To the Graduate Council:

I am submitting herewith a thesis written by B. Andrew Henderson entitled "A Case Study of the Development, Implementation, and Evaluation of a Combined Physical and Mental Performance Enhancement Program for a High School Cross-Country Runner." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Human Performance and Sport Studies.

Craig A. Wrisberg, Major Professor

We have read this thesis and
recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor
And Dean of the Graduate School

A CASE STUDY OF THE DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF A COMBINED PHYSICAL AND MENTAL PERFORMANCE ENHANCEMENT PROGRAM FOR A HIGH SCHOOL CROSS-COUNTRY RUNNER

A Thesis

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ABSTRACT

Researchers suggest that a combination of physical prowess and mental toughness is required for continued optimal athletic performance. More and more athletes are realizing the benefit of individualized, sport-specific training, which often includes physical conditioning and/or psychological skills training. While professional and elite amateur athletes are often research participants, data concerning the implementation of such training at the high school level is sparse. Thus, using a single-participant case study design, the complete process of developing, implementing, and evaluating a combined mental and physical training program for a high school athlete was conducted and described. The participant was an 18-year old male cross-country runner. Sport training involved both strength training sessions and sport psychology consultations. Data included the athlete's and coach's interviews, Goal Attainment Scales, the Profile of Mood States inventory, the Competitive State Anxiety Inventory-2, and performance statistics for the season. While the participant did not achieve all of the goals he originally set at the season's start, he was able to set a new personal performance record during the season and he and the coach both endorsed the intervention.

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Chapter I

INTRODUCTION

Introduction

This study was an attempt to assess the effectiveness of integrating mental and physical training into a unified service. Despite the surplus of anecdotal evidence regarding the "psychology of coaching" as well as a rapidly growing body of literature on the psychology of exercise and physical training, there is very little published research on the efficacy of a combined program of psychological skills training and physical strength/endurance training on athletic performance. Considering the importance of both mental and physical "fitness" in competitive athletics, this step towards the unification of services seems worthy of further investigation.

As the level of skill among sport participants rises, the difference in physical talent decreases (Weinberg & Williams, 1993). Therefore psychological factors are often crucial in determining success in competition. Orlick (1990) noted that "Personal excellence is largely a question of believing in your own capabilities and fully committing yourself to your own development" (pp. 8). The athlete must devote large amounts of time and energy to sport preparation if success at higher levels of competition is to be reached. Not surprisingly, commitment to training, both physical and mental skills, and strong confidence in one's ability are common themes in the applied sport psychology literature (e.g., Elliott, 1991; Nideffer, 1992; Williams & Krane, 1993).

The drive to succeed in sport is often established during the early years of participation. Youth and high school sport provide an arena for the demonstration of athletic prowess, social/peer comparisons, and evaluation from highly significant others. Smith and Smoll (1991) noted that for adolescents in search of identity and social acceptance in peer groups, the value placed on success in sport might have particularly crucial implications. As the level of competition in sport escalates with age, the demands placed on the competitive athlete typically increase as well. Simply earning a spot on the varsity team may be difficult; and, if the adolescent athlete wishes to participate at the collegiate level, he or she must

clearly demonstrate superior performance. Winning a starting role or athletic scholarship in college sport is even more difficult.

This drive to achieve athletic excellence has resulted in poor decisions, such as anabolic steroid use by high school athletes (Corbin, Feyrer, Phelps, & Lewis, 1994; Engel, 1989; Marquart & Sobal, 1993). The psychological and physiological effects of competitive stress on young athletes have been well documented by Gould, Horn, & Spreeman (1983), Smith and Smoll (1991), and Smoll and Smith (1990, 1996). Carr, Kennedy, and Dimmick (1990) reported that, compared to non-athletes, a significantly greater proportion of male high school athletes use alcohol. Carr and Murphey (1995) cited Griffin, who linked increased alcohol consumption with additional stressors placed on athletes by competitive sport. Clearly many young athletes value success in sport greatly, and the literature suggests that both external and self-imposed demands on high school athletes are manifested through certain behavioral trends.

Researchers lend support for the effectiveness of many types of sport psychology interventions. Relaxation and arousal control techniques have been used successfully to reduce stress (Smith & Smoll, 1989), preparing for imagery and self-hypnosis (Orlick, 1990), and in enhance concentration (Elliott, 1991). Imagery (Vealey & Walter, 1993) and attentional control (Nideffer, 1992) have been linked to enhanced performance in a wide variety of sport settings. Motivational techniques such as goal setting (Locke & Latham, 1985) have been found to be widely successful both in controlled research and clinical application. Many other forms and variations of intervention have been found to positively influence athletic performance and these techniques are continually being refined to further enhance their efficacy.

Despite the demonstrated efficacy of psychological skills training for performance enhancement in collegiate and professional sport, Bull (1991) and Greenspan and Andersen (1995) reported a limited amount of information on sport psychology consultation for high school athletes. An increasing amount of research has focused on youth sport interventions, particularly in the areas of coaching (e.g., Smoll & Smith, 1981, 1987; Stern, 1992) and parenting (McElroy & Kirkendall, 1980; Smoll & Smith, 1987; Weiss, 1995). However, most of the studies involved younger children in sport programs outside of the

school and none examined the influence of mental training interventions on the behavior of actual sport participants.

The limited data on high school age participants suggests that few high school athletes are being exposed to mental training techniques. Various reasons for the limited use of mental training programs in high school sport have been identified. Hughes (1990) cited limited athletic budgets as a primary explanation for the absence of sport psychology consultation in high schools. Haslam & MacDonald (1991) indicated that coaches have concerns about the implementation of psychological skills training possibly due to their lack of their lack of sport psychology knowledge, concerns about possible detrimental effects on performance, and difficulties connected with including the material in the practical training environment.

The few existing studies of psychological skills training programs for high school athletes have typically revealed support for their efficacy (e.g., Hughes, 1990). Research suggests that mental training should begin at a young age and that it is effective for both novice and skilled athletes (Weinberg & Williams, 1993). Greenspan and Andersen (1995) noted that the implementation of certain clinical sport psychology services might be more successful at the high school level than at the college level. These services included consultation on transition to college athletics (or sport career termination), eating disorders, and substance abuse.

High school athletes face specific challenges in reaching their maximum potential in sport. Whereas professional and elite amateur athletes (i.e., Olympic, NCAA Division I) are typically provided with the services of several coaches, a physical trainer, a sports medicine specialist, and a sport psychology consultant and/or psychological counselor (Hughes, 1990), high school athletes receive most of their physical conditioning, sport-instruction, and mental training from a head coach or an assistant coach. A high school coach's limited time and resources must be distributed across the entire team and may often be focused on winning rather than the improvement of the mental and physical skills of all participants. As Smoll and Smith (1984) reported, coaches lack of information and awareness on how they affect their athletes is usually the case.

The literature contains several reports on the use of coaching strategies involving both physical practice/conditioning and mental training. Elliott (1991), a high school track and field All-American, Big Eight-Conference champion, and high school coach described his use of mental training with his cross-country team. He integrated both group and individually based interventions such as goal setting, relaxation, and imagery into everyday practices. However, most high school coaches likely have neither Elliott's knowledge of mental preparation nor his extensive athletic and coaching experience and they may not be as proficient or comfortable as he is in applying psychological skills training.

The consistency and quality of mental training is paramount to its successful implementation. Orlick (1990) stated that athletes often fail to perform well in important events because "They have not done enough quality imagery, quality training, and competition simulation to refine the mental and physical skills required to excel in competition" (pp.11-12).

Although Hughes (1990) successfully instructed secondary school coaches on using mental training with athletes, other obstacles exist. The nature of high school athletics, the characteristics of adolescent sport participants, and adherence research suggest that the athlete who *does* receive instruction for mental training from the coach may not rehearse the skills frequently enough or with sufficient quality to be effective. The typical sport season lasts approximately three to four months, leaving the rest of the year for the athlete to maintain his or her skills without coach supervision. The athlete's academic demands, emotional issues, social and family activities and part-time jobs can interfere with continued practice and refinement of skills during the off-season. Bull (1991) identified self-motivation as a significant predictor of compliance to mental skills training. Athletes' motivation may wane if noticeable results aren't readily achieved, which could result from lack of *quality skills practice,* forming a vicious circle of sorts. Thus the aspiring athlete may not adhere to a mental training program at a level necessary for desired benefits to be realized.

While psychological variables are extremely important in determining athletic success at higher levels of competition, athletes must also have the necessary physical assets such as skill, speed, strength, stamina, and coordination. Exercise science research has consistently emphasized the importance of

physical conditioning for improved sport performance. In endurance sports such as distance running, the athlete's level of cardio-vascular fitness often directly correlates with sport performance (Galloway, 1984). Muscular strength and flexibility are also cornerstones of most comprehensive physical training programs.

Consistent off-season training is crucial for athletes aspiring to achieve peak performance during competition (Emmerton, 1992; Lananna, 1992). Programs for distance runners typically focus on endurance, speed, strength, and flexibility. A mileage 'base', a specified number of miles run each week, serves as the cardiovascular foundation for most runners entering their competitive season. Interval training and fartlek are two methods of developing leg speed for distance running. The benefits of strength training for distance runners have been widely supported by most of the literature. Adelizi (1992), Boughton (1992), and Galloway (1984) outline specific regimens to increase the runner's speed and explosiveness. These typically include both weight lifting for the upper body and hill running to develop leg strength.

Applied sport psychology researchers generally acknowledge the importance of combining mental and physical training to reach optimal performance (e.g., Chalmers, Gmitroski, & Johns, 1994; Elliott, 1991; Krattli, 1991). Nideffer (1992) explained that "Any mental skills training program that promises to improve performance must affect performance-related physiological variables" (pp.viii). Establishing the link between intervention and performance may be even more vital in applied research, where issues of validity predominate.

The role of the sport psychology consultant and conditioning coach as important members of the athlete's support 'team' is a noteworthy concept. Gardner (1995) likened the organization of a professional team to the structural hierarchy of many corporations: There are specific duties for each position and different levels of authority upon which interactions of various dynamics are based. While Gardner's main objective was to define the role of the sport psychologist in a team setting, consultation with an elite individual athlete may also include similar dynamics in relationships with coaches, significant others, athletic trainers, and agents. The high school athlete may have a similar, albeit less complex network of support, usually including parents, coaches, and athletic directors. To date, the roles

of the sport psychology consultant and athletic trainer for the high school athlete remain relatively unexplored by researchers.

Appropriate physical and mental preparation for sport appear to be critical for athletes who aspire to achieving peak performance, and in many ways these types of preparation are interrelated. Quality and consistency are crucial if results are expected from either physical conditioning or mental training. Self-motivation has been identified as a significant predictor of adherence to both psychological skills training (Bull, 1991) and physical exercise (Dishman & Ickes, 1981). Supporting athletic personnel often aid the athlete in developing mental and physical skills, assist in setting goals, and provide feedback and encouragement. The athletic trainer and sport psychology consultant both serve to help the athlete achieve their maximum potential through conditioning both the body and mind.

Sport psychology researchers have initiated cross-disciplinary research into fields as diverse as clinical, counseling, and organizational psychology, sociology, motor learning and behavior, health care, and education. The clinical sport psychologist may work with athletes on issues not directly related to sport performance, such as eating disorders (e.g., Swoap & Murphy, 1995), substance abuse (Engel, 1989), and marital conflicts (Coppel, 1995). From a 'performance enhancement' perspective, a holistic approach to consultation might include the mastery of mental skills, attempts to resolve sport and non-sport related issues, and the establishment of guidelines (e.g., proper rest, nutrition, exercise adherence) for maximizing the potential of the athlete.

The shift toward a more comprehensive approach to the conditioning of athletes has also influenced research in applied exercise science and athletic training. A growing amount of fitness, exercise, and athletic training literature focuses on the psychological aspects of physical training such as motivational techniques (e.g., Rejeski, 1991) and arousal control (e.g., Inomata, Matsuda, & Takeda, 1990). The athletic trainer may be required to implement a certain amount of 'psychology' in the strengthening and conditioning of athletes, and may often have some degree of formal education in psychology. Just as a fundamental knowledge of the physiological aspects of athletic preparation is

required of the sport psychology consultant, a successful strength and conditioning trainer should be aware of the psychological factors impacting the sport participant's physical preparation.

Based on the existent literature, it seems logical to propose that the presence of qualified athletic trainers and sport psychology consultants in high school sport would serve to enhance the experience and the performance of the athlete. However, most high school athletic departments lack the financial resources for staffing of the sort (Hughes, 1990), and thus little information exists on such an implementation of services. While the specifics of organizing such a program are far away, it seems that exploratory research into this area is warranted.

In the present study, a case study design was used in an attempt to assess the effectiveness on performance of integrating mental and physical training into a single service for the athlete. An in-depth profile of the athlete's experience was obtained by collecting both qualitative and quantitative data.

The use of case study design in sport research is gaining in popularity. Smith (1988) supported the use of the case study to provide unique observations on real life interventions that are too complex for experimental strategies. The participant may feel a greater sense of contribution to the study and his or her feedback may actually be included as a source of construct validation. Vernacchia (1977) suggested that the case study "may serve as a technique for coaches and researchers who wish to scientifically and empirically evaluate their athletes with the purpose of increasing performance effectiveness" (pp. 105).

Weinberg & Williams (1993) proposed that a semi-structured interview with the athlete be conducted prior to the implementation of psychological skills training. This initial interview should have several general questions to provide some structure, but the researcher should be able to formulate follow-up questions based on the athlete's responses. The interview should serve to help determine the athlete's needs and provide the basis of a trusting practitioner-client relationship. Combined with objective performance data and selected inventories, the semi-structured interview may add depth and context to the case study report.

Statement of the Problem

Psychological variables (Williams, Krahenbuhl, & Morgan, 1991; Chalmers, Gmitroski, & Johns, 1994) and physiological conditioning (Boughton, 1992; Gunn, 1992) are strongly associated with running performance. However, no systematic research exists on the implementation of a comprehensive mental and physical performance enhancement program for the high school athlete. Therefore, the present study was directed toward filling the above research void.

Operational Terms and Definitions

The following terms and operational definitions are used throughout this study:

Attentional Control – a skill acquired through mental training which enables the athlete to quickly shift concentration between broad/narrow and external/internal stimuli as required during a cross-country meet. (Nideffer, 1992).

Case-Study method - a research design involving one primary participant, a high-school runner, and his coach.

Goal Attainment Scaling (GAS) - a system of objectively measuring progress towards goal achievement according to predetermined goal outcome scales developed by the participant and researcher.

Goal Setting – the process of identifying the athlete's own specific, challenging, and quantifiable short and long term goals for practice and performance; the athlete was encouraged to base these goals on controllable process behaviors (e.g., stretching every day) rather than uncontrollable outcomes (e.g., finishing in first place).

Imagery – a psychological skill that incorporates the use of multi-sensory visualization to rehearse performance and re-create practice and competition experiences.

Mental skills training - a systematic instruction and practice of psychological skills such as imagery, stress management, relaxation, and attentional control; designed to prepare the athlete psychologically for competition.

Mood states - emotions of a transient nature which have been associated with running economy; in this study mood states were measured prior to selected competitions using the Profile of Mood States inventory; the mood states included tension, depression, anger, vigor, fatigue, and confusion.

Motivation – the desire of the athlete to train diligently for competition to perform at his highest possible level.

Performance baseline – three timed runs by the participant on his high school's cross-country course.

Performance enhancement program - the intervention that focused on the psychological and physical preparation of the athlete for improved performance in competition.

Performance statistics - measurements of the athlete's performance during competition; includes the athlete's time in cross-country races and his position of finish on the team.

Physical conditioning – the aspect of the intervention that attempted to improve the athlete's muscular strength, running speed, and flexibility.

Plyometrics – a method of physical conditioning that trains the muscles by incorporating explosive movements, with and without resistance.

Pre-competition routine – a series of behaviors and cognitions developed by the athlete to use prior to competition.

Race strategy – a plan developed by the athlete, coach, and researcher consisting of specific racing tactics to be used by the athlete in cross-country meets.

Relaxation – the learned ability to control psychological and physiological arousal with breathing, progressive muscle relaxation, and cognitive techniques such as imagery.

Running Economy (RE) – the amount of oxygen required to run a given submaximal speed; RE is associated with both cardiovascular conditioning and psychological states of affect.

Stress management – a learned technique in which anxiety is recognized and controlled using a variety of physical and mental techniques.

Strength training program – the aspect of the performance enhancement intervention designed to increase the muscular strength of the athlete in a way that improves running form and speed.

Assumptions of the Study

The following assumptions were made in reference to this study:

1. The information gathered in the study would be useful in understanding the perceptions of a high school athlete towards mental and physical training.
2. The participant was truly committed to personal performance improvement and approached the intervention techniques seriously.
3. The physical and mental training techniques employed throughout the intervention would typically result in improved performance.
4. The participant and coach, to the best of their ability and memory, honestly and accurately answered the questions posed to them during the interview sessions.

5. The participant honestly and accurately provided information concerning his daily goal-attainment scores and answered honestly on the inventories used throughout the diagnostic and intervention period.

Limitations of the Study

1. The use of only one high-school athlete represents a limitation. An attempt was made to obtain an in-depth look at the implementation of a performance-enhancement intervention and the perceptions of one athlete concerning the effectiveness of the intervention. However, no causal attributions can be made between the intervention and athletic performance in general. Likewise, findings from this study can not be generalized to other athletes.
2. The athlete and coach's truthfulness in their responses on questionnaires and during interviews represents a second limitation. This may be particularly evident in the discussions concerning perceived effectiveness of the intervention; research participants may occasionally attempt to please the researcher by responding in a way that he or she thinks the researcher desires.

Significance of the Study

The primary significance of this study lies in describing the development and implementation of a high school level performance enhancement program and obtaining the perceptions of the athlete and coach during the evaluation of the program. I wanted to help the athlete improve his performance and used several means of assessing the intervention. A thorough and detailed outline of the intervention's stages was attempted.

The implementation of both physical conditioning and psychological skills training is not uncommon in elite level athletics and has received considerable attention from researchers. Data supporting the effectiveness of mental training techniques for highly skilled athletes abounds. However, relatively little information concerning sport psychology for the high school athlete exists despite reports suggesting that mental skills training might be more effective if started in high school rather than college

(Bull, 1991; Greenspan and Andersen, 1995). The fields of sport psychology and athletic training are themselves well established, and on occasion their functions overlap (i.e., psychological interventions during injury rehabilitation and in promoting exercise adherence). However, the combined influence mental skills training and physical conditioning as a unified performance enhancement service has received little attention from researchers. Therefore an attempt was made in this study to combine these services into one intervention package and describe the perceptions and experiences of the participating athlete concerning the program's effectiveness.

Chapter II

REVIEW OF LITERATURE

Introduction

This literature review summarizes research regarding both case study design and the bases of mental and physical athletic preparation. Smith (1988) discusses methodological issues and offers practical suggestions for the use of the case–study. Many of his recommendations were followed in this study.

The literature concerning performance enhancement for athletics draws largely from sport psychology research. The research is organized according to breadth of information covered, starting with more general concepts that apply to many different sports and situations. The reviewed pieces gradually narrow in scope to focus on specific interventions for the distance runner.

The Research Design

Smith (1988) argued that sport psychology should remain open to alternative scientific paradigms and methods of inquiry. Although unable to substantiate causal attributions, the case study is a valuable research tool for gaining insight into underlying athletic behavior. It is particularly useful in the investigation of infrequent phenomena for which statistically significant groups are difficult to organize. In addition, the case study design is open to both quantitative and qualitative data collection. Case studies have also traditionally provided hypotheses and ideas concerning behavior, its causes, and processes of change. Theory development and subsequent research often stem from the dramatic or persuasive presentation of evidence obtained in case studies. Refutation of a theory may also begin with a case study that provides clearly contradictory findings.

The use of the case study is especially advantageous to the applied researcher/practitioner of sport psychology. Case studies offer unique observations into intervention techniques and possible causal links of real life interventions that are too complex to examine using conventional experimental strategies. The

participant may feel a greater sense of contribution to the study and his/her feedback on the study may actually be included as a source of construct validation.

The case study is traditionally performed without the use of experimental control. However, in practice, the case study represents a continuum that ranges from extensive observations and informal anecdotal reports on a single person to multiple objective measures made before, during, and after the event of interest.

Smith (1988) compared the case study to the single-subject experimental design, which due to greater experimental control permits greater specificity in making causal interpretations. However, the data from case studies may itself be highly inferential and subject to heavy interpretation by the researcher and subject. Case studies, which do utilize objective measures, still tend to use less control in manipulating the independent variables(s) than do single-subject designs. For this reason, even case studies utilizing treatment or experimental interventions are still at best quasi-experimental in nature.

The case study, despite its lack of precision and inability to rule out alternative hypotheses, is still the best research approach in some situations. When a "how" or "why" question is being asked about events over which the researcher has little or no control, the case study is typically invaluable. Despite the normally vague boundaries between the phenomenon and its natural context in these situations, there are techniques the researcher may use to rule out alternative hypotheses. Smith (1988) discussed these techniques in his subsequent sections on case study designs and validity.

Case studies vary greatly in their complexity of design. A single subject case study is generally simpler and involves the investigation of only one subject or unit. A multiple case study investigates more than one individual and is based on either replication logic or sampling logic. Replication logic based research does not attempt to sample representatively from the population. An example would be the administration of identical intervention programs to different athletes. If similar results occurred, then the researcher could have greater confidence that any changes in performance were a result of the intervention. Conversely, sampling logic might dictate that a different modification of the intervention be used with each of the athletes in order to detect the most effective variant.

Smith (1988) argued that a multiple case study viewed within a replication framework provides stronger support for theory development than does the single case design. Successful literal (i.e., subject exposed to intervention) replications promote greater confidence in the conclusions of the case study outcome. However, additional support for the conclusions of a single case study design may be provided if the study's results are predicted by a theoretical hypothesis.

Case studies also differ according to the extent which sub-units are studied. A *holistic* design looks at the performance of a team or an athlete as a whole. For example, a sport psychologist may base the effectiveness of an intervention for a football team on the coaches' film grading of the entire team. An *embedded* approach would use ratings of team sub-units, such as offensive line, special teams, or even individual players. Thus the embedded design would provide more information about the individual factors that would affect the intervention program's effectiveness.

As in all research designs, the validity and reliability of a case study is crucial in minimizing ambiguity. Smith (1988) discussed construct validity, internal and external validity, and reliability in relation to the case study design and offers suggestions for their optimization.

Construct validity is the extent to which "specific situational or intervention conditions on the one hand, and outcome measures on the other, constitute adequate operational definitions of the concepts involved in the "if-then" theoretical propositions". (p. 4) In research involving intervention for performance enhancement, it must be reasonably clear that the intervention was responsible for bringing about any changes, rather than some other extraneous factor. This is the crux of construct validity. Smith (1988) differentiated the construct validity of the 'conventional', often self-evident measures like batting average or running speed to those of 'a more psychological nature', such as anxiety or mental toughness. Measuring constructs of a less obvious, psychological nature may require ingenuity of the researcher.

Smith (1988) proceeded to outline and describe several techniques for increasing the construct validity of a case study. Multiple measures of the same psychological constructs or processes will serve to enhance the construct validity. This process, termed the 'development of converging lines of inquiry', provides more compelling evidence than does a single measure of change. Clear linkages between the

outcome measures and the factors to which the outcome is attributed also increase the study's construct validity. Finally Smith suggested having the subject and key informants read the draft of the case study report would help to demonstrate the construct validity of the outcome measures.

Drawing valid causal conclusions is the goal of most case studies. Internal validity refers to the extent to which alternative explanations can be ruled out in explaining the phenomenon. Both methodological flaws and competing theoretical viewpoints threaten internal validity. However, for purely descriptive case studies, Smith (1988) contended that internal validity is 'germane'.

As with construct validity, several suggestions are made to increase a case study's internal validity. First, the researcher should collect qualitative or quantitative measures of outcome in a systematic fashion. Smith (1988) warned that many clinical researchers have negative opinions of the case study because many investigations have been purely anecdotal in nature. It is also suggested that continuous assessment, rather than only pre- and post-tests, be utilized to further substantiate any causal conclusions. In addition, Smith contended that existing research literature or a sufficiently long baseline period be used to thwart maturation or history as rival explanations for the observed change. These suggested procedures are designed to ensure that the "causal factors to which the outcome is attributed are the most parsimonious and plausible explanation for any observed change". Thus the value of the case study resides in how effectively rival explanations can be ruled out, not if experimentation is utilized.

Data interpretation strategies are also useful in maximizing the case study's internal validity. Techniques such as pattern matching, time-series analysis, and goal-attainment scaling can add to the confidence with which causal conclusions are made.

Pattern matching can include the comparison of an empirically based pattern of outcomes with a predicted one or several predicted alternatives. If the empirical and predicted patterns match closely, than additional support is provided for the internal validity of the results. In addition to outcome pattern matching, the "independent variables" may also be used. A different intervention or situation may be used for each case in a multiple case study in which each circumstance should theoretically lead to a different outcome pattern. If these different outcomes do in fact occur according to theoretical

expectations, while the predicted patterns from competing theoretical premises do not, a clear basis for favoring one hypothesis over others is founded. Smith (1988) added that a certain degree of subjectivity is inherent to this technique, as each researcher must decide on what constitutes 'matching' patterns. Ideally, the data will lend itself to clear matches or mismatches via a visual inspection.

Time-series matching, a specific type of pattern matching involves collecting repeated measures on outcome variables over a period of time. The trend of data points is compared with a pre-specified theoretical trend, a rival trend, or any artifact-based trend. Applied sport psychology research often employs a variant known as *interrupted time-series analysis*, in which some type of intervention is viewed as an interruption to the normal time-series pattern. A sufficient performance baseline is required to observe natural fluctuations before the intervention is administered. Any change in performance *following* the intervention should be compared to and be sufficiently greater and/or more permanent than the pre-intervention fluctuations. This will provide evidence for a "real" change attributable to the intervention.

Goal attainment scaling is a system of developing personalized multivariate, scaled goals and is quite useful in certain case study methodologies. It lends itself to both goal-setting interventions and to outcome measurement purposes. The case acts as its own control in the definition of the intervention "success", and each goal scale is based on the specific characteristics of the individual case. Typically three or more independent goal scales are created and the sport psychologist and the client should both contribute to the corresponding goal statements. Attainment scales range from –2 (most unfavorable treatment outcome) to +2 (most favorable treatment outcome), with zero representing the expected outcome. Smith (1988) saw considerable application for goal attainment scaling in sport psychology and reported on its use in clinical psychology case studies.

The case study has been criticized for its lack of external validity. Because of the typically small number of subjects in a case study, it is difficult to generalize any findings across a large population. Cases also tend to be selected because they are unusual, thus further limiting any generalizations. Smith summarized that "...it is difficult to draw any sweeping conclusions on the basis of a single case study".

(p.9) Therefore, a different perspective on the issue of external validity is offered. Instead of generalizing to a population, Smith cited Yin, who stresses that the case should instead be generalized to theory. However Smith (1988) admits the need to generalize conclusions beyond the individual case. He suggests replication logic in single case studies to promote greater confidence in the external validity. A similar pattern of results in enough individual cases will help refute the likelihood that changes were simply a function of idiosyncrasies of a single subject or situation.

Reliability refers to the likelihood that the same findings and conclusions would result if another investigator were to follow identical procedures and conduct the same case study over again. However the emphasis for the case study, Smith stated, is not on replicating the same results, but on doing the same case over again. Minimizing errors and biases in the study is foremost. Reliability can be increased through he development of explicit case study protocols and the detailed presentation of data. Finally, Smith (1988) stressed the value of "making everything as operational as possible" both in conducting and reporting the study.

Smith provided suggestions to the researcher about to embark on a case study. He advised the development of a *case study protocol*, a detailed written plan for the study which also includes theoretical propositions, specific questions and predictions, procedures and measures to be employed, and a listing of potential sources of information from which each question may be answered. Although a time-consuming endeavor, Smith (1988) contended that the protocol will help the investigator stay focused on the study, aid in planning and data collection, and help enhance the replicability to other cases.

A good case study has a number of characteristics according to Smith. The introduction should clearly state the study's significance from a theoretical or intervention technique viewpoint. The literature ought to be reviewed in the same manner as an experimental research project. A thorough description of the subjects, the context of the case study, and the methodology employed is required. The data collected and the degree of confidence placed on various pieces of evidence should also be included, as should any alternative explanations and perspectives. Alternative interpretations (including threats to internal validity) should be explicitly addressed and ruled out procedurally and/or with empirical evidence.

Finally, Smith (1988) advised that evidence should be reported fairly and in an unbiased nature, with both supporting and inconsistent data.

To conclude, Smith emphasized his recommendation of having the subjects and main informants review a draft of the case study report to boost confidence in the construct validity of the outcomes. He added that if the participant and informant feedback is informative enough, it might also be included in the final report. While emphasizing the need for methodological advances, he optimistically reminded the reader that there are already ways of increasing the validity and reliability of case studies. Smith (1988) ended by encouraging sport psychology researchers to conduct high quality case studies that will further the understanding of principles in athletics and promote the development of intervention strategies for assisting the athlete. "Perhaps most importantly" Smith stressed, "competently designed case studies can help to reduce the gap between research and practice". (p. 11)

Several suggestions from Smith (1988) were heeded in the present case study. The use of an interrupted time-series analysis was employed in which a short performance baseline was first established. Performance measures and perceptions of the participant concerning the intervention were collected following the intervention period. In addition, goal-attainment scales were developed to provide further information regarding the participant's consistency in several aspects of athletic training.

Athletic Preparation: A Multidimensional Approach

This section of the literature review focuses on studies and writings about psychological and physiological principles that influence athletic performance and how sport scientists have attempted to improve performance through various manipulations of these variables.

Although sport psychologists rely on a standard repertoire of techniques and interventions for helping athletes improve performance, consultants' effectiveness lies in their ability to apply these methods to meet the specific needs of the individual athlete. Taylor (1993) based his guidelines for developing a mental training program on this premise. To illustrate, he took the four primary psychological variables which influence performance (self-confidence, intensity, concentration, and

motivation) and described how each might be considered within the contexts of three different sports. Taylor (1993) chose tennis, golf, and alpine skiing for the various psychological and physical demands required by participants. Each sport was described along these parameters and suggestions for implementing mental training for athletes in each sport was offered.

An understanding of the individual needs of the athlete is the first requisite for successful implementation of psychological skills training. Taylor (1993) stressed that the athlete's needs be approached within the context of self-confidence, intensity, concentration, and motivation. Because every athlete has an ideal level for each variable, the most effective program is one developed on an individual basis. Necessary insights into the athlete's needs may be gained by asking the athlete, the coach, or through the use of objective inventories.

In addition to meeting the needs of the individual athlete, a mental training program should also focus on sport-specific demands. Taylor (1993) differentiated between sports according to the length of competition, physical demands, the amount of time between actual performance, and the type and amount of pre-competition preparation. Downhill ski racing requires 60-120 seconds of intense, anaerobic activity. The sport requires moderate motor skill. The actual competition may be a 'one-shot deal' or several runs spaced over a day. Pre-race preparation involves equipment checks along with physical and mental preparation immediately prior to the race run. A tennis match may last from 1 to 3 hours and requires both aerobic and anaerobic activity. Tennis is a moderately demanding motor skill and preparation for competition a involves physical and hitting warm-up. Golf requires little aerobic or anaerobic conditioning, but precise motor control is crucial. A round of golf may last up to six hours and the period time in between shots is usually 5 to 20 minutes. Clearly the nature of the sport dictates the type and amount of preparation required.

Psychological requirements for strong performance also vary from sport to sport. Using the constructs of self-confidence, intensity, concentration, and motivation, Taylor (1993) evaluated the mental demands of competition. For the alpine skier, self-confidence, motivation, and concentration are crucial in off-season, pre-season, and early season preparation. Intensity control becomes extremely important on

the day of the race, when even the slightest of mistakes can mean the difference between first and second place in a race. The tennis player must be motivated and confident to endure the physical and mental fatigue associated with long matches and occasional performance lapses. Finally, the golfer's regulation of concentration and control of intensity are necessary to execute the fine motor control that is necessary.

As the psychological demands of each sport vary, so too should the method of mental training. Taylor (1993) offers suggestions for implementing mental training that focus on sport-specific requirements. The alpine skier should establish current and ideal levels of intensity by recalling his/her best and worst performances and the way he/she felt prior to each. Because skiing is a very active sport, an intensity control technique based on physical action (such as progressive muscle relaxation, listening to music, or smiling) is suggested. The tennis player needs to stay in control of thoughts and stay positive during the time in between points. Therefore, techniques such as thought-stopping, objective performance evaluation, and positive keywords are useful in helping the athlete to remain confident even through periods of poor play. In addition, the setting of immediate goals, using motivational keywords and imagery, and increasing intensity may provide motivation to get through performance lapses. Taylor (1993) recommends using a pre- and post-shot routine in golf to regulate concentration and intensity. The routine might include narrowing attention, assessing the shot situation, using intensity control techniques, imaging and physically rehearsing the shot, executing the shot, evaluating the shot, and releasing the concentration and intensity in between shots.

Taylor's (1993) suggestions for integrating information about athletes and their sports provide a simple yet sound approach to implementing a mental skills program. Particularly vital is the notion that each athlete should be worked with individually whenever possible. In addition, the sport psychology consultant should be familiar with the specific demands of the sport and how each athlete can best prepare for these demands.

Anxiety Management

The effects of stress on athletic performance have been well documented, both through clinical and experimental reports. Every form of competition places a varying degree of stress on its participants, and therefore a fundamental review of competitive stress seems appropriate. Smith and Smoll (1989) discussed issues of anxiety associated with the pressures of elite level sport.

They defined mental toughness as the ability to prevent stress and adversity from hurting performance under conditions of high psychological and physical demand. Thus mental toughness is linked directly to the athlete's ability to reduce anxiety. Smith and Smoll (1989) suggest that certain methods of stress reduction developed by individuals in clinical and counseling psychology might be modified to meet the specific needs of athletes.

Smith and Smoll (1989) discussed counter-conditioning and its potential use in sport psychology consultation. This method involves conditioning a response to the anxiety-arousing cues that is incompatible with anxiety. It's primary proponent, Joseph Wolpe described counter-conditioning as replacing sympathetic nervous system arousal with parasympathetic activity. This method of treatment is premised upon *reciprocal inhibition,* the process by which sympathetic and parasympathetic activity cannot simultaneously exist. This is accomplished by conditioning a behavior to an anxiety-arousing cue that requires predominantly parasympathetic enervation. One form of counter-conditioning is systematic desensitization. Relaxation, incompatible with anxiety, is used as the response to anxiety-related cues. While other responses such as exercise or eating could be used as response behaviors, Smith and Smoll (1989) argue that relaxation is the easiest, most effective, and therefore preferred method. This treatment is initiated by training the client in deep muscle relaxation using a variant of Jacobson's progressive relaxation procedure. At the same time the clinician should also begin to construct a stimulus hierarchy of 10 to 15 scenes, gradually increasing in the intensity of anxiety produced. This may be accomplished by constructed the hierarchies along one or more of a variety of gradients including time (proximity to the feared event), seriousness, distance, and so forth.

When the athlete has mastered the deep relaxation exercises, treatment may start. The clinician first has the athlete visualize the least threatening scenario. If relaxation is maintained, the athlete gradually moves towards more intense scenes. This process continues until the last scene of the hierarchy is imagined without anxiety. It is assumed that some of the athlete's total anxiety is being deconditioned through reciprocal inhibition and that this reduction in anxiety generalizes to the items higher in the hierarchy. Wolpe warned that great care should be taken to avoid anxiety in this method of treatment, as this could possibly undo the deconditioning that has occurred.

Smith and Smoll (1989) reported that results from over 100 controlled studies have found systematic desensitization to be superior to placebo or treatment controls in treating many different anxiety-based disorders. In particular, the positive effect of systematic desensitization on self reported test anxiety leads the authors to conclude that this technique would also be of value to athletes with well-defined anxiety issues. However, due to lack of its treatment generalization and its potentially long and arduous nature, approaches other than desensitization are preferred for individuals with multiple phobias or diffuse anxiety.

Smith and Smoll (1989) emphasized that the Counter-conditioning model is most effective when aimed at one specific source of anxiety at time. However, certain athletes may require a more generalizable technique for handling stress. The authors described the Cognitive Mediational model by as a method that will provide the athlete with coping skills for other circumstances and future events. Its proponents, including Ellis and Lazarus, claim that in most situations, emotions are mediated by cognition, rather than elicited directly from environmental cues. Thus, the modification of these cognitions is believed to result in anxiety reduction.

Albert Ellis, the founder of Rational-Emotive Behavioral Therapy (REBT), proposed that many maladaptive emotions, including anxiety, are the result of irrational beliefs which are learned early in life and reinforced within our culture. One irrational belief is that one must be thoroughly competent in every way in order to be worthwhile. Through the process of *cognitive restructuring*, such irrational beliefs are

attacked using rational, logical thinking and replaced with cognitions that prevent or reduce maladaptive anxiety.

Despite a lack of clinical outcome studies, Smith and Smoll (1989) proposed that cognitive restructuring approaches would likely aid athletes in anxiety reduction, especially those athletes who "are fairly insightful and psychologically minded". In addition, the modification of key irrational beliefs and self-statements would typically generalize to other related anxiety-arousing circumstances.

The fourth model described by Smith and Smoll (1989) is the Coping Skills model. This model focuses on the client as personally responsible for and active in the pursuit of stress management. The development of coping skills to deal with anxiety-arousing life events is emphasized. Conditioning-based techniques such as systematic desensitization are reconceptualized as procedures to practice relaxation as an active coping skill for the self-control of anxiety. This model underlies several approaches including stress inoculation training and cognitive-affective stress management training.

Stress inoculation training provides a comprehensive treatment plan including both cognitive and physiologic coping skills. Progressive muscle relaxation and adaptive self-statements are developed together to prepare for the four stages of dealing with stressors. These stages are: (1) Preparing for a stressor, (2) confronting and handling a stressor, (3) coping with the feeling of being overwhelmed, and (4) reinforcing oneself for effective coping. The client plans visualized and real life encounters of low and moderately stressful situations to inoculate against higher levels of anxiety in actual life situations.

Clinical reports support stress inoculation training as effective across a wide range of populations. In addition to reducing anxiety and anger, this method has also had success in increasing pain tolerance. Smith and Smoll (1989) concluded that stress inoculation training appears to be highly applicable to athletes, as the self-instructional training could possibly contain self-statements regarding skill, strategy, and attentional processes.

Cognitive-affective stress management training is a coping skill approach that differs from stress inoculation training in several different respects. Like stress inoculation training, this technique employs both progressive muscle relaxation and cognitive relaxation training. Cognitive restructuring through

self-statement modifications is also used to manage stress. The main difference between the two approaches lies in the intensity of arousal that the client practices the coping skills under.

In cognitive-affective stress management training, the client rehearses coping responses under a high emotional arousal. This state of arousal is achieved through *induced affect*, a process in which the client imagines a stressful situation and focuses on the feelings that the scene solicits. The consultant to elicit greater arousal provides verbal encouragement and reinforcement. Once a sufficient level of affect is reached, the client is instructed to "turn off" these feelings using his or her coping responses. Initially, relaxation alone is used, then self-statements alone. Finally, both techniques are integrated into an "integral coping response" which is tied into the breathing cycle. As the client inhales, he or she repeats a stress-reducing or task-relevant statement. On the exhalation, the client gives the mental self-instruction to relax.

The cognitive-affective approach uses levels of anxiety that are as high as or higher than those encountered in the actual situation. This approach has been found effective in controlled studies across a wide population, including athletes. Smith and Smoll cited a 1980 study by Ziegler which found that subjects trained in cognitive-affective stress management showed greater endurance on a post-training submaximal treadmill run as defined by heart rate and oxygen consumption. Subjects attributed the difference to the acquisition of coping skills that helped them to manage the discomfort experienced during the run.

Smith and Smoll (1989) provided an example of how cognitive-affective stress management training helped a highly skilled college quarterback to overcome severe muscular tension and high arousal during games. The training was presented to the player as an educational program in self-control of emotion. He learned and regularly practiced progressive relaxation exercises. The quarterback also learned to monitor his thought processes during competition and was able to isolate the self-statements that created anxiety. His irrational self-statements of fear and failure were attacked using cognitive restructuring in which outcome-based cognitions were replaced with effort-based statements. In addition, self-instructional training was used to develop task-relevant thoughts focusing on concentration and attention.

The athlete practiced both relaxation and self-statement techniques under high levels of induced anxiety and eventually integrated both into his breathing cycle. He eventually was able to effectively utilize cognitive-affective stress management in actual competitions, leading to marked improvement in performance.

Smith and Smoll (1989) concluded that the coping skill approach to anxiety reduction is superior in sport applications to the extinction and counter-conditioning models. First, the athlete assumes major responsibility for developing the necessary coping skills, and thus is more likely to attribute improvement to his or her own effort. Self-attributional changes are typically maintained more so than externally based changes. Furthermore, coping skills training tends to generalize to other potential sources of anxiety whereas extinction and counter-conditioning target only specific cues. For these reasons, the authors expected that for athletes, the application of coping skills programs will be useful over a wider range of both athletic and non-athletic situations.

Goal Setting

While the impact of competitive anxiety on performance may vary for different athletes according to the individual and the demands of the situation, the issue of motivation and direction for behavior seems universal for all athletes of all levels. Each athlete has reasons for their participation in sport and may desire certain intrinsic or extrinsic rewards from their involvement, and for the competitive athlete, this often includes success in competition.

Goal setting has emerged as a useful means of motivating and directing behavior in sport (Gould, 1993; Lerner and Locke, 1985; Kyllo & Landers, 1995). Locke and Latham (1985) described goal setting as "a technique we believe can be used to increase both the skill and confidence of athletes in competitive sports". (p. 205) This was based upon the widely held assumption that most athletic success is directly related to skill and motivation. Much of the available evidence for the benefits of goal setting involves tasks that consist of mental and physical actions directed towards some end (e.g., typing,

assembling). The authors hypothesized that properly implemented goal setting would also be beneficial to athletes in competitive situations.

There are eight basic findings from existing goal setting research on which Locke and Latham (1985) base their sport applications. These findings concern: (1) goal specificity, (2) goal difficulty, (3) the use of short term goals, (4) the four mechanisms which explain the effectiveness of goal setting (i.e., direction and focus of activities, regulation of effort expenditure, enhancement of persistence, and development of new strategies), (5) feedback concerning progress, (6) goal acceptance and commitment, (7) use of a plan or strategy, and (8) competition as a form of goal setting..

From these eight findings, Locke and Latham (1985) present 10 specific hypotheses concerning goal setting in sports (p.209):

1. Specific goals will regulate action more precisely than general goals.
2. For quantitative (specific) goals, the higher the goal the better the performance, assuming sufficient ability and commitment (see hypothesis 7).
3. Specific, difficult goals will lead to better performance than goals of "do your best" or no goals.
4. Using short-term goals plus long-term goals will lead to better performance than using long term goals alone.
5. Goals will affect performance by directing activity, mobilizing effort, increasing persistence, and motivating the search for appropriate task strategies.
6. Goal setting will be most effective, if not only effective, when there is feedback showing degree of progress in relation to the goal.
7. With goals that are difficult, the higher the degree of commitment the better the performance.
8. Commitment can be affected by asking the individual to accept the goal, showing support, allowing participation in the setting of the goal, training, selection, and incentives and rewards.

9. Goal attainment will be facilitated by a suitable plan of action or strategy, especially when the task is complex or long-term.
10. Competition will improve performance to the degree that it leads to the setting of higher goals and/or increases in goal commitment.

Locke and Latham (1985) use these hypotheses to make specific suggestions for both practice and competition in various sports for different positions. The authors acknowledged that perhaps there were already professional teams that were using goal setting to improve performance, but that there were possibilities for all athletes on any level of competition to use goals as a means to enhance their experience.

There are some commonalties for goal setting that cross skill boundaries. For example, to motivate improvement, the goals must become progressively more difficult as the individual attains increased skill. Also, the goals must be set realistically and based on the capabilities and long-term aspirations of the particular individual at that specific point in time. If a goal is not helping the individual get where he/she is going, then it must be reevaluated. In other words, goals are dynamic, not static, and are always subject to change.

The authors (1985) include a chart of possible goals for athletes in different sports to use in practice situations. For example, a golf player may want to set sub-component goals such as: (a) 6 drives in a row over 200 yards and landing on fairway, (b) 15 puts in a row of 12 feet, and (c) 10 9-irons in a row onto green from 75 yards. Of course, the goals are only suggestions and should be modified to meet the specific needs of the athlete. However, it seems that repetition of specific skills is common in all goal recommendations. This may be to enhance motor learning as well as provide an easy way to increase or decrease the difficulty of the goal (by increasing or decreasing the number of successful repetitions).

In applying goal setting to competitive situations, it was theorized that competitive goals should be limited to one or two. The capacity to remember more than this under stressful situations is lessened, and goal overload may result, with none of the goals actually being accomplished. The athlete must also

remember strategy, thus further complicating the issue. Locke and Latham (1985) suggested that an observational method of goal assessment be utilized in competition. For example, athletes may be given a certain number of pre-determined points for specific positive performances in a game (e.g., for a defensive lineman in football: 20 points for a touchdown, 5 points for a sack, 10 points for a fumble recovery). These points are tallied and possibly displayed for the team to see, thus encouraging friendly competition. These points may result in stickers for the helmet, a trophy, etc. However, it seems that specific verbal recognition and praise from the coach is usually the most effective reward. The authors also warned against punishments or negative reinforcement; keeping focus on the positive is preferred.

The issue of group goals vs. individual goals was briefly discussed. Locke and Latham (1985) theorized that the principles for both are basically the same because team sports can be broken down into individual tasks. However, since most team sports require coordination between members (e.g., an offensive line blocking for a particular play, turning a double play), it was hypothesized that group goals should also be set in an attempt to motivate cooperation among teammates.

Aside from mere performance improvement, Locke and Latham (1985) also hypothesized that goals may be used to increase self-confidence in the athletic setting. Through successful goal setting, an athlete will achieve higher skill levels. Related to this skill level is the individual's self-efficacy, or the conviction that one can perform a certain task. Through goal setting, the individual may also develop power of concentration, and undergo feelings of tension that will likely be encountered in competitive situations. Thus goal setting may also serve as a tool to prepare the athlete to concentrate on the task at hand and control stress, often simultaneously.

Several other suggestions for goal setting applications in sports include setting the difficulty of the "practice" goal higher than what the actual competition setting will present. For example, using a smaller net in soccer practice (or a larger net if the goalie is the prime concern) will possibly make the subsequent performance in competition better. Using short-term goals as "stepping stones" to the long-term goal is also recommended. An example of this provided by Olympic gold medal winner John Naber. Naber's goal was to take off one second per year over a period of four years from his 100-meter

backstroke. Naber then proceeded to break this down as far as 1/1200th of a second for every hour of practice. Using this technique, Naber stayed motivated and succeeded.

To conclude, Locke and Latham (1985) mentioned that goal setting, in addition to performance enhancement, also provides the athlete with a feeling of control and positive self-direction. The goal provides an athlete with an incentive for action, a specific way of improving. The authors warned against setting goals which are either too high or too low, as either will be ineffective and lose the athlete's attention and commitment. The use of goal setting may also have positive implications in regards to the social psychology of a team. To the extent that a team agrees to the goals that it needs to attain, determines the "how's" and "when's" of these goals, a sense of team is formed. Finally, the use of goal setting and its positive effect on self-concept and self-efficacy both in and out of the athletic setting were emphasized.

Locke and Latham (1985) provided important and valuable guidelines concerning the use of goals in athletic preparation. Many of these findings have become the integral pieces to the theoretical foundation of goal setting in athletics. The notion of improving self-confidence and self-efficacy through goal setting holds especially pertinent for the child or adolescent athlete. The use of goal setting for establishing the direction and timeline of a psychological skills training program also seems to have merit.

In *Goal Setting in Competitive Sport: An Exploratory Investigation of Practices of Collegiate Athletes*, Weinberg, Yukelson, Burton, and Weigand (1993) presented goal setting as one of the most popular motivational techniques in business, education, and sport. However there are inconsistencies in the research regarding which type of goals and structures of their implementation are most effective in performance enhancement. For example, Locke and Latham hypothesized that using short-term goals and long-term goals would be more effective than using long-term goals alone. Bandura argued that short-term goals should provide the most effective reinforcement because of the immediate feedback and incentives. Finally, Weinberg et al. concluded in their 1985 and 1988 research articles that there were no differences in outcomes resulting from goal proximity. Such discrepancies in the literature led the present authors to investigate the actual perceptions of effectiveness from athletes and present their findings in a

descriptive fashion. The present authors hence conducted a study of NCAA Division I athletes to assess the frequency, effectiveness, and importance of different types of goals used in performance enhancement.

A total of 678 collegiate athletes (357 males and 321 females) from 17 to 25 years in age participated in the study. They were selected from three geographically distinct American universities, and were representative of most individual and team sports. To better understand the goal-setting process a questionnaire was developed by reviewing previous studies on goal setting in sport and exercise psychology. Four experts were called upon to help develop categories within goal setting and individual questions for the survey. It was pilot tested with a group of 17 athletes and then further refined. The final questionnaire contained sections for demographic information (including sport experience), frequency of goal setting strategies, effectiveness of goal setting strategies, goal commitment and effort, goal preference, and preferred level of goal difficulty.

Descriptive data from the surveys revealed that the most preferred type of goals were improving overall performance (36%), winning (24%), and fun/enjoyment (19%). In terms of goal difficulty, the three most preferred types were considered to be moderately difficult (60%), very difficult (20%), and moderate (14%). Weinberg et al. (1993) theorized that the athletes wanted goals which were attainable yet challenging. On a scale of 1 to 9, the athletes rated the overall effectiveness of their goal setting programs to be 6.02 and the overall frequency of goal setting exercises as 6.42. Thus the authors concluded that the athletes used goal setting fairly often and that they found it reasonably effective. The top three most used goal setting strategies were goals focusing on competition, goals focusing on conditioning, and goals focusing on improving specific sport skills. The top three most effective strategies were physical conditioning goals, competitive goals, and rewards to help increase commitment to achieve goals.

Aside from the descriptive statistics, a number of one-way ANOVAs and independent t-tests were conducted. Using the Bonferroni technique, the alpha level was adjusted to .005 in consideration of the large number of statistical tests that were run to test for differences between groups, such as male/female, and starter/non-starter.

Results concerning goal preference indicated that the athlete's sport orientation, that is whether their main concern was performance, winning, or fun, was strongly and positively related to the type of goals which they preferred, most frequently set, and found most effective. Other findings regarding goal preference were: (a) performance oriented athletes found setting performance goals was more effective than did fun oriented athletes, (b) performance oriented athletes felt that short-term goals were more effective than either winning oriented or fun oriented athletes, and (c) winning oriented athletes felt that setting outcome goals and using rewards to increase commitment were both more effective than performance oriented athletes did.

Because 94% of all surveyed athletes reported favoring moderate, moderately difficult, or very difficult goals, these three types were used in the data analysis. Results indicated that those who preferred moderately difficult goals set the most short-term goals and most often evaluated the effectiveness of goals. Athletes preferring moderately difficult or very difficult goals set significantly more performance goals than did those setting moderate goals. Again, athletes rated their own goal difficulty level as being the most effective.

In differentiating between genders, Weinberg et al. (1993) discovered that females used more goals and used them more effectively than did their male counterparts. In terms of goal frequency, females set significantly more short-term goals, more team goals, and more mental training goals. Females also evaluated their goals and wrote their goals down more frequently than males. Males did set more outcome-related goals, but the authors conclude that females definitely utilized goal setting more effectively than males.

The status of starter vs. reserve and differences in goal setting behaviors was also evaluated. Starters used goals more frequently and effectively than did non-starters, set significantly more long-term goals, team goals, and performance goals, and more often had specific plans to achieve goals. Starters also viewed goal setting to maintain confidence and positive motivation as more effective than did reserves.

The last group's comparison was made between athletes of higher and lower ability. In the questionnaire, participants were asked to rate their athletic ability on a scale from 1 to 9. Those

responding from 1 to 3 were classified 'lower ability' while those scoring 7 to 9 were placed in the 'higher ability' category. The results were very consistent in that higher ability athletes used goal setting more frequently and believed it to be more effective. Higher ability athletes also differed significantly from lower ability athletes in that they made their goals public and had specific plans for goal achievement.

Due to the exploratory nature and sheer quantity of significant findings, Weinberg et al. (1993) chose to discuss the most consistent and important results of their study. The three most prevalent goals, performance, winning, and having fun, seem to be interrelated in that winning can make the sport more fun and by improving performance, one is more likely to win. The authors gave two possible reasons why performance was the most common goal: (1) intrinsic motivation and competence are related to performance enhancement and (2) many athletes are on scholarships based on their individual performance, regardless of the team's success. The possibility of exploring the goal setting tendencies of coaches and the potential for changing goal preferences in athletes are also mentioned in the discussion.

The equivocal findings in the literature concerning goal difficulty and utility, including the occasional effectiveness of unrealistically high goals were highlighted. The authors recommended more research on this topic as well as determining how athletes go about determining the difficulty of their goals. Gender differences in goal setting and the tendency for females to be more committed to their own standards of excellence are summarized and research and application of these gender related findings to the construction of goal setting programs was encouraged. With regard to starters vs. reserves in goal-setting tendencies, several possible explanations were offered. First, since starters will get more playing time and have a sense of how long they will play, they are able to set their goals accordingly. Starters are also more likely to get feedback from their coach concerning areas of desired improvement, and can use this information to set goals more efficiently.

Finally, the relationship between perceived ability and goal setting was stressed. Because of the questionnaire nature of the survey, the authors were unable to determine any possible direction of causality in this relationship. It may be that goal setting actually helped athletes to achieve more, or that

the higher ability athletes simply perceived greater effectiveness in using goals than did the lower ability athletes.

Weinberg et al. (1993) revealed several noteworthy trends in goal setting for high level collegiate athletes. Because of the exploratory and mainly descriptive nature of the study and the participation of only collegiate athletes, the findings should be generalized with caution to a training program for a high school athlete. However, because of the large sample size, wide variety of sports, and statistically significant findings included in the research, the results may be included in developing a framework for a related study.

The majority of the athletes desired to improve through setting difficult goals. At the high school level, enhancement of performance would seem to be the primary motivation for establishing a mental and physical training routine. This is especially true considering the implications that athletic prowess may have during adolescence; social recognition, peer comparison, and evaluation by close significant others have all been identified by Smith & Smoll (1991) as significant motivating forces behind teen sport participation. Therefore moderate to difficult performance based goals might prove effective at the high school level as well.

While the findings of Weinberg et al. (1993) are useful in developing a specific goal setting strategy, the goal orientation of ***the individual athlete*** needs primary consideration. If improved performance is indeed the primary desire of the athlete, he or she should feel comfortable with and have substantial input on the development of training goals. This may be especially important in working with adolescents, who may be seeking autonomy and self-defined purpose through sport. An athlete with a 'winning' goal orientation may benefit from a demonstration of how short term performance goals can eventually lead to improved outcomes. Finally, athletes motivated by 'having fun' could be encouraged to continue having fun, and may find that improving performance and/or winning may only increase their level of enjoyment. Similarly those athletes with a performance or winning goal orientation may also benefit by setting a goal to simply enjoy their sport more. In this sense, athletes with particular goal

orientations can be encouraged to 'experiment' with other approaches by combining goal-setting strategies.

Another important finding was that athletes named physical conditioning as the second most used goal setting strategy and the most effective goal strategy. This is very encouraging, as it supports the idea of using goals as a successful means to motivate and direct behavior in a physical training program. The findings concerning gender differences, perceived ability, and goal difficulty can also be used in conjunction with other research to help better understand the motivational process and optimal structure of goal setting programs for both mental and physical training adherence

In a study on motivation and task performance, Lerner and Locke (1995) investigated the variables of goal setting, self-efficacy, competition, and individual traits on the performance of sit-ups. The authors cited inconsistent findings in goal setting research between industrial/organizational and sport settings as the primary basis for further evaluation. The authors attributed some of these discrepancies to methodological flaws in research design. Following suggestions put forth in Locke's 1991 study, the researchers attempted to correct this problem by measuring personal goals, commitment, and self-efficacy. Steps were also taken to insure that do-your-best groups did not set specific goals. With this improved design in place, the authors (1995) hypothesized that assigned goals, competition, and personality would affect performance, but that these effects would be mediated by personal goals (including goal commitment) and self-efficacy.

Seven specific hypotheses concerning the specific effects of each of the variables were also presented. First, it was predicted that specific, difficult goals would be more effective than specific, moderate goals or do-best goals. Second, the authors hypothesized that personal goal level would be significantly associated with personal goal level and would mediate the effect of assigned goals on performance. Third, it was predicted that self-efficacy would be significantly related to personal goal level, goal commitment, and performance. The fourth hypothesis stated that face-to-face competition or goal equivalent (matching a confederate's performance) would increase the level of goal commitment more so than simply being assigned that performance level as a goal. Fifth, participants in a competition

setting were predicted to set higher personal goals and have higher self-efficacy than those in non-competitive settings. The sixth and seventh hypotheses dealt with personal traits as measured on the Sport Orientation Questionnaire (SOQ), an inventory designed to evaluate the desire to strive for and achieve success in sport. It was predicted that (6) the SOQ and its three subscales would be significantly related to performance and (7) any significant association between the SOQ and the effects of goals and self-efficacy would moderate performance.

Seventy-five males from undergraduate physical education classes participated in the study. Their average age was 20.4 years and they volunteered to participate for extra credit. The original 60 participants were selected from a pool of 100 in terms of sit-up performance. Those who fell in the middle 60% were chosen for the study. A 2 X 2 (Competition X Goal Level) factorial plus one (do-best group) design was utilized and the participants were randomly assigned by ability strata to one of five conditions: competition with a hard goal, competition with a with a medium goal, no competition with a hard goal, no competition with a medium goal, or do-best. The do-best group was from the same class of an earlier semester and was added on after the original 60 were selected. Each group had 15 participants.

In the pilot test, it was concluded that a one-minute sit-up task would be best to use for the main study. One hundred individuals were tested in three separate do-best trials with seven minutes rest between each to establish a baseline for the study. The middle 60% was then chosen for the main test in order to insure equal starting ability in the participants. Two goal levels were set for both the noncompetitive and competitive conditions. The medium goals were based on the performance of the 50th percentile scores of each trial (44, 43, and 38 sit-ups), while the difficult goal was based on the 90th percentile of each trial (52, 51, and 48 sit-ups). Participants in the noncompetitive group performed the task alone each trial, but were told to try to meet or exceed the assigned goal. Members in the competitive group performed the task against a confederate for each trial. The confederate performed first, and then the participant was told to try to match or beat the confederate's performance. The confederates performed exactly the number of sit-ups corresponding to the goals (medium or hard) of the noncompetitive condition. The participants in the do-best condition performed the sit-ups alone, were told

only to their best, and were not assigned any goals. They were prevented from keeping track of their performance by counting backwards in increments of three aloud, and were given no information concerning the performance of others in order to eliminate competition.

The SOQ was given to each participant at the time of pre-testing. This survey was used to evaluate the three factors of competitiveness, win orientation, and goal orientation. Goal commitment was measured after the experimental directions were given using a six item scale, with participants in the competitive group basing their commitment on beating the confederate's score and those in the noncompetitive group using the assigned goal. The participants then indicated what their personal goals were before the sit-up task, regardless of their testing condition. Next, self-efficacy was evaluated and self-efficacy strength (SES) was based on how much confidence the participants had in being able to do each number of sit-ups. This was measured on a scale of 1-10, with 10 = extremely confident.

The combined results of all three trials were analyzed instead of separate analysis for each trial. Initial analyses were made using a 2 X 2 ANCOVA on four experimental groups, controlling for ability on the pretest. There was a borderline main effect for goal level on performance but at $p<.05$, it was not supported as being significant. There was a significant difference in performance between do-best group and hard goal groups at $p=.0001$, thus supporting hypothesis 1b, as well between do-best group and medium difficulty goal group ($p=.0003$), which was not predicted. At $p=.01$ the hard goal group set significantly higher personal goals for themselves than did the medium goal groups, supporting hypothesis 2a. A significant correlation ($r=.74$, $p<.001$) existed between self-efficacy and personal goals, goal commitment ($r=.36$, $p<.01$), and performance ($r=.77$, $p<.001$), thereby supporting all of hypothesis 3. Hypothesis 4 was not supported, as the ANCOVA did not show a significant effect for competition on performance, nor was there an interaction effect. Hypothesis 5 was also unsupported, with no significant effect of competition on personal goals or self-efficacy and no interaction. Significant correlations between performance and goal orientation ($r=.257$, $p<.05$), win orientation ($r=.35$, $p<.05$), competitiveness ($r=.395$, $p<.01$) ,and the overall SOQ scale ($r=.41$, $p<.01$) existed, thus fully supporting hypothesis 6. The seventh hypothesis, that personal goals and self-efficacy would mediate the personality

effect, was supported using two hierarchical regression analyses.

Lerner and Locke (1995) concluded that there are definite benefits to be gained by following the suggestions for methodological improvement outlined by Locke's 1991 study. Despite greater goal commitment, the do-best groups performed significantly worse than did the medium or hard difficulty groups. It was proposed that this may be due to the relative ease of their goal and thus higher commitment resulted. Important findings regarding personal goals were: (a) personal goals can be influenced by assigned goals in sport and exercise settings, (b) personal goals were more strongly related to performance than assigned goals, and (c) personal goals were effective as mediators in analyses of other variables. Self-efficacy was found to be related with personal goals, commitment and performance, and served along with personal goals to mediate goal and personality effects. The apparent lack of influence of competition on performance aside from those attributable to assigned goals was noted. The authors concluded therefore that competition was actually a form of goal setting within itself, in which the goal was to beat the performance of another person, and thus had no other effect in itself. The researchers do admit that their study of competition did not account for simultaneous performances or the dynamic nature of goals resulting from competition, and therefore more research on competition is clearly warranted. Finally, Lerner and Locke's findings support the validity of the Sport Orientation Questionnaire and the potential for its application in other competitive situations.

Lerner and Locke (1995) provided useful insight into the variables of goal setting and the potential interactions that may result in successful goal setting programs. Especially important is the usefulness that both assigned and personal goals may have in weight training/fitness programs and the potential of influencing personal goals with assigned ones. This has major implications in programs designed to increase exercise adherence and maximum intensity workouts through a systematic and organized program. It was surprising to see that competition had no significant result on performance, but the way in which competition was staged and the lack of extrinsic reward resulting from success in competition may be involved. The use of informal competition in a fitness/weight-training program (e.g.,

posting strength and body measurements of individuals/groups in a public place) may still provide a means to an effective goal, although more research is necessary in this area.

The studies of Locke and Latham (1985), Weinberg et al. (1993), and Lerner and Locke (1995) all investigated motivation and performance. Motivation appears to be an important necessity in a sport like distance running, in which high levels of performance are often accompanied by physical discomfort. To persist through the pain and fatigue encountered in training and competition, the runner must be highly driven. In addition to being motivated, the distance runner may also benefit from other mental training techniques. The following three reviewed articles focus specifically on enhanced running performance and cover several different topics including relaxation, mental imagery, and psycho-regulative control.

Combining Physical and Mental Training

Much physiological research on running endurance has been conducted. Inomata, Matsuda, and Takeda (1990) proposed that the psychological aspect of long distance running also needed further investigating. They reported mixed results in the literature concerning mental training for runners; some studies suggested that mental training produced significant improvements, while other studies yielded insignificant results or no effect at all. The authors emphasized this lack of consistent data in their introduction of the research problem. In an attempt to evaluate the effectiveness of mental training for runners, Inomata et al. (1990) implemented a relaxation-training program with collegiate cross-country runners. They hypothesized that such a program would result in significant improvements on physiological indices of endurance. Pre- and post- intervention measurements of endurance variables were compared to measure the efficacy of such a program on the laboratory-controlled performance of a running task.

The subjects consisted of fifteen male long-distance runners from a Japanese university's track and field team. The subjects were randomly placed in either a treatment (i.e., intervention) or control (i.e., no intervention) group. The exercise electrocardiogram and maximal oxygen uptake (VO_2 max.) of

all subjects were recorded. The pre-test consisted of a twenty-minute treadmill run divided into two ten-minute segments. Each subject ran for ten minutes (base running) at 70% VO_2 max and then for an additional ten minutes (relaxation running). The speed and incline of the treadmill was controlled by experimenters to keep the athletes at the 70% level of VO_2 max. Heart rate (HR), VO_2 max, ventilation (Ve), and rate of perceived exhaustion (RPE) measurements were taken during this pre-test.

Both treatment and control groups continued their normal track and field practices. However, the treatment group also completed a three-week mental training program that emphasized relaxation during running. The program consisted of two main stages. The subjects first learned to recognize and control tension and relaxation states through action. In the second stage subjects started by relaxing and then selecting an image or experience from a past competition. They became aware of the relaxation that is necessary for successful running (setting of criterion imagery). The runners practiced arousal control exercises and imagined the application of these exercises to produce similar effects in the criterion imagery. The final step of stage 2 required the runners to relate the states of tension and relaxation to their heart rate and to voluntarily control their state of arousal using criterion imagery. Inomata, Matsuda, and Takeda (1990) met with the intervention group every few days to advise the runners.

Following the three-week program, all runners were post-tested for VO_2 max, Ve, HR, and RPE during a twenty-minute treadmill run. Again the runners were kept at 70% VO_2 max. for both base and relaxation running.

The pre- and post-test measurements of HR, Ve, VO_2, and RPE of the two groups were compared using a 2 X 2 ANOVA. A significant group effect ($p<.01$) for HR was found, but the post-test HR showed the same tendency as the pre-test. Inomata et al. (1990) reported no significant effects for group, running condition, or interaction on the other measures. Thus the expected training effect was not found in the physiological measurements used. The relative brevity of the mental skills training program was offered as a possible explanation for the lack of group effects.

While Inomata et al. (1990) did not receive significant support for their hypothesis, the authors pointed out that there were large individual differences for several treatment group members on pre- and

post-test measurements. Additional support lies in the data concerning the biomechanical load of the treadmill. The average speed and incline of the treadmill for the treatment group's post-test were higher by 10% and 3% respectively in comparison to those on the pre-test. The runners from the training program performed under more stressful conditions yet maintained the same physiological load (70% VO_2 max.). Conversely, the control group ran at an average of 3% *less* incline in the post-test than in the pre-test. Therefore on the post-test the subjects of the training group "could be running faster and sharper than on the pre-test under the same physiological load condition." (pp. 43)

Although the anticipated group training effect was not significant, Inomata et al. (1990) stated that further research is warranted. The researchers also provided the relative brevity of psychological training as a possible reason for statistically insignificant results. In providing suggestions for further research and implementation of mental skills training for long distance runners, particularly emphasized is the need for individualized and specialized mental training programs.

The individual improvements of those in the treatment group after only three weeks provided encouragement for further investigation. The expectation of improvement of performance after a lengthier, more comprehensive mental and physical training program seems to be warranted by these individual results.

Burhans, Richman, & Bergey (1988) investigated the parameters of effective imagery for stress reduction and enhanced performance for a motor task. Specifically, the effectiveness of results imagery and skills imagery in a stress reduction/performance enhancement program was compared . Sixty-five university students were divided into four randomly assigned training groups (skills, results, skills/results, and control) and participated in a twelve-week training program for long-distance running. A 1.5-mile run and several inventories were used as pre-test/post-test measures and the results from the four training groups were compared to see which group benefited the most from mental training.

The potential value of combining mental and physical training was discussed in the introduction of Burhans, Richman, & Bergey (1988). Their review of literature highlighted the disparity of research findings concerning the effectiveness of mental training for performance enhancement and several

important conclusions drawn from the literature were discussed. The need for motor task experience in maximizing the benefits of mental imagery was touched upon. Also included was the "realization that mental rehearsal cannot replace physical rehearsal." (Burhans et al., p. 27) Finally, mental and physical training programs which are of optimal length and duration and are based on the individual needs and abilities of the athlete are more likely to improve performance than those of a more generic nature.

The relationship between imagery, trait anxiety, and athletic performance was also investigated in the literature review of Burhans et al. (1988) Research has generally supported the value of visuo-motor behavior rehearsal (VMBR), a combination of relaxation and visualization which first minimizes anxiety, thus permitting effective imagery. However, the demand characteristics of the experimental situations in these studies have been questioned. In addition, many studies have led to equivocal findings concerning the impact of state anxiety on motor task behavior. Conversely, competitive A-trait (trait anxiety) has been a good indicator of performance, albeit inadequate when used alone. Furthermore, the authors cited research that described behavior as a "function of the interaction between traits and situations". (Burhans et al., p. 27) Based on these findings, the need for more research concerning the interaction between trait anxiety, imagery, and performance was established.

The need for further testing the generality of mental training techniques across sports was deemed crucial by Burhans et al. (1988) In order to deduct whether imagery was task specific or not, the establishment of effective parameters of imagery was first required. A discussion of these much-needed guidelines included the dearth of information concerning the comparison of external and internal imagery strategies. Burhans et al. (1988) proposed to further demarcate the parameters of effective imagery by comparing the effectiveness of several different strategies.

Burhans et al. (1988) randomly divided 65 university students (ages 17-22) into four conditions. Prior to initial training instructions, the subjects were administered the Sport Competition Anxiety Test (SCAT) and the Life Stress Scale. They also were timed in a 1.5-mile run. Each condition utilized a different imagery strategy (skills, results, skills/results, and control) during a 12-week mental training program. The skills group visualized the perfect performance of specific skills associated with running,

the results group practiced imagery of successful competitive performance (i.e., crossing the finish line first), the skills/results group used both specific skills and competitive success imagery, and the control group received lectures on the health benefits of running. It should be noted that the subjects in the three experimental conditions were instructed to use an 'outside of body' perspective in their imagery.

After the initial timed run and inventories administration, the groups were placed in four separate rooms to begin their training. After four weeks of physical and mental training, all subjects were again timed in the 1.5 mile run and administered the SCAT and Life Stress Scale. In addition, the subjects completed a manipulation check questionnaire to determine whether and to what extent they used their respective imagery strategies. A 'booster shot' of imagery instruction was provided separately to each group following this run. Another four weeks of physical training and imagery practice ensued, followed by a third timed 1.5 mile run. Prior to each timed and practice run, subjects were reminded of their imagery strategies and given ten minutes to focus on these strategies.

Prior to initial experimental manipulation, there were no significant group differences in the times to run the 1.5 miles, levels of competitive trait anxiety, or levels of stress (Burhans et al., 1988). While all groups improved their running times through the program, the skills imagery group showed the only significant improvement ($t(26) = 2.01$, $p < .05$) over the control group from Trial 1 to Trial 2. However, between the first to third trial and second to third trial there were no significant group differences. No groups showed significant improvement over the others. The only significant difference found for any of the three dependent variable measures was gender-related, with females improving their times ($F = 6.49$, $p < .05$) more than males. No significant changes in competitive trait anxiety appeared in any of the groups or genders between the first and second administrations of the SCAT. One significant group x gender interaction was detected in stress scores. The males utilizing the skills imagery strategy reported significantly greater stress prior to the timed runs ($F = 89.61$, $p < .05$) than did females using the same strategy. Males from the skills group actually reported feeling more stress before the second trial than at the first.

All four experimental conditions demonstrated similar improvement in the timed run after the twelve week training program. Therefore the authors concluded that over an extended period of time, an athlete's performance would improve regardless of whether external imagery of skills, results, or a combination of both is used. However, Burhans et al. (1988) stressed that between the first and second trial the skills imagery group improved significantly more than the other three groups ($t = 2.01$, $p < .05$) on the timed run. The overall decrease in running times for the groups utilizing imagery was consistent with the hypotheses.

While the running times improved, the prediction of lowered competitive trait anxiety for the imagery subjects was left unsupported. Despite this, overall reduction in state stress and improved running times served to substantiate the theoretical proposition that "behavior and performance are a function of the interaction between traits and situations". The gender differences reported by Burhans et al. (1988) also support the use of stress reduction techniques in mental training; Female subjects, who reported less stress after using imagery, improved significantly more on running times for each trial than did male subjects, who reported greater stress after implementing imagery practice.

The use of external mental imagery involving specific skills and movements involved in a successful performance was supported by the results of Burhans et al. (1988). This strategy would be particularly helpful when the athlete is attempting to quickly reach his or her maximum performance level. Skills imagery in an open-skilled sport such as running may be difficult for some athletes, as the specific skills and movements needed for successful performance may not be obvious. The authors admit that for some athletes, a result based imagery strategy may be more effective, but the results of their study support the use of skills-based imagery to enhance athletic performance on a short-term basis.

Murland (1990) outlined and described the tenets of a holistic training system for the distance runner. He focused on the need for the increased awareness of psychological factors affecting the athlete and how these factors can be addressed. Murland (1990) refers to holism as taking all of the positive elements and influences to 'make a better runner'. Likewise, this approach seeks to eliminate or minimize all of the negative aspects that might interfere with performance. Murland (1990) stressed the

need for an approach to training which plans for the mental and emotional aspects of running as well as the physiological requirements. Unless all of the related factors are considered, the performance will not be representative of the athlete's true potential.

Relaxation and the control of competitive stress are important skills for the long distance runner to master. As the techniques and mechanics of running are mastered, the level of physical relaxation increases. However this relaxation is difficult to maintain under highly competitive situations in which muscular lactate build-up approaches. As a result, the runner's mechanics and performance often suffer While some runners can compete successfully using will power or conscious control to fight through negative thoughts and pain, Murland (1990) contends that this method is ineffective for most athletes. Likewise, it is difficult for a runner to simply relax upon the orders of a coach during the middle of competition. Instead, the athlete must learn and practice relaxation techniques in order to implement them under duress.

Murland (1990) emphasized mental training for enhanced sport performance. He stated that "the proper psychological preparation of the athlete is more important than the combined influences of dietary and physiological preparation." (pp. 24) Where once performance was primarily the athlete's domain, now the athlete, coach, and psychologist each take a share in this responsibility. Murland (1990) cited Hahn, who encouraged coaches and sport psychologists to make athletes aware of their behaviors and use behavioral modifications to control negative behaviors. In addition, Hahn suggested that the sport psychologist focus more on education and communication with the athlete rather than adopting a psychotherapeutic orientation.

Relaxation, according to Murland (1990), is the most important feature in a system for handling competitive stress. Ideally, the athlete should be able to use a technique to deliberately reduce stress under competitive situations. Schultz's Autogenic Training and Jacobsen's Progressive Muscular Relaxation were briefly described as effective methods for relaxation training. These psycho-regulative measures should be taught as a specific routine and practiced over time in order to be an effective instrument for the athlete. Murland (1990) outlined three essential elements for such a program: (a) psycho-regulative

measures must be selected with the athlete's cooperation, (b) they must be appropriate for the individual athlete and sport, and (c) They must be practiced under a wide variety of conditions. In addition, Murland (1990) offered Intel's COPE model for athletic preparation. The athlete uses relaxation to *c*ontrol emotions, *o*rganizes input into positive and negative categories, *p*lans the response, and *e*xecutes the planned response.

Murland (1990) suggested that other mental training techniques such as visualization are best practiced and used in a state of relaxation. Pre-competition visualization for the endurance athlete can take several different forms. The athlete using positive self-imagery would picture running in a fast, relaxed manner and responding competitively. Murland (1990) also included self-talk, the reciting of certain phrases that elicit positive strengths and images of performance. Finally, a visual technique that changes 'anxiety into energy' was described. By removing the energy of feared competitors and transferring it to the athlete through a visualization process, the original fear of rivals is turned into energy for the athlete.

Several cognitive techniques for psycho-regulative control during the competition are suggested. The runner may focus on a movement pattern needing improvement such as stride length, cadence, or arm control. Murland (1990) also advises that the use of a race plan may offer the runner a focal point for attention as well as provide several problem-solving options through the race. However, he is quick to note that most athletes need time to practice these skills before they can effectively use them in a competitive situation and should be instructed by trained practitioners. Murland (1990) also warns against teaching different cognitive techniques too quickly and suggests that the athlete partake in an ongoing program in which the athlete confronts issues of stress occurring before, during, and after each performance.

The holistic approach towards sport preparation taken by Murland (1990) provides support for a program attempting to combine mental and physical training services. The emphasis on relaxation has important implications for the development of a mental training program for a distance runner. Perhaps it

is the first skill required of the athlete; a relaxed state is more conducive to the effective learning of other psychological skills such as visualization and attentional control.

Chapter III

METHODOLOGY

Introduction

Using a case study approach, I attempted to determine the perceived effects of a combined psychological skills and physical conditioning intervention program on the performance of a high school cross-country runner. This chapter includes descriptions of the participant, instruments, and methodology involved. The intervention focused on the mental and physical needs of the athlete as determined by previous performances, baseline measurements, and preliminary interviews with the athlete and the athlete's cross-country coach. The performance enhancement program combined specialized physical training with an educational psychological skills package geared specifically for distance running.

Participant

I attempted to design and implement a training package for a high school distance runner. The participant in the research study was an 18 year old, male high school cross-country runner. The participant was selected because of his desire for improved performance, his demonstrated commitment to off-season training, and his stated interest in the field of psychology. In addition, I believed that the participant had substantial room for improvement and would put forth great effort into the physical and mental training program. The athlete and coach both agreed to participate and gave their informed consent (Appendix A-1, A-2) that they understood the nature of the research project, what was expected of them, and their rights as participants.

Instruments

Profile of Mood States

I used McNair, Lorr, and Droppleman's (1971) Profile of Mood States (POMS) scale to obtain data concerning the athlete's pre-competition mood state. The questionnaire (see Appendix B) consists of

six subscales which purport to assess transient, fluctuating mood states. The five negative state subscales are tension-anxiety, depression, confusion, anger, and fatigue, and the single positive mood state is vigor. There is no item overlap and the score for each subscale is derived from 5-point adjective rating scales. A total mood disturbance score (TMD) may also be calculated from the six subscales. Eichman (1978) and Weckowicz (1978) both reported that the POMS scale demonstrated high face validity and reliability. The test has high internal consistency due to the considerable redundancy of the items in each sub-scale. K-R 20 reliability values ranged from .84 to .95 and test-retest correlations ranged from .65 to .74.

Although originally developed for psychiatric outpatient evaluation (Eichman, 1978; Weckowicz, 1978) the POMS has been used in a number of different sport applications including player selection, prediction of performance, and as a diagnostic evaluation. Research has identified a trend in the POMS scores of elite athletes termed the *iceberg profile,* in which the scores of the five negative mood state subscales are typically below the 50th percentile and the score on the Vigor subscale is above the 50th percentile (McNair, Lorr, & Droppleman, 1992). In addition, the POMS has been used in 17 studies involving runners (Le Unes, Hayward, & Daiss, 1988). Crews (1992) reported that the TMD score of the POMS correlated highly (r=. 88) with running economy (RE) for within-subject variation of moderately trained male distance runners, demonstrating that less negative affect was associated with lower oxygen consumption. The POMS has been generally seen as a valid and reliable instrument to measure fluctuating, subjective feelings.

Competitive State Anxiety Inventory

I also administered the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Vealey & Burton, 1990) was also administered to the athlete prior to a cross-country meet. I used the CSAI-2 to obtain additional information concerning the extent and source of competitive stress for the runner, so that my intervention could be more specifically tailored to meet the athlete's needs. The CSAI-2 is a 27-item likert scale inventory (see Appendix C) that takes about five minutes to complete. It contains three,

independently scored, nine-item subscales designed to measure state cognitive anxiety, state somatic anxiety, and state self-confidence.

The authors established the internal consistency of the CSAI-2 using three separate samples: (A) 35 male college track athletes and 22 elite high school wrestlers, (B) 40 elite male high school wrestlers and women collegiate volleyball players, and (C) 54 elite high school wrestlers. Cronbach's alpha coefficient ranged from .79 to .90 for each of the subscales, demonstrating a sufficiently high degree of internal consistency (Martens, Vealey, & Burton, 1990). Concurrent validity was generally supported through comparisons with four A-trait inventories: (1) the Sport Competition Anxiety Test (SCAT), (2) the Trait Anxiety Inventory (TAI), (3) the Achievement Anxiety Test modified for Competition (AAT-C), and (4) the Internal-External Control Scale (I-E Control). The subscales of the CSAI-2 were also compared to four A-state inventories: (1) the Worry-Emotionality Inventory (WEI), (2) the Cognitive-Somatic Anxiety Questionnaire, (3) the State Anxiety Inventory (SAI), and (4) the Affect Adjective Checklist (AACL). Concurrent validity was strongly supported through these comparisons according to the inventory's authors.

Construct validity for the inventory's ability to measure sport-specific A-state, somatic A-state, and state self-confidence was also established through four studies investigating: (1) variables influencing competitive A-state, (2) changes in competition A-state as the time to compete nears, (3) the relationship between performance and the CSAI-2 subscales, and (4) the relationship between CSAI-2 subscales and a more sensitive intra-individual performance measure.

Goal Attainment Scaling

I used the Goal Attainment Scaling guide (Kiresuk, Smith, and Cardillo, 1994) to organize and evaluate the level of the athlete's achievement. The participant and researcher assigned a "weight", or level of importance to each goal and objectively measured progress towards these goals using a 5-point scaling system. Each of the points, ranging from –2 to + 2, correspond with a possible outcome for each goal, with +2 being the "best possible outcome" and –2 being the "worst possible outcome".

Other Materials

I used a stopwatch to time the baseline runs and an audio tape recorder with microphone to record interviews with the participant and coach. The participant recorded daily and weekly mileage, body weight, injuries, and other training information in The Running Log 2000. It is a comprehensive journal that also contains information from leading distance runners on stretching, training, and injury prevention. In addition, I gave the athlete a copy of The Competitive Edge, Richard Elliott's 1991 book on mental preparation for distance running, and assigned chapters that corresponded to components of the performance enhancement program for reading. Elliott is a former collegiate track All-American and high school cross-country coach with considerable experience in psychological skills training for running.

Procedures

The case study consisted of three primary stages: (a) diagnosis of athlete & development of intervention, (b) implementation of the intervention, and (c) evaluation of the intervention. The first stage was diagnostic in nature and involved the collection of both qualitative and quantitative data. Information gathered in this process was used to develop a training program that focused specifically on the needs of the participant. The second stage, program implementation, involved setting training and performance goals, educating the participant about mental preparation through consultations and assigned readings, having the participant practice psychological skills with and without supervision, and providing supplemental physical conditioning exercises to compliment the participant's team workouts. The final stage, evaluation, included interviews with the coach and participant, analysis of performance data collected throughout the season, and inspection of the results of the final POMS scale.

Stage 1: Program Development

A performance baseline consisting of three timed runs on the participant's "home" 3-mile cross-country course was first obtained. The athlete ran with a faster teammate in order to simulate a competitive situation. Weather conditions (i.e., temperature, and humidity), time of day, course

conditions, and the times to complete the run for both the participant and the other runner along with other observations were recorded. Following each trial, the researcher obtained verbal feedback from the participant concerning his performance.

A pencil and paper version of the POMS scale was administered to the participant 45 minutes prior to the season's first race in order to identify the participant's mood state before competition. Grove and Prapavessis (1992) reported that the inventory could be completed in 5-7 minutes, allowing the runner time to warm up and stretch while still approximating a pre-competition mood state. Scores from each of the six subscales (i.e., tension-anxiety, depression, confusion, anger, fatigue, and vigor) and the total mood disturbance (TMD) were evaluated. The TMD score has been highly correlated with running economy, the efficiency of the body's cardiovascular functioning under a constant workload. The results from the POMS test along with the data gathered from the preliminary interviews provided the basis of the performance enhancement program.

I gathered information from the participant and coach in separate tape-recorded interviews. In an attempt to minimize my own influence, I conducted these preliminary interviews before scoring the POMS test. I used a semi-structured interview with the coach to discover her perceptions of the participant's level of ability in cross-country running. The coach was informed about the nature of the athlete's participation in the study and asked about her opinions on the athlete's strengths and weaknesses. The coach was asked for information concerning the team's practice, race schedule, and recommendations for supplemental physical conditioning.

I also used a semi-structured approach to interview the athlete. Questions focused on the athlete's sport history, previous and current levels of performance, perceived strengths and weaknesses, and his expectations for the upcoming season. Interviews with the coach and athlete were taped, reviewed, and analyzed for specific strengths, weaknesses, and goals of the participant for the training program. Consistencies and discrepancies between: (a) the interviews of the coach and of the athlete, (b) the results of the POMS, and (c) my own observations, are presented in the results section of this study. As with all tape-recorded interviews and sessions in the study, I erased these tapes at the end of the study.

Stage 2: Program Implementation

The performance enhancement program spanned the length of the high school cross-country season, about two months. The intervention lasted eight weeks and addressed the goals of the athlete as identified in the preliminary interview. Input from the coach and the results from the POMS test helped me identify specific areas of concern about the athlete's psychological and physical preparedness for competition.

The performance enhancement program typically consisted of two weekly sessions of both psychological skills training and physical strength training. Physical conditioning sessions took place at a local fitness club. The mental skills training sessions were conducted in my apartment. One training session consisted of running an outdoor stairway at the University of Tennessee's track and field facility in order to prepare for a competition that included steps on the course. Another session was held at the race site of an upcoming county championship meet. In addition, I attended selected competitions during the season to administer the POMS and CSAI-2 scales and make performance observations.

During the first consultation, we focused on setting training and performance goals. I helped the athlete format his goals using Goal Attainment Scaling (Kiresuk, Smith, and Cardillo, 1994).

The psychological skills training program was designed to educate the athlete in various mental techniques for performance enhancement while focusing on those which appeared to be most relevant to his specific requirements. In constructing the program I followed guidelines for consultation presented by Taylor (1993), who stressed the importance of developing the training program around sport specific requirements and the athlete's individual needs.

I assigned to the participant short reading assignments from Elliott's 1991 book The Competitive Edge to prepare for the mental training sessions with the researcher. This book described the psychology of distance running and the theory and use of specific techniques, so the participant entered into each session already familiar with the concepts of the mental skill to be learned.

During bi-weekly consultations the participant was permitted to ask questions and to refine skills with my assistance. Each session lasted 60 minutes and consisted of reading assignments

discussions, learning and practicing of psychological skills, and GAS evaluations and modifications. Recent competitions were reviewed and the athlete and I discussed and prepared for upcoming meets.

The first evaluation of the program took place during the fourth week. This evaluation included the participant's performance statistics of the first half of the season (i.e., time to finish, overall placing in races, and position of finish on the team), the results POMS scale re- administered 45 min. before a meet, and the athlete's observations and suggestions concerning the program. This evaluation provided information that enabled me to make adjustments in the program.

Pre-race nervousness was both reported by the athlete and observed by me. I hoped to gain additional information concerning the source of the athlete's competitive anxiety so as to help prepare him for the county's championship meet at the end of the season. Therefore, I administered a paper and pencil version of the CSAI-2 45 minutes prior to a meet in the later part of the season; the entire 27-item inventory took approximately four minutes to complete. The scored subscales of the CSAI-2 provided further insight into the physiological and mental components of the participant's anxiety and also served to quantify the athlete's pre-race level of self-confidence.

In addition to supervising the athlete's psychological skills training, I led him through physical conditioning sessions designed to increase strength, speed, and flexibility. I developed a detailed eight-week program based on the input of the coach, participant, and my own observations. I incorporated guidelines for physical conditioning and nutrition presented in Jeff Galloway's 1984 Galloway's Book on Running. I conducted bi-weekly sessions at a local fitness club during which I instructed the athlete on proper exercise form, verbally encouraged, and "spotted" him throughout each workout. I kept an exercise log of sets, repetitions, resistance, and other training variables.

The physical conditioning program served as a supplement to the participant's team workouts, which consisted primarily of long runs for endurance, hill runs for leg strength, and intervals/fartlek for speed. Sufficient rest for the distance runner is crucial (Bowerman, 1992; Eynden, 1984; Galloway, 1984; Stinzi, 1992) and I repeatedly cautioned him against over-training. In addition, the physical training regimen of my program did not include additional distance running. Instead, I developed a

peripheral exercise program that complimented the team's practices. This program included weight training, plyometrics (exercises to develop muscular explosiveness), circuit training, and swimming. These cross-training options for distance runners have been supported in other literature (e.g., Galloway, 1984; Stinzi, 1992). In addition, the participant met several times with a former NCAA All-American and two-time Olympic middle-distance runner to fine-tune his running form and discuss his race strategy.

One of the goals of the performance enhancement program was to successfully educate the participant in both psychological and physiological preparation for optimal performance. The participant was encouraged to take responsibility for learning and practicing mental techniques, eating properly, resting sufficiently, and running with high intensity during team practices. To help foster the participant's progress, I made myself available to the athlete and coach whenever necessary, conferring with them by telephone as well as in person.

Stage 3: Program Evaluation

The third stage of the case study consisted of an overall evaluation of the performance enhancement program. Weinberg and Williams (1993) recommended the use of both objective and subjective data in evaluating a psychological skills training program. Therefore, the evaluation of the program was based on feedback provided by the athlete and coach in the final interviews, performance statistics obtained throughout the course of the season, the T-score from the GAS, and the results of the three POMS scale administered prior to competition throughout the season. I used a semistructured interview approach that emphasized the experience of the athlete during training and competition and the coach's perceptions of change in the athlete's performance and behavior.

Chapter 4

THE DATA

Introduction

I attempted to describe, through the use of a single subject case study, the process of incorporating a performance enhancement package with a high school athlete. The research methodology in Chapter 2 was presented according to the three steps of (1) development, (2) implementation, and (3) evaluation of the mental and physical training intervention. To provide continuity, the presentation of results is also organized into these three phases.

Section 1, entitled *Intervention Development*, includes pre-season baseline performance measures, results of the first POMS administration, and interpretation of the pre-intervention interviews with the athlete and coach. A discussion of this diagnostic information and its influence on the intervention's structure completes this section.

Section 2, *Implementation of the Intervention,* provides a chronological outline of the intervention period and details each of the specific aspects of the program. Performance statistics and a discussion of the notes I took in each of the mental skills training sessions are included. The mid-point interview of the athlete and the subsequent modifications made to the intervention are presented. Results from the CSAI-2 and their bearing on the intervention are also included in this section.

Section 3, *Program Evaluation,* provides an overview of the athlete's performance throughout the intervention period. Goal-attainment items and scores and their scores are presented. Another significant part of the evaluation lies in the post-intervention interviews with the athlete and coach. Both individual's perceptions of the performance enhancement program are paramount, and serve to conclude this section and the chapter.

Intervention Development

Pre-season performance baseline

To help determine the athlete's pre-season level of conditioning and performance, three baseline trials of the participant's performance at the 3-mile 'home' course at his high school were conducted. The time to finish the course and variables such as time of day, temperature, and humidity were recorded. In addition, I recorded comments from the athlete and myself regarding each run immediately following each trial.

Trial 1. *Date of run:* 7/2/97. *Starting time: 8:11* PM. *Temperature*: 85°. *Humidity:* 63% The participant completed the course in 21:40 and was joined by a teammate who ran along side him and provided encouragement. Both runners were instructed to prepare and run as if they were at a true competition, and they ran a slow, 10-minute mile and stretched another 10-15 minutes together beforehand. Following the run, the participant complained about feeling tired, cramping in sides, and admitted to not eating a good pre-race meal. He said that he ran as fast as he could and that he was "hurting" during the run. He had no particular strategy for the run and said that his first mile was "fast". He insisted that he could finish the course more quickly, perhaps in the 19-minute range. A general discussion of the athletes on their team followed, in which they both described the team's #1 runner as "Olympic bound" and "one of the top two to three high school cross-country runners in Knoxville".

Trial 2. *Date of run:* 7/8/97. *Starting time:* 6:37 p.m. *Temperature*: 83°. *Humidity:* 49%. Again the athlete arrived early to the course and warmed up and stretched on his own. The subject's time of 20:50 marked a 50-second improvement over the first timed trial. Although his teammate was unable to run with him, I ran alongside the athlete for the second half of the course, providing encouragement near the end. After the run the athlete said that he "planned to start a little slower and keep a 7-minute/mile pace through the course", and that he "didn't think much about strategy, but instead thought about pain and trying to forget about it". The athlete commented that he felt better physically than he had on the first trial.

Trial 3. *Date of run:* 7/12/97. *Starting time:* 8:28 a.m. *Temperature*: 70°. *Humidity:* 54%. At a time of 20:00, the athlete once again improved his time by 50 seconds over the second trial and 1:40 over the first trial. This run took place in the morning and the temperature was lower than on the first two trials. In addition, the other two trials were run at night, following the athlete's day at work. It is likely that the favorable weather conditions and the freshness of the participant both contributed to the lower time. The teammate who ran with the athlete on the first trial again joined him for this run. Following this trial the athlete commented that he felt like he had run better, but that his "quadriceps were tired" and he felt like he "needed to start hill work".

The three trial runs served several purposes. I saw the athlete perform for the first time in a simulated competition setting, thus providing a general idea of the athlete's ability. The times of the pre-season trial runs also provided baseline data for post-season performance comparison. The athlete may have also gained awareness of his conditioning level and what aspects of his running needed attention in prior to the start of the season. Although there were variations in things such as weather and time of day, the three pre-season trial runs proved useful in the development of the intervention.

Profile of Mood States (POMS) – First Administration

I administered POMS prior to the season's first meet at the athlete's home course. Approximately 45 minutes before the start of the meet, the athlete and I found a quiet area and he completed the inventory.

The scores of the first POMS administration provided valuable information that I used in developing the intervention. The athlete's scores were compared to a typical *iceberg profile* in which the scores on the five negative mood state subscales are below the 50th percentile and the positive mood state subscale score is above the 50th percentile. As the participant was 18 years of age and a high school senior, the most appropriate comparison group to determine his T-score ranking was a sample of 856 college undergraduate students (McNair, Lorr, and Droppleman, 1992). The participant's scores were compared to the mean scores of the 340 males in this sample.

Results of the POMS administrations are presented in figure 1. The participant's **Tension** subscale score of 32 was equal to a t-score norm of 76 for all undergraduates and was much higher than the mean of 12.9 reported by the male undergraduates. The **Depression** score of 7 was comparable to a t-score norm of 41 among all undergraduates and below the 13.1 mean of males. The participant's score of 7 was equivalent to a t-score norm of 47 and was below the 10.1 mean score of males for the **Anger** subscale. His score of 18 on the **Vigor** subscale equaled a t-score norm of 54 and was slightly higher than the male mean of 15.6. The athlete reported a score of 0 on the **Fatigue** subscale, equivalent to a t-score norm of 34 and much lower than the mean of 10.4 for undergraduate males. The final subscale of the POMS, **Confusion**, resulted in a raw score of 12, equaling a t-score norm of 52, and a score slightly above the 10.2 mean of males.

The POMS scores revealed information concerning the athlete's mental and emotional state prior to competition; however, several important limitations of the inventory should be noted. First, the sample group to which the athlete's scores were compared consisted of college undergraduates, not high school

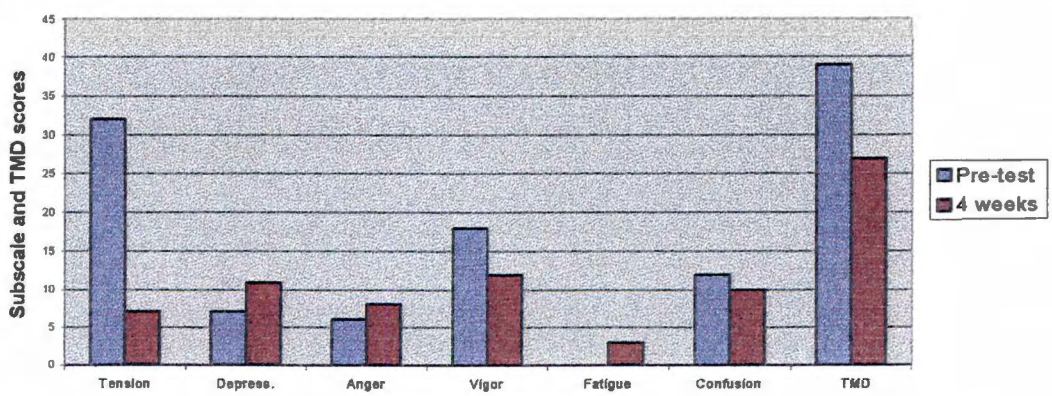

Figure 1. POMS Results.

students. Although close in age, there may be group differences in subscale norms between high school seniors and college undergraduates. In addition, the athlete in this study was tested close to the time of athletic competition, while those included in the undergraduate student sample were not. Higher levels of mood disturbance may very well have resulted to the context in which the participant completed the POMS. Therefore the comparison between the participant's scores to those of the norm sampling group were important only to the extent that they permitted the researcher to further develop a performance profile of the athlete prior to the intervention period; results from the first POMS administration were used in conjunction with interviews of the athlete and coach to establish a more comprehensive profile.

Pre-intervention Interview with Athlete

Several days prior to the first meet of the season, I interviewed the participant in an attempt to learn about his athletic history, obtain insight regarding his perceived strengths and weaknesses, and determine his attitudes towards the upcoming season. The interview was tape-recorded and transcribed shortly thereafter. Segments of the transcription deemed important to the development of the intervention are categorized in this section.

Participant History

The participant said that he had been running recreationally since the 2nd grade, when he first ran in the Expo 10K. He has entered this road race every year since that time. However, the participant, a senior at the time of the interview, "...didn't get really serious and competitive until freshman year when [he] joined the cross-country team." He was a member of the JV squad during his freshman and sophomore years, but attained a position at the varsity level in the beginning of his junior season. The participant attributed this advancement to the fact that "...we had a really bad team, and that's why I was on varsity. We lost four of our varsity runners [from the previous year]." He admitted that he wouldn't have made it on a stronger varsity squad. During his junior season he suffered from a nagging shoulder injury and believed that he "wasn't very healthy at all that season".

When asked to describe his best and worst races, the athlete said that his best performance was a meet in his sophomore year at his high school course. "I ran it in 18 minutes flat. I ran up the first hill, which is a hard hill and really, no problem. I was just able to continue until I got to the downhill, recovered there, and finished the first mile in 5:15... I wanted under 18 minutes but I ended up with 18:00 flat and I was happy." The participant was at first unable to recall the day in great detail, but then remembered that his JV squad had competed against the varsity teams of other high schools. He suggested that perhaps "something...clicked that said 'hey, you need to go faster for this one because you don't have the other guys to back you up' ". He remembered that during the race he "hurt", but that he felt as if he "was doing well and going fast".

The athlete's worst performance ever was at an intra-squad race:

> The worst run was my first one but that wasn't-I don't consider that the worst feeling. The worst feeling - I think it was the first race last year. That's when I noticed that there was something wrong because there were a lot of guys that I saw there that I knew I was faster than, but they beat me pretty bad and I knew I was I giving it all I had, so I didn't know what was wrong. So that was the worst feeling, running really bad and not knowing why.

Although he placed seventh on the team, sufficient for a varsity position, the participant "didn't think [he] was deserving of varsity" and "didn't want to wear a shirt that said [he] was seventh when [he] should have been fourth". The runners wear jerseys with numbers that correspond to each of the runner's finishing positions on the team for the prior race, and the top seven finishers run at the varsity level in the next meet.

Self-Perceptions of Participant

The interview next moved to the participant's perception of his abilities. In particular, the athlete evaluated his own physical and psychological strengths and weaknesses. He believed that he had "a lot of endurance, but ...lacked in speed and flexibility". He explained that:

> Some people are much more natural sprinters on the team than I am, and at the big races where you have to get out fast, they can get out fast and that little spurt at the start doesn't phase them

> as much as it phases me. After that I'm always dead, but they can keep going sprinting, and I'm really used to going out slow and staying with it for a long time.

The athlete stated that the start was the toughest part of the race for him, but that "it hurts more at the end". He believed that his conditioning typically improves over the course of the season, and that the speed workouts done in practice benefit him more so than most of his teammates. The athlete and I had exercised with weights several times prior to the interview, and the participant felt that it would be especially helpful to continue strengthening his upper back in order to keep his shoulders from slouching forward when he ran. He also believed that his legs were in need of additional strength and flexibility, stating that he was one of the least flexible runners on the team.

The athlete also discussed psychological components of successful performance. He identified the ability to manage physical discomfort during a race as one of the most important factors. "During the races I think about how much it hurts and sometimes I give in and I don't need to be giving in." When asked to clarify what "giving in" meant, he added "I feel the pain and you can really go faster and you know that you can do it, it just hurts and you don't really want to...sometimes the pain wins and sometimes you win". Both the participant and I agreed that this "mental toughness" would be crucial for him to achieve if he wanted to succeed. When asked about his mental focus at the start of a race, the athlete stated:

> Usually I'm pretty nervous and it's kind of being between nervous and afraid because really everyone has their good and bad days. I'm always afraid of having another bad day and so I think about that and I almost always ask myself before the start of the race 'why am I doing this?' because I usually feel pretty bad before a race and pretty good after the race.

According to the participant, his anxiety typically disappears after the first 400 yards of the race, and then he "goes into feeling the pain and... that's a hell of a lot better feeling than the start". He felt that physical discomfort associated with the race was less troublesome than the nervousness that preceded.

The Upcoming Season

The participant conveyed a cautiously optimistic attitude towards the approaching competitive cross-country season. The first personal goal he stated was to be among the top five runners on his team. In a high school cross-country meet, each team receives points according to the overall standings of its first five runners at the completion of the course. He also stated that "...it would be great if I could get under 16:30 for three miles and I'd like to help my team win state". He listed "hard work, staying injury-free, getting more flexible, and eating right" as things he could do to help his team get to the state championship meet. When asked to define what 'hard work' meant to him, he replied " Just going to practice every day and giving it all I've got. Last year I did (gave it all he had) so I don't see why I wouldn't do that this year. It's my senior year, so I have nothing to lose by working hard".

The participant was voted captain by his teammates prior to the start of the season. In addition to his expectations for personal accomplishments, the athlete knew he had to take on a leadership role on the team as well. When asked how being voted captain made him feel he responded "It puts more responsibility on my shoulders but at the same time it feels great because it's an honor to be voted captain". When asked why he thought his team voted him captain, he speculated that:

> I think a lot of them know that I work hard and the other thing is I just, compared to the other seniors, I'm with them a lot more, I organize things and do stuff like that and I talk to them a lot more than some of the other guys. I guess they saw me as more of a friend than some of the other guys.

However, the athlete expressed a certain degree of concern over his personal performance and ability to maintain a spot on the varsity team. He explained that "...if somehow I lost my varsity spot I don't think I would be the right person for being captain...sometimes the JV team doesn't go to the meets". Further probing revealed that the athlete's fear of not maintaining varsity status had been with him since his junior season, and "even though I've got a feeling that I'm in much better shape than I was last year, I'm

still afraid that it will happen again". The participant's new position of leadership on the team seemed to be both a source of pride and additional concern.

The participant also discussed his goal of leading the team to the state championship meet. He responded confidently when asked if his team could accomplish this goal, and said he believed that his team would also finish first in their region. In order for a team to win the state championship meet, he stated "at least four runners need to finish under 16:00". The participant commented that there were some injuries on the team, including injuries to the top two runners, but that he thought they would both be ready to perform well by the end of the season.

The interview concluded with the athlete briefly discussing his relationship with his coach. Although he evaluated his coach as "nice to everybody" and "fair because she didn't pick favorites", he felt as though she lacked the ability to inspire him and his teammates. He proposed that "for some reason, male coaches might be more inspiring to another male..." He anticipated hard but productive training workouts and added that "every time I have a hard workout I feel a whole lot better because I'm really doing what I can do to make sure that last year doesn't happen again". When asked what he expected to obtain from the upcoming program, he answered that he "...hoped that there are things that we can do that will help me get that fighter's mentality".

Pre-Intervention Interview with Coach

I also interviewed the athlete's high school cross-country coach the day after the team's first meet. The coach was present for all four of the participant's years on the team and she felt that she was able to provide "some pretty good feedback". It was her eighth season in coaching and her second year as head coach. She was asked several questions about the participant and offered some suggestions to help in the development of the intervention. The interview was tape-recorded and transcribed shortly afterwards.

When asked to talk about the runner's strengths, the coach immediately mentioned that he had been voted captain of the team and that "the other runners felt that he had the quality needed to help them

in motivation and ...fulfill all the duties of a captain". According to the coach, the participant had some problems at the end of the prior season due to certain physical pains, but that "this year he has started out more positive and on a stronger level than last year". She mentioned that this runner was usually strongest at the beginning of a race, and that he was working toward keeping a faster pace throughout the entire course.

> The coach expressed high expectations for the participant for his senior year:
>
> Number one, being the captain, I'm hoping that he can be a true leader for the other runners, especially the younger runners... I also want motivation, showing what a true runner should do- not making cuts, getting by with things, especially things they think the coach doesn't know exists out there...and to show them that even though you're not the top one or two on the team, you're still part of the team and it takes the whole team to make the true effort. And through that, hopefully he will be strong enough to pull the guys together as a unit so that they can work together as a team...and if he puts forth the true work ethic that I know he has, there is a very good possibility that he can even make that varsity squad and stay there and not be the one right close, as we call the 'killer bee', so I think it's under his power if he wants it bad enough this year.

The "killer bee" position, the coach explained, is the name given to the runner who just misses the seventh and last varsity spot; the participant has often been in this position. However, the coach pointed out that the entire team typically runs together regardless of standing, with the exception of the larger meets at University of Tennessee, Chattanooga and the AF Bridges meet in Nashville in which the varsity and JV squads run separate races.

I asked the coach for suggestions concerning the athlete's physical preparation and she provided some valuable feedback for the development of the intervention. She evaluated the participant as having sufficient physical endurance to complete the necessary mileage throughout the season, but insisted that he needed to "push himself up to the next notch...on a daily basis in practice". She believed that if the

endurance could hold, it would help him increase his speed. She also commented that the runner's flexibility needed improvement to prevent injury and suggested that he could do this by "...stretching, even when he's sitting in front of the television..."

I informed the coach that a large portion of the performance enhancement program would consist of psychological training and asked her if she "had any particular ideas about what it takes to reach a personal best, to maximize one's potential?" She commented that in distance running, there is more time to think during the competition, and that this aspect was a big part of the race. She stated that the participant would truly benefit if "he has a positive attitude daily and [knows] that he can do it if he pushes himself to the limit and [does] the work that needs to follow it". In addition, the coach commented on the participant's need to focus on his own performance:

> I think a lot of it has to do with worrying about [himself] and no one else, and that's hard to do because a lot of our runners focus on the other runners they're racing instead of worrying about their capabilities and their limits, and that's what they need to concentrate the most on. Hopefully we will be able to get each one to focus on their own abilities and times and know what they can do and what it feels like to run at their pace that they need to be setting.

The interview moved into specific strategies for dealing with pain during a race, a problem that was mentioned by the athlete in his interview. The coach recommended that the runner not focus on the pain, because that would "bring you down" and keep the focus off of the running. She suggested that much of the cramping in the stomach region could be alleviated through proper breathing technique, and planned to discuss this with the team. When asked to elaborate, she stated that "...breathing in through the nose and out through the mouth..." and "taking in deep breaths and blowing out quickly...helps to keep down cramping".

In addition, the coach believed that proper nutritional habits and hydration were important in preventing cramps during competition and practice. She stated that carbo-loading, the consumption of

foods high in complex carbohydrates such as pasta, on the day of and the night before races was a valuable practice that most of the team used to ensure an adequate energy supply. She also suggested that the runner consume as much non-carbonated fluid as possible throughout the day to prevent dehydration.

The coach emphasized the value of relaxing during a race; staying relaxed is something "that should be paid attention to, but not focused on". In particular, the runner should stay loose on downhill sections of the course and "stride out to get the full distance and use of the hill". To conclude, the coach suggested that the mental aspect of performance was perhaps the most important aspect of the upcoming intervention, although she indicated that strength and flexibility training was also very valuable.

The Intervention

I considered several sources of information when designing the performance enhancement program. Input gathered from the coach and athlete's interviews was paramount, specifically concerning their evaluations of strengths and weaknesses. The results from the POMS were instrumental in further establishing the focus of the mental skills training portion of the intervention. The three trial runs provided me the opportunity to observe the participant under simulated competition conditions and gather immediate feedback from him following each run.

Sport psychology interventions

Pre-race anxiety

Both the athlete and coach interviews and the POMS result strongly suggested a high level of tension prior to competition. The athlete reported "feeling pretty bad" and "between nervous and afraid" at the start of races. The coach reported that the participant was worrying too much about the other runners prior to the race. The subscale score for Tension on the POMS was 32, equivalent t a t-score of 76. This is much higher than a typical iceberg profile, in which the Tension subscale score is below 50%. The concurrence of data regarding the athlete's pre-race anxiety strongly suggested that the intervention

should directly address this issue and I decided to use stress management/relaxation techniques to counteract tension.

Motivation

The athlete's attitude towards the upcoming season appeared to be positive. He mentioned several ambitious goals he had for the team and himself, including a chance to compete at the state championships and to lower his personal best time to 16:30. His decision to seek the Captain's position on the team also displayed motivation.

However, statements obtained from both the athlete's and coach's interviews led me to believe that additional structured goal-setting would benefit the athlete in fulfilling the day-to-day demands that would be required of him through the season. The athlete's comment regarding his coach's inability to inspire the team suggested that perhaps his own internal motivation was not always sufficient. Several times the coach commented that the participant would have to push himself harder in order to succeed, suggesting that his effort level in prior seasons had been somewhat lacking. Therefore, the participant and I developed Goal-Attainment Scales in order to provide measurable process goals that would organize and motivate behaviors and hopefully improve his performance.

Focus of Attention

Several statements made by the athlete and coach during interviews suggested that the focus of the athlete's attention prior to and during competition was not conducive to optimal performance. The coach commented that the participant was too concerned with the other competitors in the field and not focused enough on his own running. The interview with the participant suggested that he was unable to remain focused on his race strategy and instead dwelled on the physical discomfort he was experiencing. These concerns weighed heavily during the development of the intervention, and consequently, sessions concerning attention control and stress management techniques were included. The runner also chose a cue word to use during competitions to help him remain relaxed and mentally focused on the correct things.

Physical conditioning in the Intervention

Both the athlete and coach stated that participant's performance was hindered by a shoulder injury of the rotator cuff during the previous season. In addition, the athlete tended to slouch his shoulders when running, a problem which he verbally acknowledged in his interview. Therefore, the physical training program included upper-body exercises to strengthen the upper back and rear shoulder muscles. Any exercises that posed unnecessary risk of re-injury to the athlete were excluded, his feedback concerning discomfort in the shoulder was frequently obtained during training workouts, and subsequent modifications were made.

Both the athlete and coach identified his lack of flexibility, particularly in the legs, as a physical liability. Tight muscles are not conducive to fast running and the likelihood for injury increases over the season if flexibility is not maintained. One of the three Goal Attainment Scales concerned a daily stretching routine, and the participant's training sessions often ended with extended periods of stretching.

The participant was running 4 to 5 times during the week with his team and about once each weekend on his own. The coach believed that the participant had adequate endurance, but needed additional foot speed. At the end of the third trial run, the participant complained of tired quadriceps, and in his interview, stated that he believed additional leg strength would help him on hilly courses. Therefore, I implemented a strength training routine (Appendix D) used by the University of Tennessee's cross-country team and modified it to the available training facility and the athlete's specific needs. This intervention consisted of two training sessions per week under my supervision.

In addition, the athlete and I met several times with a two-time Olympian and former NCAA All-American in the 800M event to work on speed drills. This person suggested that the participant should frequently run intervals of short distances at higher speeds and practice his 'strides' before and after each practice. This athlete and I heeded this suggestion and developed a Goal Attainment Scale that measured the athlete's consistency in performing the additional work.

Implementation of the Intervention

In this section I provide a chronological outline of the athlete's season and detail each of the specific aspects of the intervention. Performance statistics (Table 1) and discussion of my notes during each of the mental skills training sessions are included. The mid-intervention interview of the athlete, the results of the mid-intervention administration of the POMS, the results of the CSAI-2 are also presented.

Performance Statistics

The participant's performance statistics are presented in Table 1 and include the date of each race, the race location, and the participant's finishing time, finishing position in the meet, and finishing position on the team. Their information is presented here to provide context to the events (i.e., competitions) that are mentioned in the following discussions of the interviews and mental training sessions.

Table 1. 1997 Performance Statistics

Date	Meet	Time to finish	Finishing position/Total runners	Finishing position on team
26-Aug	N/A	19:14	15 of 38	9 of 16
6-Sep	All Comers	17:59	54 of 224	6 of 18
13-Sep	UTC Invitational	19:21	97 of 175	9 of 9*
18-Sep	Panther Creek	19:39	59 of 226	8 of 13
27-Sep	A.F. Bridges	19:48	N/A	12 of 17**
2-Oct	All Comers	19:58	72 of 164	9 of 15
10-Oct	KIL	18:26	50 of 156	12 of 18
21-Oct	JV Regional Championships	19:39	22 of 38	8 of 13

*JV squad and Varsity squad ran separate races; participant ran with varsity squad
**JV squad and Varsity squad ran separate races; participant ran with JV squad

Physical Training in the Intervention

The athlete participated in a modified version of the University of Tennessee's men's cross-country Team's strength training routine throughout much of the intervention period. The routine consisted of two circuit-style workouts in which I led the participant quickly through a series of light-weight, high-repetition workouts. Each workout was typically performed once a week although on several occasions training sessions were missed due to various reasons. During each session I recorded the

weights, sets, and repetitions of each exercise. The complete routines with the name of each exercise and the respective muscles used can be found in Appendix G.

The intensity of physical training was adjusted according to feedback from the participant. For example, on several occasions the runner complained of muscle soreness and tightness and therefore lighter weights were used, some exercises were avoided, and extra time was spent stretching. I helped the runner in several stretches requiring assistance. The athlete also performed 'water running' in the deep end of a swimming pool for which he wore a flotation device around the waist and maintained a running motion. This exercise was included on the advice of the previously mentioned Olympian.

Sport Psychology Sessions

The participant and I met 1-2 times per week, a total of ten sessions, to discuss his performance, to plan for upcoming meets, and to practice mental training techniques. Time was also taken to review the participant's reading assignments from Elliott's (1991) *The Winning Edge.* These sessions lasted approximately one hour each and were conducted at my home. In addition, the participant and I discussed issues concerning performance and team leadership over the telephone on several occasions. I took brief notes during each session and later edited them.

Session #1: We discussed the first race of the season. The runner admitted to having many different thoughts immediately prior to the race, including lyrics to a song. Although he had a strategy, to mentally segment the course off into shorter sections, he found himself distracted at about 1½ miles into the race. His focus shifted to the other runners and how strong they were running. We discussed the importance of concentrating on what was important to his own performance, and that he couldn't control how well the competition ran. We then developed Goal-Attainment Scales to help measure behaviors (i.e., practicing strides, stretching, and arriving early to practice) that we believed would improve his performance. We reviewed the Introduction of Elliott's (1991) *The Competitive Edge* and I assigned Chapter 2: Complexities of the Simplest Sport, for the next session.

Session #2: The participant talked more about the first race and said that he lacked confidence on the downhill sections of the course. The runner's expectations and his definition of a 'bad' performance were also covered; he believed that not making the varsity squad or finishing in a lower position than the previous race constituted a poor race. We then reviewed Chapter 2: Complexities of the Simplest Sport, in Elliot (1991) and I read aloud a list of negative pre-race statements that the author had recalled from his days of coaching. The athlete agreed that he had many of the same thoughts before his own races. Chapter 2 also covered arousal theory and its relevance to sport. Drive theory and the inverted-U theory were compared, and the athlete agreed that the U-theory would better explain performance in distance running. He and I discussed his abnormally high score on the Tension scale of the first POMS administration and related this to the inverted – U model. He agreed that he needed to "come down" emotionally before a race. The session concluded with a short progressive muscle relaxation and imagery exercise. The participant was instructed to read Chapter 3: Calming the Body, and to practice the relaxation technique each night before sleep.

Session #3: The participant did not complete the reading assignment, so together he and I finished Chapter 3: Calming the Body. We discussed some possible techniques for managing tension and stress before and during competition and agreed that focusing on breathing, reviewing race strategy, and scanning the body for muscular tension were viable strategies he could use at the next day's meet. In addition, the runner chose the cue word "relax" to use when he felt nervous before and during competitions. I led the runner through a relaxation and imagery script and tape-recorded it for him to use at home. He was assigned Chapter 4: Preparing the Mind and was instructed to use the relaxation/imagery tape.

Session #4: The athlete reported that his last race's time of 17:59 was a personal and that he felt fairly relaxed at the starting line. He felt as though he was "on the right spot of the arousal curve" and was able to "stay with his strategy". We reviewed the first part of Chapter 4: Preparing the Mind and discussed his attentional focus before and during a race. He and I then discussed his upcoming meet in Chattanooga. The athlete believed that prior to a competition, the majority of his attention should be

internally focused (i.e., staying calm and breathing deeply). However, as team captain, he felt it was also necessary for him to ensure that the other runners on his team were ready. During the first part of the race, his attention was to be on the course and other runners so as to avoid a collision, but then he should quickly turn his attention to setting his own pace. When discussing the strategies of associative versus dissociative strategies for pain management, the participant said he would prefer the associative technique, in which the body's sensations are closely attended to and monitored, instead of ignored or replaced with distracting thoughts. I then instructed him to complete Chapter 4: Preparing the Mind, and to use the relaxation/imagery tape before retiring each night.

Session #5: The participant was concerned about the coach's perceptions of him as team captain. He said his coach doesn't think that the team is working hard enough in practice, and he believes that the coach places the blame on him. I advised him to confront the team and have them set team goals to facilitate greater accountability to one another. The participant met with a two-time Olympian in the 800M event on the previous day and did speed work at a local track, and believed that this would help him get out to a fast start in the next meet. He was looking forward to the large invitational race in Chattanooga on the next day, and planned on running "his own race". The participant and I developed a plan for the next day's race in which he would "start out quickly, relax after the bottleneck, get into a groove, and try for a 5:50 minute pace for each mile of the 5-km race".

Telephone Conversation #1: He called me and we discussed the meet in Chattanooga. The participant explained that he "tripped and fell shortly after the start and was passed by about 50 runners...got flustered, and was unable to stay with his plan". He finished 9th on his team. The telephone conversation turned to his role as team captain and his concerns about the coach's perceptions of his leadership ability. An incident on the bus ride to the meet involving one of the runners on the boys' team occurred, and according to the participant, "one of the female runners told on him". The participant also felt that the captain of the female team was swaying the coach's view of the boys' team and of the participant. The participant and I believed that he should confront the coach and the girls' captain about the issue in a diplomatic way.

Session #6: He and I completed reading Chapter 4 together. The participant explained that he spoke with his coach, the top runner from the boys' team, and his other teammates about the incident occurring on the bus and about his performance as team captain, and he believed that these issues had been resolved. He mentally rehearsed the course for his race the next day and was encouraged to use imagery that was first person in focus and high in details. He and I discussed how imagery could also be used to "practice mishaps", so that if an unexpected accident or problem arose, he would be more prepared to appropriately respond. The participant had used the relaxation and imagery tape only three times since it was made, and cited a lack of time as the primary cause.

Session #7: The athlete and I reviewed his last race at the Panther Creek course, in which he finished 8th on his team. He was not pleased with his finishing position, especially because the top three runners on the team did not compete. He explained that the Panther Creek course required a fast start and he had been concerned about "running fast enough at the start and still being able to finish". Although he was "in the top 25% of the pack up to a bridge in the course, the long hill after the bridge hurt [him]", and people he usually finished ahead of were passing him. He complained that he "didn't feel relaxed in [his] running form".

The session's conversation moved to the upcoming meet at Nashville's AF Bridges course; the runner was competing at the JV level, and believed that he would have a chance to win. If his time were in the top seven on the team, he would again be eligible to run on the varsity squad. The runner met with the former 800M Olympian for a challenging track workout two days before this session, and he complained that his legs felt tired during practice the following day. He planned to take this day off from practice to allow his legs to recuperate, but I advised him to still appear at practice to encourage his teammates.

Session #8: This session began at my apartment and we discussed the race at Nashville. Although he finished in the top 1/3rd of the JV race, he was still disappointed with his time of 19:48. The hot weather had been a factor, and apparently several of the runners had collapsed during the race. The discussion turned to the upcoming meet at Norris Dam, a course which included a flight of steps that had

proven troublesome for the runner in his previous meets there. Therefore, I decided that it would be helpful for the participant to practice running on steps, so we moved the session to the University of Tennessee's track stadium. The runner appeared overcautious while running on the steps, and was encouraged to allow his feet to move without restraint. He was also asked to visualize the steps on the course that he would be competing, and to pretend that he was actually running them instead. I ran along side him to simulate another competitor.

Telephone Conversation #2: The participant called me to report what he believed was a 'breakthrough' practice that day. About one hour before practice, he and I met for an upper body strength training session, and both he and the coach agreed that he was more relaxed in his running than he had been. The runner attributed this relaxed state to the workout beforehand, and suggested that perhaps another upper body workout immediately prior to the Norris Dam meet would prove beneficial in "taking the edge off" before the race. This short conversation ended with us agreeing to try the participant's suggestion.

Cross-country Meet at Norris Dam: The athlete and I met for a short upper-body strength training session before the race at a local fitness facility. He completed the POMS at the race site about 45 minutes before the start. The participant appeared relaxed before the race and was focused on organizing his teammates. However, shortly after the race started, he fell down and was passed by a number of other runners. He regained his composure quickly and attempted to catch up, which he did with limited success. The participant finished in 19:58, well within the top 50% of the entire field, but 9 of 15 on his team.

Telephone Conversation #3: The runner called me to discuss a concern he had about tightness and soreness in his right quadriceps. Possible treatment options included ice and heat therapies and deep muscle massage, and I encouraged him to rest his legs as much as possible.

Session # 9: The participant and I discussed the Norris Dam race. The runner believed that the course was more difficult this year than it had been in previous years because of the direction in which the race was run, and felt that he ran it better this year. The session continued with a discussion of Chapter

Six: What the Experts Say, from the Elliott (1991) book. In this chapter several well-known distance runners are asked questions about their psychological approach to running, including tactics for dealing with pain, what they think about during a race, and how they mentally prepare for competition. The athlete agreed that race strategy was important, but stated that he preferred a "more laid back" approach. He and I concluded by reviewing his goals for the upcoming KIL meet, an event to determine the Knoxville city champion; he believed that 1-mile split times of 5:45-5:50 was a reasonable time to strive for in the three-mile race.

Second Interview of Participant

This tape-recorded interview was conducted at my apartment and was transcribed soon after. The interview was originally scheduled for the chronological midpoint of the participant's cross-country season. However, it was actually held towards the end of the season because the participant did not run in the last two meets of the year, thus shortening his season by eleven days.

"It feels pretty bad when you know what your potential is and you're running way below it". The participant expressed this sentiment regarding his performance in the three races prior to this interview. The runner agreed that his running up to that point generally disappointed him. I asked him, "How much does that get to you? Do you think about that or is it something that happens and you're over it and it's time to race again, try again?" To this question, the participant responded "I do a good job that day [of the race] of forgetting about it and going out with the team and having fun after the meet, but at the same time I'm still pretty mad at myself, I guess, or disappointed".

I asked him to clarify what he believed his 'potential' was and how he arrived at this conclusion. He cited his two best times in competition, "an 18:00 on a hilly course and a 17:59 on a flat course", and explained that after each of those meets, he felt that he "could have done better". When asked to clarify, he explained that at times "he eased up a little bit" during the race and "wussed out".

I then brought up the results of the second POMS, administered at the Norris meet four days earlier:

> It [The POMS] shows that your [pre-race] anxiety has gone down. Would you say that's pretty consistent with how you've felt or how you're feeling since we've started this program? Have you felt a gradual decrease in the amount of stress that you feel before a race? Is that something that's pretty consistent through the races or is this just particular to this one race?

The runner responded that he "felt a whole lot better" before the second race of the year at Cherokee in which he set a PR than he had at the first meet of the season. He explained that "Some of the races where I haven't done so well, I didn't feel so great before the race started, and then at Norris I felt a little bit better." The participant's comments suggested that his psychological state prior to the meet was indeed an influence on his performance.

The drop in his score on the Vigor scale of the POMS was also discussed. The participant was informed that Vigor was a 'positive' mood state and that most top runners typically report high scores on this subscale prior to competition. The participant believed that his lower vigor may have been partially attributed to his lessened anxiety prior to the start of the race, and that his nervousness may have actually translated into increased energy. I then mentioned the slight increase in score on the Fatigue subscale, and the participant agreed that this was probably due to the fact that he was physically tired from his demanding training schedule. The runner believed that his legs were not 'fresh' and said that he had already asked for the coach's permission to skip a day of practice before the next meet in order to rest.

I then requested the participant's evaluation of the program to that point. He believed that his track workouts with the former Olympic runner were informative, but that "the last time we did one my legs were so sore, I had a race like a week later and my legs weren't fresh". He also believed that the weight training workouts needed some modifications, including less training on the legs to allow for greater recovery. However, the participant expressed doubt as to whether it was too late for the changes in the program to be effective. He reported that he was no longer consistently practicing his form runs, or strides, due to continuous leg soreness.

Session #10: The runner decided to take the last two days off from practice with the permission of his coach. He complained about pain in his knees and ankles, and felt like his body "was breaking

down". I advised him to continually stretch and use ice on painful areas to help reduce any inflammation. The participant had spoken to his team and coach about the upcoming KIL race, and said he had a decidedly pessimistic attitude about it. He had each of his teammates verbally state what their goal for the race was, and planned with them to run as a pack instead of splitting up.

The CSAI-2: Approximately 45 minutes prior to the start of the KIL meet, the runner completed the Competitive State Anxiety Inventory (CSAI-2; Martens, Vealey, & Burton, 1990). The 27-item inventory took approximately four minutes to complete. The scored subscales of the CSAI-2 provided further insight into the somatic and cognitive dimensions of the participant's anxiety and also served to quantify the athlete's pre-race level of self-confidence.

Martens, Vealey, and Burton (1990) offered normative information for each of the subscales in the CSAI-2. Gender and level of competition (high school, college, and elite), and sport organized these norms. The participant's subscale scores were compared to those of 1) male high school athletes and 2) track and field athletes.

The participant's *cognitive* A-state anxiety subscale score of 25 was greater than both the high school male mean of 18.48 (N=284, SD=5.35) and the track and field norm of 20.34 (N=259, SD=5.76), placing in the 86th and 79th percentile, respectively. His *somatic* A-state anxiety subscale score of 24 was also higher than the high school male athlete mean of 17.7 (SD=5.53) and the track and field mean of 18.73 (SD=5.76), falling in the 85th and 80th percentile. Finally, his score of 16 on the self-confidence subscale of the CSAI-2 fell well below the mean for high school male athletes (M=24.73, SD=5.52) and track and field athletes (M=22.88, SD=5.79). This score fell in the 3rd percentile for high school male athletes and the 11th percentile for track and field athletes.

The results of the CSAI-2 were useful to the extent that they confirmed earlier conclusions regarding the participant's psychological states prior to competition, which were based on reports by the participant, the coach, and results from the POMS. Both the participant's *somatic* and *cognitive* A-state anxiety subscale scores were considerably (over one standard deviation) higher than their respective normative samples, and I concluded that he competed at levels of anxiety well above optimal. In addition,

the participant's *self-confidence* subscale score of 16 suggested that the pessimism expressed in the previous mental training session had prevailed up to the start of the race.

While the CSAI-2's reports of high anxiety and low self-confidence were not completely unexpected, their magnitude was. However, the athlete's high levels of cognitive and somatic anxiety present before the KIL county meet may have also been partially due to the importance of the meet to the team. His school had a long history of winning this county championship and there may have been additional pressure for the participant to lead his team as the captain with a strong performance.

Session #11: This session began with a discussion of the previous KIL race which he finished in 18:26, over a minute slower than his goal of 17:20, and 27 seconds slower than his time on the same course earlier in the season. He recalled feeling tight while running his strides during warm-ups, and felt "a little nervous" at the beginning of the run. He believed that his disappointing performance was partially related to his running form in that he wasn't "using the arms" enough. Despite this, the participant had an optimistic attitude regarding the upcoming run-off, a race between the squad members to determine who would run on the varsity team for the regional and state championship meets. He believed that he, along with four other teammates, would be competing for the seventh and final varsity position. He stated a goal of 17:40 for the run-off, and planned to ask another, faster runner to 'pace him'. He and I agreed that he had worked hard before and during the season, and that he should simply try to run the best that he could in the run-off.

End of the Season: Unfortunately, the participant did not place high enough in the team run-off to qualify for the varsity squad in the regional qualifiers or state championships. He did run in the regional JV meet, and finished in 19:39, placing him 22nd out of 38 runners.

Evaluation of the Intervention

The following appraisal relies on various types of information, both quantitative and qualitative in nature. A performance enhancement intervention should, by definition, aim to *improve performance* in competition. Race statistics and goal-attainment scale scores in this study provide quantitative data by

which to measure success in reaching program goals. Due to the nature of this case study, much of the program's evaluation lies in the perceptions of the athlete and coach. Therefore, I used the post-intervention interviews as the foundation upon which I evaluated the performance enhancement program.

Performance Statistics

The participant's performance statistics are presented in Table 1 (p. 65) and include the date of each race, the race's location, and participant's finish time, finishing position in the meet and finishing position on the team. In high school cross-country, the top five placing runners for each team directly impact the team's final score. For example, if a team's top five runners placed 1st, 7th, 10th, 17th, and 20th overall, the team would receive 1 point, 7 points, 10 points, 17 points, and 20 points respectively, for a total of 55 points. The team with the *least* amount of points wins the meet. Therefore, even those runners *not* placing in the top five on their own team can contribute to their team's standing by placing ahead of one of the top five runners on another team, thereby increasing the competing team's point total. At most of the meets in which the participant competed, there were many other high schools competing.

Pre-Season/Post-Season Baseline Run Comparison

Prior to the season the participant completed three baseline trials on his high school's home course, resulting in times of 21:40, 20:50, and 20:00. He also ran the same course for the August 26th meet, and improved his time to 19:14. Following the season's end, the participant once again ran this course, finishing in 19:00. While the improvement in time from the beginning to the end of the season may be attributed to several factors, including cooler temperature, this may also indicate that the participant increased his endurance, speed, and mental 'toughness'. In addition, I observed that the participant was physically spent at the end of the post-season run, lying down on the ground immediately after completing the course. This contrasts with my observations of his performance at the pre-season trials and at many of the season's meets, in which it appeared to me and the coach that he still had "too

much left" at the end of the race. This may be partially explained by the runner's desire to demonstrate improvement from his baseline performances in order to provide me with 'good results'.

Goal Attainment Scales

I used Goal Attainment Scaling (GAS; Kiresuk, Smith, A., & Cardillo, 1994), a program evaluation technique, to monitor the athlete's consistency in behaviors believed to assist in three areas of special importance for the runner: foot speed, flexibility, and team leadership. Each goal scale was developed and agreed upon by the athlete and myself at the onset of the season. The athlete "graded" himself on three specific practice behaviors (i.e., practicing strides, stretching, arriving early to practice) on a weekly basis. Table 2, the Goal Attainment Scaling follow-up guide, displays these scores for each of the six weeks of the participant's competitive season. The average and individual scale scores for each week are also presented in Figure 2.

An average scale score for each of the six weeks was calculated by using the equation:

$$\textit{Average scale score} = \frac{\Sigma x_I}{n},$$

where n is the number of scales and x_I is the outcome score for the ith scale on the follow-up guide (Kiresuk, Smith, A., & Cardillo, 1994). For example, during week 3, the runner reported scores of 2 on his strides scale, 1 on the flexibility scale, and 1 on the promptness scale. These three scale scores of 2, 1, and 1 are added, equalling 4, and then divided by 3 (the number of scales), resulting in a mean score of 1.66 for Week 3. The participant reported an average scale score for all three goals of 0 for Week 1, .66 for Week 2, 1.33 for Weeks 3, 4, and 5, and 1.66 for Week 6.

Visual inspection of table 2 and figure 2 reveals that the participant reported improvement during the season on all three-goal scales. He reported that he practiced his strides, stretched, and was early to team practice more often and more consistently as the season progressed. In addition, the participant reported no goal scale scores below 0 (i.e., the expected outcome) throughout the study.

Table 2. Goal-Attainment Scaling Follow-up Guide

LEVEL OF ATTAINMENT	Scale 1: Strides	Scale 2: Flexibility	Scale 3: Promptness
Much less -2 than expected	No strides/Injured. *	Stretch less than 5 min. a day.	More than 10 min. late for practices more than 3x a week. *
Somewhat less -1 than expected	Strides 1x/week before and after every non-interval run.	Stretch 1x a day for at least 5 min. *	5 – 10 min. late for practice at least 3x a week.
Expected level of 0 outcome	10 x 100 strides 2x/week before and after every non-interval run. **Week 1**	Stretch at least 5 min. before and after each practice. **Week 1, 5**	Arrive 0-5 min. late for every practice. **Week 1,2**
Somewhat more +1 than expected	Miss only one day a week of strides before and after every non-interval run. **Week 2, 4, 6** √	Stretch 2x a day for at least 10 min. **Week 2, 3, 4**	Arrive 5-10 min. early for practice 4-5 x a week. **Week 3**
Much more +2 than expected	Strides before and after every non-interval run. **Week 3, 5**	Stretch 3x a day for at least 15 min. **Week 6** √	Arrive 15-20 min. early for each practice. **Week 4, 5, 6** √

* = Starting level
√ = Follow-up level

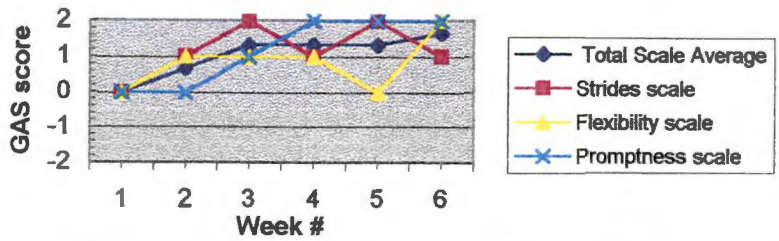

Figure 2. Average and Individual Weekly Scores of Goal Attainment Scales

GAS served to quantify the participant's targeted behaviors via self-report. However, the validity of these scores is subject to scrutiny; the participant may have reported inflated scores in an attempt to please me. In addition, some of the goal scale scores are inconsistent with other reports of behavior. For example, in one interview, the participant stated that he was not practicing his strides because of muscular fatigue and soreness resulting from a particular track workout. However, the scores for his goal scale *strides* during this same time were either +1 or +2. This disparity may have also resulted from postponed completion of the weekly GAS charts, which possibly led to inaccurate self-evaluations. Despite the shortcomings of GAS use in this study, this method of evaluation seemed to be successful in that in provided continuous reinforcement of and structure for the participant.

Post-Intervention Interview with Athlete

An interview with the participant was conducted following the season's completion and was tape-recorded and transcribed. Each of the major topics of discussion from the interview is outlined with supporting quotes in this section.

Goal-setting

The athlete and I began by discussing each of the aspects of the performance enhancement program. The goal-setting session that initiated the intervention was the first topic of conversation:

Me: One of the first things we did was to set some goals. We talked about some of the personal goals and goals that you had for your team. If I remember, one of them was to run a 16:30, another was to win the KIL and do well at states, possibly even win states. So there were some pretty ambitious goals that you had at the beginning of the season. What purpose do you think that served? Was that useful to you to talk about what you wanted to do?

Athlete: I think it's always good to have something to strive for. I think goals, in that case and in most cases, help. So I think the goals helped.

Me: In retrospect, looking back at the situation, do you think that those goals were realistic?

Athlete: Yeah. I think looking at the team, the team looked like it was going to be a whole lot better than it ended up being. You never really know that people are going to get injured and sick and all that stuff. As far as reaching 16:30, I think it was a possible goal, it just never happened.

Discussion of the use of Goal Attainment Scaling and the participant's self-evaluation followed :

Me: We took some of those goals and we talked about a few ways, specific things that we could do to help you reach those goals. We set up 3 goal attainment scales where we charted your activity on those behaviors. One of them was stretching-lots of flexibility work.

Athlete: Yeah.

Me: How would you say you did on that?

A: The stretching-I stretched just about every minute I had because I was so sore most of the time. The, what were those little sprints called?

M: The intervals? The strides?

A: The strides, yeah.

M: That was another goal was to run strides before and after practice.

A: The strides I didn't keep up with very much. That was partly due to all the stuff that I was already doing and being sore and I just often wasn't motivated to do that just because of everything else. I feel I was very motivated, not just to do that specifically.

M: Part of that was physical discomfort?

A: Yeah.

M: The last one was promptness-getting to practice ahead of time. I think that we decided that that would give you the extra time to do your stretching, your strides, and also it would be a good example as team captain. Overall, how would you say you did?

A: I'd say most of the time I was the first person to practice and the last person to leave. Partly to do some of that stuff, and partly to set an example. I didn't want to leave early, just because I wanted to talk to everybody before they left and congratulate everyone on a good practice and all that stuff. So unless I had something to do that night, I would stick around as long as I could.

M: Again, in retrospect, do you think that those three goals that we established were appropriate? Were those the things that we needed to focus on the most?

A: Stretching was definitely something that I needed to focus on. I should have been focusing on it years earlier. Strides is another thing I should have focused on more. Getting to practice early-that was something that I think was important to do. I was captain...

Text assignments

The participant briefly evaluated *The Competitive Edge* (Elliott, 1991), the book used during the intervention:

> I thought the book helped. It helped get me thinking about things that, I guess aspects of running that I've thought about before: when you should speed up, what to do on a hill, and it just kind of reminded me of things that I already knew sometimes and taught me some things new. I thought it was a helpful book.

Relaxation/arousal

Relaxation techniques were taught and practiced during several of the mental training sessions. The participant seemed to find this skill particularly appropriate and helpful:

Me: We spent a few sessions going over relaxation exercises – learning to focus on breathing and using progressive muscle relaxation. What was your evaluation of that aspect of the program?

Athlete: It helped quite a bit, because I can remember specifically the first race, I called you before the day before it, told you I was so nervous, and was having a hard time concentrating on the race and wouldn't be able to get to sleep that night and stuff like that. Then after doing some of the relaxation exercises and stuff for the second race, I was very calm and was ready to go at it, and I ran very well that day. So I attribute that – my good second race – to relaxation.

I tape-recorded a relaxation script for the participant to listen to at night, but he used it only sparingly throughout the season. The athlete briefly discussed this tape:

Researcher: As I recall later on in the season we kind of moved away from that a little bit. We had made a tape and I don't think you used it a whole lot. Do you remember?

Athlete: I used it about 3 or 4 times.

M: About 3 or 4 times? Do you feel like you had gotten pretty successful at using those exercises or was it still something that needed more practice and refinement for it to be truly and consistently effective for you?

A: I thought I did achieve a good level of relaxation. I was able to, before a meet, be calm enough not to go out flying and not to get too nervous like I had before and I think I achieved almost the right amount of...I mean you want to be a little bit nervous, you don't want to be totally calm, so I think I got to about the right point.

Imagery

The subject of imagery in race preparation was the next topic of the interview. The participant reported that he would usually visualize himself in the first person during imagery sessions, as if he was actually running the course. He also stated "If I knew the course very well, then it would be much easier to imagine it."

Race planning

The athlete and I would typically develop a race strategy for each of the meets. The participant believed that splitting up the course into 400M or 800M sections was a useful strategy. In addition, special planning was done for courses that presented certain challenges to the runner. The participant explained:

> I think we did a good job of listing things to focus on and not focus before the race... I think I always knew what my plan was. I had a specific plan for each course. Most courses I would have split up into 800's. I remember sometimes the plan was 'just run it like a practice' because I ran better in practice sometimes and honestly, I think running it like a practice helped, or thinking of it like that, because I think I had a lot of pressure on me and I wasn't handling the pressure very well sometimes.

During the second interview, several mental training sessions, and several telephone conversations, the participant expressed feeling an uncomfortable amount of pressure to perform well both individually and as team captain. He believed that the sources of this pressure were primarily his coach and one other runner on the team. He believed he was "Just kind of being blamed for the team not doing well" and that the coach and the other runner were "saying that the team wasn't motivated enough", so he "thought that I had to do extraordinarily well to motivate them...". In addition, he admitted to "putting some of the pressure on myself". The participant was then asked if any additional pressure resulted from his participation in the study and from the researcher's expectations. To this, he replied:

> I think actually having you around helped relieve some of the pressure cause I could talk to you about some of the things and I could say "they're putting all of this pressure on me" or saying that "the team isn't motivated", and I remember you telling me that "All you expect from me is to try my hardest", and that was my plan anyways...

The participant reiterated his belief that most of the pressure he felt came from his coach and one other teammate.

Cue Words

Another intervention strategy involved the use of cue words at certain stages of the cross-country meets. The participant chose the word "relax" to help him stay calm prior to the start of each race, and remembered "I would probably say that to myself what felt like every ten seconds. Just relax, just relax." At the end of the race, when the runners sprint to the finish, he would often think "OK, you only have 100M left-go for it", or "this is it". Sometimes the beginning of one his favorite songs would also come to mind at this point of the race.

Testing

The participant completed written inventories prior to the start of three meets during the season. According to the participant, the results of these tests "showed that I was getting less and less stressed before (races)", and "as the season went on, I felt less stress". He answered "yes" when I asked him if "the test results were pretty accurate with what was actually going on". He did not think that the testing before the meets created any unnecessary distractions, and added that "It was interesting to see that I was doing better as far as stress."

Strength & Conditioning Program

This segment of the interview focused on the physical conditioning aspect of the intervention. The following exchange between the athlete and me describes the possible effects of the conditioning program on his performance:

> *Me*: OK. Another part of the intervention dealt with strength training. We did about 2 workouts a week, circuit-style workout, fairly light weight, high repetitions. What, if any help was that aspect of the training?
>
> *Athlete*: I think I was doing too much during the season. But I think weights in general helped me a lot in terms of getting past my shoulder injury. So I think the weights were important in getting me so I didn't slouch as bad and putting some endurance in my muscle. The weights are probably something that I would start much earlier if I was going to run again. I'd probably start doing weights before running.

Me: Do you think that the weight training would be better left undone during the actual season and focused on more before the competitive season started?

Researcher: Yeah, I do. I think the perfect schedule would have been able to include weight lifting in there. Days off for weight lifting or easier days when weight lifting would occur, but that was never, we didn't really have much opportunity to choose my workouts as far as running with the team.

The runner cited his lack of flexibility as the primary culprit in his seemingly chronic muscular soreness and stiffness, and did not believe that the additional weight training contributed substantially to this discomfort.

An additional element of the conditioning routine involved several track workouts with a former NCAA All-American and Olympian in the 800M event. The participant believed that he "learned a lot from them (the workouts)", but stated that "...we couldn't have known it, but they were the wrong thing, or maybe the right thing at the wrong time". His legs were extremely sore and tired for quite a while afterwards.

When he had me run 15 -200's and I was wearing my spikes, that was a bad idea because that just made me extremely sore and the soreness never really went away. There was only so much time I was willing to take off because I didn't want to look like a lazy person and I wanted to look like I was working extremely hard and all that stuff.

Despite this, the participant was very excited about this opportunity and believed that working with an athlete of this stature "was really a very motivational kind of thing to do".

Participant's Overall Impression

After the athlete discussed the specific aspects of the performance enhancement program, I asked him to describe his overall impression of the program as a "total package" and to recall what things he learned during his participation. The participant responded that he learned "lots of things about weightlifting" and that if he were to run in college, he "would start way before the season with endurance

lifting". He credits the former Olympian for teaching him to "to run strides and...to take a race and split it up into 800's". As for mental training techniques, the participant decided that:

> As far as the relaxation for races, I remember that and I would use that and the imagery I would use. But as far as the imagery goes, I wouldn't use it as much as it may have been suggested to me because something I've noticed is that I like to forget about the race that's coming up as much as possible and let it all just pile on me before the race and deal with it then, than to actually deal with it over a long period of time.

I asked the participant for feedback regarding my evaluation of his needs as a runner. He responded "overall, I think you listened to me pretty well", but said that "the first time I said I was enormously sore, I think we both should have taken it a little bit more seriously than we did". In terms of the sport psychology sessions and strength training sessions, the participant responded positively:

> I thought they were very professional. I thought, like I said, that the relaxation stuff helped me because I would actually be able to get to sleep before a race the night before and at the start of the race I wasn't almost sickly nervous, so I think I was able to go into a race with a good head on my shoulders...I thought that the weightlifting workouts were good. The fact that we changed the weights from my legs to more upper body, I thought that was good thing. I thought it was very helpful to be doing weights. I've heard many runners say that you should do weights a lot in the pre-season and then back off a little bit during the season and just try to keep yourself at the same level as far as weights and I think you did a good job of that. I would do that again if I ran again.

These comments from the participant generally supported the notion that he would use much of the program's content if he were to again run competitively.

The interview's scope moved from the participant's personal experiences to his opinions regarding the potential for implementing a physical/psychological training approach at the high school athletic level. He agreed that this program design would be "very appropriate", and added that "...as far as imagery goes and teaching people to relax, I think a lot of it is stuff that coaches could do and should

do and the better coaches probably do...". However, the participant believed that if outside practitioners were utilized, they shouldn't attempt to "make an obscene amount of money doing something like that at public high schools". He emphasized the importance of discovering the weaknesses of the athlete in order to help them improve, and stressed that the consultant should "take everything they say seriously". The notion of "discovering weaknesses" was echoed by the participant regarding his own experience

The interview concluded with a brief discussion of the demands and benefits the athlete realized on a personal level:

> *Me*: What about the time requirements involved in something like this? You were working during the season I think, you were busy with your studies, your team practices. How much of a time demand did this program put on you?
>
> *Athlete*: I didn't have very much free time during the season with this program, but from what I recall, everything was fine. I really didn't want too much free time. I didn't want to have like a girlfriend at the time or anything that would take my focus away. My focus was pretty much on cross-country the whole time, so it was fine.
>
> *Me*: One last thing, and that's getting past just the specific things in the intervention. I want you to just talk about the relationship that we had during your season just as two people. What value, if any, did having someone who was there to support you and attempted to help you-what psychological value did that have for you?
>
> *Athlete*: It helped quite a bit. I guess the more people that are there to help, the better. The fact that I could call you up and say "I need help stretching" or " I feel bad about this" is very good because I wouldn't be able to call up coach and say "This is putting a lot of pressure on me" or "I need help with this", so your outside help helped a lot.

In general, the runner expressed a positive attitude towards the experience of participating in this study, but clarified

> ...if we had started this before my junior season, then we could have used all that we learned for my senior season, and I think I would have done a whole lot better...I don't think either one of us

really knew my weaknesses until the season had already started and it was too late to do anything about it. I think it would have made a huge difference if we had known my weaknesses earlier." The participant agreed that it was valuable to obtain additional information from the coach regarding the athlete's needs, but that "...it would be good to test it, to see if it's really true...". He believed that there was a rush to determine his needs due to the timing of the intervention, and that more time would be valuable in this process.

Post-Intervention Interview with Coach

Following the season's conclusion, I asked the head coach of the participant's cross-country team to provide feedback regarding the team's season and, more specifically, the participant's performance. In addition, the coach provided information and opinions regarding the general nature of high school athletics and the special needs that high school athletes may have. Each of the interview's major themes are outlined and detailed, often with direct quotation.

Review of the Team's Season

I first reviewed the major points of the intervention – how it was developed, the goal-setting process, and the presence of high pre-race anxiety and the techniques used to combat it. I then asked the coach to give her overall impression of the boys' team over the season. She responded that her impression of the team "fluctuated at each meet". The team's number one runner was injured for most of the season, forcing the other runners to "...change their thought pattern and their goals...to help the team accomplish the goal that they had set at the beginning of the season, which was to win the KIL and to make it to state". Several other injuries and illnesses led to inconsistency in the team's performance, and the coach also believed that some runners did not perform to their potential because they were involved in too many other activities at the same time and not focused enough on running. These runners were not willing to do additional work on the weekends, and didn't push as hard as they should have during practices. She agreed with the researcher's observation of a "laissez-faire attitude from some of the runners... about how they were really relying on a few of the top runners to carry them". The team's best runner suffered an

injury at the onset of the season, and the coach believed that many of the other runners thought that "...he would be back a lot sooner". Although this runner returned in time for the regional meet at the end of the season, the coach explained that another top runner on the team "had the worst race of his season", and "cost the team the points that would have allowed them to have gone on".

Despite the disappointments in the season, the coach explained that many positive things had happened during the season. She was particularly pleased with the progress of several of the younger runners on the team. The coach added that, "...a couple of our veteran runners actually improved drastically...", and the team learned "...more of what's got to be done between now and next year...". She had many of her runners returning for the next year and was optimistic about their chances for success. Because the team's "...top seven did not stay the top seven every race", explained the coach, "it made it more competitive for them...". She believed that the pressure to place in the team's top seven and race on the varsity squad provided them with extra motivation to perform well.

The participant's season

The coach's impression of the participant's season was discussed next. She stated that "...the main thing I saw in him is if there was something that was a big determining factor as to a race, the outcome of being in a certain position, made the difference in the best two races that he had for the season." When he ran a 17:59, his personal record, that was at the meet prior to the UTC meet. "He knew that he had to be in a certain position in order to run that, otherwise he would not be on the varsity squad", she reasoned. "And when it came down to the one meet that made the difference whether or not he made the varsity squad for the region meet, he knew he had to be in the top two in that meet in order to make that squad because we had a run-off in the JV regional." At 18:26, this was his next best performance, and the coach "...actually saw the most wanting and dedication that he gave prior to that in order to run a good time". The participant responded well to pressure, but relied on external rewards for motivation, according to the coach.

Practice habits

The comments of the coach indicated that the participant was not highly internally motivated during practices, and that the presence of a reward or punishment was necessary for him to truly exert himself. Although he exerted himself in these important meets, the coach believed that in practice the participant was "slacking" and "did not give that little extra..., go that extra mile in order to achieve that goal. His goal was to finish practice so they could leave and go do other things at that time and I really didn't see that hard, hard practicing to continue having good times".

I explained to the coach that this feedback regarding his practices came as "a bit of a surprise" and that I had gathered from the participant's comments that he was "...pushing it in practice and that especially during the intervals, he was really proud of himself". The coach agreed that in these supervised track workouts the participant showed better effort, but that during the longer, unsupervised runs, he was finishing well behind the top group of runners, which the coach interpreted as "he probably didn't go as hard as he could have". However, she explained, when the participant was given a specific time to complete these long practice runs in, he would usually try to reach that goal "because they knew that if they didn't I'd send them out again".

Team leadership

The coach and I next discussed the participant's role as team captain and how he performed his position's responsibilities. She stated:

> when needed I think he did a good job leading them in what they needed to do, but again you can ask a lot of kids and if they really don't want to do it or know that they are capable of doing it, it's sometimes hard to get them to push them to push that extra, but I think that he tried in what he did as a captain...

She commended the participant on his ability to promote group cohesion and believed that "he did a great job of coming up with activities and functions for them to get together as a team, on the course and...off the course". When asked if the participant was effective at motivating his teammates, the coach replied "I think so, to a degree". However, she believed that some of the runners "let you believe that you're

motivating them, even though there are times that you're not even getting to them". She believed that her position as coach allowed her to see this "in a different way than he probably saw it... that he was motivating them most of the time". The researcher stated that perhaps this was the participant's first leadership position and that he needed to learn from the experience and further develop those interpersonal skills. The coach agreed, and stated that she also learned something new with each season. She concluded that "he as a captain had a very good year, learning all kinds of things that will help him later on".

Additional evaluation of participant's performance

Following her evaluation of the athlete's team leadership, the coach commented on how the participant's running compared to his previous season. She believed that he had improved from the past season, one in which a shoulder injury plagued him for the majority of the time. She recalled that "his mental aspect was constantly on that pain... and that it was a major factor in his performance last year". She added that "this year, he had other things to focus on, I guess I really believed working with you helped that also". However, she "could still see the strain he put on himself right before a race" and believed that this "really had an effect on his performances". The coach and I agreed that the participant's "cerebral and cognitive" nature was at times disadvantageous to his performance and led to pre-race anxiety. The coach, also a teacher in the participant's school, added that she noticed similar tension when the participant was about to take a test in the classroom.

The coach commented that high school students were at "a very difficult age to work with", and the role of self-esteem in high school students arose as a side-topic. She acknowledged that his leadership role on the team "really boosted his self esteem", and she saw this in his running, "especially with that first race he had in the 17's". However, the pressure to maintain his spot on the varsity squad proved to be a challenge in itself.

I asked the coach how the participant did in terms of reaching his full potential as a runner. She responded "I think he could still have reached better" and wished that he could have stayed "in the mode that he was in for that first race". She recalled:

> ...at most of the races during the season you could see he still had stuff left, which showed me he probably didn't go out as hard as he could have gone throughout, but I don't know if it was mentally he was thinking he couldn't hold on if he did go out hard, and I think I have seen that throughout all the years he has run. It's the point that he's afraid that if he does go harder he won't finish the race...you could still see that he had too much at the end.

The coach added that in the beginning of the season, she saw improvements in the participant's endurance, which she attributed to him training with a faster runner during the summer. However during the season, the participant ran instead with several slower runners during practice, and according to the coach, didn't exert himself to the same extent.

I asked the coach for suggestions in "working with high school athletes in a way that would compliment what was going on with their coach and their team". For physical conditioning, she emphasized endurance and flexibility, particularly for male runners . She added that "if there's any way that you could find for individuals that will help them to relax going into a race so that the pressure is not so great and makes them tense up, that would be wonderful." She clarified, "But I know that's all on an individual basis too. You've got to find out what clicks for each one...And usually that takes a year plus to ever find that special thing for each child." When working with teenagers, the coach advised, "Be caring, but at the same time you've got to be firm and be the authority. You have got to expect more than what they think they can give you to get the best performance out of them." She explained that in addition to "pushing them to their limit", it was important to "be understanding on the different things that they deal with. Everything from relationships to their schoolwork to dealing with the relationships on the team."

This last statement from the coach concluded her post-intervention interview, and I thanked her for her time and input.

Chapter 5

DISCUSSION OF THE DATA

Introduction

The purpose of this study was to assess the effects of a unified mental and physical training intervention on athletic performance. The participant, a high school cross-country runner, and his coach provided information upon which the intervention was developed and later evaluated. Greater depth in appraising the value of the program was achieved by obtaining: (A) the perceptions of the runner and his coach during semi-structured interviews and (B) quantitative data (e.g., performance statistics, goal-attainment scales).

Program Evaluation: Comparison of Data

The perceptions of the participant were paramount in evaluating the efficacy of the performance enhancement intervention. Applied sport psychology, according to Williams & Straub (1993), focuses on "...identifying and understanding psychological theories and techniques that can be applied to sport and exercise to enhance the performance and personal growth of athletes..." (p.1). Therefore the value of an intervention is often based on the extent to which the athlete believes his performance was improved. Since this was a single-subject case study, no definitive causal connections between the intervention and performance can be made.

In his post-intervention interview, the participant clearly expressed the feeling that both the physical and mental training components of the intervention were appropriate and helpful. The injured shoulder that affected his performance during the previous season no longer hampered him. He also expressed satisfaction in his ability to "...achieve a good level of relaxation" prior to the start of his meets. In addition, he believed that the supportive relationship between him and the consultant "helped quite a bit".

While the perceptions of the participant are critical, they should not be the sole source for evaluation. To gain further confidence, the participant's statements are placed in the context of other data to look for congruencies and discrepancies. Simply put, one must ask "Do the statements of the participant appear to mesh with the other results?" In addition, "Are the statements from the participant's follow-up interview consistent with *his previous* statements in other interviews and the researcher's observations? These questions are addressed to enhance the accuracy and provide context for the data presented.

Table 3 displays several emergent themes from the participant's post-intervention interview and compares them to the coach's statements and to other sources of relevant data. For example, the participant stated in his exit interview that he learned to control his nervousness immediately prior to the beginning of meets. Evidence supporting and contradicting this statement (i.e., previous self-reports, coach's interviews, POMS and CSAI-2 test results) is displayed alongside.

While not all of the issues discussed in the participant's and coach's final interview are included in Table 3, many of the more relevant themes are reported. These issues are: the team's season in overview, participant's competition performance, participant as team captain, physical training, psychological factors, and overall evaluation of performance enhancement program and suggestions for the researcher.

Overview of Program

In this study I attempted to examine the entire process of: (A) developing a performance enhancement intervention based on the specific needs of a high school athlete, (B) implementing the intervention over the course of the athlete's competitive season, and (C) obtaining various sources of feedback to evaluate the intervention.

Bull (1991) and Greenspan and Andersen (1995) reported that minimal research on sport psychology consultation at the high school level exists, despite recommendations that mental training should begin at a young age and is effective for both novice and skilled athletes (Weinberg & Williams, 1993). With this in mind, a discussion of the entire intervention *process* seems warranted, as opposed to

Table 3: Comparison of Evaluation Data

Theme	Participant's Follow-up Interview Statements	Coach's Follow-up Interview Statements	Other Data
The team's season in overview	"I think looking at the team, the team looked like it was going to be a whole lot better than it ended up being."	"An overall impression of the guys-fluctuated at each meet…Some of them did not…have the year that they've had in the past".	Team was ranked 11th in the state's pre-season poll, but lost 2 of their top runners for much of season and didn't qualify for state championships.
Participant's competition performance	"As far as reaching 16:30, I think it was a possible goal, it just never happened." "I think I had a lot of pressure on me and I wasn't handling the pressure very well sometimes…I thought I had to do the impossible, actually."	"…the outcome of being in a certain position made the difference in his two best races…" "…at most of the races during the season you could see he still had stuff left, which showed me he probably didn't go out as hard as he could have…" Coach believed that participant ran better than in previous season, but that "he could still have reached better."	Participant ran a 17:59, his personal record, near the beginning of season, but was unable to consistently finish in the squad's top 7 to maintain varsity spot. In 2nd interview, he stated "It feels pretty bad when you know what your potential is and you're running way below it."
Participant as team Captain	"Getting to practice early-that was something that I think was important to do. I was captain…"	"When needed I think he did a good job leading them in what they needed to do…He did a great job of coming up with activities and functions for them to get together as a team…"	During first interview, participant stated "…if somehow I lost my varsity spot I don't think I would be the right person for being captain." During the 5th mental training session, the participant expressed concern about the coach's perceptions of him as team captain, and believed that the coach blamed him for the team's uninspired practices.

Table 3: Comparison of Evaluation Data, cont.

Theme	Participant's Follow-up Interview Statements	Coach's Follow-up Interview Statements	Other Data
Physical Training	I think I was doing too much during the season. But I think weights in general helped me a lot in terms of getting past my shoulder injury. So I think the weights were important in getting me so I didn't slouch as bad..." "I don't think the weights had much to do with my soreness...I don't think my lack of flexibility helped very much and I really don't think we could have done anything about the soreness when the season started."	"...I think it (shoulder pain) was a major factor in his performance last year...This year, he had other things to focus on, I guess I really believed working with you helped that also."	After speed workout with former track & field Olympian, participant remained extremely sore and tight. During 10th mental training session, participant complained about leg pain and felt like his body "was breaking down". Towards the end of season, weight training was decreased, especially the lower body exercises. Participant's time improved on his home course from before to after the season. His 3 pre-season trial runs were timed at 21:40, 20:50, and 20:00. His first meet of the season, on the same course, resulted in a time of 19:14. His post- season time for his home course was 19:00. This provides evidence that his speed improved throughout the season.

Table 3: Comparison of Evaluation Data, cont.

Theme	Participant's Follow-up Interview Statements	Coach's Follow-up Interview Statements	Other Data
Psychological Factors	***Goal-setting:*** "...It's always good to have something to strive for. I think goals, in that case and in most cases, help. I think the goals helped." ***Pre-race Anxiety:*** "It helped quite a bit, because I can remember specifically the first race, I called you the day before it, told you I was so nervous, and was having a hard time concentrating on the race and wouldn't be able to get to sleep that night...Then after doing some of the relaxation exercises and stuff for the second race, I was very calm and was ready to go at it, and I ran very well that day. ***Race Planning:*** "I think I always knew what my plan was. I had a specific plan for each course. I remember sometimes the plan was 'just run it like a practice' because I ran better in practice sometimes..." "As far as the imagery goes, I wouldn't use it as much...I like to forget about the race that's coming up...and let it all just pile on me before the race and deal with it then..." ***Motivation:*** "My focus was pretty much on cross-country the whole time..."	***Pre-race anxiety:*** "...I could still see the strain he put on himself right before a race , and I think it really had an effect on his performances...You could see he would get tight." ***Confidence:*** " I believe...him getting the leadership role as captain really boosted his self-esteem on how others looked at him...and I can see that, especially with that first race he had in 17's." ***Motivation:*** "When they went out on the longer runs (in practice)...he didn't go probably as hard as he could have...I saw a lot of slacking, not the determination needed in his effort during the practices...he did not give that little extra in each practice, go that extra mile in order to achieve that goal...he got through the practices and that was it. That seemed to be sufficient."	***Goal setting & motivation:*** Athlete's pre-season goals: Place in team's top 5, finish a 3 mile race in under 16:30, and help team win states. According to self-reports on Goal-attainment scales, the participant's scores on all three-process goal scales improved throughout the season, indicating continued motivation to improve. However, during 2nd interview, the participant reported that he was no longer practicing his strides and expressed doubt about whether the program modifications were made too late in the season to be effective. ***Pre-race anxiety:*** Participant's Tension and Total Mood Disturbance subscale scores were significantly lower on 2nd administration of POMS than on first, indicating a decrease in pre-race anxiety. However, both his somatic and cognitive A-state anxiety scores as indicated by a pre-race CSAI-2 administration were well above average for his gender, level of competition, and sport. ***Motivation:*** During the first interview, participant planned on "...going to practice every day and giving it all I've got." ***Confidence:*** His CSAI-2 self-confidence score was also lower than that of the norm groups.

Table 3: Comparison of Evaluation Data, cont.

Theme	Participant's Follow-up Interview Statements	Coach's Follow-up Interview Statements	Other Data
Overall Evaluation of Performance Enhancement Program & Suggestions for Improvement	"As far as the relaxation for races, I remember that and I would use that and the imagery I would use..." "...if we had started this before my junior season, then we could have used all that we learned for my senior season, and I think I would have done a whole lot better...it would have made a huge difference if we would have known my weaknesses earlier." "I thought (the sessions and workouts) were very professional...the relaxation stuff helped me...I thought the weightlifting workouts were good." "The fact that I could call you up and say 'I need help stretching' or 'I feel bad about this' is very good because I wouldn't be able to call up coach and say 'this is putting pressure on me' or 'I need help with this', so your outside help helped a lot."	"If there's any way that you could find for individuals that will help them to relax going into a race so that the pressure is not so great and makes them tense up, that would be wonderful." "Every child is different in how you reach them and how you get them to relax going into a race..."	The participant did not attain his goals of finishing in team's top 5, running under 16:30, or helping team win state championship. Despite this, he stated that the intervention was helpful and that he would use a similar approach towards training if her were to run competitively again.

solely discussing the *outcome* of the program. As the participant's coach aptly noted, high school athletes are at "...a very difficult age to work with...". Indeed, the interaction between researcher and athlete did present special challenges and rewards worthy of elaboration.

Assessment of Athlete's Needs

Following Weinberg and William's (1993) guidelines for intervention development, I conducted semi-structured interviews with the participant and his coach. I solicited input concerning the intervention's focus during both interviews, and attempted to combine this input with my personal observations during the assessment phase.

I discussed the runner's strengths and weaknesses in both the participant's and coach's interviews. While the participant noted that his nervousness at the beginning of the race presented him the most problems and this anxiety typically disappeared after the first 400 yards, the coach believed that the start of the race was actually his strong point and that he needed to keep a faster pace throughout the entire course. Both the runner and coach believed that improved flexibility was necessary to avoid injury. The coach expected the participant to "...push himself up to the next notch...on a daily basis in practice" and suggested that he "...worry about[himself] and no one else...". She emphasized that the mental side of his performance would be the most important aspect of the intervention. Specifically, the runner's ability to handle physical discomfort during a race was deemed crucial by both the participant and coach. Both the coach and participant also emphasized the athlete's need to lead his teammates by example, as they had placed their trust in him when they voted him captain.

The input from both the participant and coach were extremely valuable in the design of the intervention. Although I run occasionally in road races and have just recently completed my first marathon, I used the *participant's* experience and *coach's* expertise as the foundation upon which I designed the performance enhancement program. In addition, the majority of their comments converged; that is, both the coach and runner had similar expectations and opinions about his needs, providing me with additional confidence in the assessment. In addition, I used of the Profile of Mood States (POMS) prior to an early season meet to confirm much of what the athlete and coach stated in their preliminary interviews. Specifically, the high scores on the Tension (T) and Total Mood Disturbance (TMD) scales reaffirmed the need to focus on the runner's relaxation and stress management skills during the intervention.

Implementation of Intervention

The intervention, which lasted throughout the participant's competitive season, combined physical conditioning exercises with psychological training in an attempt to improve his cross-country running performance. The athlete and I met for conditioning workouts at a local health club, and at my apartment for the mental training sessions. The participant's willingness to travel and his reliability and promptness in keeping his appointments should be noted, especially in light of his busy schedule which also included classes, homework, a part-time job, and team practices and meets. For the most part, the athlete willingly completed his necessary tasks with enthusiasm.

The physical training sessions were high in intensity and at times uncomfortable due to the nature of the weight training. The number of repetitions for each exercise was usually 20 or more, resulting in a temporary, lactic acid-induced burning sensation common to high repetition weight lifting. Although he occasionally complained about the discomfort experienced during and the soreness after the workouts, the athlete demonstrated good effort during most sessions.

The participant at first seemed to treat the mental training component with some apprehension. Although this was not entirely unexpected, I was concerned that the participant might not sufficiently practice the mental skills, consequently minimizing the benefit. However, the participant did seem to gradually open up to some of the ideas discussed in the sessions, and found several to be quite beneficial, including the use of relaxation strategies prior to the start of each meet. Other approaches, such as a tape of a guided imagery session that he was to listen prior to retiring in the evening, were not consistently used. The participant successfully completed most of his reading assignments from Elliott's (1991) *The Competitive Edge,* which we then discussed in the following session. However on several occasions, due to time constraints, he was unable to complete the assigned readings, and both he and I covered the material together or he was instructed to complete the reading for the following session.

Whelan, Meyers, and Donovan (1995) contend that the practitioner should view the athlete as a complete person and attempt to place athletic performance within the context of the athlete's life situations. While discussion of the participant's personal performance usually took precedence at these mental training sessions, conversations concerning his role as captain, relationships with his coach and teammates, work, family, school, and social issues also occurred with some frequency.

Often, I served simply as a listener, and when requested, assisted the participant in developing a plan of action. I found these opportunities to be generally positive in that they helped me to establish rapport with the participant. The participant seemed to feel at ease in discussion of personal matters, which created a more relaxed and friendly environment. While disclosure on my part was minimal, at times it was helpful to share a common experience with the participant to provide an example or show empathy. A specific pre-planned agenda for each session helped keep the focus on the intervention, while still allowing for these other peripheral conversations.

Evaluation of Intervention

Both the participant and coach offered their impressions of the season and expressed both disappointment and satisfaction with the athlete's performance. Neither believed that he reached his potential, but both agreed that he did improve from previous years. He set a personal record early in the season, breaking 18:00 for the first time ever, but he was unable to maintain this type of performance and had difficulty remaining on the varsity squad throughout the year. The team's failure to qualify for state championships was also disappointing for both the participant and coach, as their team was a pre-season favorite.

It is my observation that the participant, although not entirely satisfied with his performance, was generally satisfied with the effort he made during the season. In addition, the participant seemed to enjoy running and competing, as evidenced by his reduced mental discomfort prior to the meets. The participant believed that he committed himself during the season to improve in both his running and his leadership. Though his drive to excel may have waned periodically, I believe that the participant did indeed fulfill his commitment to the study, to his teammates, and to himself.

Conclusion

Placing this case study within the context of high school athletics was a continuous challenge for me. It was all too easy to forget that the participant, although legally an adult of 18 years, was still a high school student with many other activities, distractions, and concerns aside from cross-country running. Success, as defined by the athlete, tends to improve the sport experience and increase enjoyment. While

participation in the sport itself should bring intrinsic value, the achievement of goals by the sport participant can serve to further enhance the experience.

Csikszentmihalyi (1990) proposed that the participant's skills should be matched by the challenge of the activity to increase the chances of experiencing a state of optimal experience. For the high school athlete, time invested in athletic practice and competition should be rewarding, and potentially lead to this state of enjoyment, referred to as *flow*. The present intervention was conducted in an attempt to enhance the participant's enjoyment of running by helping the athlete set challenging goals and providing him with the necessary skills, both physical and mental, to achieve his goals. Equally important, this piece of research sought the thorough documentation and description of the intervention process, from development through evaluation. Hopefully both objectives were accomplished.

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APPENDICES

APPENDIX A-1

COACH'S INFORMED CONSENT STATEMENT

I, _____, hereby volunteer to participate in a research study that explores the development and implementation of a mental and physical training program for a high school cross-country runner. The purpose of the study is to develop and administer a mental skills training and physical training program for a high school athlete and evaluate its perceived influence on performance.

I understand that I will be involved in two interview sessions lasting approximately 45-60 minutes each. I understand that the initial interview session will be conducted at the beginning of the cross-country season and that the second interview will be conducted after the completion of the season. I understand that the interview sessions will be audiotaped. I understand that these audiotapes will be erased upon transcription. I understand that I will be asked to provide my perceptions and opinions on the performance of the participant.

I understand that I will be given the opportunity to listen to the audiotapes, read the transcribed information, and approve its use in the study. I understand that my name and interview session will remain confidential. To ensure confidentiality, I understand that I will be given the opportunity to select a pseudonym, with which I will be identified. I understand that no written link of my true identity will be associated with that of my pseudonym. In order to preserve confidentiality, the audiotapes will be erased at the completion of the study.

I understand that the possible benefits of this investigation include a better understanding of mental skills training with adolescent athletes. In addition, this study is significant because it investigates the perceptions of a high school athlete and coach concerning the influence of a combined mental and physical training program on performance.

I understand that participation in this study is voluntary and that participation or refusal to participate will involve no penalty. I understand that I may withdraw or discontinue participation at any time without penalty.

Date: _____ Signature: _____

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APPENDIX A-2

SUBJECT'S INFORMED CONSENT

I, _____, hereby volunteer to participate in a research case study that explores the development and implementation of a mental and physical training program for a high school cross-country runner. The purpose of the study is to develop and administer a mental skills training and physical training program for a high school athlete and evaluate its perceived influence on performance.

I acknowledge that I am at least 18 years of age. I understand that I will be involved in two interview sessions, one at the beginning and one at the end of the cross-country season. I understand that the interview sessions will last approximately 45-60 minutes. I understand that the researcher will also interview my cross-country coach at the beginning and the end of the season. I understand that all interview sessions will be audiotaped. I understand that these audiotapes will be erased upon transcription.

I understand that I will be asked to complete an inventory that measures mood states approximately 45 minutes prior to competition on 3 separate occasions.

I understand that I will be given the opportunity to listen to the audiotapes, read the transcribed information, and approve its use in the study. I understand that my name and interview session will remain confidential. To ensure confidentiality, I understand that I will be given the opportunity to select a pseudonym, with which I will be identified. I understand that no written link of my true identity will be associated with that of my pseudonym. In order to preserve confidentiality, the audiotapes will be erased at the completion of the study.

I understand that I will be participating in a training program involving physical conditioning and sport psychology consultation. I understand that this program will last approximately eight weeks and that there will be two sessions per week. I understand that each session will last approximately two hours.

I understand that the possible benefits of this investigation include a better understanding of mental skills training with adolescent athletes. In addition, this study is significant because it investigates the perceptions of a high school athlete and coach concerning the influence of a combined mental and physical training program on performance.

I understand that participation in this study is voluntary and that participation or refusal to participate will involve no penalty or loss of benefits to my practice, meet participation, or team standing. I understand that I may withdraw or discontinue participation at any time without penalty.

Date: _____ Signature: _____

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APPENDIX B

PROFILE OF MOOD STATES INVENTORY

Below is a list of words that describe feelings people have. Please read each one carefully. Then choose the number which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

The numbers refer to these phrases.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

1. Friendly
2. Tense
3. Angry
4. Worn out
5. Unhappy
6. Clear-headed
7. Lively
8. Confused
9. Sorry for things done
10. Shaky
11. Listless
12. Peeved
13. Considerate
14. Sad
15. Active
16. On edge
17. Grouchy
18. Blue
19. Energetic
20. Panicky
21. Hopeless
22. Relaxed
23. Unworthy
24. Spiteful
25. Sympathetic
26. Uneasy
27. Restless
28. Unable to concentrate
29. Fatigued
30. Helpful
31. Annoyed
32. Discouraged
33. Resentful
34. Nervous
35. Lonely
36. Miserable
37. Muddled
38. Cheerful
39. Bitter
40. Exhausted
41. Anxious
42. Ready to fight
43. Good natured
44. Gloomy
45. Desperate
46. Sluggish
47. Rebellious
48. Helpless
49. Weary
50. Bewildered
51. Alert
55. Trusting
56. Full of pep
57. Bad-tempered
58. Worthless
59. Forgetful
60. Carefree
61. Terrified
62. Guilty
63. Vigorous
64. Uncertain about things
65. Bushed

APPENDIX C

COMPETITIVE STATE ANXIETY INVENTORY-2

Illinois Self-Evaluation Questionnaire

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

The numbers refer to these phrases

1 = Not at All
2 = Somewhat
3 = Moderately So
4 = Very Much So

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

APPENDIX D:

STRENGTH TRAINING ROUTINE

Each routine is performed once per week with several days of rest in between workouts.

Day 1

Seated Machine Chest Press (for chest, triceps, and shoulders) - 1 set of 20 reps.
Machine Lying Leg curl (for hamstrings) – 1 set of 20 reps.
Machine Leg Extension (for quadriceps) – 1 set of 20 reps.
Machine Back Extension - 1 set of 20 reps.
Incline Bench Press (for chest, shoulders, and triceps; free-weights) - 1 set of 20 reps.
Seated Machine Row (for upper back and biceps) - 1 set of 20 reps.
Machine Butterfly (for chest and shoulders) - 1 set of 20 reps.
Smith Machine Squats - 1 set of 20 reps.
Weighted Bench Step-ups (for hamstrings, quadriceps, gluteus, and hip muscles) - 1 set of 20 reps.
Machine Lat Pulldown - (for upper back and biceps) 1 set of 20 reps.
Eagles (floor exercise for abdominal group and hip flexors) -1 set of 20 reps.
Barbell Biceps Curls - 1 set of 20 reps.
Abdominal Crunches - 200 reps.

Day 2

Seated Machine Chest Press (for chest, triceps, and shoulders) - 1 set of 20 reps.
Machine Lying Leg Curl (for hamstrings) – 1 set of 20 reps.
Machine Leg Extension (for quadriceps) – 1 set of 20 reps.
Standing Calf Raise - 1 set of 20 reps.
Decline Dumbbell Bench Press (for chest and triceps) - 1 set of 20 reps.
Dumbbell Front Raises (for shoulders) - 1 set of 20 reps.
Dumbbell Side Raises (for shoulders) - 1 set of 20 reps.
Machine Incline Chest Press (for chest, shoulders, and triceps) - 1 set of 20 reps.
Body-weight Squat Jumps (for legs and gluteus) - 1 set of 20 reps.
Body-weight Lunges - 1 set of 20 reps.
Machine Lat Pulldown - (for upper back and biceps) - 1 set of 20 reps.
Straight Leg Raises – (for abdominal muscles and hip flexors) - 1 set of 20 reps.
Triceps Cable Extensions – 1 set of 20 reps.
Abdominal Crunches (on incline) – 250 reps.

VITA

B. Andrew Henderson was born in Woodbury, New Jersey on December 7, 1971. He graduated from St. Augustine Preparatory High School in June, 1990. Andrew attended Florida International University, where he received a bachelor's degree in Psychology in August, 1994. During these five years of undergraduate coursework, Andrew also worked as a youth coach for the Dade County YMCA and a crisis hotline operator for Switchboard of Miami. These experiences cultivated his interest in psychology and his desire to help people proactively through athletics.

In 1995, Andrew began his graduate studies in Human Performance and Sport Studies at the University of Tennessee. A research project on goal setting in exercise heightened his interest in the fitness profession, and in 1996 he attained certification as a personal trainer. Since then, Andrew has been training at a Knoxville health and fitness center while completing his graduate work. He is a member of the honor society of Phi Kappa Phi and will graduate summa cum laude receiving the Master of Science.