A COGNITIVE-BEHAVIORAL STRESS MANAGEMENT INTERVENTION
FOR DIVISION I COLLEGIATE STUDENT-ATHLETES

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
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The Ohio State University
2004

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ABSTRACT

The main purpose of this study was to examine the effectiveness of a cognitive-behavioral stress management intervention designed to help collegiate student-athletes understand and utilize various techniques to manage stress better and regulate arousal to achieve optimal performance. The final sample consisted of 30 participants divided into a treatment and a wait-list control group. The treatment group met for one hour per week for a five-week intervention, where they learned how to use skills such as relaxation, imagery, and self-talk. Both treatment and wait-list control group members completed measures of competitive sport anxiety, trait anxiety, life stress, coping skills, and positive and negative affect at pre, post, and follow-up testing.

Competitive anxiety was measured using the Sport Competition Anxiety Test. Other measures included the Trait Anxiety Inventory, the Life Events Survey for Collegiate Athletes, the Athletic Coping Skills Inventory, and the Positive and Negative Affect Schedule. MANCOVAs using life stress as the covariate were conducted for competitive anxiety, trait anxiety, coping skills, and positive and negative affect to explore differences between the groups for the entire sample across test times. The results indicated that the treatment and control groups differed significantly as expected on both competitive anxiety and negative affect at follow-up testing. The differences
between groups for the remaining variables were non-significant. The implications for these results are discussed, as are suggestions for future research in this area.
Dedicated to Joseph, whose spirit guided me throughout this process, and to my father, whose faith and enthusiasm carried me from the beginning to the end.
ACKNOWLEDGMENTS

I would like to thank my advisor, Dr. Rich Russell, for his encouragement and words of wisdom throughout the development of my Dissertation. I would also like to express my gratitude to the members of my committee, Dr. Bruce Walsh and Dr. Pam Highlen for their interest and helpful comments. Dr. Highlen has been particularly supportive as I embark in the relatively new area of sport psychology.

Thanks to all of the people who provided valuable advice throughout this process, particularly my mentors Dr. Jennifer Carter and Dr. Todd Kays. I am very grateful to all of my friends and colleagues who have supplied encouragement and balance in my life as I worked on this dissertation. Lastly, I am indebted to my family for their endless cards and phone calls and for their unwavering belief in me.
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TABLE OF CONTENTS

Abstract ............................................................................................................................ ii
Dedication ....................................................................................................................... iv
Acknowledgements ......................................................................................................... v
Vita ................................................................................................................................... vi
List of Tables .................................................................................................................. xi
List of Figures ............................................................................................................... xii
Chapters:
1. Introduction ............................................................................................................... 1
   1.1 Background ........................................................................................................... 1
   1.2 Significance of the Study .................................................................................... 4
2. Review of the Literature ........................................................................................... 6
   2.1 Overview .............................................................................................................. 6
   2.2 Stress .................................................................................................................... 7
   2.3 Anxiety ................................................................................................................ 10
   2.4 Effects of Stress and Anxiety on Performance .................................................. 11
   2.5 Flow .................................................................................................................... 15
   2.6 Coping ................................................................................................................ 16
   2.7 Stress Management Components ...................................................................... 18
   2.8 Stress Management Treatments ....................................................................... 21
   2.9 Treatment Considerations .................................................................................. 24
   2.10 Treatment Intervention ..................................................................................... 26
   2.11 Hypothesis ....................................................................................................... 28
3. Methodology ............................................................................................................. 30
Appendix F, Positive and Negative Affect Schedule…………………………94
Appendix G, Evaluation Form………………………………………………95
Appendix H, Invitation to Pre-Testing………………………………………96
Appendix I, Reminder about Pre-Testing…………………………………97
Appendix J, Scripts for REP (Psychology 100) Web Site………………….98
Appendix K, Schedule Form………………………………………………..99
Appendix L, Pre-Testing Script……………………………………………100
Appendix M, Pre-Testing Debriefing Sheet………………………………101
Appendix N, Invitation to be in Control Group……………………………102
Appendix O, Invitation to be in Treatment Group………………………..103
Appendix P, Reminder about Treatment Group……………………………104
Appendix Q, Behavioral Contract………………………………………….105
Appendix R, Invitation to Post-Testing…………………………………….106
Appendix S, Post-Testing Script……………………………………………107
Appendix T, Post-Testing Debriefing Sheet………………………………108
Appendix U, Invitation to Follow-Up Testing……………………………..109
Appendix V, Follow-Up Testing Script…………………………………….110
Appendix W, Follow-Up Session Debriefing Sheet……………………….111
Appendix X, Time Line for Research Study……………………………….112
Appendix Y, Stress Management Group Protocol……………………….113
Appendix Z, Progressive Muscle Relaxation……………………………..121
Appendix AA, Relaxation Worksheet……………………………………..122
Appendix BB, Burns' 10 Types of Cognitive Distortions.................123
Appendix CC, Self-Talk Homework........................................124
Appendix DD, Flow Handout.................................................125
Appendix EE, Representation of Varsity Sports..........................126
Appendix FF, Evaluation Form Data........................................127
Appendix GG, Correlation Tables for Pre and Post-Testing.............129
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Means and Standard Deviations for Total Sample on All Measures at each Test Period</td>
</tr>
<tr>
<td>4.2</td>
<td>Reliability Coefficients for Total Sample on All Measures at Pre, Post, and Follow-Up Testing</td>
</tr>
<tr>
<td>4.3</td>
<td>Pearson Product-Moment Correlation Matrix at Follow-Up Testing</td>
</tr>
<tr>
<td>4.4</td>
<td>Multivariate Analysis of Covariance for Groups on All Measures</td>
</tr>
<tr>
<td>EE.1</td>
<td>Varsity Sport Representation by Gender in Treatment and Control Groups</td>
</tr>
<tr>
<td>FF.1</td>
<td>Evaluation Form Data from the Treatment Group at Post and Follow-Up Testing</td>
</tr>
<tr>
<td>GG.1</td>
<td>Pearson Product-Moment Correlation Matrix at Pre-Testing</td>
</tr>
<tr>
<td>GG.2</td>
<td>Pearson Product-Moment Correlation Matrix at Post-Testing</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Mean Scores on the SCAT at Pre, Post, and Follow-Up Testing for Treatment and Control Groups</td>
<td>58</td>
</tr>
<tr>
<td>4.2</td>
<td>Mean Scores on the PANAS NA at Pre, Post, and Follow-Up Testing for Treatment and Control Groups</td>
<td>58</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

1.1 **Background**

Situations that are perceived as challenging, threatening, or stressful are considered stressors (Ntoumanis & Biddle, 1998). Competitive athletes face many stressful situations in the sport realm. Sport stressors could include important competitions, media attention, injuries, bad referees, bad weather, and performance slumps (Ntoumanis & Biddle, 1998). Other examples include making an error, being criticized by the coach, a taunting crowd, or the successful performance of an opponent (Anshel, Williams, & Hodge, 1997). Life events such as the death of a loved one or a change in residence may also contribute to the overall stress an athlete may be experiencing (Gill, Henderson, & Pargman, 1995).

General life stress and sport-related stress both have the potential to affect an athlete's physiological and psychological well-being, which in turn can affect sport performance (Felsten & Wilcox, 1992). According to Andersen and Williams (1988), an individual's reaction to stress is determined by three things: personality characteristics such as trait anxiety, the person's history of stressors, and his or her available coping...
resources. Some athletes may not be adequately equipped to cope with stress in various situations.

A stress response is activated when an individual perceives a situation as stressful and does not feel like he or she has the resources to cope with the problem; the stress response often consists of physiological, cognitive, emotional, and behavioral components (Andersen & Williams, 1988). Buceta (1985) further described impairments due to stress that may be observed for each of these components. Physiological reactions to stress involve symptoms associated with increased arousal, such as increased heart rate, sweating, dizziness, and muscle tension. The cognitive component of stress usually involves distorted thinking and poor concentration, while the affective stress response may include worry, aggression, fear, anger, and sadness. Stress at the behavioral level might be observed as avoidance behavior or loss of accuracy or timing in a sport situation.

The literature has provided evidence that high levels of stress associated with a state of anxiety are related to poor performance (Felsten & Wilcox, 1992). Kleine (1990) conducted a meta-analysis of the relationship between anxiety and sport performance, and found that the two variables were consistently negatively correlated. Kimiecik and Stein (1992) suggested that athletes who experience high levels of anxiety may be less likely to experience "flow states" or optimal performances when they are competing. Flow is associated with the ability to concentrate, feel in control, and perceive a balance between challenges and skill level (Jackson & Csikszentmihalyi, 1999).
It is possible that anxiety affects performance differently depending on the type of sport (Smith, Smoll, & Shutz, 1990). For example, anxiety may have a greater impact on performance when high concentration and fine motor coordination is needed, in sports such as gymnastics or diving (Felsten & Wilcox, 1992). Across sports, athletes are also more likely to experience burnout and withdraw from a sport when they have high levels of stress and are exhausted from ineffective coping efforts (Silva, 1990). In addition, trait anxiety, life stress, and lack of coping resources have been associated with more frequent and more severe sport-related injuries (Hanson, McCullagh, & Tonymon, 1992; Petrie, 1993a).

Individuals with high trait anxiety may exhibit stress-related symptoms more regularly, since they are more likely to perceive a situation as threatening (Man, Stuchlikova, & Kindlmann, 1995). Athletes with high trait anxiety are also less self-confident in high stress situations (Man et al, 1995). These individuals may be especially in need of a stress management intervention that helps them learn new coping methods, which will in turn facilitate athletes' attempts to regulate arousal levels for optimal performance.

One particular type of program that has been successfully used with athletes is the cognitive-behavioral stress management intervention (CBSM; Perna, Antoni, Kumar, Cruess, & Schneiderman, 1998). Initially, CBSM interventions were shown to effectively help cancer and AIDS patients increase immune functioning and decrease distress (Antoni, Baggett, & Ironson, 1991). In one study that applied CBSM with varsity athletes, the CBSM group participants showed decreases in negative affect,
fatigue, and levels of the stress hormone cortisol (Perna et al., 1998). In a study by Holm, Beckwith, Ehde, and Tinius (1996), the cognitive-behavioral treatment group showed decreases in anxiety and increases in academic performance compared to the control group.

A CBSM intervention usually begins with a psychoeducational component in order to explain to the participants to what stress is and how it affects people's lives. The conceptual aspect is then followed by the instruction and practice of cognitive and behavioral techniques. The main cognitive component in a CBSM program is cognitive restructuring, a technique that involves identifying negative, dysfunctional patterns of thinking and learning to replace them with positive, self-affirming statements (Beck, 1984). During the behavioral part of the intervention the participants learn a technique known as progressive muscle relaxation (Jacobson, 1938) and are usually given homework to practice relaxation at home in between sessions. Other techniques that may be introduced in a CBSM program include assertiveness training (Antoni et al., 1991), imagery (Perna et al., 1998), and time-management strategies (Holm et al., 1996).

1.2 **Significance of the Study**

According to the literature, there is a great need for interventions that help athletes enhance sport performance by teaching them arousal regulation and coping methods (Gould & Udry, 1994). Stress management programs are useful because they teach athletes problem-solving strategies that enable them to adapt to stressors (Silva, 1990). Both coaches and athletes can benefit from such programs, and the skills they
learn can be applied not only to sport but also to life in general (Crocker, Alderman, & Smith, 1988). Many interventions that have been used with athletes are based on the idea that a limited coping repertoire is associated with poor performance and sport dissatisfaction (Crocker, 1991). Athletes who participate in a stress management program have the opportunity to obtain and learn to apply effective coping methods to deal with sport and life stressors, which will ultimately lead to optimal performance and enjoyment in their sport. In addition to providing such an opportunity for a group of varsity athletes, this study will add to the existing research on the effectiveness of cognitive-behavioral stress management interventions in reducing stress and anxiety, increasing coping skills, and improving arousal regulation with a specific population.
CHAPTER 2

REVIEW OF THE LITERATURE

2.1 Overview

There is a vast amount of psychology literature devoted to the topics of stress, anxiety, and stress management. The sport psychology literature also demonstrates an increasing focus on these concepts, particularly showing a strong interest in the relationship between anxiety and performance. Many different theories have been developed to explain this complex relationship (Cox, 1998). Different types of anxiety have been described and discussed (Martens, Vealey, & Burton, 1990), and sport psychologists generally agree that athletes perform their best when they possess an optimal level of anxiety (Jackson & Csikszentmihalyi, 1999).

Athletes may fail to attain optimal levels of anxiety because of sport-related stress or general life stress that they experience (Ntoumanis & Biddle, 1998). Stress results when an individual does not feel able to handle a situation, often because of a lack of coping resources (Crocker, 1991). Anshel, Williams, and Hodge (1997) state that an athlete's ability to cope in sport is important in maintaining optimum arousal and focus. A debilitating state of physiological and psychological anxiety can result from high stress levels. Costs that are associated with failing to attain an optimal level of

6
anxiety or arousal in sport include poor performance, negative thought patterns, negative emotions such as depression, and possibly even injury (Buceta, 1985).

Thus, it is important for athletes to possess a broad repertoire of coping strategies in order to handle a variety of stressors in both sport and life. Effective coping skills will help athletes achieve an optimal level of anxiety, and improved performance will likely follow. A review of the literature has shown that stress management programs have successfully helped athletes reduce anxiety and enhance performance (Gould & Udry, 1994).

2.2 Stress

Stress can be defined as an imbalance between perceived environmental demand and one's perceived ability to respond, which could result in important consequences (McGrath, as cited in Martens et al., 1990). There are many examples of environmental stressors in athletics. Situations that may be perceived as challenging, threatening, or stressful include important competitions, media attention, bad referees, bad weather, and performance slumps (Ntoumanis & Biddle, 1998). Other sport stressors may include financial insecurity, poor communication with coaches or teammates, coaching methods, role changes, value conflicts, and uncontrollable events (Buceta, 1985). In addition, athletes may make errors, take criticism, suffer an injury (Anshel et al., 1997), experience sport violence, struggle with burnout (Crocker, 1991), or have eligibility problems (Gill, Henderson, & Pargman, 1995). Stressful life events such as death of a loved one or a change in residence may also contribute to an athlete's anxiety (Gill et
al., 1995). In the current study, the participants in the treatment group were asked to identify the stressors they deal with as Division I collegiate student-athletes.

The transactional model of stress developed by Lazarus and Folkman postulates that stress occurs as a result of an interaction between person and environment factors (as cited in Crocker, 1991). Individuals may respond differently to sport situations. Person factors that contribute to the experience of stress include cognitive appraisal and coping resources (Crocker, Alderman, & Smith, 1988). Lazarus and Folkman state that an individual may appraise the effect that an event or situation could have on his or her well being in one of four ways: benefit, harm/loss, threat, or challenge. Following this appraisal, a person takes inventory of the coping resources on hand to deal with the stressor. If an athlete perceives a stressful situation as a threat and does not feel equipped to handle the situation, a state of anxiety will ensue (Felsten & Wilcox, 1992).

This state of anxiety is referred to as the stress response, and an individual's stress response is determined by three factors (Andersen & Williams, 1988). First, personality characteristics such as hardiness, locus of control, trait anxiety, achievement motivation, and sensation seeking may contribute to the stress response. Second, a person's history of stressors, including major and minor life events, will affect his or her stress response. Stress from life events was assessed and used as a covariate in the current study to control for individual differences in life stress, a strategy that has been used in previous research (Perna, Antoni, Kumar, Cruess, & Schneiderman, 1998; Petrie, 1993a). Finally, coping resources and social support that an individual can rely
on will also be influential. The stress response involves physiological, cognitive, emotional and behavioral components.

According to the transactional model of stress, these physical, affective, cognitive, and behavioral domains are all interrelated, and thus when a change occurs in any one of them, the other domains are also affected (Crocker et al., 1988). Thus, debilitating anxiety in an athlete may involve muscle tension, negative emotions, self-debasing thoughts, and poor performance or avoidance behavior. Correspondingly, a stress management program that targets change in one of the domains will likely lead to improvement in all of the domains. Support for this method is provided in a study by Maynard and Cotton (1993), in which both the relaxation group (physical domain) and the positive thought control group (cognitive domain) showed significant decreases in somatic and cognitive anxiety.

The current study is based in part on the transactional model. Cognitive and behavioral stress management methods such as positive self-talk, imagery, and relaxation were presented to the treatment group with the expectation that each athlete would find at least one skill that helped ease anxiety, decrease negative affect and increase positive affect, and improve performance. For example, an athlete who chose to use relaxation strategies to control arousal would physically relax, which would then lead to more positive thoughts and emotions and a better sport performance. Likewise, an athlete who preferred to use positive self-talk would think more positively, which would lead to physical relaxation, more positive emotions, and improved athletic performance. This study is not designed to examine the transactional model directly.
Nevertheless, it is expected that athletes in the treatment group will prefer various stress management methods, and that change in one domain will lead to change in other domains.

2.3 Anxiety

Although some athletes may struggle with low levels of arousal such as boredom or low motivation, the more difficult anxiety problem involves athletes who suffer from debilitating levels of anxiety (Cox, 1998). The anxiety/stress spiral is the term Cox uses to describe the cycle in which increasing anxiety leads to poor performance, which subsequently leads to higher anxiety.

Anxiety may be manifested consistently as a general personality trait in addition to occurring on a temporary basis in response to specific situations. Spielberger differentiated between trait and state anxiety: trait anxiety is a personality characteristic and state anxiety refers to an emotional reaction to a stressor involving fear, apprehension, and somatic symptoms (Cox, 1998). According to this theory, individuals with higher trait anxiety are more prone to state anxiety in stressful situations (Man, Stuchlikova, & Kindlmann, 1995).

Athletes may experience primarily cognitive anxiety or somatic anxiety (Maynard & Cotton, 1993). Cognitive anxiety is the mental aspect that involves negative thought patterns, while somatic anxiety is the physiological component of anxiety that involves autonomic arousal (Maynard, Hemmings, & Warwick-Evans, 1995). The sport psychology literature indicates that successful athletes are those who think positively (Williams & Leffingwell, 1996), and that negative self-talk such as "I'm
not good enough" contributes to cognitive anxiety (Beswick, 2001). Somatic anxiety is the physiological component of anxiety that involves autonomic arousal (Maynard et al., 1995). Physical symptoms of anxiety may include increased heart rate and breathing, tight muscles, restlessness, excessive perspiration, fatigue, and headaches (Smith, 1993). Somatic anxiety is disruptive partly because bodily tension can negatively impact athletes by interrupting smooth movements needed for optimal sport performance (Kauss, 2001).

Some physiological arousal is necessary for optimal sport performance. Most likely, individuals will have their own unique optimal level of anxiety depending on the task (Morgan, 1996). For example, a golfer may need to have a lower anxiety level than a hockey player in order to perform at an optimal level. In addition, two golfers may have different optimal levels of anxiety.

2.4 **Effects of Stress and Anxiety on Performance**

High stress levels and excessive anxiety are associated with many unfavorable outcomes. Athletes are perhaps most concerned that anxiety results in poor performance, and this issue is strongly represented in the sport psychology literature. In a study by Smith (as cited in Crocker, Alderman, & Smith, 1988), 40% of the 200 college football players who participated in the research reported frequently experiencing anxiety that interfered with sport performance.

Although some somatic anxiety may be beneficial, any amount of cognitive anxiety seems to be detrimental to performance (Cox, 1998). Research shows a negative linear relationship between cognitive anxiety and performance, in contrast to the
"inverse U" relationship observed between somatic anxiety and performance (Burton, 1988). In other words, athletes need to reduce cognitive anxiety or negative thoughts to improve performance, while they need to find the optimal level of somatic anxiety to perform their best. These findings were reflected in the stress management intervention conducted in the current study. Athletes learned how to counter negative thoughts to decrease cognitive anxiety. In addition, the participants learned about the "inverse U" theory of somatic arousal and discussed methods of adjusting physical arousal to reach the optimal level of arousal for optimal performance. More specifically, the athletes learned how to use relaxation to decrease somatic anxiety, and they listed strategies such as listening to music and doing warm ups to increase somatic anxiety.

Sport-specific anxiety is a better predictor of performance than general anxiety, and this relationship is influenced by complex individual factors such as locus of control, self-efficacy, and sport confidence (Felsten & Wilcox, 1992). Both general trait anxiety and sport-specific trait anxiety (also known as competitive anxiety) were measured in the current study, and it was expected that competitive anxiety would be more affected by the sport-specific treatment than general anxiety. Felsten and Wilcox also stated that state anxiety is more useful than trait anxiety in predicting sport performance. Unfortunately, state anxiety is difficult to measure in athletes because it involves testing them immediately before they compete. Thus, the current study measured competitive trait anxiety instead, which tends to be strongly correlated (coefficients ranging from .56 to .72) with competitive state anxiety prior to competition (Martens et al., 1990).
The anxiety-performance relationship may be different for different sports. The negative impact of anxiety may be most likely seen in sports that require high levels of concentration and fine motor coordination, such as gymnastics, diving, and skating (Felsten & Wilcox, 1992). In addition, cognitive and somatic anxiety may affect performance differently depending on the task (Smith, Smoll, & Schutz, 1990). A certain level of anxiety may benefit field hockey players, whereas the same degree of anxiety could be detrimental to a swimmer's performance (Maynard & Cotton, 1993). Individual sports and contact sports are associated with higher levels of both cognitive and somatic anxiety, and subjectively scored sports based on judges' evaluations are linked to higher cognitive anxiety levels (Martens et al., 1990). Thus, the type of sport is an important factor in the anxiety experienced by an athlete. When athletes have an inappropriate level of anxiety for their sport, their performance could suffer.

Another negative consequence associated with high levels of stress is the occurrence of burnout (Silva, 1990). Varsity athletes train very hard for success, and many demands are placed on them to perform well both in athletics and academics. Sometimes these pressures may become overwhelming. Overtraining has been linked to decreased immune functioning, increased negative affect and increased fatigue (Perna et al., 1998). Athletes may also have negative reactions to normal training levels, especially when conflict, boredom, poor coping, or insufficient work/rest patterns are involved (Silva, 1990). Silva states that repeated failure to cope with demands of the sport and exhaustion from such ineffective efforts characterize burnout in sport. Athletes who experience burnout often withdraw from the sport, and this can result in
low self-esteem and loss of athletic identity (Silva, 1990). In addition, psychological stress is associated with increased levels of the stress hormone cortisol; in cases of chronic stress, cortisol can render individuals vulnerable to injury and illness by diminishing the effectiveness of the immune system (Perna et al., 1998).

Sport injury has been linked to high levels of negative life stress and trait anxiety, but there does not appear to be a clear, direct relationship between these variables (Petrie, 1993a). A study with female collegiate gymnasts suggested that social support and playing status (starter versus non-starter) moderate the relationship between negative life stress and injury (Petrie, 1993b). A study on injury in college football players showed that better coping abilities were associated with decreased injury rates, while higher competitive trait anxiety was related to likelihood of injury (Petrie, 1993a). Although more research is needed, Petrie comments that it also appears that better coping abilities are associated with decreased injury rates.

Surprisingly, higher positive life stress was also linked to higher injury rates in Petrie's study (1993a). Hanson, McCullagh, and Tonymon (1992) found similar results with regard to positive life stress and injury in their study with collegiate track and field athletes. They also found that coping resources, negative life stress, social support, and competitive trait anxiety differentiated between injury severity groups. Again, the relationships between these variables have not yet been fully illuminated, but there is some evidence that high stress and anxiety levels are linked to athletic injury frequency and severity.
2.5 Flow

Anxiety, when it is not experienced at an optimal level, can prevent an athlete from reaching the optimal flow state (Kimiecik & Stein, 1992). Flow is associated with enjoyment of the sport for its own sake and the occurrence of peak performances (Jackson & Csikszentmihalyi, 1999). Athletes may describe the flow state as being "in the zone," "in the groove," or when "everything clicks."

Although flow is difficult to define, common factors emerge from athletes' descriptions of optimal moments in sport. The flow state seems to involve nine fundamental components: balance between challenge and skills, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, loss of self-consciousness, transformation of time, and autotelic experience (Jackson & Csikszentmihalyi, 1999). The athlete in flow feels empowered, has no worries, is completely present in the moment, and experiences intrinsic reward by participating in the sport for its own sake. If an athlete is overly worried about the performance or the outcome of a competition, that anxiety will interfere with attaining the flow state (Kimiecik & Stein, 1992). Flow is more likely to occur when an athlete is focused, confident, composed, feels strong, and is free of self-doubt (Jackson & Csikszentmihalyi, 1999).

The study of flow is plagued by methodological problems (Kimiecik & Stein, 1992). Flow is a subjective experience, and thus is difficult to measure. There may be some personality antecedents to flow, such as the tendency to be task involved rather than ego involved. Situational factors may also play a role; participation in a sport that
is more easily controlled by the athlete may facilitate the flow state. However, research in this area is limited, and as Kimiecik and Stein state, "Anyone wishing to embark on a research journey in this area should be ready to face a complex collage of conceptual and methodological challenges." Rather than attempting to measure or examine the flow state, this study will educate athletes in the treatment group about the components of flow. Increased awareness of the flow state and how it relates to the use of skills such as relaxation, positive self-talk, and imagery may help athletes facilitate their own flow experiences.

2.6 **Coping**

Coping can be defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person," (Lazarus & Folkman, as cited in Crocker, 1991). According to the transactional model, coping is not a trait; thus, there are no "bad" copers (Crocker, 1991). Coping should be thought of as a process rather than an outcome. For example, a person may be attempting to cope with a situation but the coping strategy may be ineffective.

Anshel et al. (1997) reported that an inability to cope with persistent stress may lead to demotivation, while the ability to cope in sport means being able to regain composure and maintain focus. Ntoumanis and Biddle (1998) studied individual differences in preferred coping methods. They found that athletes use many different coping strategies, and perceived effectiveness of coping methods predicts positive or
negative affect. They also reiterated the relationship between effective coping and performance and the link between poor coping and burnout.

A distinction is made between problem-focused and emotion-focused coping (Anshel et al., 1997). Problem-focused coping usually means actively attempting to achieve a task objective by doing things such as being assertive, seeking social support, or avoiding the situation. Emotion-focused coping refers to regulating emotions to decrease cognitive distress through strategies such as self-talk or relaxation. Ntoumanis and Biddle (1998) examined positive and negative affect associated with several coping strategies used by athletes. They found that two strategies, effort and suppression of competing activities (focus), were linked with positive affect, whereas behavioral disengagement, or quitting, was associated with negative affect. In addition, negative affect was experienced when athletes did not perceive the strategies of seeking social support and venting emotions to be effective.

In addition to problem and emotion-focused coping, the difference between approach and avoidance coping styles has also been discussed in the literature (Anshel et al., 1997). Avoidance coping techniques involve avoiding the stressor and could be useful to protect an athlete from distractions. However, most athletes prefer the more active approach coping techniques that can be used to confront the situation. Women tend to use approach-emotion coping while men use approach-task coping more often. For example, if the referee makes a bad call, approach-emotion coping might involve feeling anger at the referee, while approach-task coping may involve verbally...
confronting the referee. There are many individual differences in preferred coping styles, and stress management programs that recognize this are needed (Anshel et al.).

2.7 Stress Management Components

There is a wide range of techniques that can be included in a stress management intervention. Cognitive strategies, relaxation, and imagery are the most commonly used techniques, and so these are discussed in detail. Other possible components in a stress management group include assertiveness training, goal setting, time-management, and problem-solving.

Cognitive strategies are used to identify and adjust problematic thinking that has the potential to negatively impact performance (Williams & Leffingwell, 1996). Cognitive psychologists Albert Ellis and Aaron Beck have both repeatedly espoused the importance of restructuring irrational thoughts and dysfunctional beliefs by replacing them with more realistic, positive thinking (Buceta, 1985). Athletes may possess several different distorted thinking styles (Williams & Leffingwell, 1996). For example, an athlete may have an unrealistic expectation to be perfect and think, "If I lose it's the end of the world," (Buceta, 1985). Athletes may hinge their feelings of self-worth on athletic success or internalize mistakes made by the team and think, "It's all my fault we lost. I'm a horrible person." On the other hand, an athlete might tend to blame others for poor performances (Williams & Leffingwell, 1996).

After identifying the problematic thoughts and beliefs, one must challenge them and replace them with more realistic and positive thinking (Williams & Leffingwell, 1996). According to Buceta (1985), factual and specific evaluation of performances or
situations, rather than global evaluation, will increase an athlete's sense of control and decrease negative affect and frustration. For example, an athlete who thinks, "If I lose it's the end of the world," may replace that thought with the thought, "It stinks that I lost on Tuesday, but that makes me even more motivated to win next week."

Buceta (1985) also espouses attention diversion techniques such as thought-stopping and focusing on the task at hand. Thought-stopping involves stopping a negative thought and replacing it with a positive, success-oriented thought. Concentrating on the immediate task allows the athlete to ignore both internal and external distractions (Cox, 1998). Positive self-talk can be used to focus attention and increase self-confidence (Williams & Leffingwell, 1996). Cognitive strategies such as restructuring and self-talk have been repeatedly shown to be effective with athletes in enhancing performance and decreasing anxiety (Williams & Leffingwell, 1996).

Sport psychology interventions often help participants learn relaxation techniques as well as cognitive strategies (Hays & Smith, 1996). Relaxation skills increase athletes' awareness of their physiological arousal level and give them tools to regulate that level in order to achieve optimal arousal for best performance. Progressive muscle relaxation (Jacobson, 1938) is an empirically validated method for reducing anxiety and decreasing affective distress (Antoni et al., 1991). The technique involves tensing various series of muscles throughout the body and then relaxing them. In this way, the individual learns the difference between the feelings of tension and those of relaxation and requires less and less amounts of time to become relaxed. Cue-controlled relaxation involves choosing a word such as "calm" or "relax" to associate with the state
of relaxation, so that after much practice a person can quickly achieve a relaxed state by merely saying the cue word (Russell, Wise, & Stratoudakis, 1976). Practice is crucial in order for these relaxation strategies to work. Nideffer reported that an athlete should be able to evoke the relaxation response in merely a few minutes after several months of PMR practice (as cited in Cox, Qiu, & Liu, 1993).

Cox et al. (1993) report that autogenic relaxation, a technique that combines progressive relaxation, breathing, focus on warmth and heaviness of limbs, and self-talk, is also effective in reducing anxiety and tension. However, PMR may be better suited for athletes, given that repeated practice should eventually lead to the ability to relax without necessarily needing to lie down or find a quiet setting. Thus athletes who learn PMR can ideally achieve relaxation just prior to or during a competition. Case studies provide evidence that progressive relaxation helps athletes improve performance. For example, Nideffer and Deckner reported improved performance for shot-putters who had relaxation training, and in a 1982 article Winter reported that San Jose State University track athletes broke 37 world records in sprint events with the help of progressive relaxation techniques (as cited by Cox et al.).

Imagery is often applied in conjunction with cognitive strategies and relaxation techniques in stress management programs (Gould & Damarjian, 1996). Gymnasts who learned cue-controlled relaxation and mental visualization during preseason reported decreases in somatic and cognitive anxiety prior to their first meet (Cogan & Petrie, 1995). A review of programs that include imagery reveals that they are successful in controlling anxiety levels and improving performance (Gould & Udry, 1994).
It is important to inform participants that imagery can improve performance with a lot of practice, and that imagery works best when it is positive and controlled (Gould & Damarjian, 1996). Relaxation skills can facilitate imagery by increasing concentration and improving vividness. Athletes may imagine a successful performance to achieve an optimal arousal level, or they may use imagery to learn a new skill or improve an existing skill. According to Gould and Damarjian, athletes should try to use all senses, not just visualization, during imagery. In addition, individuals should try both internal and external perspectives to see what works best for them. Athletes should also be encouraged to imagine a scene in real time and to focus on bodily sensations associated with kinesthetic movement when they use imagery. The athletes in the treatment group will learn imagery in the third session and practice it on their own and in subsequent sessions.

2.8 Stress Management Treatments

There are a few types of stress management programs commonly used to help athletes cope more effectively with stress. Stress Inoculation Training (SIT), developed by Meichenbaum, has been successfully applied with athletes (Long, 1984; Whitmarsh & Alderman, 1993; Holm, Beckwith, Ehde, & Tinius, 1996). SIT consists of three phases of treatment: conceptualization, skill acquisition, and application. The second phase, skill acquisition, consists of training the athletes in relaxation and controlled breathing, attention diversion and imagery, and positive self-talk. Cognitive strategies are emphasized in the skill acquisition phase of the intervention (Kerr & Leith, 1993). This phase is probably the most crucial component in the program, as shown by
Whitmarsh and Alderman (1993); they conducted an outcome study that compared a SIT group to a group that only participated in the skill acquisition phase and showed that the latter group was just as effective in increasing athletes' pain tolerance in a wall-sit exercise. Other SIT studies with athletes have demonstrated that this intervention helps decrease anxiety, increase academic performance, (Holm et al., 1996) and increase positive self-statements (Long, 1984). However, no difference in athletic performance was found between the SIT group and the control group in Holm et al.'s study.

Cognitive-Affective Stress Management Training (SMT) is a program designed by Smith (as cited in Crocker et al., 1988) that has also been shown to be effective with athletes. It involves teaching individuals how to control their emotional arousal using both relaxation and cognitive techniques. This program has three phases that are similar to SIT, but it also adds the component of induced affect in the participants. Athletes are asked to imagine distressing situations that heighten anxiety levels, and then they use coping skills such as self-talk and relaxation to reduce the anxiety (Crocker et al., 1988). Limited research shows this program to be somewhat effective in cognitive and performance domains (Crocker, 1989; Crocker et al., 1988). For example, athletes in an SMT group reported fewer negative thoughts in response to videotaped stressors and had better service reception in a controlled volleyball practice compared to the control group (Crocker et al.). However, no differences were found between treatment and control groups for competitive state or trait anxiety in Crocker et al.'s study.
Another program that has been successfully used with athletes is the cognitive-behavioral stress management intervention (CBSM; Perna et al, 1998). Initially, CBSM interventions were shown to effectively help cancer and AIDS patients increase immune functioning and decrease distress (Antoni et al., 1991). In one study that applied CBSM with varsity athletes, the CBSM group participants showed decreases in negative affect, fatigue, and levels of the stress hormone cortisol (Perna et al., 1998). In another study with athletes by Holm et al. (1996), the cognitive-behavioral treatment group showed decreases in anxiety and increases in academic performance compared to the control group. Because of the convincing empirical support for the efficacy of the CBSM intervention, an adapted CBSM program was conducted for athletes in the current study.

A CBSM intervention usually begins with a psychoeducational component in order to explain to the participants what stress is and how it affects people's lives. This conceptual aspect is then followed by the instruction and practice of cognitive and behavioral techniques. The main cognitive component in a CBSM program is cognitive restructuring, a technique that involves identifying negative, dysfunctional patterns of thinking and learning to replace them with positive, self-affirming statements (Beck, 1984). During the behavioral part of the intervention the participants learn progressive muscle relaxation (Jacobson, 1938) and are usually given homework to practice relaxation at home in between sessions. Perna et al. (1998) also included imagery in their CBSM program. The cognitive-behavioral stress management intervention conducted with athletes in the current study included psychoeducation about stress in
addition to education and experiential activities related to self-talk, relaxation, and imagery. Thus, the major components of a CBSM intervention were incorporated into this study, with an emphasis on relaxation and the addition of education about flow.

Stress management programs almost always include homework assignments for the participants to practice relaxation skills on their own in between group sessions. Many of the experimenters employed strategies to increase adherence. For example, Perna et al. (1998) asked participants to listen to relaxation tapes each day and rate their stress before and after listening to the tape. Participants were given index cards to keep track of the stress ratings and write down the days and times that they practiced. Not only could the participants then self-monitor their progress, but the experimenters were able to get a sense of how often the athletes were practicing relaxation on their own.

2.9 Treatment Considerations

There are many individual differences in anxiety levels, performance, and preferred coping strategies. In an intervention study done by Cogan and Petrie (1995), different college gymnasts on the same team rated different components as helpful. A good argument can be made for the usefulness of individualized programs that are catered to athletes' unique needs (Daw & Burton, 1994). In Daw and Burton's study, tennis players who were committed to working on targeted psychological skills such as imagery or control showed performance that corresponded to use of their targeted skills. The researchers attributed this strong correlation found for two athletes on the team to the individual meetings used to work on unique problem areas. A group treatment would not allow for such personal attention.
In addition, Maynard and his colleagues have done studies that suggest that interventions may work best when catered to the type of anxiety (cognitive or somatic) predominantly experienced by an individual, an idea known as the matching hypothesis (Maynard & Cotton, 1993; Maynard et al., 1995; Maynard, Smith, & Warwick-Evans, 1995). However, both cognitive and somatic anxiety significantly decreased in the participants in each of these interventions, regardless of the cognitive or somatic focus of treatment. Typically, the targeted anxiety type decreased more, but overall these results support the transactional model. In other words, reducing one type of anxiety helps reduce other aspects of anxiety because of the interaction between the cognitive, physiological, affective, and behavioral domains. This idea lends support to the efficacy of a stress management intervention for a group of individuals that includes various techniques.

Crocker et al. (1988) voiced concern that such a treatment may be put together on the whim of the researcher rather than deciding which techniques to include based on existing empirical support. However, Ahn & Wampold (2001) recently reported that a meta-analysis of component studies revealed no significance. Thus, a stress management made up of several different techniques that have shown to be useful for athletes seems warranted, especially given that there are so many individual differences in preferred techniques. Granted, it may be difficult to identify the role that common group therapeutic factors such as faith in the therapist, attention to the problem, modeling, feedback, and support might have had on any significant results (Long,
1984). Ideally, an outcome study would compare a new treatment to an existing
efficacious treatment in order to control for non-specific therapy factors (Long, 1984).

2.10 Treatment Intervention

Although a multi-treatment design is beyond the scope of the current study, the
components of this study have been specifically chosen for their empirical efficacy. The
current study includes self-talk, relaxation training, and imagery as major components.
Didactic information about stress will also be part of the treatment. In addition, athletes
will learn about the flow state and discuss how each component of the program can
facilitate the attainment of a state of optimal arousal. This aspect of the program is
unique. No known studies have included the concept of flow in stress management
programs for athletes. As the athletes in the treatment group learned how to reduce
anxiety and manage stress, these skills were consistently discussed in the context of
achieving optimal arousal for better sport performance. This addition is important in
view of the ultimate goal of stress management programs in sport: improving
performance. It is crucial to link coping strategies such as relaxation and positive self-
talk with how they can help athletes enhance their sport performance.

Unfortunately, sport performance is a difficult thing to measure, particularly in a
study such as this that includes participants from several different sports. Reliability and
validity problems have been found in studies that attempted to use expert ratings of
athletes' performance (Maynard & Cotton, 1993; Maynard et al., 1995). Although
performance was not a major dependent variable in the current study, athletes'
perceptions of performance change were assessed at post and follow-up testing on an evaluation form for the athletes in the treatment group.

The major dependent variables assessed in the current study included competitive anxiety, trait anxiety, positive and negative affect, and coping skills. Stress management and performance enhancing skills such as relaxation and positive self-talk reduce anxiety related to sport competition. Thus, it was important to look for changes in sport-specific anxiety following the treatment. General trait anxiety was also a variable of interest because it is related to competitive anxiety (Martens et al., 1990). Positive and negative affect were chosen as dependent variables because the cognitive-behavioral stress management intervention conducted by Perna and his colleagues (1998) led to reduced negative affect in the treatment group. In addition, research has demonstrated that athletes experience positive affect when they perceive their coping skills to be effective (Ntoumanis & Biddle, 1998). Finally, at the recommendation of Smith, Schutz, Smoll, and Ptacek (1995), a coping skills inventory was included to measure any self-reported changes in the athletes' coping abilities as a result of the treatment. To prevent pre-existing stress in the lives of the athletes from confounding the results of the study, perceived stress from life events was measured and used as a covariate in the analyses, as others have done in their research (Perna et al., Petrie, 1993a).

The duration of the five-week intervention was short relative to various sport psychology interventions in the literature ranging from eight weeks (Crocker et al., 1988) to eight months (Kerr & Leith, 1993). However, the cognitive-behavioral stress
management program by Perna et al. (1998), which served as the foundation for the current intervention, consisted of seven 45-minute sessions. In addition, the cue-controlled relaxation program conducted by Russell and Lent (1982) was only five sessions long. The decision to hold five one-hour sessions for the treatment group in the current study was based partly on previous research and partly on the need to recruit participants and conduct the treatment within a ten-week time frame.

Crocker et al. (1988) encourage those who conduct applied research evaluating complex treatment programs to be especially careful about ensuring internal validity. Current research in this area is plagued by small sample sizes and lack of appropriate control groups (Holm et al., 1996). Although there was an attempt to procure an adequate sample size of approximately 60 athletes for the current study, unfortunately the number of athletes who participated was relatively small. However, there was an adequate control group, and the power to find large effects in this study was between .70 and .80 (Keppel, 1991). Psychologists are ethically responsible to account for the efficacy of interventions, and research studies such as this one are valuable for planning future interventions with athletes (Cogan & Petrie, 1995).

2.11 Hypothesis

The main hypothesis of this study is that the treatment group will demonstrate the efficacy of the stress management intervention by showing significant changes on the measures of competitive anxiety, coping skills, and positive and negative affect compared to the wait-list control group. Life stress as measured by the Life Events Survey for Collegiate Athletes (LESCA; Petrie, 1992) will serve as the covariate in the
between-group analyses in order to account for outside stress the athletes may be
experiencing that could affect the results.

Specifically, the treatment group is expected to report a decrease in competitive
anxiety as measured by the Sport Competition Anxiety Test (SCAT; Martens, 1970).
Additionally, the treatment group is expected to report increased coping abilities on the
Athlete Coping Skills Inventory (ACSI-28; Smith et al., 1995; Smith, Smoll, & Ptacek,
1990). Increased positive affect and decreased negative affect as measured by the
Positive and Negative Affect Scales (PANAS; Watson, Clark, & Tellegen, 1988) are
also predicted for the treatment group following the intervention.

Finally, the treatment and control groups will be tested for any differences in
trait anxiety, as measured by the Trait Anxiety Inventory (TAI; Spielberger, Gorsuch, &
Lushene, 1970). Although a decrease in trait anxiety for the treatment group would
provide support for the efficacy of the stress management intervention, trait anxiety is
normally a stable personality trait and thus is not expected to change based on the five-
week sport-specific treatment conducted in this study.
CHAPTER 3

METHODOLOGY

3.1 Participants

The participants were 36 Division I student-athletes at a large Midwestern university. Thirty of the original participants took part in all facets of the study and were included in the data analyses. The varsity athletes were recruited from a pool of 70 athletes enrolled in Psychology 100 classes. These individuals were notified by e-mail of the opportunity to participate in the study as part of their research experience program requirement. Participation in the study was voluntary, yet individuals received course credit for Psychology 100 in exchange for their participation. The original research plan involved doing an initial prescreening to select those athletes with high levels of sport competition anxiety. However, due to the small number of students who responded to the request for participants, the decision was made to forego prescreening. Subsequently, 35 of the participants were invited by e-mail to be part of the treatment or wait-list control group. One student-athlete was excluded from the remainder of the study because of an outlier score on the competitive anxiety measure.

3.2 Instruments

3.2.1 Demographic Questionnaire
A brief questionnaire that included questions about age, class standing, race/ethnicity, gender, and GPA was administered to all participants. Information regarding the athlete's sport, season of play, scholarship status and participatory status on the team was also collected. See Appendix A.

3.2.2 **Sport Competition Anxiety Test - Adult (SCAT)**

The SCAT (Martens, 1977) is a 15-item scale that is used to measure competitive trait anxiety in adults. Ten of the items make up the actual scale; five spurious items (1, 4, 7, 10, and 13) are included solely to reduce response bias. Items are measured on a 3-point scale, from "Hardly Ever" (1) to "Often" (3). Scores range from 10 to 30, and higher scores indicate higher competitive trait anxiety. Sample items include, "Before I compete I worry about not performing well," and, "Before I compete I get a queasy feeling in my stomach." See Appendix B.

The psychometric properties of this scale have been extensively evaluated (Martens, Vealey, & Burton, 1990). Item-total correlations range from .60 to .82. Internal consistency ranges from .95 to .97 and mean test-retest reliability is .77. Scale items were selected based on evaluation of content validity by a team of expert raters, and good construct validity has been demonstrated. Martens et al. (1990) reported that high SCAT scores were related to high competitive state anxiety in competitive situations and that SCAT scores predicted competitive state anxiety better than coaches' ratings did. Concurrent as well as divergent validity has been demonstrated by a .44 correlation with the Trait Anxiety Inventory for Adults (Spielberger, Gorsuch, &
Lushene, 1970). SCAT scores tend to be higher for college males versus females and for individual sport athletes versus team sport athletes (Martens et al.).

3.2.3 Trait Anxiety Inventory for Adults (TAI)

The TAI (Spielberger, Gorsuch, & Lushene, 1970) is a 20-item scale that measures self-reported trait anxiety, a relatively stable personality trait that corresponds with an individual's tendency to respond anxiously to stressful situations. The items are measured on a 4-point Likert scale, from "Not at All" (1) to "Very Much So" (4). Scores range from 20 to 80, with higher scores indicating stronger trait anxiety. Sample items include, "I lack self-confidence," and, "Some unimportant thought runs through my mind and bothers me." See Appendix C.

The TAI is a widely used measure of general anxiety (Walters, 2001). Spielberger reported that the test-retest stability of the TAI ranges from .65 to .86 for time periods spanning three to fifteen weeks, and reliability coefficient alphas range from .86 to .95 (as cited by Walters). Spielberger also reported that the TAI correlates more strongly with measures of self-report, behavioral, and physiological measures of anxiety than with similar measures of depression and anger, thus demonstrating content validity (as cited by Walters).

3.2.4 The Life Events Survey for Collegiate Athletes (LESCA)

The LESCA (Petrie, 1992) is a 69-item scale that measures self-reported life stress based on life events experienced during the last 12 months. The impact of each life event is assessed with an 8-point Likert scale that ranges from "Extremely Negative" (-4) to "Extremely Positive" (+4). Negative, positive, and total scores can be
calculated for the scale. Negative life stress scores range from 0 to -276 (maximum negative life stress), and positive life stress scores range from 0 to +276 (maximum positive life stress). Total life stress scores are calculated by adding the negative and positive life stress scores. Sample items include, "Major change in playing status on team," and "Major change in the amount of academic activity." See Appendix D.


3.2.5 **Athletic Coping Skills Inventory (ACSI)**

The ACSI consists of 28 items that measure athletes' perceived ability to use emotional, cognitive, and behavioral coping skills (Smith, Schutz, Smoll, & Ptacek, 1995; Smith, Smoll, & Ptacek, 1990). Each item is measured on a 4-point Likert scale, from "Almost Never" (0) to "Almost Always" (3). Total scores range from 0 to 84, with higher scores indicating higher perceived coping ability. Sample items include, "I take time before a game to mentally prepare myself," and, "When I feel myself getting too tense, I can quickly relax my body and calm myself." See Appendix E.

Smith et al. (1995) reported an internal consistency reliability coefficient of .86 and a test-retest reliability of .87. Smith et al. (1995) found seven sub-scales using factor analysis (coping with adversity, peaking under pressure, goal setting/mental preparation, concentration, freedom from worry, confidence and achievement
motivation, and coachability) with Cronbach's alpha ranging from .62 to .78. Athletes' scores on the ACSI also appear to moderate the stress-injury relationship (Smith et al., 1990).

3.2.6 Positive and Negative Affect Schedule (PANAS)

The PANAS was developed by Watson, Clark, and Tellegen in 1988. It consists of two scales with 10 items each that measure positive and negative affect. It measures the extent to which participants experience certain emotions using a 5-point Likert scale that ranges from "Very Slightly or Not at All" (1) to "Extremely" (5). Total scores for each scale range from 10 to 50, with higher scores indicating either more positive or more negative affect. Positive affect items include "excited", "enthusiastic", and "inspired," while the negative affect scale includes items such as "distressed", "hostile", and "irritable." See Appendix F.

Affect can be measured over several different time frames, and for this study the instructions asked about affect experienced in the last few weeks. Shorter time frames (this moment or today) are sensitive to mood fluctuations, while longer time frames (past year) demonstrate trait-like stability (Watson et al., 1988). Therefore, assessing affect experienced by participants over the last few weeks provides the best gauge of treatment-induced change.

The PANAS shows good convergent and divergent validity, as evidenced by the relationship between the positive and negative affect scales and measures of depression and anxiety (Watson et al., 1988). Internal reliability coefficients were .91 for the positive scale and .83 for the negative scale (Ntoumanis & Biddle, 1998). Watson et al.
reported that these two scales were largely uncorrelated (ranging from -.12 to -.23), had good factor structure, high internal consistency, and relatively stable scores over a two-month period regardless of the population studied.

3.2.7 Post-Treatment Evaluation Form

This form was based on an evaluation questionnaire described by Daw and Burton (1994). It consisted of four sections that assessed how and to what extent various aspects of the stress management program influenced the participants. See Appendix G. Each item was scored on a 5-point Likert scale. In the first section, participants in the treatment group evaluated how beneficial each program component was for them, with Likert endpoints ranging from "Not at all Helpful," (0) to "Highly Helpful" (4). Scores for the helpfulness of the intervention could range from 0 to 24, with higher scores indicating that the treatment was more beneficial.

The second section of the post-treatment evaluation form measured changes in the participants' perceived ability to use the various techniques and to manage stress in general, with Likert endpoints ranging from "Not at all Improved" (1) to "Highly Improved" (4). Improvement scores could range from 0 to 20, with higher scores indicating more perceived improvement in ability to use various stress management strategies.

In the third section, participants reported their level of commitment to each program component, with Likert endpoints ranging from "Not at all Committed" (1) to "Highly Committed" (4). Commitment scores could range from 0 to 24, with higher scores indicating more commitment to various aspects of the intervention.
The fourth section contained one item that measured perceived change in athletic performance, with Likert endpoints ranging from "Not at all Improved" (1) to "Highly Improved" (4). Thus, scores on this item ranged from 1 to 4, with higher scores indicating more performance improvement.

Total evaluation scores were calculated by summing scores from each item on the evaluation form. These scores could range from 0 to 72, with higher scores indicating a more positive evaluation of the intervention. Finally, the participants had the opportunity to add any comments on their impressions of the program.

3.3 Procedures

Prior to the start of autumn quarter 2002, a list of the names and e-mail addresses for all of the varsity athletes enrolled in Psychology 100 was obtained from Student Enrollment Services. This list was available to the researcher following approval by both the Human Subjects Institutional Review Board and the Athletic Department's Health and Social Responsibility Committee.

During the second week of class, 70 student-athletes enrolled in Psychology 100 were contacted via e-mail and asked to participate in the first part of a research study in exchange for research experience credit (see Appendix H). During the third week of class, a second e-mail was sent to those athletes who had not yet signed up for the study to remind them of the opportunity (see Appendix I). Several sessions were offered over a two-week period to accommodate athletes’ schedules. Students signed up online for one credit for the Research Experience Program as part of their enrollment in
Psychology 100 (see Appendix J). Measures were administered to groups ranging from one participant to five participants.

Of the 70 athletes contacted, 35 athletes agreed to attend an initial session of the study. During the initial session, each participant received the demographic questionnaire, the SCAT, the TAI, the LESCA, the ACSI, and the PANAS (all of the measures except for the post-treatment evaluation form; see Appendices A - G). The demographic questionnaire was administered first, and the other measures were randomized for each athlete to avoid order effects. The demographic questionnaire plus the five conceptual measures included a total of 166 items and required approximately thirty minutes to complete.

Following completion of the measures, the athletes were asked to complete a schedule form to facilitate scheduling of the treatment groups. The form also asked the athletes to state whether they preferred to be contacted by telephone or by e-mail; if they chose phone contact, they were asked to specify whether a phone message could be left. See Appendix K. All of the participants included their e-mail addresses as a method of contact, and several of them also included their telephone numbers.

A standard script was read at the start of each pre-testing session (see Appendix L). The participants were assured that the information they provided would be kept confidential. During pre-testing the student-athletes were given an envelope in which to place the questionnaires, and the envelopes were coded by number. Because of the original intent to select participants with high competitive anxiety, a list of names and respective code numbers was compiled during pre-testing to identify athletes who
scored in the upper half of the sample on the Sport Competition Anxiety Test (Martens, 1977). This list was kept confidential. Athletes received a debriefing form when they left the pre-testing session (see Appendix M).

Thirty-six varsity student-athletes participated in the pre-testing during the two weeks following the initial e-mail request. The number of participants was too small to select for those athletes with high competitive anxiety. As a result, 35 of the original 36 participants were invited to take part in the remainder of the study. One athlete was not invited to be in either the treatment or wait-list control group because of an outlier score of 10, the lowest score possible, on the competitive anxiety scale (SCAT). The athletes who qualified for continued participation in the research study were assigned to either the treatment or wait-list control group. The group assignment process was accomplished using the athletes' schedule forms to identify which participants would be available during treatment group meeting times. Participants were not aware of the group meeting times when they filled out their schedule forms. The formation of treatment and wait-list control groups was also influenced by an attempt to achieve gender-balance and equivalent SCAT means across groups.

All 35 student-athletes were notified of their group assignment via e-mail, at which time the treatment group participants were also notified of the weekly meeting time for their group (see Appendices N-O). The treatment group participants were subsequently sent a reminder to sign up for the study on the Research Experience Program website (see Appendix P). The treatment group was divided into three groups.
in order to accommodate athletes' schedules and to follow Yalom's (1995) recommendation to keep group size between five and ten participants.

All seven participants (four females and three males) who were invited to be in the treatment group that met on Mondays from 1:30 to 2:30 pm accepted the offer. Of the six participants invited to be in the treatment group that met on Tuesdays from 4:15 to 5:15 pm, five (two females and three males) accepted the offer. Of the seven participants invited to be in the treatment group that met on Tuesdays from 5:30 to 6:30 pm, five (three females and three males) accepted the offer. The two student-athletes who declined to participate in the treatment group following an invitation were female, and both cited schedule changes as the reason for being unable to attend treatment group meetings. Both of these participants were invited to return for post-testing as part of the wait-list control group. Thus, there were 17 total participants in the treatment group (nine females and eight males) and 18 total participants in the wait-list control group (twelve females and six males). Two of the wait-list control group participants did not return for post-testing and were subsequently excluded from data analyses. One member of the wait-list control group and one member of the treatment group did not return for the follow-up testing; neither one was included in data analyses.

Each of the three treatment groups met one hour per week for five straight weeks in the group therapy room in the Psychological Services Center, where they learned about and practiced cognitive-behavioral stress management skills. The student-athletes in the treatment group were asked to complete a behavioral contract during the first treatment session to emphasize the importance of their commitment to participate
(see Appendix Q). Every participant signed the contract willingly. The contract clearly stated that the participants could choose to leave at any time without penalty if they felt uncomfortable. No participants took this option. The treatment group members were reminded by the experimenter of each weekly meeting the night before group sessions through their desired mode of communication (phone or e-mail).

Following the five-week intervention, both the treatment and wait-list control groups were asked through e-mail to sign up for a post-testing session on the Research Experience Program (REP) website in order to receive two additional hours of credit (see Appendix R). Although post-testing was initially only going to be worth one REP hour, the researcher awarded each participant an extra hour of credit in advance for their participation in follow-up testing during winter quarter. The treatment groups were asked to meet at their regular meeting time for post-testing two weeks following their last treatment session. Those who could not attend at the regular treatment time scheduled alternate post-testing sessions. Several session times were offered for the wait-list control group members. All participants completed post-testing during the last week of classes in autumn quarter 2002.

During post-testing, each participant completed the questionnaires measuring sport competitive anxiety, trait anxiety, life stress, affect, and coping skills. The treatment group also filled out the post-treatment evaluation form. See Appendix S for the oral script that was read at the start of each post-testing session. See Appendix T for the debriefing form that the participants received upon completion of the post-testing.
The pre-treatment assessment, the intervention and the post-treatment assessment all took place during autumn quarter 2002.

During the third week of winter quarter 2003, the wait-list control group and treatment group participants were contacted via e-mail and asked to complete a follow-up assessment in order to examine reliability of measures and durability of any treatment effects (see Appendix U). The wait-list control group was also offered the option of participating in the treatment group during winter quarter 2003. No participants made follow-up contact with the experimenter to accept this offer. Prior to follow-up testing, the participants were read an oral script similar to the scripts from pre-testing and post-testing (see Appendix V). The participants were given a debriefing form when they left the follow-up session (see Appendix W). Each of the treatment and control participants was also invited to attend a weekly workshop for varsity athletes called the "Mental Toughness Academy" that was offered by the sport psychologist at the university during winter quarter 2003. See Appendix X for a timeline of the study.

3.4 Treatment

Each treatment group was conducted by the same individual, a doctoral student in Counseling Psychology with the experience and skills to carry out the stress management intervention. This is a potential limitation of the study because the design does not control for experimenter effects. However, training other experimenters would have been a difficult and prolonged undertaking. The experimenter followed an outline for each treatment session to ensure that every important point was covered. This should
have helped to maintain consistency across the three treatment groups throughout the five-week intervention.

The treatment groups each met one hour per week for five weeks. See Appendix Y for a more detailed group protocol. The intervention included psychoeducational and experiential segments concerning cognitive and behavioral components related to stress management. The psychoeducational component involved teaching the athletes about stress during the first session in addition to providing didactic instruction for each of the stress management techniques. Psychoeducation about flow took place during the fifth treatment session. The cognitive component included discussion and activities related to self-talk, imagery, and flow. The behavioral component was primarily experiential and involved relaxation and breathing exercises.

The first session included introductions and important information about confidentiality and commitment to the study. The participants then brainstormed the different stressors they faced and learned more about how stress affects physiological, cognitive, affective, and behavioral components. The facilitator used a white board to write down the participants' contributions to the discussion. Jacobsen's (1938) progressive muscle relaxation was introduced in the first session (see Appendix Z), and participants were instructed to practice the relaxation technique on their own every day. Follow-up relaxation practices were incorporated into the remaining sessions. Each week, the participants received a worksheet to monitor their adherence to the relaxation homework (see Appendix AA). Each time they practiced, they recorded the date and time and then rated their relaxation level before and after the relaxation exercise. At the
start of each session, homework was discussed briefly and then worksheets were collected. The participants were not punished or eliminated from the study due to non-compliance; they were encouraged to provide honest responses on the homework. Worksheet data was noted for information about participant compliance.

During the second session, participants took part in an interactive discussion about reaching optimal arousal for sport performance. Participants learned diaphragmatic breathing as a way to decrease anxiety in order to achieve an optimal level of arousal (Caudill, 1995). Progressive muscle relaxation was conducted again at the end of the second session, and the cue word "calm" was introduced to facilitate cue-controlled relaxation (Russell, Wise, & Stratoudakis, 1976).

Imagery was covered during the third session. The session included information about how to harness the power of the mind through imagery (Simons, 2000). The participants learned about research findings related to imagery, such as the difference between internal and external imagery and the benefit of using all of the senses during imagery (Cox, 1998). In addition, there were several short demonstrations and experiential activities to bring the topic to life and to help the participants better understand how to use imagery (Sadler, 1997). Once again, PMR was conducted at the end of the session, and the cue word "calm" was reintroduced once the participants were relaxed. In addition, they were instructed to imagine themselves performing following the relaxation activity.

The fourth session was about positive self-talk. The session included information about cognitive restructuring and the effect that self-talk can have on
athletic performance. The participants learned about Burns' Cognitive Distortions (see Appendix BB) and took part in a group activity designed to teach them how to challenge irrational thoughts while reframing thinking to be more positive (Caudill, 1995). Participants were given a homework sheet and instructed to record and reframe automatic thoughts for up to five situations that took place before the fifth session (see Appendix CC). PMR with the cue word was done at the end of the session.

During the fifth and final treatment session, the group was a review of the previous topics, including relaxation, imagery, and self-talk. In addition, the participants brainstormed aspects of optimal performance and then learned about the various components of the flow state that have been identified in the literature (Jackson & Csikszentmihalyi, 1999; see Appendix DD). They were asked to integrate the information they had learned throughout the intervention by discussing how each of the coping skills taught throughout the treatment could help them achieve the flow state. In addition, the participants repeated the PMR with the cue word and the imagery exercise to tie all of the experiential activities together.

In sum, the main purpose of this intervention was to help the participants understand and learn to utilize various cognitive and behavioral stress management techniques in order to manage stress better and regulate arousal to achieve optimal performance.

3.5 Analysis of Data

Unless otherwise indicated, all analyses used a significant alpha level of .05. Descriptive statistics, including means and standard deviations, were determined for
each group on each measure for pre, post, and follow-up tests. The pre-test data for the three separate treatment groups was tested for significant differences in order to determine whether or not the data could be collapsed across treatment groups. Correlations between all of the measures for pre, post, and follow-up testing were also conducted to examine the relationships between life stress, coping skills, sport anxiety, trait anxiety, and positive and negative affect in this sample.

In addition, life stress (LESCA) scores for pre, post, and follow-up testing were compared using a 2 x 3 (group x time) multivariate analysis of variance (MANOVA), with repeated measures on the second factor. This MANOVA was important because the LESCA would serve as a covariate for the remainder of the analyses. A covariate cannot have repeated measures, and as such it was necessary to find out if there were any significant differences in LESCA scores for either the treatment or wait-list control group across test times. Finding no such differences would enable the pre-test LESCA scores to serve as the covariate for the between-group analyses on the dependent measures.

Preliminary t-tests were done on the pre-test variables to look for any pre-treatment differences between the treatment and control groups on sport anxiety, trait anxiety, coping skills, positive affect, and negative affect. These tests revealed that the treatment group had lower trait anxiety, better coping skills, and more positive affect than the control group at pre-testing. Three separate 2 x 2 (group x time) MANCOVAs, with repeated measures on the second factor and life stress as the covariate, were done for these three variables to look for significant differences between the treatment and
control groups at post and follow-up testing. The pre-test values for each of these respective variables were also included as covariates for the 2 x 2 MANCOVAs to control for pre-treatment differences. For sport anxiety and negative affect, separate 2 x 3 (group x time) multivariate analyses of covariance (MANCOVAs), with repeated measures on the second factor and life stress as the covariate, were done to look for significant differences between the treatment and control groups at pre, post, and follow-up testing. Significant MANCOVAs were followed up with post hoc tests to look for differences between groups across test times.
CHAPTER 4

RESULTS

4.1 Sample

The final sample included 30 participants who took part in the pre-testing, post-testing, and follow-up testing. The sample was made up of 12 males and 18 females who ranged in age from 18 to 23 years ($M=19.21$, $SD=1.40$). Participants ranged from first-year students to college seniors, with 60% being first-year students. The ethnic distribution of the sample included 66.7% Caucasian Americans and 33.3% from other groups, including participants who identified themselves as the following: 7% African American, 3% African American/Native American, 3% East Indian, 3% Latina, 3% Israeli, 7% Canadian, and 7% European. The sample represented 14 of the 36 varsity sports at the university where the study was conducted (see Table EE.1 in Appendix EE for further sport breakdown). Seventeen of the 30 total participants reported being on partial or full athletic scholarship. Twelve treatment group members and eight control group members reported being starters or participating often in their varsity sport competitions, while 9 of the 30 participants did not yet know what their role on their team would be.
Certain participants were excluded from analyses and thus are not included in the total reported number of participants. Five individuals who did not complete the measures at every test period were excluded from analyses. Two of these individuals failed to return for the post-test session, and three of these individuals completed the pre and post-testing but did not return for the follow-up testing. One individual was not invited to participate in the study following pre-testing due to an outlier score of 10, the lowest score possible, on the SCAT, a measure of competitive anxiety.

All of the participants attended at least four of the five treatment sessions, with twelve of the sixteen attending all five sessions. There were occasions when participants were unable to attend the group at the designated weekly session time, and when possible the author of this study arranged a make-up session. Altogether, six people from the treatment group participated in at least one make-up session, and eleven total make-up sessions were conducted.

The commitment of the treatment group can be ascertained by their compliance with the assigned homework related to progressive muscle relaxation (PMR) and self-talk. Participants practiced PMR an average of 10.9 times over the course of the five-week treatment period, ranging from zero to 28 times practicing. The majority of this practice took place within the first three weeks of the study. Of the sixteen treatment participants, only four actually turned in the self-talk homework.

Data from the evaluation form administered to the treatment group at both post-testing and follow-up testing indicate that participants found the program helpful, perceived improvement in their ability to manage stress using the skills taught
throughout the intervention, and were committed to various components of the treatment. The treatment group also reported improvement in their athletic performance following the intervention (see Table FF.1 in Appendix FF for evaluation data). In addition, reported commitment to the program was significantly correlated with perceived change in athletic performance at follow-up testing, with higher commitment related to more improvement ($r=.61, p=.01$).

Data from the three treatment groups were analyzed to rule out the possibility of significant differences between treatment groups. No significant differences were found between these three groups on any of the dependent variables or on the covariate, so the data for each treatment group were collapsed into a single treatment group for the remainder of the analyses.

4.2 Total Sample Means and Standard Deviations

Means and standard deviations for the entire sample ($N=30$) for each variable at pre, post, and follow-up testing are presented in Table 4.1. Examination of Table 4.1 reveals that the mean scores for the total sample at pre-testing for sport competition anxiety (SCAT), trait anxiety (TAI), positive life stress (LESCA POS), negative life stress (LESCA NEG), coping skills (ACSI), positive affect (PANAS PA), and negative affect (PANAS NA) were 19.70, 33.28, 16.23, 17.93, 55.70, 39.03, and 19.67, respectively.

For comparative purposes, the total sample mean at pre-testing for competitive anxiety, 19.70, was similar to previously reported means on the SCAT. Martens, Vealey, and Burton (1990) reported SCAT means of 20.92 and 19.79 for college males.
and females, respectively. In fact, the SCAT was the only scale used in this study that showed gender differences, with males reporting lower competitive anxiety than females ($F=4.20$, $p<.05$). This gender difference adds to the various findings on the SCAT and gender reported by Martens et al. (1990).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Sample (N=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Test</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>SCAT</td>
<td>19.70</td>
</tr>
<tr>
<td>TAI</td>
<td>33.28</td>
</tr>
<tr>
<td>LESCA POS</td>
<td>16.23</td>
</tr>
<tr>
<td>LESCA NEG</td>
<td>17.93</td>
</tr>
<tr>
<td>ACSI</td>
<td>55.70</td>
</tr>
<tr>
<td>PANAS PA</td>
<td>39.03</td>
</tr>
<tr>
<td>PANAS NA</td>
<td>19.67</td>
</tr>
</tbody>
</table>

Note. SCAT = competitive anxiety; TAI = trait anxiety; LESCA POS = positive life stress; LESCA NEG = negative life stress; ACSI = coping skills; PANAS PA = positive affect; PANAS NA = negative affect.

Table 4.1: Means and Standard Deviations for Total Sample on All Measures at each Test Period.

The pre-test trait anxiety mean for the total sample was 33.28, which is lower than TAI means found in the literature. Long (1984) reports a mean of 46.66 for trait anxiety in his study of community residents aged 24 to 65. Following an aerobic conditioning treatment, however, the TAI mean of the participants in Long's (1984)
study was 35.85, a value that is much closer to the TAI mean found in the athlete sample in this study. Differences in age and in physical activity may explain the discrepancy between the overall sample mean on the TAI and the trait anxiety means that have been reported in the literature.

The LESCA POS mean score at the pre-test time for the overall sample in this study was 16.23 (SD=10.10), and the LESCA NEG mean score was 17.93 (SD=15.66). Petrie (1993a), the author of the LESCA, reported similar means and standard deviations for positive and negative life stress in a sample of intercollegiate football players (M=20.14, SD=13.07; M=19.94, SD=16.44, respectively) (Petrie, 1993a).

The overall sample mean at pre-testing on the ACSI, a measure of athlete coping skills, was 55.70. This mean is significantly higher than the ACSI mean of 48.35 (t=4.13, p<.01) reported by the authors of the scale (Smith, Schutz, Smoll, & Ptacek, 1995). The pre-test PANAS means for the total sample for negative and positive affect were 19.67 and 39.03, respectively. The PANAS NA mean is similar to the mean of 19.5 previously reported in the literature (Watson, Clark, & Tellegen, 1988). Although the PANAS PA mean for this sample of 39.03 is significantly higher than the PANAS PA mean of 32.0 for a sample of university students and employees reported by Watson et al. (t=5.41, p<.01), it is similar to the PANAS PA mean of 36.7 reported by Ntoumanis and Biddle (1998) for a sample of university athletes in Britain.

4.3 **Reliability of Measures**

The internal consistency (Cronbach's alphas) and test-retest reliability coefficients based on pre-test, post-test, and follow-up test data for each measure used
in this study are listed in Table 4.2. Each scale shows acceptable test-retest coefficients, which range from .64 (PANAS PA) to .87 (LESCA NEG). The internal consistency of the SCAT, a measure of competitive anxiety, steadily increases from .49 at pre-testing to .67 at post-testing to .84 at follow-up testing. Each of the remaining measures shows adequate internal consistency statistics (Cohen & Cohen, 1983).

Table 4.2: Reliability Coefficients for Total Sample on All Measures at Pre, Post, and Follow-Up Testing.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of items</th>
<th>Pre-Test Cronbach's Alpha</th>
<th>Post-Test Cronbach's Alpha</th>
<th>Follow-Up Test Cronbach's Alpha</th>
<th>Test-Retest Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCAT</td>
<td>15</td>
<td>.49</td>
<td>.67</td>
<td>.84</td>
<td>.81</td>
</tr>
<tr>
<td>TAI</td>
<td>20</td>
<td>.90</td>
<td>.89</td>
<td>.91</td>
<td>.86</td>
</tr>
<tr>
<td>LESCA</td>
<td>69</td>
<td>.80</td>
<td>.70</td>
<td>.81</td>
<td>.82</td>
</tr>
<tr>
<td>LESCA POS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.81</td>
</tr>
<tr>
<td>LESCA NEG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.87</td>
</tr>
<tr>
<td>ACSI</td>
<td>28</td>
<td>.83</td>
<td>.84</td>
<td>.90</td>
<td>.82</td>
</tr>
<tr>
<td>PANAS PA</td>
<td>10</td>
<td>.85</td>
<td>.81</td>
<td>.89</td>
<td>.64</td>
</tr>
<tr>
<td>PANAS NA</td>
<td>10</td>
<td>.87</td>
<td>.84</td>
<td>.82</td>
<td>.79</td>
</tr>
</tbody>
</table>

Note. SCAT = competitive anxiety; TAI = trait anxiety; LESCA = life stress; LESCA POS = positive life stress; LESCA NEG = negative life stress; ACSI = coping skills; PANAS PA = positive affect; PANAS NA = negative affect.

The coefficients for life stress represent a composite life stress score that includes all 69 items, or life events, on the LESCA scale. On the LESCA, participants rated the stress they experienced following only those events they had experienced within the last year. In addition, participants could rate each event as positive stress or
negative stress. Thus, it would be impossible to separate items into positive and negative scales. The composite score is found by subtracting the negative life stress score from the positive life stress score. The test-retest coefficients for positive and negative life stress were calculated using the separate positive and negative life stress mean scores at each test time (see Table 4.2).

4.4 **Total Sample Correlations**

A matrix showing Pearson product-moment correlation coefficients for the total sample (N=30) for each dependent measure and the covariate measure at follow-up testing is presented in Table 4.3. The correlations from the follow-up test data are shown because nearly all of the correlations that did not reach significance at either pre-testing or post-testing reached significance at follow-up testing. See Table GG.1 and Table GG.2 in Appendix GG for correlations from all of the measures at pre-testing and post-testing. Examination of Table 4.3 reveals that 15 of the 21 correlations were significant at follow-up testing, with all 15 significant correlations in the expected direction. Of these, eight correlations are particularly noteworthy because they were consistently significant across pre-testing, post-testing, and follow-up testing.

The positive relationship between competitive anxiety and trait anxiety is represented by a coefficient of \( r=.58, p<.01 \), while the negative relationship between competitive anxiety and coping skills is represented by a coefficient of \( r=-.44, p<.05 \). Other correlations that deserve mention include the relationships between trait anxiety and negative affect (\( r=.57, p<.01 \)), trait anxiety and coping skills (\( r=-.67, p<.01 \)), and coping skills and negative affect (\( r=.60, p<.01 \)).
Table 4.3: Pearson Product-Moment Correlation Matrix at Follow-Up Testing (N=30).

<table>
<thead>
<tr>
<th>Measure</th>
<th>SCAT</th>
<th>TAI</th>
<th>LESCA POS</th>
<th>LESCA NEG</th>
<th>ACSI</th>
<th>PANAS PA</th>
<th>PANAS NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCAT</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI</td>
<td>.58**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESCA POS</td>
<td>-.09</td>
<td>-.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESCA NEG</td>
<td>.52**</td>
<td>.39*</td>
<td>-.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACSI</td>
<td>-.44*</td>
<td>-.67**</td>
<td>.38*</td>
<td>-.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PANAS PA</td>
<td>-.46*</td>
<td>-.58**</td>
<td>.44*</td>
<td>-.52**</td>
<td>.60**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PANAS NA</td>
<td>.63**</td>
<td>.57**</td>
<td>-.04</td>
<td>.44*</td>
<td>-.19</td>
<td>-.42*</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. *p<.05; **p<.01.

Negative life stress scores were correlated consistently with three measures. LESCA NEG scores were negatively related to positive affect ($r=-.52, p<.01$) and positively related to both trait anxiety ($r=.39, p<.05$) and negative affect ($r=-.44, p<.05$). In general, these correlations suggest that strong relationships exist between competitive anxiety, trait anxiety, coping skills, negative life stress, and positive and negative affect. The relatively strong correlations found between the negative LESCA scores and the dependent variables provide support for the planned decision to include the life stress scores as a covariate in the remainder of the analyses.

4.5 Between Group Differences

Table 4.4 presents means and standard deviations for the treatment and control groups across repeated measures. For each dependent variable, a Multivariate Analyses of Covariance (MANCOVA) was conducted using the assigned group (treatment or control) as the independent variable, the repeated measures of the scale as dependent
### Table 4.4: Multivariate Analysis of Covariance for Groups on All Measures.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Follow-Up Test</th>
<th>df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCAT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>19.50</td>
<td>19.63</td>
<td>18.94</td>
<td>2</td>
<td>5.60</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>SD*</td>
<td>2.45</td>
<td>3.24</td>
<td>3.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>19.93</td>
<td>22.36</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SD</td>
<td>3.34</td>
<td>3.32</td>
<td>4.53</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>TAI</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
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<td>29.94</td>
<td>29.75</td>
<td>1</td>
<td>.02</td>
<td>ns</td>
</tr>
<tr>
<td>SD</td>
<td>6.08</td>
<td>7.39</td>
<td>6.98</td>
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</tr>
<tr>
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<td>33.85</td>
<td>33.77</td>
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<tr>
<td>SD</td>
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<tr>
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<tr>
<td>Treatment</td>
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<td>14.50</td>
<td>11.44</td>
<td>2</td>
<td>.93</td>
<td>ns</td>
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<tr>
<td>SD</td>
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<tr>
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<td>Treatment</td>
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<td>SD</td>
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<td>9.59</td>
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<td>56.43</td>
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<tr>
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<tr>
<td>Treatment</td>
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<td>37.94</td>
<td>35.94</td>
<td>1</td>
<td>.04</td>
<td>ns</td>
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<tr>
<td>Control</td>
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<td>36.64</td>
<td>34.57</td>
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<td>8.23</td>
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<tr>
<td><strong>PANAS NA</strong></td>
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<tr>
<td>Treatment</td>
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<tr>
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<td>5.68</td>
<td>6.37</td>
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<td></td>
</tr>
</tbody>
</table>

Note. *SD = standard deviation; **LESCA NEG was a MANOVA.
variables, and the life stress measure as a covariate. The degrees of freedom, the F values, and the significance levels for the difference between groups across time for each variable are also presented in Table 4.4.

Because a covariate cannot be a repeated measure in this type of analyses, either the pre-test, post-test, or follow-up LESCA scores had to be chosen to serve as the covariate for the MANCOVAs. In addition, a decision had to be made about which LESCA score (negative life stress, positive life stress, or the composite score) to use as the covariate. LESCA NEG scores were not significantly different across time ($F=.46, ns$) or by group ($F=.93, ns$). LESCA POS scores approached significance across time ($F=3.18, p=.07$), a finding that substantiated using the negative LESCA scores as the covariate rather than the composite LESCA score, which includes the participants' reports of positive stress. In addition, the literature provides a model for separating positive and negative life stress scores (Petrie, 1993a & 1993b) and for using the negative life stress score as a covariate in a stress management intervention (Perna, Antoni, Kumar, Cruess, & Schneiderman, 1998). Thus, the pre-test LESCA NEG scores were used as the covariate for the remainder of the analyses.

Preliminary analyses revealed that the treatment and control groups differed significantly on three of the dependent measures at pre-testing: trait anxiety (TAI), coping skills (ACSI), and positive affect (PANAS PA). Therefore, in addition to the LESCA as a covariate, the pre-test values on the TAI, ACSI, and PANAS PA were also used as covariates for each of their respective MANCOVAs. As a result of these unforeseen pre-test differences between the treatment and control groups, the repeated
measures analyses did not include the pre-test data. Instead, each MANCOVA for trait anxiety, coping skills, and positive affect became a 2 x 2 design in which two groups were compared at post-testing and follow-up testing.

An examination of Table 4.4 reveals that no significant differences were found between groups for trait anxiety (TAI), coping skills (ACSI), or positive affect (PANAS PA). However, significant differences were found between groups over time on both the competition anxiety (SCAT) and negative affect (PANAS NA) measures. The results indicate that the treatment group was significantly different from the control group on the SCAT over the course of the study ($F=5.60, p<.01$). Post-hoc tests using the Bonferroni correction, which controls for overall error when doing multiple comparisons, were conducted to look for differences between groups at pre-test, post-test, and follow-up test times. Surprisingly, these post-hoc tests did not reveal any significant differences. Upon closer inspection, this lack of significance may be because the analyses were conducted using a fixed covariate value. In other words, the SCAT means for each group at each test time are estimated based on the LESCA NEG mean. It is possible that higher or lower values of negative life stress may alter these post-hoc results. Examination of the SCAT means provides evidence of absolute mean score differences between groups at the follow-up test time (i.e. Treatment $M=18.94$ vs. Control $M=22.36$). These differences in mean scores are illustrated in Figure 4.1.

The MANCOVA results in Table 4.4 also show that the treatment group was significantly different than the control group on the PANAS NA over the course of the study ($F=3.48, p<.05$). Post-hoc tests using the Bonferroni correction were conducted to
Figure 4.1: Mean Scores on the SCAT at Pre, Post, and Follow-Up Testing for Treatment and Control Groups.

Figure 4.2: Mean Scores on the PANAS NA at Pre, Post, and Follow-Up Testing for Treatment and Control Groups.
look for differences between groups on negative affect across test times. Once again, the post-hoc tests did not reveal any significant differences. As with the SCAT measure, this lack of significance may be attributed to the fact that the analyses are conducted using the LESCA NEG mean to estimate the PANAS NA means for each group at each test time. Higher or lower values of negative life stress may have shown significant post-hoc results. Figure 4.2, a bar graph of the PANAS NA means at each test time, demonstrates that there are absolute differences in mean scores between groups at the follow-up test time (i.e. Treatment $M=17.25$ vs. Control $M=22.00$).
CHAPTER 5

DISCUSSION

5.1 Review of Objectives

The main purpose of this study was to examine the effectiveness of a cognitive-behavioral stress management intervention designed to help collegiate student-athletes understand and utilize various techniques to manage stress better and regulate arousal to achieve optimal performance. Participants were assigned to be part of the treatment or wait-list control group. The treatment group met for one hour per week for a five-week intervention, where they learned how to use skills such as relaxation, imagery, and self-talk. Both treatment and wait-list control group members completed measures of competitive sport anxiety, trait anxiety, life stress, coping skills, and positive and negative affect at pre, post, and follow-up testing.

Means and standard deviations for each measure at pre, post, and follow-up testing were examined. In addition, correlations between measures at each test time provided information about the relationships between competitive anxiety, trait anxiety, life stress, coping skills, and positive and negative affect. Life stress as measured by the LESCA at pre-testing served as the covariate for between-group analyses.
Multivariate analyses of variance (MANCOVAs) were conducted to look for differences between the treatment and wait-list control groups on competitive anxiety, trait anxiety, coping skills, and positive and negative affect across test times. Competitive anxiety (SCAT) and negative affect (PANAS NA) were examined between groups across pre, post, and follow-up testing in separate 2 x 3 MANCOVAs. By contrast, trait anxiety (TAI), coping skills (ACSI), and positive affect (PANAS PA) were examined between groups only across post and follow-up testing due to pre-treatment differences between the treatment and wait-list control groups. Thus, in addition to the LESCA scores, the pre-test scores for the TAI, the ACSI, and the PANAS PA were used as covariates for their respective 2 x 2 MANCOVAs. Further analyses of variance were conducted to explore significant MANCOVA results.

5.2 Summary of Results

The mean scores for the total sample for competitive anxiety (SCAT), trait anxiety (TAI), life stress (LESCA), and negative affect (PANAS NA) were each similar to means that were previously reported in the literature for those respective scales.

The mean score for the total sample for coping skills (ACSI), 55.7, was slightly higher than the mean of 48.35 reported by the authors of the scale (Smith, Schutz, Smoll, & Ptacek, 1995). There are at least three potential explanations for this discrepancy. Perhaps the difference was found merely due to the small sample size. On the other hand, the sample of athletes used in this study could have had better coping skills than the sample of 1,026 male and female high school athletes used in the study by Smith et al. Athletes, even first year athletes, who compete at the Division I
collegiate level may have more well-developed psychological skills than high school athletes. In fact, Smith et al. reported that overachieving high school athletes scored significantly higher on the ACSI than both normal achieving athletes and underachievers, based on coach ratings of physical ability and performance.

A third possible explanation for the high ACSI mean found for the total sample at pre-testing in this study involves the correlation of .43 between ACSI scores and social desirability scores (Smith et al., 1995). Perhaps the student-athletes who participated in this study were more concerned with making a good impression than those who participated in Smith et al.'s study, and thus they reported having higher coping skills.

The overall sample mean for positive affect (PANAS PA) at pre-testing was 39.03, which is significantly higher than the PANAS mean of 32.0 reported by Watson, Clark, and Tellegen (1988). Participants in the study by Watson et al. were university students taking psychology courses and university employees. In a study by Ntoumanis and Biddle (1998), a sample of university athletes in Britain had a PANAS PA mean of 36.7, which is closer to that found in the current study. The higher PANAS PA scores found in athlete samples indicates that perhaps athletes experience and report higher positive affect than other populations.

Boutcher (1993) reports that research has generally indicated a relationship between exercise and positive emotions. Boutcher discusses how this relationship may be moderated by physiological mechanisms such as the release of endorphins, the induction of a relaxed state through parasympathetic nervous system activation,
reduced brain activity following exercise. Boutcher adds that factors such as social support and increased self-esteem may also help explain why exercise appears to lead to the experience of positive emotions. Thus, it is not extraordinary that the PANAS PA mean for this entire sample of collegiate athletes at pre-testing is higher than the mean for this scale published by its authors (Watson et al., 1988).

Reliability of the measures used in this study was examined by obtaining a test-retest coefficient across pre, post, and follow-up testing and an internal consistency coefficient (Cronbach's alpha) for each scale. All of the measures showed adequate test-retest reliability, with coefficients ranging from .64 to .87. The measures of trait anxiety (TAI), life stress (LESCA), coping skills (ACSI), positive affect (PANAS PA), and negative affect (PANAS NA) all exhibited acceptable Cronbach's alpha coefficients, ranging from .70 to .91.

The SCAT, a measure of competitive anxiety, showed a peculiar pattern across testing sessions. Internal reliability coefficients for the SCAT for pre, post, and follow-up testing were .49, .67, and .84, respectively. The psychometric properties of this scale have been comprehensively reviewed by Martens, Vealey, and Burton (1990), and SCAT internal consistency coefficients in the literature ranged from .95 to .97. The reliability coefficients that emerged from the pre and post-test data in this study were lower than expected.

Observation of item-total correlations for the SCAT revealed that two items appeared to be negatively correlated with the total score in both pre and post-testing: item 6 ("Before I compete I am calm") and item 11 ("Before I compete I feel relaxed").
These two items happen to be the items that are reverse scored on the SCAT. The reverse scored items should be positively correlated with the total score after reverse scoring is completed, but the opposite is true for pre and post-test SCAT data. This pattern does not appear in the follow-up test data. It is possible that the participants adopted a response set on the measure of competitive anxiety in pre and post-testing. This seems unlikely given that the SCAT only contains 15 items and was randomly ordered among a group of questionnaires that took less than 30 minutes to complete, but it is difficult to identify another explanation for this oddity. In light of the adequate internal consistency coefficient for the follow-up SCAT scores (.84) and the acceptable test-retest reliability (.81) for the SCAT in this study, the integrity of the SCAT scores is not completely compromised. However, the remainder of the results using SCAT scores from pre and post-testing should be interpreted with caution.

The SCAT was the only scale used in this study that showed gender differences, with males reporting lower competitive anxiety than females. This gender difference adds to the equivocal research on the SCAT and gender reported by Martens et al. (1990). Past research has shown that gender has no effect on SCAT scores, that males tend to have higher SCAT scores than females, and that females tend to have higher SCAT scores than males (as cited in Martens et al.). It has been suggested that gender differences are not due to biological sex but are rather a function of gender role and the socialization of masculinity and femininity, thus accounting for the inconsistent findings regarding competitive anxiety and gender. Wittig, Duncan, and Schurr found
that masculine individuals scored lowest and feminine individuals scored highest on the SCAT regardless of gender (as cited by Martens et al.).

The results of the correlational analyses indicated that the several of the measures administered to participants in this study were consistently significantly correlated with each other across pre, post, and follow-up testing. Among these, competitive anxiety was positively correlated with trait anxiety ($r = .58$, $p < .01$ at follow-up testing), a finding that is consistent with the correlation of .44 between the SCAT and the TAI reported in the literature (Martens et al., 1990). This relationship is not surprising, given that both scales are designed to measure trait anxiety, albeit sport-specific trait anxiety with regards to the SCAT. According to Felsten and Wilcox (1992), sport-specific anxiety is a better predictor of performance than general anxiety.

Competitive anxiety (SCAT) was negatively correlated with self-reported coping skills (ACSI) at pre, post, and follow-up testing ($r = -.44$, $p < .05$ at follow-up testing). This finding indicates that athletes who report higher sport-specific anxiety also report having fewer coping skills. This relationship between anxiety and perceived coping skills was also found for general anxiety (TAI) across test times ($r = .67$, $p < .01$ at follow-up testing). Again, it makes sense that increased anxiety is related to diminished ability to cope with stress. An individual who appraises a situation as a threat and does not feel able to cope with the stressor will experience a state of anxiety (Crocker, Alderman, & Smith, 1988). Likewise, increasing coping skills such as positive self-talk and relaxation through sport psychology interventions is associated with decreased anxiety among athletes (Hays & Smith, 1996; Williams & Leffingwell, 1996).
Trait anxiety (TAI) was positively correlated with PANAS NA scores, a measure of negative affect, at each of the three test times ($r=.57$, $p<.01$ at follow-up testing) and negatively correlated with positive affect (PANAS PA) at both pre and follow-up testing ($r=-.58$, $p<.01$ at follow-up testing). Given that anxiety can be construed as a negative emotion, this finding is not surprising. Emotion words such as "distressed," "nervous," "jittery," and "afraid" appear as items on the PANAS NA scale. The sport psychology literature indicates that successful athletes are those who think positively (Williams & Leffingwell, 1996), and that negative self-talk such as "I'm not good enough" contributes to cognitive anxiety (Beswick, 2001). Thus, it makes sense that increased trait anxiety is associated with negative emotions, while decreased trait anxiety is associated with positive emotions. Incidentally, competitive anxiety (SCAT) was also positively related to negative affect (PANAS NA) at post and follow-up testing ($r=.63$, $p<.01$ at follow-up testing). This finding would be expected given the positive relationship between competitive anxiety and trait anxiety.

A positive relationship between positive affect (PANAS PA) and coping skills (ACSI) was found consistently across test times ($r=.60$, $p<.01$ at follow-up testing). In other words, the athletes who report having better coping skills also report experiencing more positive emotions. Perhaps being able to cope with situations helps athletes experience the flow state and its associated positive emotions more often. The flow state occurs when there is a balance between the perceived challenges of a situation and a person's skills (Jackson & Csikszentmihalyi, 1999). Flow is associated with enjoyment of the sport for its own sake and the occurrence of peak performances. It could also be
true that those who experience more positive emotions engage in more social interaction and more activities as a result of their positive mood, thus gaining valuable coping resources such as social support (Frederickson, 1998).

Positive affect (PANAS PA) was also consistently negatively related to negative life stress (LESCA NEG) across pre, post, and follow-up testing ($r=-.52$, $p<.01$ at follow-up testing). In addition, negative affect (PANAS NA) was consistently correlated with negative life stress in the opposite direction across test times ($r=-.44$, $p<.05$ at follow-up testing). In other words, people who report more positive emotions and less negative emotions also report experiencing less stress from negative life events ranging from the death of a family member to a decrease in playing time. This relationship between emotions and perceived negative stress could be moderated by coping skills, as Perna, Antoni, Kumar, Cruess, and Schneiderman (1998) demonstrated with their stress management intervention that resulted in decreased negative affect in the athletes who participated. It would make sense that individuals who learn to cope effectively with negative events in their lives experience more positive affect and less negative affect. On the other hand, individuals who have high trait anxiety appear to report more stress associated with negative life events, as evidenced by the consistent correlation between TAI and LESCA NEG scores across test times in this study ($r=.39$, $p<.05$ at follow-up testing).

Prior to conducting the multivariate analyses of covariance (MANCOVAs) to examine differences between the treatment group and the control group on the dependent variables, preliminary t-tests revealed pre-treatment differences between
groups on trait anxiety (TAI), coping skills (ACSI), and positive affect (PANAS PA). Thus, separate 2 x 2 (group x time) MANCOVAs were conducted for each of these three variables to look for between-group differences at post and follow-up testing. In addition to using negative life stress (LESCA NEG) as a covariate, the pre-test scores for the TAI, the ACSI, and the PANAS PA were used as covariates in each of their respective MANCOVAs to account for pre-treatment group differences. Meanwhile, separate 2 x 3 (group x time) MANCOVAs were conducted for the SCAT and the PANAS NA to look for between-group differences on competitive anxiety and negative affect across pre, post, and follow-up testing. Thus, a separate MANCOVA was done for each of the five variables listed above, and two of these were significant, providing some support for the study's hypothesis.

The SCAT MANCOVA was significant, revealing that the treatment and control groups were significantly different on competitive anxiety across test times. However, post-hoc tests were surprisingly not significant, which may be because the SCAT means for each group at each test time were estimated based on the life stress covariate (LESCA NEG) mean. It is possible that the between-group difference was present when participants reported higher or lower values of negative life stress. Examination of the SCAT means provides evidence of absolute mean score differences between groups at the follow-up test time, with the treatment group reporting less competitive anxiety than the control group. This indicates that the effects of the intervention emerge over time.

This finding could be due to practice effects; perhaps the athletes were practicing the stress management techniques on their own following the treatment.
Practice of cognitive reframing, relaxation, and imagery is crucial in achieving the best outcome possible (Cox, Qiu, & Liu, 1993; Gould & Damarjian, 1996; Williams & Leffingwell, 1996). Another possible reason why treatment effects were not evident immediately after the intervention could be that all of the participants were preparing for final exams when they took part in post-testing at the end of autumn quarter. Exam stress at post-testing may have accounted for why the between-group differences on competitive anxiety did not emerge until follow-up testing. In addition, the internal consistency of the SCAT appeared to be the most sound at follow-up testing, while there were problems with internal consistency on the SCAT at post-testing. In any case, the decreased competitive anxiety reported by the treatment group as compared to the control group at follow-up testing indicates that the stress management intervention was effective at helping athletes achieve lower levels of competitive anxiety.

The other significant MANCOVA finding was for the measure of negative affect (PANAS NA). However, as with the SCAT post-hoc test, the PANAS NA post-hoc test revealed no significant differences. This lack of significance following a significant MANCOVA may be due to the fixed covariate value for negative life stress (LESCA NEG), the same dilemma suspected with the SCAT post-hoc result. Examination of absolute PANAS NA means for the treatment and control groups suggests that the difference between groups in negative affect exists at follow-up testing. The treatment group reported less negative affect than the wait-list control group did at follow-up testing. This provides partial support for the hypothesis that the stress management intervention would effectively reduce the experience of negative affect.
emotion for the treatment group members. As with the SCAT, the exam stress at post-testing may have accounted for why the between-group difference on the PANAS NA did not emerge until follow-up testing.

The remainder of the MANCOVAs for trait anxiety (TAI), coping skills (ACSI), and positive affect (PANAS PA) were not significant. Thus, the treatment and control groups did not differ significantly on these dependent variables across post or follow-up testing. Examination of absolute means shows that the treatment group did report less trait anxiety, higher coping skills, and more positive affect than the control group at both post and follow-up testing, yet these differences were not significant. One explanation for this could be the small sample size. The study had enough power to find a large effect size (Keppel, 1991) with approximately 15 people in each group. However, medium or small effects would likely go undetected by statistical tests.

It is not too surprising that trait anxiety (TAI) did not change significantly for those in the treatment group, given that it is considered to be a stable personality trait (Spielberger, 1983). The reduction of trait anxiety was not predicted in the hypothesis for this study, especially given that the intervention was limited to five weeks and was sport-specific. Of course sport-specific coping skills can be generalized to other arenas in life, but that was not an emphasis of the stress management treatment in this study.

On the other hand, the lack of significance for the ACSI, a measure of coping skills, was surprising. Athletes who participated in the treatment group were expected to report better coping skills following the intervention than those who did not take part in the treatment. It is possible that the ACSI did not accurately assess the specific coping
skills taught during the stress management program. In hindsight, many of the 28 items in the measure appear to be assessing cognitive coping skills and goal setting abilities. While the intervention conducted in this study included instruction, activities, and homework on positive self-talk, this was not introduced until the fourth session of the treatment. In addition, only 4 of the 16 participants turned in the homework on cognitive restructuring. Goal setting was not included in the intervention at all. Rather, relaxation was a major part of the treatment, as it was introduced in the first session, assigned as daily homework, and revisited in each of the remaining four sessions. The ACSI may not accurately measure the ability to cope using relaxation, which would partially account for the lack of a significant difference between the treatment and control groups on this variable. This result could also possibly be traced to the participants' lack of homework compliance or the relatively short treatment duration.

As for positive affect (PANAS PA), the treatment group was expected to report higher positive affect following the intervention compared to the control group. The PANAS PA MANCOVA was not significant. Interestingly, examination of the absolute PANAS PA means reveals that both treatment and control groups reported decreasing positive affect across pre, post, and follow-up testing. Again, this is not a significant trend. However, when it is considered in light of the high positive affect reported by all the participants at pre-testing compared to means on the PANAS PA in other samples (Watson et al., 1988), it suggests regression to the mean. Failure to find significance between groups on positive affect following treatment may be related to the decrease in PANAS PA scores over time, which brought the mean scores for both treatment and
control groups closer to the general population mean. This trend may also reflect an increase in the participants' workload as the academic year progressed.

In sum, the treatment group demonstrated a significantly greater decrease in competitive anxiety and negative affect across test sessions than the control group did, a finding that provides partial support for the study's hypothesis. In other words, the treatment group reported less competitive anxiety and less negative emotion following the intervention when compared to the control group. This between-group difference appears to have emerged after the passage of time following the intervention; absolute means on the SCAT and the PANAS NA indicate that the treatment group was most different from the control group at follow-up testing. These significant results suggest that the stress management intervention was successful in helping athletes learn coping strategies to lower competitive anxiety and reduce distress.

Although athletic performance was not objectively measured in this study, the treatment group reported perceived improvement in their athletic performance following the intervention (see Appendix FF for evaluation data). Additional self-report data from the evaluation form administered to the treatment group at both post-testing and follow-up testing indicate that participants found the program helpful, perceived improvement in their ability to manage stress using the techniques taught throughout the intervention, and were committed to various components of the treatment. In addition, higher reported commitment to the program was related to greater perceived change in athletic performance at follow-up testing. It is not surprising that those who were not as committed to attending each group or to doing relaxation, imagery, and self-talk
activities and homework did not feel that the intervention aided their performance. This does not necessarily mean that the intervention helped improve the performance of those who were committed to the treatment. Additional field research would have to be done to ascertain whether the intervention actually enhanced athletes' performance.

5.3 Limitations of the Study

This study was limited by several methodological constraints. Methodological problems included the small sample size, the use of self-report measures, and the fact that neither the experimenter nor the participants were blind to the study's hypothesis. The research in sport psychology has been plagued by small sample sizes, and this study is another example of the difficulty in obtaining large numbers of athletes for psychology research (Holm, Beckwith, Ehde, & Tinius, 1996). In addition, self-report measures, while easy to administer, present validity problems if participants provide data that is socially desirable or that will support the researcher's hypothesis (Cone & Foster, 1999). It was no secret that this study was investigating the effectiveness of a stress management intervention, and the participants would not have had difficulty figuring out how to answer the questionnaires in the manner expected of them. The results could have also been affected by repeated testing, given that the athletes filled out the same questionnaires three times. The inventories used in this study may not have been the best measure of the effectiveness of the stress management intervention. Although the results provided some support for the program's success, non-self-report measures such as physical health indicators, ratings by others, or actual performance
improvement were not collected. These types of measures might have provided additional information about the impact of the treatment on participants.

The use of only one facilitator across the three treatment groups promotes the possibility of experimenter effects. It is possible that the results were not due to the treatment itself, but rather to the facilitator. Ideally, the study would have involved more than one trained facilitator. However, training another facilitator would have been a time-consuming and challenging endeavor that was beyond the scope of this study. On a positive note, the facilitator was able to provide consistency across the three different treatment groups.

An additional limitation of this study was the lack of random assignment to groups. There is a need for field studies that use random assignment to evaluate the effectiveness of sport psychology interventions (Cogan & Petrie, 1995). However, due to schedule constraints, it would have been impossible to do pure random assignment. The use of athletes' schedules to select individuals for the treatment group may have been a confounding variable. It is possible that those who had more free time and could manage to attend the treatment group each week were also those who were not yet in season for their sport.

In fact, only 4 of the 16 treatment group participants reported that autumn quarter was their primary season of play, while 6 of the 14 control group members were reportedly in the midst of their competitive season during autumn quarter. Perhaps this would explain the difference between the treatment and control groups at pre-testing on the measures of positive affect, coping skills, and trait anxiety; if many of the treatment
group members had not yet started their collegiate athletic season, they may have felt less stressed and more positive. However, if this were the case, the treatment group would be expected to show a decrease in positive affect and an increase in anxiety at follow-up testing while they were in the midst of their competitive season. This was not the case. Therefore, it is unknown what effect of assigning athletes based on their schedules may have had on the final results of this study.

Another potentially confounding variable was the disparate amount of REP credit that the participants in the control and treatment groups received. The treatment groups received a total of eight REP hours for their participation in the study, while control group members had the opportunity to earn only three of their required seven REP hours. Perhaps the treatment group responded more to the demand characteristics of the study due to a desire to please the experimenter in return for REP credit and as a result of spending more time with the experimenter during the treatment group sessions.

This research study was also limited by the age of the participants. Because the student-athletes were recruited from an Introduction to Psychology class, first-year collegiate athletes composed 50% of the total sample. This could have influenced the study in a number of ways. First, many of the participants had not yet started their first competitive season at a Division I university. During autumn quarter 2002, they were still adjusting to college athletics and college life in general and lacked experience at the Division I level of sport competition. They may have been eager to make a good impression and perhaps more vulnerable than an older sample of athletes would have been to social desirability effects. An older sample of college students would have had
more experience competing at the collegiate level, which means that they may have better understood the importance of mental training and anxiety reduction in sport. Perhaps more advanced collegiate athletes or athletes at the elite and professional levels would have been more motivated than the first-year athletes were to utilize coping skills such as imagery, relaxation, and positive self-talk in athletics. Caution should be used when generalizing the results of this study to other populations.

A major limitation of the study was the difficulty in tailoring the program to meet individual needs. This was accomplished to some extent through individuals' contributions to group discussion and reactions to experiential activities. However, each student-athlete is unique in terms of mental challenges in sport and preferred coping skills. The participants may have benefited even more from the treatment if it had involved extra individual attention to meet their own unique needs. In addition, athletes reported that the progressive muscle relaxation was difficult to practice on their own. Doing PMR was a challenge without the facilitator's calming voice guiding them through the steps, and some participants reported having to handle additional distractions such as noise and roommate interference. Perhaps it would have been beneficial to give the participants a recording of the activity on audiotape or CD to help them practice the relaxation exercises at home.

5.4 Qualitative Comments

The treatment group participants had the opportunity to provide qualitative comments about the intervention during both post and follow-up testing. These comments, as well as various observations by the group facilitator throughout the stress
management program, provide insight about the study beyond that which is found with
the quantitative results.

One athlete stated, "I believe programs like this experiment should be available for all athletes on a regular basis. It will improve your mental and physical play."
Another athlete remarked, "I really enjoyed this program and learned a lot about myself through this program. I really believe that I have benefited a great deal from this program, and I would recommend the Athletic Department making this mandatory for all varsity athletes." Several other participants commented that they benefited from the program as well.

Individual athletes appreciated different components of the program. One athlete remarked that learning about stress was helpful. Others reported that positive self-talk was most beneficial for their performance, while some preferred the relaxation techniques. One athlete commented that the deep breathing helped her significantly ease her asthma problem, and others reported using the cue word "calm" to help them relax. Other participants favored the imagery aspect, with one stating, "Imagery helped me more than anything - seeing myself in my head helps me perform in reality better." Two athletes stated that they already knew about these mental skills, and thus their athletic performance did not necessarily improve as a result of the program. All of these comments underscore the need for interventions that are tailored for individual athletes, although the current stress management program does appear to have helped several athletes learn new skills to manage arousal and improve performance.
Anecdotes from the treatment group participants provide interesting support for the efficacy of the intervention. During the imagery session, the athletes were asked to develop a "power image" to promote confidence. A male participant reported feeling extremely confident and pumped up when he imagined the fearful expression he had seen on an opponent's face as he tackled him in a high school football game. The athletes in the treatment group were also taught to try both external and internal perspectives when using imagery. One female pole vaulter reported that she disliked imagery because she always crashed into the bar in her mind; she was amazed to find that she cleared the bar when she tried the internal point of view. Another athlete who dreaded early morning crew practices reported using positive self-talk to make the experience less distressing, while her teammate reported imagining herself on the river to make indoor rowing practices more interesting.

When stories such as these are combined with the quantitative evidence of the program's efficacy, these results provide strong support for conducting this type of stress management program with collegiate athletes.

5.5 **Directions for Further Research**

Further research in applied sport psychology that that examines the effectiveness of interventions with athletes is very important. Programs that have been shown to be effective in previous research need to be continually evaluated using objective measures of improvement, particularly related to athletic performance. The stress management intervention conducted in the current study should be researched further to identify how and to what extent the program impacts athletes' athletic performance.
Future research could examine the validity of the results found in this study by asking treatment and control group members to participate in performance tests. For example, the percentage of free throws a basketball player makes could be measured at pre and post-testing to gauge improvement following the treatment. External validity of the intervention could be examined further with win/loss records or by observing performance in actual competition. Measures of physical health such as blood pressure or athletic injury could be collected, and measures of academic performance such as GPA could be used to evaluate student-athletes' abilities to generalize coping skills learned in the intervention. Studies with more experienced collegiate athletes, professional athletes, and adolescents would provide information about the extent to which the results from this study generalize to other athlete populations.

Qualitative studies should be done to examine the effectiveness of the cognitive-behavioral stress management intervention when it is tailored to meet individual athletes' performance enhancement needs. In addition, a study that evaluates the intervention across various durations would be informative in planning sport psychology interventions with teams and individual athletes. For example, if five one-hour sessions were as effective as an intervention that lasts eight months, the five-week program would be more practical. On the other hand, future research could show that longer programs provide additional benefits for athletes.

Finally, additional research that compares the stress management intervention used in this study to other empirically validated interventions would identify whether this program is as effective as or perhaps better than similar sport psychology programs.
5.6 **Implications for Counseling**

Athletes may benefit more from individual sport psychology consultation than from group interventions, given that each athlete is unique in talent, skills, and preferences for certain types of interventions. However, team consultation is still a valuable aspect of sport psychology work, as it is time effective and provides athletes with opportunities to learn from each other and obtain social support. Another benefit of a group intervention is that more athletes can benefit from mental training. In reality, many athletes would not seek out help from a sport psychologist on an individual level, given that the stigma of getting professional mental help is still rather strong in the athletic world.

It may be ideal to provide group interventions for athletes first. As athletes become more comfortable with sport psychology professionals and begin to understand the importance of skills such as relaxation, positive self-talk and imagery, they may then seek out one-on-one stress management and performance enhancement training that can be catered to their individual needs.


APPENDIX A

Demographic Questionnaire

Age __________

Class (circle one): First Year Sophomore Junior Senior Senior +

Year of Eligibility as a Varsity Athlete: 1 2 3 4

Gender (circle one): Male Female

Race/Ethnicity (circle one):
Caucasian African American Asian American Hispanic/Latino(a)
Native American Other (please name) ________________________________

Varsity Sport(s): ______________________________________________________

Primary Season of Play: ________________________________________________

Are you on scholarship? Yes, full scholarship Yes, partial scholarship No

How would you describe your participation or your role on the team?
Starter/Key player Participate often/Second team Participate occasionally
I don't know yet because ________________________________________________.
Other __________________________________________________________________
APPENDIX B

Sport Competition Anxiety Test (SCAT)

This measure has been excluded from the published dissertation due to the fact that it is copyrighted material. Please see the following references for additional information about the SCAT.


APPENDIX C

Trait Anxiety Test (TAI)

This measure has been excluded from the published dissertation due to the fact that it is copyrighted material. Please see the following references for additional information about the TAI.


APPENDIX D

Life Events Survey for Collegiate Athletes (LESCA)

Listed below are 69 events that sometimes occur in the lives of collegiate athletes. These events often produce change within an individual's life that requires some adjustment by the individual. For each event that you have experienced within the last year (12 months):

1. Place a check under the column 0 months to 1 year to indicate that you experienced the event within the last year. Please make sure that each check corresponds to the event that has happened to you in the 1-year time frame. Remember, only respond to those events that you have experienced within the last year. If you have not experienced an event within the last year, leave that item blank.

2. Indicate what kind of an effect it had on your life when the event occurred. A rating of -4 would indicate that the event had an extremely negative effect on you. A rating of +4 would indicate that the event had an extremely positive effect on you. For those events that have happened more than once, indicate the average effect across all occurrences.

The events are listed in no particular order, and there are no right or wrong answers. Please respond to each event honestly as applies to you.

<table>
<thead>
<tr>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>+1</th>
<th>+2</th>
<th>+3</th>
<th>+4</th>
</tr>
</thead>
<tbody>
<tr>
<td>extremely negative</td>
<td>negative</td>
<td>moderately negative</td>
<td>somewhat negative</td>
<td>somewhat positive</td>
<td>moderately positive</td>
<td>positive</td>
<td>extremely positive</td>
</tr>
</tbody>
</table>

0 mos.-1 yr. Effect

1. Marriage
2. Death of mate (boyfriend, girlfriend, spouse, significant other)
3. Major change in sleeping habits (increase or decrease in amount of sleep)
4. Death of close family member(s)
   a. Father
   b. Mother
   c. Brother
   d. Sister
   e. Grandfather
   f. Grandmother
   e. Other
5. Major change in eating habits (increase or decrease in food intake)
6. Death of a close friend(s)
7. Outstanding personal achievement
8. Male: mate pregnant
9. Female: becoming pregnant
10. Sexual difficulties
11. Being fired from job
12. Being apart from mate (boy/girlfriend, spouse, etc.) due to sport
13. Serious illness or injury of close family member(s)
   a. Father
   b. Mother

90
<table>
<thead>
<tr>
<th>Effect</th>
<th>0 mos.-1 yr. Effect</th>
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</thead>
<tbody>
<tr>
<td>c. Brother</td>
<td>___</td>
</tr>
<tr>
<td>d. Sister</td>
<td>___</td>
</tr>
<tr>
<td>e. Grandfather</td>
<td>___</td>
</tr>
<tr>
<td>f. Grandmother</td>
<td>___</td>
</tr>
<tr>
<td>g. Other</td>
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<tr>
<td>14. Major change in the number (more or less) of arguments with mate</td>
<td>___</td>
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<tr>
<td>15. Major personal injury or illness</td>
<td>___</td>
</tr>
<tr>
<td>16. Major change in the frequency (increased or decreased) of social activities due to participation in sport</td>
<td>___</td>
</tr>
<tr>
<td>17. Serious injury or illness of close friend</td>
<td>___</td>
</tr>
<tr>
<td>18. Breaking up with mate (boy/girlfriend, etc.)</td>
<td>___</td>
</tr>
<tr>
<td>19. Beginning a new school experience (beginning college, transferring colleges, etc.)</td>
<td>___</td>
</tr>
<tr>
<td>20. Engagement</td>
<td>___</td>
</tr>
<tr>
<td>21. Academic probation/ineligibility</td>
<td>___</td>
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<tr>
<td>22. Being dismissed from dorm or other residence</td>
<td>___</td>
</tr>
<tr>
<td>23. Failing an important exam</td>
<td>___</td>
</tr>
<tr>
<td>24. Major change in relationship with coach (better or worse)</td>
<td>___</td>
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<tr>
<td>25. Failing a course</td>
<td>___</td>
</tr>
<tr>
<td>26. Major change in the length and/or conditions of practice/training (better or worse)</td>
<td>___</td>
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<tr>
<td>27. Financial problems concerning school</td>
<td>___</td>
</tr>
<tr>
<td>28. Major change in relationship with family member(s) (better or worse)</td>
<td>___</td>
</tr>
<tr>
<td>29. Conflict with roommate</td>
<td>___</td>
</tr>
<tr>
<td>30. Male: mate having an abortion</td>
<td>___</td>
</tr>
<tr>
<td>31. Female: having an abortion</td>
<td>___</td>
</tr>
<tr>
<td>32. Major change in the amount (more or less) of academic activity (homework, class time, etc)</td>
<td>___</td>
</tr>
<tr>
<td>33. Pressure to gain/lose weight - due to participation in sport</td>
<td>___</td>
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<tr>
<td>34. Discrimination from teammates/coaches</td>
<td>___</td>
</tr>
<tr>
<td>35. Major change in relationship(s) with teammate(s) (better or worse)</td>
<td>___</td>
</tr>
<tr>
<td>36. Suspended from team for nonacademic reasons</td>
<td>___</td>
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<tr>
<td>37. Trouble with academic counselor</td>
<td>___</td>
</tr>
<tr>
<td>38. Major change in use of alcohol/drugs (increased or decreased)</td>
<td>___</td>
</tr>
<tr>
<td>39. Beginning sexual activity</td>
<td>___</td>
</tr>
<tr>
<td>40. Major change in relationship(s) with friend(s) (better or worse)</td>
<td>___</td>
</tr>
<tr>
<td>41. Recovery from illness/injury/operation</td>
<td>___</td>
</tr>
<tr>
<td>42. Major change in level of athletic performance in actual competition (better or worse)</td>
<td>___</td>
</tr>
<tr>
<td>43. Divorce or separation of your parents</td>
<td>___</td>
</tr>
<tr>
<td>44. Major change in level of responsibility on team (increased or decreased)</td>
<td>___</td>
</tr>
<tr>
<td>45. Receiving an athletic scholarship</td>
<td>___</td>
</tr>
<tr>
<td>46. Not attaining personal goals in sport</td>
<td>___</td>
</tr>
<tr>
<td>47. Major change in playing status on team</td>
<td>___</td>
</tr>
<tr>
<td>48. Injury to teammate(s)</td>
<td>___</td>
</tr>
<tr>
<td>49. Being absent from school (classes) because of participation in sport</td>
<td>___</td>
</tr>
<tr>
<td>50. Troubles with athletic association and/or athletic director</td>
<td>___</td>
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<tr>
<td>51. Difficulties with trainer/physician</td>
<td>___</td>
</tr>
<tr>
<td></td>
<td>extremely negative</td>
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<tr>
<td>---</td>
<td>-------------------</td>
</tr>
<tr>
<td>0 mos.-1 yr. Effect</td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>Major change in playing time (playing more or less) - due to injury</td>
</tr>
<tr>
<td>53.</td>
<td>Major errors/mistakes in actual competition</td>
</tr>
<tr>
<td>54.</td>
<td>Losing your athletic scholarship</td>
</tr>
<tr>
<td>55.</td>
<td>No recognition/praise of accomplishments from coaching staff</td>
</tr>
<tr>
<td>56.</td>
<td>Pressure from family to perform well</td>
</tr>
<tr>
<td>57.</td>
<td>Loss of confidence due to injury</td>
</tr>
<tr>
<td>58.</td>
<td>Unable to find a job</td>
</tr>
<tr>
<td>59.</td>
<td>Change in coaching staff</td>
</tr>
<tr>
<td>60.</td>
<td>Female: menstrual period/PMS</td>
</tr>
<tr>
<td>61.</td>
<td>Major change in level of academic performance (doing better or worse)</td>
</tr>
<tr>
<td>62.</td>
<td>Making career decisions (applying to graduate school, interviewing for jobs, etc.)</td>
</tr>
<tr>
<td>63.</td>
<td>Being cut/dropped from the team</td>
</tr>
<tr>
<td>64.</td>
<td>Continual poor performance of team</td>
</tr>
<tr>
<td>65.</td>
<td>Change in graduation schedule</td>
</tr>
<tr>
<td>66.</td>
<td>Major change in family finances (increased or decreased)</td>
</tr>
<tr>
<td>67.</td>
<td>Major change in attitude toward sport (like/enjoy more or less)</td>
</tr>
<tr>
<td>68.</td>
<td>Victim of harassment/abuse (sexual, emotional, physical)</td>
</tr>
<tr>
<td>69.</td>
<td>Victim of personal attack (rape, robbery, assault, etc.)</td>
</tr>
</tbody>
</table>

Other events might have occurred to you in the past year (and affected you in a positive or negative manner) but were not included in this list. If there were such events, please list them below.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>70.</td>
</tr>
<tr>
<td>71.</td>
</tr>
<tr>
<td>72.</td>
</tr>
<tr>
<td>73.</td>
</tr>
<tr>
<td>74.</td>
</tr>
</tbody>
</table>
APPENDIX E

Athlete Coping Skills Inventory (ACSI)

This measure has been excluded from the published dissertation due to the fact that it is copyrighted material. Please see the following reference for additional information about the ACSI.

APPENDIX F

Positive and Negative Affect Schedule (PANAS)

This measure has been excluded from the published dissertation due to the fact that it is copyrighted material. Please see the following reference for additional information about the PANAS.

APPENDIX G

Evaluation Form

I. Please rate how beneficial each component of the program was for you.

<table>
<thead>
<tr>
<th>Component</th>
<th>Not at all Helpful</th>
<th>Slightly Helpful</th>
<th>Somewhat Helpful</th>
<th>Fairly Helpful</th>
<th>Highly Helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Education about Stress</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Deep Breathing Technique</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Progressive Muscle Relaxation</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Imagery</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Self-Talk</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Education about Flow</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

II. Please rate the changes you perceive in your ability to use these techniques.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Not at all Improved</th>
<th>Slightly Improved</th>
<th>Somewhat Improved</th>
<th>Fairly Improved</th>
<th>Highly Improved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Deep Breathing Technique</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Progressive Muscle Relaxation</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Imagery</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Self-Talk</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Overall Stress Management</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

III. Please rate your level of commitment to each area of the program.

<table>
<thead>
<tr>
<th>Component</th>
<th>Not at all Committed</th>
<th>Slightly Committed</th>
<th>Somewhat Committed</th>
<th>Fairly Committed</th>
<th>Highly Committed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learning about Stress</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Using Deep Breathing Technique</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Doing Progressive Muscle Relaxation</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Using Imagery</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Using Self-Talk</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Learning about Flow</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

IV. Please rate any change you perceive in your athletic performance since participating in this program.

<table>
<thead>
<tr>
<th>Not at all Improved</th>
<th>Slightly Improved</th>
<th>Somewhat Improved</th>
<th>Fairly Improved</th>
<th>Highly Improved</th>
</tr>
</thead>
</table>

V. Please feel free to add any comments or impressions you have regarding this program.
Hello!

You are receiving this e-mail because you are a varsity student-athlete enrolled in Psychology 100 this quarter. I am writing to offer you an opportunity to earn credit for the Research Experience Program (REP). As you may already know, Psychology 100 is a 5-credit hour course that includes a research requirement of seven hours. You may choose to participate in various research studies to fulfill this REP requirement.

I am a graduate student in Counseling Psychology at OSU, and I am conducting a study with athletes this quarter under the supervision of faculty member Dr. Pamela Highlen. If you would like to sign up for the initial part of the study, please go to the REP website (http://www.psy.ohio-state.edu/rep) and look for the experiment CoBr-1 titled, "Stress Management." You will have an opportunity to earn one hour of REP credit by filling out a series of short questionnaires.

This study will only be offered for the next two weeks. If you participate in this initial study during the next two weeks, you may be selected to participate in the remainder of the study for additional REP credit. I am offering a stress management group designed to help athletes learn effective strategies for coping with stress and improving performance. In fact, if you are invited to join the stress management group that I am conducting, you will be able to earn all of your REP credits by participating in the initial part of the study, five one-hour group sessions, and a one-hour follow-up session in which you will complete questionnaires again.

Please consider signing up on the REP website for the initial study titled "Stress Management." Please e-mail me if you have any questions or concerns about this.

Thank you,

Megan Brent, M.A.
Doctoral Student
Counseling Psychology
The Ohio State University
Hello!

You are receiving this e-mail because you are a varsity student-athlete enrolled in Psychology 100 this quarter. Last week, I sent you an e-mail about an opportunity to earn credit for the Research Experience Program (REP). I have included the original message as an attachment.

I am writing to remind you that you have one week left to sign up for the one-hour experiment CoBr-1 titled, "Stress Management." To sign up, please go to the REP website (http://www.psy.ohio-state.edu/rep). If you participate in this study by Friday, October 11th, you may be selected to participate in the remainder of the study for additional REP credit.

Please e-mail me if you have any questions or concerns about this.

Thank you,

Megan Brent, M.A.
Doctoral Student
Counseling Psychology
The Ohio State University
APPENDIX J

Scripts for REP (Psychology 100) Web Site

Experiment CoBr-1 (Counseling/Brent-Highlen-#1). Stress Management

Requirements: Must be an OSU VARSITY STUDENT ATHLETE

Description: Participants will complete a demographic survey, a schedule form, and five short questionnaires asking about your stress levels and coping skills. Possibility of being invited to participate in remainder of study for further REP credit.

Experiment CoBr-2 (Counseling/Brent-Highlen-#2). Stress Management

Requirements: OSU VARSITY ATHLETES who participated in CoBr-1 and were invited to enroll in this treatment group.

Description: Participants will attend five one-hour group sessions over the course of five weeks to learn more effective coping strategies for managing stress and enhancing sport performance.

Experiment CoBr-3 (Counseling/Brent-Highlen-#3). Stress Management

Requirements: Must be an OSU VARSITY STUDENT-ATHLETE who is already in either the control group or the treatment group following participation in stress management pre-testing study.

Description: Participants will complete five short questionnaires asking about your stress levels and coping skills. Experimental group participants will also complete an evaluation form.
APPENDIX K

Schedule Form

Name ____________________________

What is the best way to reach you? Circle one and fill-in the appropriate blank.

E-mail __________________________ Phone ___________________________

Is it okay to leave a phone message?  Yes  No

Please block off times that you are unable to meet for a one-hour group due to conflicts with practice, class, work, etc.

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>8:00</td>
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<td>8:00</td>
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</table>

Thank you! I will contact you by October 18th if you are chosen to participate in the rest of the study.
Welcome to the study for varsity student-athletes entitled Stress Management. The study number is CoBr-1. I am glad that you decided to participate in this study as part of the REP program. This study is being conducted under the supervision of a faculty member, Dr. Pamela Highlen, at Ohio State. Your participation will be beneficial to this research and hopefully will help improve existing programs for athletes and possibly promote future programs.

If you are in the wrong room, feel free to leave now. At this time, I would like to verify who is present, in order for you to receive proper research credit.

I would now like to begin the study. I am going to pass out a packet of questionnaires that I would like you to fill out. They should take you about one hour to complete. If at any point you do not understand the instructions, please raise your hand and I will come assist you. If at any time during the study you feel uncomfortable or unable to complete the questionnaires, you are free to leave. Your participation is voluntary, and you will not be deducted research hours or penalized for doing so. You will still receive research participation credit for this study if you choose to leave during the study.

Everything you fill out is completely confidential. Each of your names is collected for the purpose of reporting research participation. Do not put your name on any of the forms. Your responses may be used to help us select participants for the remainder of this study. There is a number on the envelope you will receive that contains the forms. This number will be connected with your name only so that we can contact you regarding continued participation in this study. Your name will not be linked to your responses for any purpose other than to contact you if you meet the criteria for the remainder of the study. Please place your packet in the envelope before you hand it to me. I will then record your name and the number of your envelope. Again, everything is completely confidential.

Please keep in mind that it is important for each of you to respond as accurately and honestly as possible. Please bring your packet up to me when you have finished and I will provide you with information about the study.

Does anyone have any questions?
APPENDIX M

Pre-Testing Debriefing Sheet

Dear Student-Athletes:

Thank you so much for participating in our experiment. We are interested in the degree of anxiety that athletes' experience and how they cope with the stress in their lives. The questionnaires you filled out included measures of trait anxiety, sport anxiety, coping skills, life stress, and positive and negative emotions.

You may be contacted by your preferred method of communication, phone or e-mail, before October 20th and given the opportunity to participate in either the wait-list control group or the treatment group in exchange for further REP credit. The treatment group will meet weekly for a total of five one-hour sessions beginning the week of October 20th. Both the wait-list control group and the treatment group will be able to sign up for a one-hour post-screening session in November.

Through this study, we hope to examine the benefits of conducting an intervention with athletes designed to improve coping skills and teach performance enhancing strategies. By understanding more about the level of stress that athletes experience and the coping skills that are most helpful for athletes, we can develop future programs to help athletes manage their stress and perform their best.

If in the course of this experiment you have developed concerns or uncertainties about your athletic pursuits or your life in general, you may wish to seek counseling. If you wish to do this, you may be able to find counseling at the Psychological Services Center in 141 Townshend Hall (please call 292-2059). In addition, the Ohio State University Counseling and Consultation Services located in the Younkin Success Center is open 8 hours a day for appointments, and if needed, on an emergency basis. If you need counseling services through the Counseling and Consultation Services, please call 292-5766. If you have any other questions about this study, please call Megan Brent at 488-4727.

Again, thank you for assisting us with this research. We hope that the results will contribute to the availability of quality programs designed to help student-athletes like you.
APPENDIX N

Invitation to be in Control Group

Hello!

Thank you for participating in the experiment CoBr-1 titled, "Stress Management." This is an invitation to be part of the control group for this study. As a member of the control group, you have the opportunity to earn one hour of REP credit by participating in a post-testing session during the week of December 2nd through December 6th. Please sign up for the experiment CoBr-3 titled, "Stress Management" on the REP website (http://www.psy.ohio-state.edu/rep). Following the post-testing, you will be given the chance to participate in a stress management group during Winter Quarter 2003 if you'd like.

Please e-mail me if you have any questions or concerns about this.

Thank you,

Megan Brent, M.A.
Doctoral Student
Counseling Psychology
The Ohio State University
Hello!

Thank you for participating in the experiment CoBr-1 titled, "Stress Management." This is an invitation to be part of the stress management group for this study. This stress management group is designed to help athletes learn effective strategies for coping with stress and improving performance. As a member of this group, you have the opportunity to earn six hours of REP credit by participating in five weekly one-hour sessions and a post-testing session. Based on the schedule form you completed, you are invited to participate in the stress management group that will meet at (time) on (day of the week). The group will meet for the next five weeks, beginning on (date). If you are interested in this opportunity, please sign up on the REP website (http://www.psy.ohio-state.edu/rep) for the section of the experiment CoBr-2 titled, "Stress Management" to which you were assigned.

Please e-mail me or call me at 488-4727 if you have any questions or concerns about this. I hope to see you in my group!

Thank you,

Megan Brent, M.A.
Doctoral Student
Counseling Psychology
The Ohio State University
Hello!

I sent you an e-mail recently asking you to be part of a stress management group for the study CoBr-2 titled, "Stress Management." As a member of this group, you have the opportunity to earn six hours of REP credit by participating in five weekly one-hour sessions and a post-testing session. This is a reminder that you are invited to participate in the stress management group that will meet at (time) on (day of the week). The group will meet for the next five weeks, beginning on (date). If you are interested in this opportunity, please sign up on the REP website (http://www.psy.ohio-state.edu/rep) for the section of the experiment CoBr-2 titled, "Stress Management" to which you were assigned.

Please e-mail me if you have any questions or concerns about this. I hope to see you in my group!

Thank you,

Megan Brent, M.A.
Doctoral Student
Counseling Psychology
The Ohio State University
APPENDIX Q

Behavioral Contract

I, ________________________________, express my commitment to participate in this research study. As a member of the treatment group, I understand that I am expected to attend all of the five one-hour sessions during the next five weeks. I understand that it is important for me to attend each session in order to fully benefit from the treatment. I will do my best to arrive on time for group sessions, and I will notify the facilitator in advance if I cannot attend a session.

I understand that my participation in this study is voluntary, and I know that I may leave if I feel uncomfortable at any time during the course of the study without being penalized for doing so. I realize that I will still receive research credit for the sessions I attend if I choose to leave a session early or discontinue participation in the treatment group.

__________________________________
(signature)
Hello!

Thank you for participating in the experiment titled, "Stress Management" earlier this quarter. As promised, you now have the opportunity to earn one additional hour of REP credit by participating in a post-testing session during the week of November 18th through November 22nd. Please sign up for the experiment CoBr-3 titled, "Stress Management" on the REP website (http://www.psy.ohio-state.edu/rep). This post-testing session will involve filling out a series of short questionnaires. Remember that you are required to earn seven hours of REP credit for Psychology 100, and you can earn up to three extra credit REP hours.

Please e-mail me if you have any questions or concerns about this.

Thank you,

Megan Brent, M.A.
Doctoral Student
Counseling Psychology
The Ohio State University
APPENDIX S

Post-Testing Script

Welcome to the study for varsity student-athletes entitled Stress Management. The study number is ________. I am glad that you decided to participate in this study as part of the REP program. This study is being conducted under the supervision of a faculty member, Dr. Pamela Highlen, at Ohio State. Your participation will be beneficial to this research and hopefully will help improve existing programs for athletes and possibly promote future programs.

If you are in the wrong room, feel free to leave now. At this time, I would like to verify who is present, in order for you to receive proper research credit.

I would now like to begin the study. I am going to pass out a packet of questionnaires that I would like you to fill out. They should take you about one hour to complete. If at any point you do not understand the instructions, please raise your hand and I will come assist you. If at any time during the study you feel uncomfortable or unable to complete the questionnaires, you are free to leave. Your participation is voluntary, and you will not be deducted research hours or penalized for doing so. You will still receive research participation credit for this study if you choose to leave during the study.

Everything you fill out is completely confidential. Each of your names is collected only for the purpose of reporting research participation. Do not put your name on any of the forms. Your name will not be linked to your responses. Again, everything is completely confidential.

Please keep in mind that it is important for each of you to respond as accurately and honestly as possible. Please bring your packet up to me when you have finished and I will provide you with information about the study.

Does anyone have any questions?
Dear Student-Athletes:

Thank you so much for participating in our experiment. We are interested in the degree of anxiety that athletes' experience and how they cope with the stress in their lives. The questionnaires you filled out included measures of trait anxiety, sport anxiety, coping skills, life stress, and positive and negative emotions.

Through this study, we hope to examine the benefits of conducting an intervention with athletes designed to improve coping skills and teach performance enhancing strategies. By understanding more about the level of stress that athletes experience and the coping skills that are most helpful for athletes, we can develop future programs to help athletes manage their stress and perform their best.

If in the course of this experiment you have developed concerns or uncertainties about your athletic pursuits or your life in general, you may wish to seek counseling. If you wish to do this, you may be able to find counseling at the Psychological Services Center in 141 Townshend Hall (please call 292-2059). In addition, the Ohio State University Counseling and Consultation Services located in the Younkin Success Center is open 8 hours a day for appointments, and if needed, on an emergency basis. If you need counseling services through the Counseling and Consultation Services, please call 292-5766. If you have any other questions about this study, please call Megan Brent at 309-5268.

You will be contacted early in Winter Quarter 2003 and asked to schedule a one-hour follow-up testing session at your convenience. The follow-up session will be completely voluntary. Again, thank you for assisting us with this research. Your participation is valued. We hope that the results will contribute to the availability of quality programs designed to help student-athletes like you.
Hello!

Thank you for participating in the experiment titled, "Stress Management" during Autumn Quarter 2002. Your participation was greatly appreciated! The study is nearly completed, and I am writing to you now to ask you to volunteer one more hour of your time for a follow-up post-testing session. This session will involve filling out a series of short questionnaires. Your participation in this follow-up session is important to my dissertation research, so I would be very pleased if you are interested in contributing your time. If you would like to participate, please e-mail me soon to schedule a post-testing time.

If you were a member of the wait-list control group, you now have the chance to take part in a stress management group. Please let me know if you would like to take advantage of this opportunity.

Please e-mail me if you have any questions or concerns about this.

Thank you,

Megan Brent, M.A.
Doctoral Student
Counseling Psychology
The Ohio State University
APPENDIX V

Follow-Up Testing Script

Welcome to the study for varsity student-athletes entitled Stress Management. I am glad that you decided to participate in this study during Autumn Quarter as part of the REP program. Thank you for continuing your participation in the study by volunteering to be here today. This study is being conducted under the supervision of a faculty member, Dr. Pamela Highlen, at Ohio State. Your participation will be beneficial to this research and hopefully will help improve existing programs for athletes and possibly promote future programs.

If you are in the wrong room, feel free to leave now. At this time, I would like to verify who is present.

I would now like to begin the study. I am going to pass out a packet of questionnaires that I would like you to fill out. They should take you about thirty minutes to complete. If at any point you do not understand the instructions, please raise your hand and I will come assist you. If at any time during the study you feel uncomfortable or unable to complete the questionnaires, you are free to leave. Your participation is completely voluntary, and you will not be penalized for doing so.

Everything you fill out is completely anonymous and confidential. Do not put your name on any of the forms. Your name will not be linked to your responses. Again, everything is completely confidential.

Please keep in mind that it is important for each of you to respond as accurately and honestly as possible. Please bring your packet up to me when you have finished and I will provide you with information about the study.

If you were a member of the wait-list control group during Autumn Quarter, you now have the chance to take part in a stress management group. Please let me know if you would like to take advantage of this opportunity.

Does anyone have any questions?
APPENDIX W

Follow-Up Session Debriefing Sheet

Dear Student-Athletes:

Thank you so much for participating in our experiment. We are interested in the degree of anxiety that athletes' experience and how they cope with the stress in their lives. The questionnaires you filled out included measures of trait anxiety, sport anxiety, coping skills, life stress, and positive and negative emotions.

Through this study, we hope to examine the benefits of conducting an intervention with athletes designed to improve coping skills and teach performance enhancing strategies. By understanding more about the level of stress that athletes experience and the coping skills that are most helpful for athletes, we can develop future programs to help athletes manage their stress and perform their best.

If in the course of this experiment you have developed concerns or uncertainties about your athletic pursuits or your life in general, you may wish to seek counseling. If you wish to do this, you may be able to find counseling at the Psychological Services Center in 141 Townshend Hall (please call 292-2059). In addition, the Ohio State University Counseling and Consultation Services located in the Younkin Success Center is open 8 hours a day for appointments, and if needed, on an emergency basis. If you need counseling services through the Counseling and Consultation Services, please call 292-5766. You may also receive counseling services and performance enhancement training from the Sport Psychologist at Ohio State, Dr. Jennifer Carter, by calling 293-3600. If you have any other questions about this study, please call Megan Brent at 309-5268.

If you were a member of the wait-list control group, you now have the chance to take part in a stress management group. Please let Megan know if you would like to take advantage of this opportunity. You may also learn more about performance enhancing strategies by attending the Mental Toughness Academy, a weekly seminar for varsity athletes held every Wednesday from 6:30 - 7:00 pm in Younkin Room 300.

Again, thank you for assisting us with this research. Your participation is valued. We hope that the results will contribute to the availability of quality programs designed to help student-athletes like you.
APPENDIX X

Time Line for Research Study

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 25th</td>
<td>First day of Autumn Quarter classes</td>
</tr>
<tr>
<td>September 27th</td>
<td>REP visited Psychology 100 classes to explain the REP requirement</td>
</tr>
<tr>
<td>October 1st</td>
<td>Co-Investigator e-mailed student-athletes in Psychology 100 about the study</td>
</tr>
<tr>
<td>October 3rd - 17th</td>
<td>Pre-testing sessions</td>
</tr>
<tr>
<td>October 11th</td>
<td>Sent reminder e-mail about pre-testing</td>
</tr>
<tr>
<td>October 18th</td>
<td>Group assignments e-mailed to athletes</td>
</tr>
<tr>
<td>October 21st - 25th</td>
<td>Treatment Group - session 1</td>
</tr>
<tr>
<td>October 28th - 1st</td>
<td>Treatment Group - session 2</td>
</tr>
<tr>
<td>November 4th - 8th</td>
<td>Treatment Group - session 3</td>
</tr>
<tr>
<td>November 11th - 15th</td>
<td>Treatment Group - session 4</td>
</tr>
<tr>
<td>November 18th - 22nd</td>
<td>Treatment Group - session 5</td>
</tr>
<tr>
<td>November 18th</td>
<td>Sent e-mail about post-testing sessions</td>
</tr>
<tr>
<td>December 2nd - 6th</td>
<td>Post-screening sessions</td>
</tr>
<tr>
<td>January 6th</td>
<td>First day of Winter Quarter classes</td>
</tr>
<tr>
<td>January 27th</td>
<td>Sent e-mail about follow-up testing sessions</td>
</tr>
<tr>
<td>February 3rd - 20th</td>
<td>Follow-up testing sessions</td>
</tr>
</tbody>
</table>
Day 1 - Psychoeducation about Stress, PMR

- Introduce myself
- Talk about purpose of the group
  - To learn about and practice strategies that will help you cope with stress and improve your performance
  - Mostly educational, some activities - relaxation, imagery
- Confidentiality important; facilitator will keep confidentiality, but cannot guarantee group members will do the same; share at your comfort level - this is not a therapy group
  - Ask group members to keep confidentiality
- Commitment is important, but you can leave if you feel uncomfortable and still get credit for those sessions you attended
  - Have participants read and sign behavioral contract
  - Need to attend all the groups to get the full benefit/full credit
- Group introductions
  - Name, year, sport, how each person feels about doing this group
- Definition of Stress - when demands outweigh coping ability
- Brainstorm stressors in their lives (write on the board)
  - Important competitions, media attention, injuries, bad referees, bad weather, performance slumps, making an error, being criticized by the coach, a taunting crowd, the successful performance of an opponent, and life events such as the death of a loved one or a change in residence
- What does stress do to your body and mind? How do you know when you are stressed?
  - Four components: physiological, cognitive, affective, behavioral
  - Increased heart rate, high blood pressure, difficulty breathing, sweating, nausea, tense muscles, backache, headache, decreased immune functioning, ulcers, heart disease
  - Anxiety, depression, moodiness, trouble sleeping and/or eating, irritable, negative thinking, excessive drinking/drugs
- How might stress affect your performance?
• Trouble concentrating, too much muscle tension, negative thinking/attitude, injury, not at your best game!

• Today we will focus on the relaxation technique Progressive Muscle Relaxation.
  o Introduce the technique
    ▪ Jacobsen developed it in the 1930s
    ▪ Pendulum/Swing metaphor - you relax better if you tense your muscles first
  o Talk about the benefits
    ▪ Self-control, self-management of anxiety to achieve optimal arousal
    ▪ Improved health… less negative impact of stress on body
  o Run through each muscle group to show members how to tense each group of muscles
  o Talk about letting thoughts come and go; focus on learning technique
  o Do PMR with seven muscle groups and give members handout (see Appendix Z)
  o Countdown to alertness - becoming more alive and awake and energized

• Assign homework… practice PMR daily in between group meetings
  o Give worksheet (see Appendix AA)
    ▪ Name, date, time started & stopped, tension rating before & after
    ▪ We will go over homework next week

• Meet next week - same time & place.

Day 2 - Optimal Arousal, Breathing, & Progressive Muscle Relaxation

• Introductions again
• Just to reiterate, the purpose of this group is to give you some successful strategies for coping with stress and enhancing your performance.
• Collect PMR homework… review & process how it went
• Last week we talked about how it is important to have the right amount of energy when you practice and compete in your sport.

• Theory of Optimal Arousal - Yerkes-Dodson (write on the board)
  o 0 = low energy; 10 = high energy
  o Curve may move left or right for different sports & unique individuals… so optimal level of arousal may be different depending on you & your sport, & even tasks within a sport
    ▪ ex) free throws vs. rest of basketball game
    ▪ ex) golf vs. football
    ▪ non-sport tasks… ex) taking a test
  o What is it like to be at zero?
• Flat, low energy, not focused, slow, too relaxed
  o What is it like to be at ten?
    ▪ Extremely pumped up, spastic, anxious, heart racing, nerves
  o Where is your level of arousal?
  o What is it like to be at the optimal point?
  o How do you get there?
    ▪ Pump yourself up… music, teammates, warming up, bouncing around
    ▪ Relax yourself… stretching, bouncing around to get out jitters, deep breathing
  o Important to know your optimal level & know how to get there. Again, the activities you do in this group are meant to help you do that.

• Another method to relax yourself… deep breathing (addresses physiological component of stress)
  o Discuss diaphragmatic breathing vs. thoracic ("chest") breathing
    ▪ Short, shallow breaths are characteristic of anxiety
    ▪ We are taught to hold our stomachs in
  o Breathing Exercises
    ▪ Place one hand on your chest and one on your abdomen
    ▪ If you are not breathing diaphragmatically, try clasping your hands behind your head… this locks your chest so you breath from your abdomen
    ▪ Make a fist and notice your breathing shorten… now breath normal & notice tension decrease (Lamaze - hard to remain tense when breathing deeply)
    ▪ Count the number of breaths you can take in one minute; take as many as possible. Notice you are breathing from your chest.
    ▪ Now try it again for another minute… try to take as few breaths as possible. Notice you are breathing from your abdomen.
  o Practice deep breathing when you feel anxious.

• Explain cue-controlled relaxation… pair word with feeling of relaxation over four weeks
• Start with deep breathing
• Do PMR with six muscle groups and then, once participants are relaxed, add cue word ("calm")
  o Say "calm" aloud once and then ask participants to pair it with their breathing silently
  o Hand out relaxation worksheets and encourage daily practice of PMR with cue word
• See you next week, same time & place
Day 3 - Imagery

- Welcome back! Again, the purpose of this group is to give you some successful strategies for coping with stress and enhancing your performance. The last two weeks we went over relaxation and breathing… today something new.
- Collect relaxation worksheets and ask how homework went
- Last week we learned deep breathing. Are you more aware of your breathing now?
- Demonstrate efficacy of imagery with the corkscrew exercise
  - Stand up and point your right arm as far behind your back as you can
  - Note what you are pointing to.
  - Okay, now relax and close your eyes. Imagine that your arm is a corkscrew that can twist around your body endlessly…
  - Now open your eyes and point your arm behind your back again (it goes farther)
- Discuss the benefits of imagery
  - Fundamental skill for athletes (Do you use it?) - helps learning and can improve performance with practice
  - Natural mental process used for memory, planning, learning, creating & performing
    - Think about where your T.V. is located in your room… you saw a picture, right?
    - We often try to guide our performance with words - words are just symbols ("A picture is worth 1,000 words.")
  - We can't use words when we are born… we think in images
    - Not just visual- all senses (smell, taste, sound, touch…is that all?)
      - Get a volunteer… close your eyes. I lift up his/her arm. Where is your arm? How did you know that?!
      - Kinesthetic sense is very important to athletes (movement, balance)
  - We were good at imagery when we were little… the skill is not lost, just out of shape!
- First, you need to become more aware of your perceptions - exercise your memory
  - Short imagery exercise - close eyes and remember various sensations (the sound of rain on a window, a child laughing, the smell of freshly cut grass, the feel of clean sheets)
  - Imagery can be used in many ways:
    - Remember experiences and learn from them
    - Imagine performing in ways you would like, even if you've never done it before
      - Psychoneuromuscular theory - brain "practices" a movement pattern without moving a muscle (electrical activity)
Story of prisoner of war who improved golf game with imagery
- Advanced performers benefit more from imagery, though
  - Recall good experiences or best performances and practice recreating the feeling
  - Consciously create strong imagery of an ideal performance by including as much sensory information as you can (does not have to be like watching a movie)
    - Activity - close your eyes and imagine performing your sport
      - Were you inside or outside your body?
    - Can be internal or external point of view… internal may be more effective, but see which one works best for you
  - Try to do it in real time
    - Activity - imagine yourself performing again, inside your body using all your senses
      - How did it go this time?
  - You can develop a "power image" - remember a time when you felt in control, confident, clear-headed, and full of energy. You can use a cue word or action to invoke the feeling ("alive" or fist clench)
    - Ex) athlete who imagined being on a mountain top to achieve feelings of calm, power, and wholeness
    - Ex) long jumper - cheetah after a gazelle
  - Imagery helps performance the most when it is positive and controlled
  - Relaxation can help improve concentration and increase vividness
  - Pay attention to this imagery while performing - it should guide your performance
  - Gradually this will become automatic
- Remind yourself occasionally to feel and remember, especially after a good experience or performance
- Normal difficulties - overanalyzing, too caught up in sensations - throw off the flow
- Practice creating the ideal mood or the ideal performance in your mind… be patient and persistent at working to match your performance to this image
- Start with deep breathing
- Do PMR with four muscle groups, add cue word, then have participants imagine performing
- Hand out relaxation worksheets and encourage daily practice of PMR with cue word and attempts to use imagery on their own
- See you next week!
Day 4 - Positive Self-Talk

- Thank you for coming
- Again, the purpose of this group is to give you some successful strategies for coping with stress and enhancing your performance.
- Today will be learning another strategy to manage stress and improve your mental toughness as an athlete, but first…
- Collect relaxation worksheets and ask how PMR and imagery homework went

- The skill we are going to focus on today is called self-talk. Any idea what that is?
  - Our thoughts… what we tell ourselves
  - These can be very powerful messages! What we tell ourselves influences our feelings and actions.
  - It would be nice to have positive messages all the time, but all of us, even the biggest optimists, are prone to negative thinking at one time or another. We can be our own worst critic.
    - Imagine you just missed a crucial play… you messed up badly. What are you saying to yourself?
      - I'm horrible at this. I should quit. I can't believe I'm that stupid.
    - Then how are you feeling?
      - Sad, angry, guilty
    - What would be a more positive way to think about the situation?
      - Oops! I messed up, but I'll do better next time.
- There are different ways to interpret a situation, and how we interpret an event may determine how we think, feel, and act.
- When we think negatively, we have a hard time being rational about things. It is important to be aware of that negative, irrational thought so that we can challenge it.
- Pass out handout on Burns' 10 Types of Cognitive Distortions (see Appendix BB)
  - Do any of these ways of thinking sound familiar?
  - Ask the group members to give examples from sport (write on the board)
    - Situation
      - Ex) Lose a competition
    - Automatic Thought
      - Ex) "I stink," or "I'm never going to win."
    - Physical/Emotional Response
      - Ex) depressed, anxious, sick, tired
    - Cognitive Distortions
      - Ex) all-or-nothing thinking, overgeneralization
    - Reframed Thoughts
• Ex) "I did my best," or "I'll come back stronger next time."
• Work on identifying your cognitive distortions/negative thoughts, challenge them, and then counter them with positive thinking
• This takes practice! Sometimes our negative thoughts are messages that have been ingrained in us for a long time… it's kind of like a tape that plays in our mind. We want to record over the tape.
• Hand out self-talk homework (see Appendix CC) and encourage increased awareness of self-talk
• Hand out relaxation worksheets and encourage daily practice of PMR with cue word and attempts to use imagery on their own
• See you next week for the last group session before post-testing

Day 5 - Flow and Review

• Welcome to the last group session!
• Again, the purpose of this group is to give you some successful strategies for coping with stress and enhancing your performance… we will talk about a new concept today and also review what we've learned throughout the last five weeks
• Collect relaxation worksheets and ask how PMR and self-talk homework went
• Ask for example of negative self-talk; do reframing process with the participants
  o Write on the board… Situation, Automatic Thought, Physical/Emotional Response, Cognitive Distortions, Reframed Thoughts
• Focus on flow today… does anyone know what flow is?
  o Not an exact science, no precise definition, term coined in 1970's by Csikszentmihalyi
  o Expressions used to describe flow:
    ▪ In the zone, everything clicks, unbeatable, in the groove, tuned in, total control, super alive
    ▪ What is this like for each of you? (write on board)
  o The key to optimal experiences and performances… rewarding for its own sake
  o Nine fundamental components (give handout; see Appendix DD)
    ▪ Challenge-skills balance
      • How you perceive your skills, what you believe you can do
    ▪ Action-awareness merging
      • Smooth, fluent, very focused, feels effortless (runner's high)
    ▪ Clear goals
      • Knowing what you need to do, feeling confident
• Unambiguous feedback
  • Continuously monitoring whether you're on target to achieve your goals
• Concentration on the task at hand
  • Complete and purposeful focus, not allowing distractions
• Sense of control
  • Power, confidence, calm/composure, feeling invincible
• Loss of self-consciousness
  • Free of self-doubt or worry, acting on instinct, losing yourself in the task
• Transformation of time
  • Timeless moment… time may seem to speed up or slow down
• Autotelic experience
  • Rewarding for its own sake, almost like a high

• How does flow relate to the things we've already talked about?
  o Relaxation? Imagery? Self-Talk?
  o Of the things you have learned, what will be most helpful for you?

• Do recall relaxation (scan body for tension & release it), cue word ("calm"), and imagery exercise
• Each of those skills can help you get into the flow state.

• We have now completed our group. We have talked about stress and the effect it can have on your mind and body. Hopefully you have learned skills to handle stress more effectively and to improve your performance as an athlete. Thank you for participating!
• Meet here again at the regular time during the last week of classes - fill out questionnaires for ~30 min (worth 1 hour of REP credit)
• I will also be contacting you in January about coming in for a follow-up testing.
APPENDIX Z

Progressive Muscle Relaxation

1. **Right hand and forearm**
   Tense by making a tight fist with the right hand.
2. **Right bicep and tricep**
   Tense by bringing the right elbow into the side.
3. **Left hand and forearm**
   Tense by making a fist with the left hand.
4. **Left bicep and tricep**
   Tense by bringing left elbow into the side.
5. **Forehead**
   Tense by either raising the eyebrows up or by making a deep frown.
6. **Eyes and nose**
   Tense by squinting hard and wrinkling the nose.
7. **Mouth and jaw**
   Tense by clenching the teeth and forcing the lips back.
8. **Neck**
   Tense by either counterposing the neck muscles or by pushing the head back into the chair.
9. **Chest and shoulders**
   Tense by holding a deep breath and forcing shoulder blades back and together.
10. **Abdomen**
    Tense by tightening up the stomach muscles.
11. **Right thigh**
    Tense by either counterposing the muscles or by raising the right leg slightly off the chair.
12. **Right calf**
    Tense by pointing the right toes up toward the top of the head.
13. **Right foot and toes**
    Tense by curling the toes and pointing the foot inward.
14. **Left thigh**
    Tense by either counterposing the muscles or by raising the left leg slightly off the chair.
15. **Left calf**
    Tense by pointing the left toes up toward the top of the head.
16. **Left foot and toes**
    Tense by curling the toes and pointing the foot inward.
APPENDIX AA

Relaxation Worksheet

Relaxation is a skill that develops with practice. While you are learning how to use Progressive Muscle Relaxation, it is important that you practice daily. Complete the following weekly Relaxation Worksheet and bring it to the next group meeting. Next to each category indicate the appropriate information about your daily practice.

For "Degree of Relaxation," 0 = very relaxed… 10 = very tense.

<table>
<thead>
<tr>
<th>Date</th>
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<th></th>
<th></th>
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<tbody>
<tr>
<td>Time started</td>
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<tr>
<td>Time stopped</td>
<td></td>
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</tr>
<tr>
<td>Degree of relaxation at the start</td>
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</tr>
<tr>
<td>Degree of relaxation at the end</td>
<td></td>
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</tr>
</tbody>
</table>

*Comments:*
APPENDIX BB

Burns' 10 Types of Cognitive Distortions

1. All-or-nothing thinking - evaluating personal characteristics or situations in black-or-white categories

2. Overgeneralization - viewing one negative event as a never-ending pattern of defeat

3. Mental filtering - dwelling on a negative occurrence, which makes the whole situation seem negative

4. Disqualifying the positive - turning positive comments into negative thoughts

5. Jumping to conclusions - especially negative ones…
   a. Mind reading - assuming you know what another person is thinking
   b. Fortune telling - predicting that things will turn out badly

6. Magnification and minification - exaggerating the importance of a negative event or mistake and denying the importance of positive personal characteristics or events

7. Emotional reasoning - using your emotions to validate your thoughts… if you feel that something is right, then it must be true

8. Labeling - describing an entire situation or person based on one negative event or quality

9. Personalization - feeling responsible, to blame, for something bad that happens

10. "Should" statements - thinking you should do this or that
APPENDIX CC

Self-Talk Homework

<table>
<thead>
<tr>
<th>Date</th>
<th>Situation</th>
<th>Automatic Thoughts</th>
<th>Physical Response</th>
<th>Emotional Response</th>
<th>Cognitive Distortion</th>
<th>Reframed Thought</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Record of Automatic Thoughts
APPENDIX DD

Flow Handout

FLOW

Nine fundamental components:

- Challenge-skills balance
  - How you perceive your skills, what you believe you can do

- Action-awareness merging
  - Smooth, fluent, very focused, feels effortless (runner's high)

- Clear goals
  - Knowing what you need to do, feeling confident

- Unambiguous feedback
  - Continuously monitoring whether you're on target to achieve your goals

- Concentration on the task at hand
  - Complete and purposeful focus, not allowing distractions

- Sense of control
  - Power, confidence, calm/composure, feeling invincible

- Loss of self-consciousness
  - Free of self-doubt or worry, acting on instinct, losing yourself in the task

- Transformation of time
  - Timeless moment… time may seem to speed up or slow down

- Autotelic experience
  - Rewarding for its own sake, almost like a high
<table>
<thead>
<tr>
<th>VARSITY SPORT</th>
<th>TREATMENT GROUP (N=16)</th>
<th>CONTROL GROUP (N=14)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Baseball</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheerleading</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Crew</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Fencing</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Football</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ice Hockey</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lacrosse</td>
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<tr>
<td>Soccer</td>
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</tr>
<tr>
<td>Softball</td>
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</tr>
<tr>
<td>Swimming</td>
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<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Synchronized Swimming</td>
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</tr>
<tr>
<td>Track and Field</td>
<td>2</td>
<td>1</td>
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</tr>
<tr>
<td>Volleyball</td>
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</table>

Table EE.1: Varsity Sport Representation by Gender in Treatment and Control Groups.
APPENDIX FF

Evaluation Form Data
<table>
<thead>
<tr>
<th>Evaluation Form Items</th>
<th>Post-Test</th>
<th>Follow-Up Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Overall benefit (out of 24)</td>
<td>19.00</td>
<td>4.26</td>
</tr>
<tr>
<td>Stress education</td>
<td>3.00</td>
<td>.97</td>
</tr>
<tr>
<td>Deep breathing</td>
<td>3.38</td>
<td>.81</td>
</tr>
<tr>
<td>Relaxation</td>
<td>3.00</td>
<td>1.10</td>
</tr>
<tr>
<td>Imagery</td>
<td>3.44</td>
<td>.81</td>
</tr>
<tr>
<td>Self-talk</td>
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<td>.93</td>
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<tr>
<td>Flow education</td>
<td>2.81</td>
<td>.83</td>
</tr>
<tr>
<td>Overall change in ability (out of 20)</td>
<td>14.88</td>
<td>3.24</td>
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<tr>
<td>Deep breathing</td>
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<td>.89</td>
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<tr>
<td>Relaxation</td>
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<td>1.01</td>
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<tr>
<td>Imagery</td>
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<td>.82</td>
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<tr>
<td>Self-talk</td>
<td>2.94</td>
<td>1.12</td>
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<tr>
<td>Stress management</td>
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<td>.73</td>
</tr>
<tr>
<td>Overall commitment (out of 24)</td>
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<td>4.51</td>
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<tr>
<td>Stress education</td>
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<td>.96</td>
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<tr>
<td>Deep breathing</td>
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<td>.82</td>
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<tr>
<td>Relaxation</td>
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<td>Imagery</td>
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<tr>
<td>Flow education</td>
<td>2.69</td>
<td>1.08</td>
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<tr>
<td>Change in performance (out of 4)</td>
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<tr>
<td>Total evaluation score (out of 72)</td>
<td>54.19</td>
<td>11.92</td>
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</tbody>
</table>

Note. Each item on the evaluation form was scored on a 5-point Likert scale ranging from 0 ("Not at all Helpful/Improved/Committed") to 4 ("Highly Helpful/Improved/Committed").

Table FF.1: Evaluation Form Data from the Treatment Group at Post and Follow-Up Testing.
APPENDIX GG

Correlation Tables for Pre and Post-Testing
<table>
<thead>
<tr>
<th>Measure</th>
<th>SCAT</th>
<th>TAI</th>
<th>LESCA POS</th>
<th>LESCA NEG</th>
<th>ACSI</th>
<th>PANAS PA</th>
<th>PANAS NA</th>
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<td>SCAT</td>
<td>-</td>
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<tr>
<td>TAI</td>
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<td>LESCA POS</td>
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<td>.59**</td>
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<td>-.29</td>
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</table>

Note. *p<.05; **p<.01.

Table GG.1: Pearson Product-Moment Correlation Matrix at Pre-Testing (N=30).

<table>
<thead>
<tr>
<th>Measure</th>
<th>SCAT</th>
<th>TAI</th>
<th>LESCA POS</th>
<th>LESCA NEG</th>
<th>ACSI</th>
<th>PANAS PA</th>
<th>PANAS NA</th>
</tr>
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<tbody>
<tr>
<td>SCAT</td>
<td>-</td>
<td></td>
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<tr>
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<td>LESCA POS</td>
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<tr>
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<td>-.49**</td>
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</table>

Note. *p<.05; **p<.01.

Table GG.2: Pearson Product-Moment Correlation Matrix at Post-Testing (N=30).