Scoring Information

The Competitive State Anxiety Inventory-2 (CSAI-2) has three scales: cognitive anxiety, somatic anxiety, and self-confidence. Each of these three scales has nine items for a total of 27 items. The scales are comprised of the following questions:

Cognitive Anxiety	Somatic Anxiety	Self-Confidence
1	2	3
4	5	6
7	8	9
10	11	12
13	14(-)	15
16	17	18
19	20	21
22	23	24
25	26	27

Each question is answered on a four-point scale. Scores are obtained by adding the scores of all questions comprising each subscale. Note: item #14 is to be scored inversely.

APPENDIX D

PSYCHOLOGICAL SKILLS INVENTORY FOR SPORTS-2
C 1987 Michael J. Mahoney

NAME:_____ DATE:_____

SPORT:_____ BIRTHDATE:_____

GENDER: M F DOMINANT HAND: RIGHT LEFT

AMBIDEXTROUS

The statements below deal with various aspects of athletic performance and competition. Please rate each statement according to how well it describes your own personal experience. Fill in the circle to the right that corresponds to how strongly you agree with it. Please be sure to rate each statement.

		STRONGLY DISAGREE				STRONGLY AGREE
1.	I am very motivated to do well in my sport.	o	o	o	o	o
2.	I often have trouble concentrating during my performance.	o	o	o	o	o
3.	I am very self-confident about my athletic skills.	o	o	o	o	o
4.	I get very frustrated when a teammate is performing poorly.	o	o	o	o	o
5.	I am more tense before I perform than I am <u>during</u> the performance.	o	o	o	o	o
6.	I experience frequent "hot streaks" in which my performance is unusually good.	o	o	o	o	o
7.	I sometimes lack the motivation to train.	o	o	o	o	o
8.	I get along very well with other members of a team.	o	o	o	o	o

9.	I am seldom so tense that interferes with my performance.	o	o	o	o	o
10.	Winning is very important to me.	o	o	o	o	o
11.	In most competitions, I go in confident that I will do well.	o	o	o	o	o
12.	I tend to perform better when I feel more tense rather than less tense.	o	o	o	o	o
13.	When I am actually performing, I am almost totally unaware of the audience.	o	o	o	o	o
14.	When I am performing poorly, I tend to lose my concentration.	o	o	o	o	o
15.	It doesn't take much to shake my self-confidence.	o	o	o	o	o
16.	I concentrate more on my own performance than on the performance of the team.	o	o	o	o	o
17.	I am often panic-struck during those last few moments before I begin my performance.	o	o	o	o	o
18.	When I make a mistake, I have trouble forgetting it and concentrating on my ongoing performance.	o	o	o	o	o
19.	I would like to be more motivated.	o	o	o	o	o
20.	A minor injury or a bad practice can really shake my self-confidence.	o	o	o	o	o
21.	I set goals for myself and I usually achieve them.	o	o	o	o	o

22.	I sometimes feel intense anxiety while I am actually performing.	o	o	o	o	o
23.	During my performance, my attention seems to flip back and forth between what I am doing and other things.	o	o	o	o	o
24.	I enjoy working with teammates.	o	o	o	o	o
25.	I have frequent doubts about my athletic ability.	o	o	o	o	o
26.	I spend a lot of energy trying to stay calm before a meet.	o	o	o	o	o
27.	When I begin to perform poorly, my confidence drops very quickly.	o	o	o	o	o
28.	I think team spirit is very important.	o	o	o	o	o
29.	I worry a lot about making mistakes in an important meet.	o	o	o	o	o
30.	I can usually remain confident even through one of my poorer performances.	o	o	o	o	o
31.	My self-confidence jumps all over the place.	o	o	o	o	o
32.	When my team loses, I feel badly--no matter how well I did as an individual.	o	o	o	o	o
33.	When I make an error in my performance, I become very anxious.	o	o	o	o	o

34.	Right now, the most important thing in my life is to do well in my sport.	o	o	o	o	o
35.	I am good at controlling my tension level.	o	o	o	o	o
36.	My anxiety level drops rapidly as soon as I begin my performance.	o	o	o	o	o
37.	My sport is my whole life.	o	o	o	o	o
38.	I have always worked well with my coaches.	o	o	o	o	o
39.	I have faith in myself.	o	o	o	o	o

The Psychological Skills Inventory for Sports-2
Scoring Information

The Psychological Skills Inventory for Sports-2 (PSIS-2) has five scales: anxiety control, concentration, confidence, motivation, and team emphasis which each have between six and ten items. The PSIS-2 contains 39 items in total. The five scales are comprised of the following questions:

Anxiety Control	Concentration	Confidence	Motivation	Team Emphasis
5	2(-)	3	1	4(-)
9	6	11	7(-)	8
12	13	15(-)	10	16(-)
17(-)	14(-)	20(-)	19(-)	24
22(-)	18(-)	25(-)	21	28
26(-)	23(-)	27(-)	34	32
29(-)		30	37	38
33(-)		31(-)		
35		39		
36				
n=10	n=6	n=9	n=7	n=7

Briefly stated, the procedure for scoring is as follows:

1. Assign a numerical score to each item response using a 0-4 range.

	STRONGLY DISAGREE			STRONGLY AGREE	
	0	0	0	0	0
Value for + items	0	1	2	3	4
Values for - items	4	3	2	1	0

2. Add the individual item scores to obtain a raw summary score for each scale.

APPENDIX E

NAME_____ DATE_____

AUTOMATIC THOUGHTS QUESTIONNAIRE

Listed below are a variety of thoughts that pop into people's heads. Please read each thought and indicate how frequently, if at all, the thought occurred to you over the last week. Please read each item carefully and fill in the appropriate circle on the answer sheet in the following fashion: (1 = "not at all," 2 = "sometimes," 3 = "moderately often," 4 = "often," and 5 = "all the time").

1. I feel like I'm up against the world.	1	2	3	4	5
2. I'm no good.	1	2	3	4	5
3. Why can't I ever succeed?	1	2	3	4	5
4. No one understands me.	1	2	3	4	5
5. I've let people down.	1	2	3	4	5
6. I don't think I can go on.	1	2	3	4	5
7. I wish I were a better person.	1	2	3	4	5
8. I'm so weak.	1	2	3	4	5
9. My life's not going the way I want it to.	1	2	3	4	5
10. I'm so disappointed in myself.	1	2	3	4	5
11. Nothing feels good anymore.	1	2	3	4	5
12. I can't stand this anymore.	1	2	3	4	5
13. I can't get started.	1	2	3	4	5
14. What's wrong with me?	1	2	3	4	5
15. I wish I were somewhere else.	1	2	3	4	5
16. I can't get things together.	1	2	3	4	5
17. I hate myself.	1	2	3	4	5
18. I'm worthless.	1	2	3	4	5
19. Wish I could just disappear.	1	2	3	4	5
20. What's the matter with me?	1	2	3	4	5
21. I'm a loser.	1	2	3	4	5
22. My life is a mess.	1	2	3	4	5
23. I'm a failure.	1	2	3	4	5
24. I'll never make it.	1	2	3	4	5
25. I feel so helpless.	1	2	3	4	5
26. Something has to change.	1	2	3	4	5
27. There must be something wrong with me.	1	2	3	4	5
28. My future is bleak.	1	2	3	4	5
29. I'm just not worth it.	1	2	3	4	5
30. I can't finish anything.	1	2	3	4	5

APPENDIX F

Target # ☐

FITA II 25 METERS RESULTS — Hits Total

Arr.	1	2	3	3-Arr	6-Arr	
6						
12						
18						
24						
30						
36						
42						
48						
54						
60						
TOTAL 60					☐☐	

Archer _____

Recorder _____

Target # ☐

FITA I, METERS RESULTS — Hits Total

Arr.	1	2	3	3-Arr	6-Arr	
6						
12						
18						
24						
30						
36						
42						
48						
54						
60						
TOTAL 60					☐☐	

Archer _____

Recorder _____

Summaries and Control

				Pos.
25M	☐☐	10,s	☐	☐
18M	☐☐	10,s	☐	☐

TOTAL 120 ☐☐

APPENDIX G

Session #1

Name:_____

Date:_____

Please respond to each of the following statements by circling a corresponding number between 0 and 4

0	1	2	3	4
NEVER	SOMETIMES	OFTEN	USUALLY	ALWAYS

	NEVER		OFTEN		ALWAYS
1. I was able to create and feel tension in my muscles.	0	1	2	3	4
2. I was able to totally relax my muscles.	0	1	2	3	4
3. I could feel a clear difference in muscle tension between tensing and relaxing.	0	1	2	3	4
4. I used the mental command "relax" when asked to do so.	0	1	2	3	4
5. In the past, I have used sport psychology techniques in competition.	0	1	2	3	4
6. In the past, I have used techniques I have been taught which are designed to help me replace stress-producing thoughts with stress-reducing thoughts.	0	1	2	3	4

Session #2

Name:_____

Date:_____

Please respond to each of the following statements by circling a corresponding number between 0 and 4.

0 NEVER	1 SOMETIMES	2 OFTEN	3 USUALLY	4 ALWAYS

	NEVER		OFTEN	ALWAYS
1. I practiced my relaxation on a daily basis this past week.	0	1	2	3	4
2. Today, I was able to think of personal examples of stressful archery situations.	0	1	2	3	4
3. I was able to relate to the examples in today's session.	0	1	2	3	4
4. I asked myself the questions suggested during today's "mental control" exercise.	0	1	2	3	4
5. During today's relaxation exercise, I was able to create and feel tension in my muscles.	0	1	2	3	4
6. During today's relaxation exercise, I was able to totally relax my muscles.	0	1	2	3	4
7. During today's relaxation exercise, I could feel a clear difference in muscle tension between tensing and relaxing.	0	1	2	3	4
8. During today's relaxation exercise, I used the mental command "relax" when asked to.	0	1	2	3	4

Session #3

Name:_____

Date:_____

Please respond to each of the following statements by circling a corresponding number between 0 and 4

0	1	2	3	4
NEVER	SOMETIMES	OFTEN	USUALLY	ALWAYS

	NEVER		OFTEN	ALWAYS
1. I practiced my relaxation on a daily basis this past week.	0	1	2	3	4
2. I used principles from the handout during daily practices this past week.	0	1	2	3	4
3. I used some of the mental toughness principles during last week's intra-team competition.	0	1	2	3	4
4. When asked to imagine myself in stressful situations during today's session, I was able to do so vividly.	0	1	2	3	4
5. I felt and experienced the strong emotions suggested during today's imagery exercise	0	1	2	3	4
6. Telling myself to "relax" during today's imagery exercise helped me cope with feeling stressed.	0	1	2	3	4
7. During today's imagery exercise, I was able to rekindle the strong emotions by thinking the catastrophizing thoughts.	0	1	2	3	4
8. I was able to rekindle the strong emotions when instructed to do so during today's imagery exercise.	0	1	2	3	4

Session #4

Name:_____

Date:_____

Please respond to each of the following statements by circling a corresponding number between 0 and 4

0	1	2	3	4
NEVER	SOMETIMES	OFTEN	USUALLY	ALWAYS

	NEVER		OFTEN	ALWAYS
1. I practiced my relaxation on a daily basis this past week.	0	1	2	3	4
2. I practiced replacing stress-producing self-statements with stress-reducing self-statements during archery practice this past week.	0	1	2	3	4
3. During today's imagery exercise, I was able to vividly imagine myself in a different stressful archery situation.	0	1	2	3	4
4. During today's imagery exercise, I felt the strong emotions suggested.	0	1	2	3	4
5. During today's imagery exercise, thinking of my stress-reducing self-statements helped me cope with the feelings of stress.	0	1	2	3	4
6. I was able to rekindle the strong feelings today by repeating my catastrophizing thoughts.	0	1	2	3	4
7. I was able to rekindle the strong feelings today when instructed to do so.	0	1	2	3	4

Session #5

Name:_____

Date:_____

Please respond to each of the following statements by circling a corresponding number between 0 and 4

0	1	2	3	4
NEVER	SOMETIMES	OFTEN	USUALLY	ALWAYS

	NEVER		OFTEN	ALWAYS
1. I practiced my "short version" of relaxation (#8 on handout) during practice this past week	0	1	2	3	4
2. I practiced my stress-reducing self-statements during practice this past week.	0	1	2	3	4
3. I used some of my mental toughness principles during last week's intra-team competition.	0	1	2	3	4
4. During today's imagery exercise, I was able to feel the strong emotions suggested.	0	1	2	3	4
5. During today's imagery exercise, I was able to use the "integrated coping response" to cope with the strong emotions.	0	1	2	3	4

Session #6

Name:_____

Date:_____

Please respond to each of the following statements by circling a corresponding number between 0 and 4

0	1	2	3	4
NEVER	SOMETIMES	OFTEN	USUALLY	ALWAYS

	NEVER		OFTEN	ALWAYS
1. In the past week's practices, I used the "integrated coping response."	0	1	2	3	4
2. In today's relaxation exercise, I was totally relaxed.	0	1	2	3	4
3. In today's relaxation exercise, I was able to focus on the word "one."	0	1	2	3	4

APPENDIX H

Treatment Integrity Rating Sheet

Integrity of Sessions

Session 2A

1	2	3	4	5	6	7
Not at all similar						Exactly as manual dictates

Session 2B

1	2	3	4	5	6	7
Not at all similar						Exactly as manual dictates

Session 5A

1	2	3	4	5	6	7
Not at all similar						Exactly as manual dictates

Session 5B

1	2	3	4	5	6	7
Not at all similar						Exactly as manual dictates

Similarity of Both Administrations

Session 2

1	2	3	4	5	6	7
Not at all similar						Exactly the same

Session 5

1	2	3	4	5	6	7
Not at all similar						Exactly the same

APPENDIX I

It has repeatedly been shown that how an athlete responds to stress and feels before competition can significantly influence his or her performance. It is believed this is particularly true in a sport like archery. Consequently, sport psychologists have, in an attempt to help athletes mentally prepare for competition, provided services which athletes and coaches usually have reported as being helpful. Some coaches and sport psychologists, though, have effectively prescribed additional practice to help athletes prepare for competition and to help them cope with precompetitive stress. The problem is that not enough research has been conducted for sport psychologists to know what is most effective. The members of the Sport Psychology Department at the USOC, therefore, would like to study the effectiveness of the services they provide to archers.

All resident members of the National Training Program will take part in intra-team archery competitions every other week for the next 13 weeks. Five months after the last bi-weekly competition, there will be a follow-up competition. If you choose to participate in our study, you will be chosen completely at random, with a coin toss, to get either one extra hour of archery practice with Coach Myricks or one hour of Stress Management Training with Dr. Shane Murphy, Head of the Sport Psychology Department here at the OTC, per week for each of the next seven weeks. The groups will then be switched for weeks eight through 13. Before each of the bi-weekly archery competitions, you will be asked to put on a heart rate monitor and complete three short questionnaires which should only take about 20 minutes.

APPENDIX J

USOC DEPARTMENT OF SPORT PSYCHOLOGY
INFORMED CONSENT FORM

I,_____, freely consent to participate as a volunteer in a study of the effects of sport psychology services and archery practice on archery performance and archers' feelings prior to competition.

The study involves participation in eight intra-team archery competitions, during which I will wear a heart rate monitor and before which I will complete three short questionnaires regarding how I feel about the upcoming competition. I understand that the questionnaires will take roughly 20 minutes to complete. I also understand that I will be chosen at random to receive either 1 extra hour of archery practice or 1 hour of stress management training per week for the first 7 weeks. In addition, I also understand that after 7 weeks, the groups will be reversed so that I will have the opportunity to receive both "services." I further understand that 5 months after the 7th bi-weekly competition, a follow-up competition will take place.

The study and my participation in the study have been defined and fully explained to me and I understand this explanation. I have been given an opportunity to ask whatever questions I have and all questions have been answered to my satisfaction. I understand that my participation is voluntary and I may obtain information on the results of this study from the investigator at the address given below. I understand that all questionnaire answers and results will be treated with strict confidence and although group data may be presented to the National Archery Program Coach and Director, data on individuals will not be made available. In addition, total anonymity is guaranteed in any report of research findings in a professional publication. I FURTHER UNDERSTAND THAT I AM FREE TO WITHDRAW MY CONSENT AND DISCONTINUE MY PARTICIPATION AT ANY TIME WITHOUT PENALLTY OR RECRIMINATION IN ANY FORM. If I choose at any time not to participate, I understand that I will still be requested to take part in the weekly meetings and bi-weekly competitions as part of my training as an elite archer, however, my results will not be included in the study.

Date:_____
Age:_____ Signature:_____

Investigator: Michael Greenspan, M.A.
Department of Sport Psychology
United States Olympic Committee

APPENDIX K

Order of Administration of Instruments

Assessment 1: ATQ, PSIS-2, POMS

Assessment 2: POMS, ATQ, PSIS-2

Assessment 3: PSIS-2, POMS, ATQ

Assessment 4: PSIS-2, ATQ, POMS

Assessment 5: POMS, ATQ, PSIS-2

Assessment 6: ATQ, POMS, PSIS-2

Assessment 7: ATQ, POMS, PSIS-2

Assessment 8: POMS, PSIS-2, ATQ

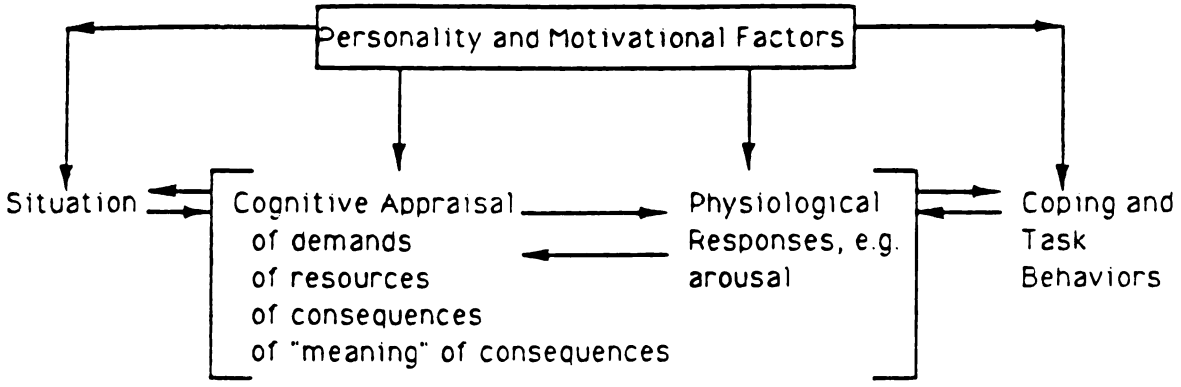
APPENDIX L

Prizes- Archery "Tournament"

Place	Prize
1st	Dinner for two, not to exceed $40
2nd	USOF 1990 registration fee paid ($30)
3rd	$15 Citadel Mall gift certificate
4th	USOC- OTC sweatshirt
5th	NAA polo shirt
6th	NAA t-shirt
7th	USOF 1990 pin
8th	NAA pin

APPENDIX M

MODEL OF STRESS



A conceptual model of stress showing interactive relationships among situational, cognitive, physiological, and behavioral components. Motivational and personality variables are believed to affect and interact with each of the components (Smith & Rohsenow, in press).

APPENDIX N

STRESS MANAGEMENT TRAINING PROGRAM

HOW TO LEARN DEEP MUSCULAR RELAXATION

The ability to relax deeply and quickly is an extremely useful coping response in dealing with stress. The following procedure should allow you to begin to master this important self-control technique within a week or so. Once mastered, the relaxation response can be used to cope with stress or tension as soon as you feel it beginning to occur. In addition, training will make you more aware of states of tension in your body so that you can respond immediately to reduce it.

It is recommended that the relaxation exercises be practiced at least twice a day until they are mastered. The exercises will initially require about 15 minutes of practice, but as you master the technique, the time required will become progressively shorter. Practice should be carried out in a comfortable chair, sofa, or bed, and in a quiet atmosphere.

1. Get as comfortable as possible. Tight clothing should be loosened and your legs should not be crossed. Take a deep breath, let it out slowly, and become as relaxed as possible.

2. While sitting comfortably, bend your arms at the elbow. Now make a hard fist with both hands and bend your wrists downward while simultaneously tensing the muscle of your upper arms. This will produce a state of tension in your hands, forearms, and upper arms. Hold this tension for 5 seconds and study it carefully, then slowly let the tension out half way while concentrating on the sensations in your arms and fingers as tension decreases. Hold the tension at the halfway point for 5 seconds, and then slowly let the tension out the rest of the way and let your arms rest comfortably in your lap. Concentrate carefully on the contrast between the tension you have just experienced and the relaxation which deepens as you voluntarily relax the muscles for an additional 10-15 seconds. As you breathe normally, concentrate on those muscles and give yourself the mental command to relax each time you exhale. Do this for 7 to 10 breaths.

3. Tense the calf and thigh muscles in your legs. You can do this by straightening your legs out while at the same time pointing your toes downward. Hold the tension for 5 seconds, then slowly let it out halfway. Hold at the halfway point for an additional 5 seconds and then slowly

relaxing the muscles as completely as possible. Again, pay careful attention to the feelings of tension and relaxation as they develop. Finish by giving the muscles the mental command, "relax," each time you exhale (7 to 10 times) and concentrate on relaxing them as deeply as possible.

4. Cross the palms of your hands in front of your chest and press them together so as to tense the chest and shoulder muscles. At the same time, tense your stomach muscles hard. As before, hold the tension for 5 seconds, then slowly let the tension out half way and focus on the decreasing levels of tension as you do so. Hold again for 5 seconds at the halfway point and then slowly let the tension out completely. Again, do the breathing procedure with the mental command to deepen the relaxation in your stomach, chest and shoulder muscles.

5. Arch your back and push your shoulders back as far as possible so as to tense your upper and lower back muscles. (Be careful not to tense these muscles too hard.) Repeat the standard procedure of slowly releasing the tension half way, then all the way. Finish by doing the breathing and mental command as you relax your back muscles as deeply as possible.

6. Tense your neck and jaw muscles by thrusting your jaw outward and drawing the corners of your mouth back. Release the tension slowly to the halfway point, hold for 5 seconds, and then slowly release the tension in these muscles all the way. Let your head droop into a comfortable position and your jaw slacken as you concentrate on relaxing these muscles totally with your breathing exercise and mental command. (You can also tense your neck muscles in other ways, such as bending your neck forward, backward, or to one side. Experiment to find the way that's best for you. Tense your jaw at the same time.)

7. Wrinkle your forehead and scalp upward to tense those muscles. Hold the tension for 5 seconds, then release it half way for an additional 5 seconds. Then relax the tension away completely. Focus on relaxing your forehead and scalp muscles completely, and use your breathing and the associated mental command to deepen relaxation.

8. While sitting in a totally relaxed position, take a series of short inhalations, about 1 per second, until your chest is filled and tense. Hold this for about 5 seconds, then exhale slowly while thinking silently to yourself the word "relax." Most people can produce a deeply relaxed state by doing this. Repeat this exercise

three times.

9. Finish off your relaxation practice by concentrating on breathing comfortably into your abdomen (rather than into your chest area). Simply let your stomach fill with air as you inhale and deepen your relaxation as you exhale. Abdominal breathing is far more relaxing than breathing into the chest.

APPENDIX O

STRESS MANAGEMENT TRAINING
Schedule of Training Sessions

Session 1. Orientation and relaxation training. The nature of stress is discussed as is the nature of coping with stress. Training is begun in progressive muscle relaxation which serves as a physical coping response.

Session 2. Continuation of relaxation training and discussion of the role of mental processes in coping with stress.

Session 3. Practice in the use of relaxation to control emotional responses induced during the session through imagining stressful archery situations. Development of coping responses.

Session 4. Practice in using relaxation and stress-reducing self-statements to control emotional reactions induced through imagination of stressful archery situations.

Session 5. Continued practice in use of coping skills with emphasis on application to actual performance situations. Combining of mental and relaxation coping skills into an "integrated coping response."

Session 6. Additional stress management principles and strategies. Training in the use of a relaxation technique having stress-reducing properties.

APPENDIX P

STRESS MANAGEMENT TRAINING PROGRAM

MENTAL CONTROL OF EMOTIONS AND STRESS

Thoughts and feelings are very closely connected to one another. Our emotional reactions are almost always the result of our general outlooks or our interpretations of specific situations. We are continually involved in talking to ourselves internally. Much of this self-talk probably occurs beyond our conscious awareness. It is carried on in a more or less "automatic" fashion, like the well-practiced skills of driving an automobile. However, people can learn to tune in to their self-talk and become aware of what they are telling themselves.

When we experience stress and other unpleasant emotions, we usually view these reactions as being directly triggered by disturbing situations. However, a careful analysis of what occurs would disclose that when the upsetting event occurs, we tell ourselves something about it ("This is awful!" "They're screwing things up for me!", etc.), and it is this self-statement that triggers the emotion. This sequence of events may be represented as:

Situation (A) -----→ Self-Statement (B) -----→ Emotion (C)

The A-B-C concept of emotion helps us understand why two different people can respond to the same situation with far different emotional reactions. It also suggests that by changing our internal self-statements at (B), we can change our emotional responses at (C). This can be accomplished by discovering what we are telling ourselves at (B), challenging those self-defeating statements, and replacing them with adaptive self-statements that decrease or prevent the emotional response. One goal of the Stress Management Training Program is to help you to learn and practice this important and effective means of coping with stress. Your task will be to learn to analyze specifically what you are saying internally to make yourself upset and to develop a set of specific self-statements that you can use to cope with disturbing situations. Thus, by the end of the program you will have a set of physical (relaxation) and mental (adaptive self-statements) tools to cope with stress.

How we distress ourselves.

What kinds of self-statements are involved when we experience anxiety, anger, and other negative emotions? One way to find out is to stop whenever you find yourself getting upset and ask yourself what you are internally saying to yourself that is causing the distress. You will find that in

most instances the sentences take forms such as, "Isn't it awful that...," or "Wouldn't it be terrible if...," or "What an (awful) (lousy) (rotten) thing for (me) (him) (her) (them) to do." In most cases you are either telling yourself that it is awful that things are not the way you demand that they be, or you are condemning yourself or someone else because your demands are not being met. (Often you will find that you are catastrophizing about something over which you have no direct control.)

We use the term "catastrophizing" to describe the kind of thinking that leads to much stress and emotional disturbance. By this we mean that relatively minor frustrations, inconveniences, and concerns are mentally blown up so that they become, for the moment, catastrophes which are emotionally reacted to as such (for it is appropriate to become very upset over true catastrophes). Much of our distress-producing thinking takes the form. "I don't like this situation! This is terrible! I can't stand it! It's driving me crazy! It shouldn't be this way! It's simply got to change or I can't possibly be happy!" If we stop and ask ourselves "How is it terrible that...?" or "Why would it actually be awful if...?" or "Who am I to demand that things be exactly the way I'd like them to be?" we will often find that we quickly get over being upset because we can readily see the irrational aspects of what we are telling ourselves. By systematically tuning in to your own internal statements about troublesome situations, you will find that you can pretty quickly pin down the thoughts that are producing your distress.

Stress-reducing thoughts.

A key to mentally coping with stress is an awareness of the role that your own thoughts play in generating distress. Whenever you feel yourself becoming upset, the first thing you should tell yourself is: "I am creating this feeling by the way I'm thinking. How can I stop myself from being upset?" This statement, or one like it, will not only serve to place things in proper perspective, but will also cause you to focus on your own stress-producing thoughts and on how you can substitute stress-reducing thoughts. It immediately alerts you that it is time to use the physical relaxation and mental coping techniques that are the focus of the Stress Management Training Program.

As we noted above, we often catastrophize when things are not the way we want them to be and thereby create our own stress. Indeed, we can go even further and suggest that <u>any</u> time we experience unpleasant emotions (stress, anger, fear) it is because things or people (including ourselves) are not the way we want them to be. Thus, the idea that things <u>should</u>

or must be the way we like them is an idea that we can focus on in developing stress-reducing thoughts. Here are some examples of self-statements that can be used to stop this irrational idea from triggering stress:

1. "I may not like this situation, but I certainly can live with it. No sense getting strung out."

2. "There's no reason why the world should revolve around my needs."

3. "Unfortunately, people don't always behave like I want them to. That's the way it goes--no use getting upset."

4. "Other people's needs are as important to them as mine are to me."

5. "I don't have to be perfect. I can make mistakes, too. I don't have to please everyone."

6. "O.K., so I don't like this. It's not the end of the world."

7. "Don't catastrophize, now. Put this in perspective."

8. "It would be nice if everything always went perfectly, but that's not the way life is."

9. If I catastrophize about this, I deserve to be upset."

10. "If I can change this situation, I should do so. Thinking about what I can do about this situation is better than getting upset."

11. "Keep cool. It's not that big a thing. Relax."

12. "Life is too short to let things like this make me miserable."

These examples should help you to develop your own set of self-statements for coping with difficult situations. You will find that you can almost always short-circuit unpleasant emotions by placing things in a non-catastrophizing perspective.

Intense emotion can often have a disruptive effect on performance. We can become so upset or angry that it is hard to function effectively. For example, some students become so anxious and fearful during tests that they cannot answer test

questions. One reason why intense emotions can disrupt performance is that we become so bound up in self-defeating thoughts about how terrible the situation is or will be that we cannot devote full attention to what we should be doing in order to cope with the situation. Here are some self-statements that people have used to help them reduce stress and keep their minds on the task at hand:

1. "What is it I have to do?"

2. "Don't think about being upset, just about what you have to do."

3. "Don't get all bent out of shape; just do what has to be done."

4. "Relax. You're in control. Take a deep breath."

5. "This upset is a cue for you to use your coping skills. Relax and think rationally."

6. "Focus on the present. What is it you have to do?"

We all know that behaviors that lead to positive outcomes become stronger and more efficient. One important source of reward for saying adaptive things to yourself is that they work and help you control your level of stress. Used in conjunction with your relaxation coping response, they give you powerful weapons against negative emotions. You can help this strengthening process along by internally rewarding yourself immediately after you use them effectively. When you feel yourself handling stress effectively, reward yourself; you're winning out over your deadliest enemy. Here are some examples of self-rewarding self-statements:

1. "Way to go! You're in control."

2. "Good--you're handling the stress."

3. "Beautiful--you did it!"

Coping competently with life's stresses increases self-confidence and resiliency. By developing your coping abilities, you can gain increasing control over your emotional life.

On the following pages are some specific suggestions for reprogramming your thinking to cope more effectively with problems involving perfectionism, anxiety, anger, and depression.

PERFECTIONISM

Core Ideas

1. "Shoulds": "I should always do my best."
2. All-or-nothing thinking: "I'm either perfect or a failure."
3. Global thinking: Poor grade on a math test = "I'm a failure" used to mean "failure in all aspects of my life."
4. Moralistic, condemning: "I should be punished for this failure." "I don't deserve any time off or any pleasure."

Approach: Logic

Why should you? Question any shoulds. Point out that although it would be better to be perfect, it doesn't mean you must be.

Who can be perfect all the time? No one can. God vs. human. Why shouldn't you be allowed to be human and make mistakes?

Point out all-or-nothing thinking. What is wrong with doing a little less well? That's not the same as a total failure.

Point out global overgeneralizations. Making one error does not mean you are totally incompetent. Yelling at your kids once does not mean you are a bad parent.

Question severe condemnation. Why should you be severely condemned for an error? What's so wrong with being only human?

Where did these ideas come from? Were you born with them? No, so you must have learned them. From who? Therefore, they are not necessarily laws of nature or gospel truth.

Approach: Consequences

Severe condemnation leads to poorer performance and to avoidance. Your intention in condemning yourself harshly for minor errors is to motivate yourself to do better, but you get so anxious and upset that you will do worse. Being less harsh is more effective.

You will spend most of your time upset at yourself and unhappy, since you are only human and therefore rarely perfect.

Since you do not reward when you are not perfect, life is grim, with many punishments and few rewards. This often leads to avoidance, not even trying to do anything with any challenge since you might "fail"

(i.e., be less than perfect).
What terrible consequence is going to result from being less than perfect or making an occasional mistake? If your worst feared consequence did happen, what would you actually do with your life then?

ANXIETY

Core Ideas

Vague but awful doom is impending.
"What if X happened??? That'd be terrible!!!"

Approach: Logic

Specify consequence
Answer the "what if" seriously.
List multiple possible consequences.
Probability of consequence
For each consequence (or for the "awful" one), decide how likely it is that it will occur.
Worst possible consequence
Specify the worst possible consequence, then, examine it. If necessary, keep asking "and what's so bad about that?" to find the ultimate consequence.
a) Consequence is not that bad.
Recognize this fact. What's so bad about that? How important is it?
How will it affect your life ultimately? Two weeks from now?
b) Consequence is bad.
(Death, lost job, major injury, divorce)
How would you handle it?
Is it the end of your life, or what would follow?
(People often don't think beyond the potential consequence.)

Some examples:
(1) When Boeing crashed in the 1960's, 25,000 engineers lost their jobs. Their worst fear came true. A study of these men found that most moved on to better jobs as a result!
(2) A bad grade means you won't get into medical school. What would you do with your life instead? Does your life end, or what alternative career would you pursue?
(3) A woman who had a number of members of her family die said she couldn't stand it if another one died. When another one died the next month, she found that she could stand it

- her life didn't end even though it hurt.

Approach: Coping

The consequence of vague anxiety is to not cope well with the threat. Use anxiety as a cue that something is wrong and needs attending to. Analyze seriously the potential consequences of the feared event. Plan coping strategies for dealing with the event and the potential consequences.

If it is not possible to change the event, decide to relax.

ANGER

Core Ideas

"Shoulds" are central to anger.

The world should be a certain way.

People should be polite and fair.

Condemnation is involved.

I hope those louses get theirs.

Mountains are often made out of molehills.

A big anger over a minor event, like traffic.

Approach: Logic

Why should they all be polite? I would like it if they were, but that doesn't mean they should be.

The world won't go the way we want it to. Why should the world revolve around my needs?

There are a lot of difficult people in the world -- I can't get upset every time I meet one, or I'd be upset all the time.

Often there is a good reason why they act like turkeys: They haven't had the advantage of your polite upbringing; their parents also threw beer cans out windows and ignored other people's feelings, so that's what they learned to do.

Catastrophizing: Am I making a mountain out of a molehill? How does it really hurt me that he cut in front of me in traffic? Big deal!

Approach: Consequences

If I let myself get tense and angry about all the unpleasant things that happen every day:

(1) I can get high blood pressure, a heart attack, etc.

(2) I'll obsess about it all day and feel lousy -- yuck!

Getting angry doesn't change anything for the better in many cases.

That guy who cut in front of me won't be affected by my anger.

Anger may make you deal <u>less</u> effectively with a situation.

If I growl at my spouse, that behavior might change, but he'll be no fun to live with for days; if I ask him to stop doing it without losing my temper, he will change and be much nicer as well.

Approach: Empathy

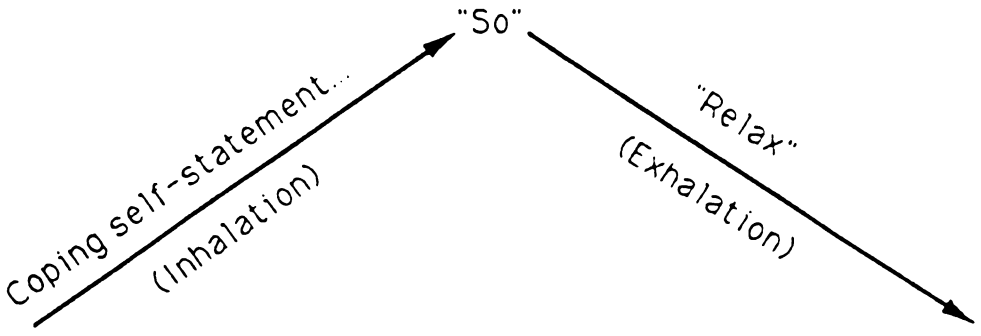
What do you think the other guy was thinking/feeling when he did that?

He didn't see you; he was in a hurry; he'd had a real bad day; he didn't know you would feel bad about that.

The other guy didn't have the advantages of your polite upbringing or doesn't have your mental abilities.

APPENDIX Q

INTEGRATED COPING RESPONSE SCHEMATIZATION



For example, "it's not that big a thing... so... relax."

"I may not like this, but I can definitely stand it... so... relax."

"I need to concentrate, not to make myself uptight... so... relax."

"I'm in control... so... relax" (Smith & Rohsenow, in press).

APPENDIX R

STRESS MANAGEMENT TRAINING PROGRAM

THE RELAXATION RESPONSE: A GENERALIZED STRESS REDUCTION TECHNIQUE

Based on Herbert Benson, M.D. (with Miriam Z. Klipper), The Relaxation Response. New York: Avon Books, 1976.

The relaxation response is a means of counteracting the typical fight-or-flight emotional response to the stresses and tensions of everyday living. Fight-or-flight is sometimes an appropriate response, but when it occurs repeatedly, it can have detrimental psychological and physiological effects, such as anxiety or hypertension. Research has shown that the relaxation response can be learned rather quickly and that it lowers oxygen consumption, heart rate, respiration, and blood lactate (which accompanies anxiety). These changes are indicative of decreased activity of the sympathetic nervous system and represent a hypometabolic, or restful, state. On the other hand, the physiologic changes of the fight-or-flight response are associated with increased sympathetic nervous system activity and represent a hypermetabolic state.

The relaxation response technique developed by Dr. Herbert Benson is a generalized version of a variety of Eastern and Western religious, cultic, and lay meditation practices. Four basic components are common to techniques such as yoga and Transcendental Meditation:

1. **A Quiet Environment:** Ideally, you should choose a quiet, calm environment with as few distractions as possible. The quiet environment contributes to the effectiveness of the repeated word or phrase by making it easier to eliminate distracting thoughts.

2. **A Mental Device:** To shift the mind from logical, externally oriented thought, there should be a constant stimulus: A sound, a word, or a phrase repeated silently or aloud. Since one of the major difficulties in the elicitation of the relaxation response is "mind wandering," the repetition of the word or phrase is a way to help break the train of distracting thoughts. Your eyes are usually closed if you are using a repeated sound or word. Attention to the normal rhythm of breathing is also useful and enhances the repetition of the sound or the word.

3. **A Passive Attitude:** When distracting thoughts occur, they are to be disregarded and attention redirected to the repetition or gazing. You should not worry about how well you are performing the technique, because this may well prevent the relaxation response from occurring. Adopt a "let it happen" attitude. The passive attitude is perhaps the most important element in eliciting the Relaxation Response. Distracting thoughts will occur. Do not worry about them. When these thoughts do present themselves and you become aware of them, simply return to the repetition of the mental device. These other thoughts do not mean you are performing the technique incorrectly. They are to be expected.

4. **A Comfortable Position:** A comfortable posture is important so that there is no undue muscular tension. Some methods call for a sitting position. A few practitioners use the cross-legged "lotus" position of the Yogi. If you are lying down, there is a tendency to fall asleep. The various postures of kneeling, swaying, or sitting in a cross-legged position are believed to have evolved to prevent falling asleep. You should be comfortable and relaxed.

The subjective feelings that accompany the elicitation of the relaxation response vary among individuals. The majority of people feel a sense of calm and feel very relaxed. A small percentage of people experience ecstatic feelings. Other descriptions involve feelings of pleasure, refreshment, and well-being. Still others report little change on the subjective level. Regardless of the subjective feelings, there is objective evidence of the physiologic changes that accompany a hypometabolic, or restful, state.

It is important to remember that there is no single method that is unique in eliciting the relaxation response. In other words, using the basic components, any one of the age-old or newly-derived techniques (e.g., Transcendental Meditation) produces the same physiologic results regardless of the mental device used. The following noncultic technique was developed, with little embellishment, from the four basic components found in the myriad of historical methods:

1. Sit quietly in a comfortable position.

2. Close your eyes.

3. Deeply relax all your muscles, beginning at your feet and progressing up to your face. Keep them relaxed.

4. Breathe through your nose. Concentrate on your breathing. As you breathe out, say the word, "ONE" silently to yourself. For example, breathe IN . . . OUT, "ONE"; IN . . . OUT, "ONE"; etc. Breathe easily and naturally.

5. Continue for 10 to 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed and later with your eyes open. Do not stand up for a few minutes.

6. Do not worry about 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 "ONE." With practice, the response should come with little effort. Practice the technique once or twice daily, but not within two hours after any meal, since the digestive processes seem to interfere with the elicitation of the relaxation response.

This meditation technique complements the progressive muscle relaxation technique in Appendix C. That technique is designed to help you learn a bodily response that you can apply quickly in stressful situations to counteract emotional arousal. Obviously, you cannot sit down and meditate in such situations. Meditation, on the other hand, produces mental as well as physical relaxation, and it can be used as a general stress reduction and energizing technique.

APPENDIX S

ARCHERY MENTAL TOUGHNESS TRAINING
SUMMARY SHEET

Here are some ways that the relaxation and thought control strategies that we've been learning can be used in other situations that may bother you:

AVOIDANCE

We all tend to try to avoid those things that we fear. If we are successful in avoiding it, we get a feeling of relief, which makes it even more likely that we will try to avoid that thing we fear in the future.

Now, it is reasonable to avoid certain things you fear--poisonous snakes, for example! Other things may not be so reasonable: for me, for example, it would not be in my best interest to avoid talking to people, if that's what I was afraid of! So you must decide if what you are avoiding is in your best interest.

You can use your coping skills and learn to face feared situations, especially if you do so in little steps.

SELF-DESENSITIZATION

One way to do this is to start by vividly imagining what you fear, rather than starting by approaching it in real life. By using your relaxation skills as your way of coping, you can learn to replace your fear with the relaxation. In order to get you used to thinking about the feared thing, it is very helpful to construct a hierarchy, where the bottom rung of the hierarchy is something related to the object that you fear, but is not very scary by itself. For example, if you were afraid of spiders, you probably would not want to start off by imagining you are holding a spider in your hand. Rather, you would maybe imagine seeing a spider from a great distance.

For example:	Your hierarchy:
5. Holding a spider in my hand	5._____
4. Looking very closely at a spider	4._____
3. Seeing a spider from 10 feet away	3._____

2. Being in the same room as a spider 2._____

1. Seeing a picture of a spider 1._____

Don't try to go through the entire hierarchy all at once; do it for only half an hour a day, going through just one or two items on your hierarchy, and always start a day with the last step you did successfully while relaxed the previous day. It is also important to include some real-life desensitization after you have done the imagined practice.

This process can also be used for problems dealing with anger by putting a situation that makes you very angry at the top of your hierarchy and then imagining yourself coping with progressively more anger-producing situations until you can cope with the original situation.

HOW YOU CREATE YOUR OWN SITUATIONS

We often create our own stressful situations that we then react to with stressful feelings. That is, we may accidently promote some behaviors in others that we don't like by the way in which we react to them.

For example, parents who punish their kids, only to find that their kids' misbehaviors are getting worse:
Kids' good behaviors---ignored by parents
Kids' misbehaviors---get (negative) attention from parents

As a general rule, if someone is responding to you in some consistent fashion, ask yourself what <u>you</u> are doing to maintain that behavior, and what you can do to change your behavior.

OBSESSIVE THOUGHTS

Sometimes we are bothered by some unpleasant thoughts that just won't quit; we obsess about something.

Every time you catch yourself thinking the obsessive thought, silently yell the word "stop" to yourself, then switch your thoughts to some pleasant thoughts instead. Gradually, the obsessive thoughts will decrease.

MEDITATION (see the handout--Appendix F--for a more complete explanation)

Sit quietly in a comfortable position
Close your eyes
Relax your body until all your muscles are loose
Become aware of your breathing
Each time you breathe out, pick a word to say silently to yourself
Breathe in...out/"your word," in...out/"your word,"...

After 10 to 20 minutes, just open your eyes and sit quietly for a few moments before standing up. Good times to meditate are in the morning when you first get up or when you return home from school or work. You can meditate twice a day for 20 minutes, or when you are feeling stressed. Meditation is especially useful because it provides a way to shut off those obsessive stress producing self-statements.

APPENDIX T

Computer Program

Line	Column	Variable
1	1	ID
1	2	Assessment
1	3	Sex
1	4-5	Age
1	6	Block
1	7	Group
1	9-21	Marlowe-Crowne Social Desirability Scale-Short Form
1	23-74	Archery Score
2	2-69	Archery Score (Cont.)
2	71-73	Automatic Thoughts Questioonnaire
3	1-27	Automatic Thoughts Questionnaire (Cont.)
3	29-67	Psychological Skills Inventory for Sports-2
3	69-73	Profile of Mood States
4	1-60	Profile of Mood States (Cont.)
4	62-73	Competitive State Anxiety Inventory-2
5	1-15	Competitive state Anxiety Inventory-2 (Cont.)
5	16-18	Contamination Checks/Intervention Checks
5	20-56	Intervention Checks

APPENDIX U

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APPENDIX V

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Tempe, AZ 85287

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