

ABSTRACT

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This study was designed to determine if the implementation of stress management and relaxation training techniques could improve indoor sport climbing performance. The sample included 90 male and female Ss (18-42 yr). Subjects self-assigned themselves into one of 4, 8-week, indoor sport climbing courses offered at the University of Wisconsin-La Crosse. Classes were randomly selected as either a control (n = 47) or treatment (n = 43) group via a coin toss. Subjects completed a sport climbing performance test before and after the training program. Treatment subjects participated in a total of 120 minutes of stress management and relaxation training techniques during the program. Both groups received climbing instruction and equal practice opportunity. Results of a one-way ANCOVA indicated no significant ($p > .05$) interaction between pre- and posttest results by group or by gender.

**THE EFFECT OF RELAXATION TRAINING ON INDOOR SPORT
CLIMBING PERFORMANCE OF COLLEGE STUDENTS**

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CHAPTER I

INTRODUCTION

A new trend has set the stage for people in the sporting industry. Adventure activities and high adrenaline sports have become increasingly popular in recent years. Traditional sports such as basketball and football are still quite prominent; however, new sports (i.e., rock climbing, mountain biking, snow boarding, and in-line skating) are making their mark in today's schools, outdoor settings, and competitive environments. The recent development of these extreme sports and competitions has created a new outlook for many educators. Increased participant numbers in such sports are steering educators toward methods and approaches for quality instruction in each of these individual sports. Participants or athletes in these new sports must be taught proper fundamentals and techniques for their individual sport. Adequate time and quality practice are needed for students to acquire the ability to adapt and refine their movement skills (Carlisle & Cole, 1994). This study focused on the sport of indoor rock climbing combined with relaxation techniques.

According to Skinner and McMullen (1993) "Rock climbing has been around for a long time; only recently has it been described as a 'sport'. Past and pioneer climbers focused above all in the pure adventure of climbing or the art and spirituality of it and did not consider their activity as a sport. The only objective these early climbers had was to

reach the summit and return alive" (p. 3). With time, specific climbs and climbers began to be recognized; henceforth, the competitive nature in people turned this recreational activity into a competitive sport for many people. True free climbing was backed by the onset of technical equipment and climbing aids that were designed to assist climbers over difficult sections in route, making almost any summit conquerable. Organized competitive climbing began in the Soviet bloc countries in the mid 1970's (Darmi, 1992).

Competitions were held on natural rock and judged by the speed it took a climber to reach the summit (Darmi, 1992).

It was in the 1980's when modern sport climbing began (Skinner & McMullen, 1993). Modern sport climbing competitions are held both indoors and outdoors although the actual climbing surface is typically a man-made structure. Individuals who participate in rock climbing, competitive or recreational, need physical skill training. Physical practice has been the primary method for participants to improve their climbing ability. The researcher believes that physical practice combined with the implementation of stress management techniques could benefit and improve climbing performance of both competitive and recreational climbers.

In sports such as rock climbing, increased adrenaline and a stimulated level of anxiety might be beneficial in some instances. However, employing relaxation procedures to reduce anxiety and control stress will enhance the vividness and clarity of one's imagery needed to properly execute a skill or movement (Weinberg, Seabourne, & Jackson, 1987).

Gray, Haring, and Banks (1984) noted it has been typically presumed that relaxation will facilitate physical improvements by reducing distracting stimuli, aiding in recall or clarifying the visual representation of motor skills. Using a relaxation training protocol (see Appendix A) the researcher of the current study hoped to identify the effect of such training on rock climbing performance among college students.

Need for the Study

Indoor rock climbing provides the possibility for many exercise benefits. Due to the recent development of this sport, little research has been conducted to assess its effectiveness when combined with stress management and relaxation. While participating in this sport, the climber competes against the rock alone or against a competitor. Many climbers, for a variety of reasons experience stress, tension, and/or high anxiety levels. Some stress is beneficial for maximum performance of athletes, but with too much stress the performance level will begin to decline. Relaxation may be a technique indoor sport climbers can use to improve performance.

Purpose of the Study

The purpose of this study was to measure indoor sport climbing improvement as a result of physical practice and relaxation training of male and female college students.

Hypotheses

The following hypotheses were tested in the study:

1. There will be no significant differences in indoor sport climbing performance between the control and experimental (relaxation trained) groups.

2. There will be no significant differences in indoor sport climbing performance between males and females.

Assumptions

The following assumptions were made in this study:

1. Students were interested in constantly assessing and updating their personal training to ensure the highest possible fitness level.
2. The students in both the experimental and control groups were taught the same techniques involved to rock climb.
3. Subjects were not color blind. (The testing procedure was designed using color coded climbing routes).
4. The researcher accurately scored each climb.
5. All rock climbing and stress management instruction was taught consistently.
6. During pre- and posttesting, subjects climbed to the best of their ability.
7. Subjects in the treatment group were able to properly engage in stress management techniques.

Delimitations

The delimitations of the study were:

1. Subjects were male and female undergraduate students from the University of Wisconsin-LaCrosse (UW-L).
2. The highest point touched on a route was the only measurement used to determine performance of a climb.

3. The size of the treatment and control groups was limited to 100 undergraduate students.

Limitations

The limitations of the study were:

1. Subjects for this study were volunteers chosen from already established UW-L rock climbing courses; thus, a nonrandom sample was used.
2. Indoor climate conditions (i.e., temperature, relative humidity, and barometric pressure) were regulated by the building's ventilation system and the environmental variables and, therefore, were not controlled by the researcher.
3. Muscle fatigue from previous climbing sessions may have hindered performance.
4. Subjects received eight stress management training sessions.
5. Motivation levels of subjects could not be controlled.

Definition of Terms

Adventure Education - a state of disequilibrium the student experiences by being placed in a novel setting and a cooperative environment while being presented with unique problem solving situations (Nadler & Luckner, 1992).

Aid Climbing - when a climber uses equipment to directly ascend a rock face (Skinner & McMullen, 1993).

Artificial Aids - using the protection bolts as holds, grabbing slings or biners, and taking tension on the rope (Darmi, 1992).

ASCF - abbreviation for the American Sport Climbers Federation (Darmi, 1992).

Belaying - the act of managing a climbing rope which is attached to a climber and safeguarding the climber (Skinner & McMullen, 1993).

Belayer - the person who is managing the rope and protecting the climber with it (Skinner & McMullen, 1993).

Cognitive Experience - the mental process that involves thinking, reasoning, understanding, and judgment, particularly when related to problem solving (Pargman, 1986).

Concentration - a withdrawal of attention from factors which are no longer or have never been relevant to your immediate performance to focus it on those which are (Syer & Connolly, 1984).

Emotional Flexibility - the ability to absorb unexpected emotional turns and remain supple, nondefensive, and balanced, able to summon a wide range of positive emotions (i.e., fun, joy, fighting spirit, and humor) to the competitive battle (Loehr, 1994).

Free Climbing - when a climber depends entirely upon his footwork, ability, skill, and physical strength to pull himself up the rock face (Skinner & McMullen, 1993).

Relaxation - a temporary and deliberate withdrawal from activity which, if correctly timed, allows an individual the ability to recharge and make full use of one's physical, mental, and emotional energy (Syer & Connolly, 1984).

Rock Climbing - bolt protected face climbing (Skinner & McMullen, 1993).

Route - an established or selected path of climbing on rock (Loughman, 1981).

Skill - an action or task that has a specific goal to achieve, and an indicator of quality of performance (Magill, 1989).

Sport Climbing - climbing with the protection points, usually bolts, already in place (Darmi, 1992).

Toughness Training - the art and science of increasing your ability to handle all kinds of stress-physical, mental, and emotional; so that you will be a more effective competitor (Loehr, 1994).

UIAA - Union Internationale Des Association D'Alpinisme, the international governing body for climbing competitions (Darmi, 1992).

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

In order to better understand the advantages associated with indoor sport climbing, it is necessary to review the various principles involved with the foundations of adventure education and rock climbing. This will provide reference for the results of the study. In addition, knowledge of existing stress management modalities that have been shown to increase performance will provide useful comparisons for any increases found with use of indoor rock climbing in this study. This chapter is presented in three sections:

a) research related to adventure, b) rock climbing, and c) relaxation training in terms of how it can effect performance.

Adventure

The term adventure has been present for many years. This simple word has quite a variety of definitions. Hopkins and Putnam (1993) reported adventure as an experience that involves the uncertainty of outcome. An adventure can be of the mind and spirit as much as a physical challenge. It normally involves people doing something new, of moving beyond their experience in discovering the unknown or meeting the challenge of the unexpected (Darst, 1991). Much of the outdoor/adventure education movement has been based on challenge and stress (Ronke, 1989). For some individuals, sports similar to rock climbing could be more routine and not as big of an adventure as something like

writing a poem or a thesis. People experience similar emotions when they undertake creative activities, are involved with unaccustomed social situations, are faced with a challenging task, or begin to acquire a new skill or knowledge (Hopkins & Putnam, 1993, p. 6).

Graydon (1992) reported additional ideas of adventure given by a pair of the most recognized climbers in the world, Fred Beckey and Sir George Leigh Mallory. Beckey stated adventure as, "Something complex and undefinable, the attraction of uncertainty". Mallory added, "What we get from adventure, is just sheer joy" (p. 13). These men were speaking more specifically on the adventure or emotion they experienced while climbing. One might perceive that a writer upon completion of a well designed poem would feel the same sheer joy as Mallory and Beckey associate with climbing.

For the purpose of this study, adventure was associated with education. The phrase 'adventure education' is in the same sense similar to the terms outdoor education, development training, outward bound activities, adventure based counseling, outdoor development, and experiential education. Adventure education is a process based on adventurous activities which use natural or artificial environments to identify individual and group intrapersonal or interpersonal strengths and weaknesses (Priest, 1990). Priest stated, "The product of adventure education is personal growth and development" (p. 114).

In recent years, adventure education has been a growing and ever popular field all around the world. Principles that have contributed to this popularity according to The

Association of Experiential Education (Gass & Williamson, 1995), include: a) the learner is a participant rather than a spectator, b) learners are engaged physically, emotionally, and intellectually, c) the results of learning are personal and form the basis for future learning, and d) learning occurs when the experiences are supported by reflection, critical thinking, and synthesis.

Nadler and Luckner (1992) have also developed a framework for adventure education. The authors assert, "The student experiences a state of disequilibrium by being placed in a novel setting and a cooperative environment while being presented with unique problem-solving situations. These situations lead to feelings of accomplishment which are augmented by processing the experience which promotes generalization and transfer to future endeavors" (p. 9).

According to Gass (1993), a leading expert in the field of adventure therapy, the processing of information gained through adventure education can occur before, during, or after the experience. One might question how learning could result before the experience as suggested by Gass. The time of learning for the participant would depend highly on the instructor's methods and approaches of teaching style. Individual characteristics of the instructor would also contribute to the amount and specific types of information learned by the participant.

Nadler and Luckner (1992) propose that processing is important because "adventure education programs are rich in symbols, metaphors, feelings, and typical behavior patterns" (p. 3). In more recent work by Luckner and Nadler (1997), they assert

processing "enhances the richness of the experience, so it stands out and apart, like the important lines of a page underlined with a yellow highlighter. This unique learning can then be used again and generalized to other settings. When a new experience is processed, integrated, and internalized, individuals are able to grow, and as a result, they have more choices and influences in their lives" (p. 10). It is generally thought by experts in the field that "processing" is essential if individuals involved in the program are to truly benefit from the experience. There must be some transfer of learning or as Kimball and Bacon (1993) contend "there is the danger that the adventure program will result in nothing more than a powerful peak experience-a temporary high-that has few lasting benefits" (p. 29).

Rock Climbing

With the help of adventure education, rock climbing has become a more popular and fast growing sport. Rock climbing has also become a very specialized sport. Some of the most difficult and popular climbs in the world are less than 40 feet in length. In 1993, Skinner and McMullen reported by mainstream affiliation, the definition of "modern" rock climbing is bolt-protected face (vertical rock wall) climbing (p. 1). When the authors use the term "bolt," they are referring to a precision constructed piece of metal (zinc-plated or solid stainless steel, p. 31) that is a permanent fixture in the rock wall placed there by a previous climber. Climbers attach their ropes to these protective bolts via carabiners and short pieces of webbing or slings, known as quick draws, to protect them from falling to the ground below. One must realize that in rock climbing the fall itself is

not the danger; hitting the earth with impact is where the real potential for serious injury occurs and where measures of prevention should be taken.

Modern rock climbing has two basic categories of classification: free climbing and aid climbing (Skinner & McMullen, 1993). The authors assert that a free climber depends entirely on his/her footwork, ability, skill, and physical strength to pull him/herself up the rock face. The equipment used while free climbing is essentially for safety (i.e., protection to stop a fall). Equipment is not used to ascend the face directly. Any use of equipment to directly ascend a rock face is called aid climbing. Aid climbing techniques are used when a section of rock cannot be free climbed, and equipment must be used to make progress up the rock (p.3). Typically, indoor rock climbing facilities around the country incorporate free climbing as the only means of climbing practices allowed. On rare occasions people might be found learning, practicing, or training, aid climbing maneuvers in an indoor rock climbing setting.

Fitness Benefits of Rock Climbing

There have been several studies to show the fitness benefits of rock climbing. Steffen and Stiehl (1995) reported sport climbing can promote muscular strength, flexibility, and endurance. In 1992, Wescott performed a study to assess fitness benefits as a result of rock climbing. The tests were conducted on a revolving rock called a Treadwall. This was a 7 week study designed to assess the following characteristics: a) body weight, b) percentage of body fat, c) fat weight, d) lean weight, e) flexibility, f) leg strength, and g) arm strength. There were also pre- and posttests administered

during the third and seventh weeks of the study to measure climbing proficiency. Subjects were placed in either a control group that did not participate in any climbing activities or a climbing (treatment) group. Subjects in the treatment group performed climbing exercises twice a week for a 7-week period.

Results indicated the climbing subjects made significant increases in body composition, joint flexibility, and muscular strength. The treatment group also made significant improvements in climbing abilities. Through this study, Wescott noticed an increase in heart rate among the treatment group subjects and decided to administer a second study. This second study was also done with subjects climbing on the Treadwall twice a week. However, this was an 8-week study that administered maximum oxygen consumption tests on ten subjects before and after the 8-week climbing regiment. The results indicated improvements in cardiovascular performance. Future studies in this area would benefit adventure education, the sport of rock climbing, and the participants of both adventure and climbing activities. In conclusion, Wescott (1992) indicated that rock climbing 15 to 20 minutes per day, two days per week, for a period of 2 months is sufficiently stressful to produce significant improvements in body composition, joint flexibility, muscular strength, and cardiovascular endurance.

Stress and Rock Climbing

Bunting, Little, Tolson, and Jessup (1986) conducted a study on rock climbing and rappelling in relation to beneficial eustress (stress) levels. Rock climbing, rappelling, and other high adventure activities were thought to promote eustress. The study used 12 low

fitness level and high fitness level subjects to participate in four rock climbing/rappelling sessions. Stress was quantified by levels of catecholamines, epinephrine, and norepinephrine found in the subject's urine. The results suggested that low fitness level individuals had higher stress during the activities. This is typical of many sports and activities. Generally, the more fit an individual the less effort required to achieve the same results as a less fit individual. Stress should be no exception. Bunting et al., (1986) reported that more research is needed to determine the implications of eustress because the Yerkes-Dodson Law has indicated that stress is beneficial to a certain point. Curtis (1991a) supports this concept when he stated in his book, "a characteristic of high level performers is that they control the level of stress in their bodies--they are not controlled by the stress. This is not to say that stress and tensions are negative. In fact, stress is a normal, desirable, beneficial part of our lives" (p. 25).

The relationship between stress levels in the body and performance can be visualized in a simple bell-shaped curve. As stress or tension level increase in an athlete's body so does their performance level. This process continues until a certain peak occurs where the athlete's performance is at a very high level. Once the stress or tension level goes beyond this the performance begins to lower. Sometimes performance is dramatically reduced at this point which can be referred to as "choking." "The goal for optimal performance is to realize when we have too little or too much stress and to be able to alter our arousal level accordingly" (Curtis, 1991a).

Relaxation Training

One important reason this study's focus was not strictly on competitive rock

climbing was because of the many different competitive events. Some climbing events last 20-30 minutes, while others last only a few seconds. There are also events where the athletes do not even get a chance to look at the rock face to be climbed prior to the event (Billat, Palleja, Charlaix, Rizzardo, & Janel, 1995). To maximize the validity of this relaxation study focus has been put on a more recreational climbing perspective. Of the 90 total subjects involved in this study, 88% were beginners and less than 3% had previous relaxation training.

Hird, Landers, Thomas, and Horan (1991) reported the effects of physical practice alone and mental practice alone are well documented; the effects of various combinations of mental and physical practice relative to physical practice are less understood. The researcher of this study hoped that by implementing physical practice and relaxation training, results would produce useful information. More specifically, information that could be used to evaluate various forms of mental practice to see if they are capable of enhancing cognitive and motor task performance.

In 1994 Brehm reported periods of relaxation are as essential for physical and psychological well-being as periods of exercise. This general concept has been recognized and supported for a number of years. Brehm (1994) also suggested that people need relaxation to return to physiological levels of normalcy: normal resting blood pressure, heart rate and blood chemistry, and resting levels of muscle relaxation. Brehm's suggestions alone rectify another need for the current study when crossed with the beliefs of Norwegian researcher, Gunnar Breivik. Breivik (1996) reported that in order to

become a top level athlete in a high risk sport one needs a more extreme psychological profile than at lower performance levels. Bunting et al., (1986), Curtis (1991a), and Anshei (1991) reported that stress is beneficial to a certain point in sports as well as everyday life.

A study conducted by Maynard, MacDonald, and Warwick-Evans (1997) used the concepts and practices of Applied Relaxation (somatic technique). The researchers investigated the changes in cognitive anxiety, somatic anxiety, and self-confidence of novice rock climbers in a noncompetitive environment. The study took an in-depth look into cognitive anxiety or the mental component of anxiety caused by negative expectations about success or negative self-evaluation (p. 67). The study also evaluated the somatic anxiety which is the physiological or affective component of anxiety that is directly related to autonomic arousal (p. 68). The study was set up to provide further means to enhance our understanding of the anxiety-performance relationship. The researchers also believed the study would allow a more detailed evaluation of the competitive anxiety response and that it could provide a constructive rationale for anxiety management or self-regulation.

The primary purpose of this investigation was to further test the matching hypotheses in a noncompetitive sporting situation. The matching hypothesis is a process that suggests the treatment of anxiety may be more effective if the method of treatment is directed at the system most activated by the stressor. More specifically, it was hypothesized that by treating both a somatically anxious group and a cognitively anxious group with a somatic relaxation technique, the matching treatment would be more effective. Based upon previous research in competitive sport, three further hypothesis

were generated for the noncompetitive activity of rock climbing. First, that cognitive anxiety will remain stable before the climb; second, that somatic anxiety will increase rapidly as the climbers arrive at the site of the climb, and third, that self-confidence should also remain relatively stable like cognitive anxiety, because the climbers' expectations should not change dramatically in this period prior to the climb.

The sample for this study was formed by 30 male undergraduate students enrolled in an outdoor pursuits course at the Chichester Institute of Higher Education. All subjects volunteered to participate in the study and none of the subjects had any prior rock climbing experience. The researchers used a 27 item Likert style questionnaire. The questionnaire was sport specific, measured both cognitive and somatic anxiety, and addressed self-confidence. The subjects of the treatment group went through a 6 stage Applied Relaxation technique.

The early stages of the treatment focused on Progressive Muscle Relaxation (Jacobson, 1938). Progressive Muscle Relaxation works by contrasting tension of specific muscle groups with relaxation of those particular muscle groups. Progressions were made through tensing and relaxing muscles of the body from the head down to the toes. Next, focus concentrated on getting the whole body in a relaxed state. Then attention was focused on rapid relaxation or relaxing in a naturally occurring nonstressful situation. The final stage was application training. (The primary researcher of this thesis introduced a combination of these steps used by Maynard et al., (1997) in addition to other relaxation methods from other sources for his study on relaxation and rock climbing). The main purpose of this study was to test the hypothesis that by treating both a somatically anxious

group and a cognitively anxious group with a somatic relaxation technique, the matching treatment would be more effective. The findings in the study by Maynard et al., (1997) with novice rock climbers supported this contention. It was found that the more efficacious approach is to reduce preclimb state anxiety with a method directed at the type of anxiety being experienced by the subject. The researchers also believed it should be noted "that anxiety reduction techniques directed at one system also facilitate relaxation through the other system, suggesting that the systems do interact" (p. 75).

Another study by Chan, Weinberg, and Jackson (1983) set out to investigate the effectiveness of a combination of mental preparation (including relaxation) strategies versus a single strategy in enhancing performance. However, results did not support the contention that a combination of techniques is better than a single technique. The researchers' focus was on imagery, relaxation, relaxation plus imagery, and a control group. The researchers discussed different aspects of "psyching-up" athletes, performance at various arousal levels, and methods they used to approach relaxation and imagery with their subjects. This study appeared to be well-structured, valid, and reliable. One possible explanation for the lack of superiority of the combination group might reside in the amount of information to be processed during the psych-up interval. The authors suggested that the combination of both strategies may have been too much information at one time for subjects to get a concrete understanding. This belief is supported by several subjects that indicated they experienced difficulty in concentrating on both strategies and then transferring this to the actual performance. The authors then went on to discuss the

period of time that is needed for subjects to get a sound understanding of multistrategy stress reduction techniques to improve performance consistently.

Summary

Indoor sport climbing is closely related to and a reflection of actual rock climbing. Created mainly for rock climbers seeking an indoor means for staying in shape and honing their skill during the off-season, sport climbing has received much attention (Steffen & Stiehl, 1995). Over the past few years, competitive rock climbing has experienced increased popularity worldwide. In 1989, the first six-event World Cup competition was held with all events contested on artificial modular walls (Billat et al., 1995). Climbing benefits are not only physical, but also include those taught through adventure education and the experiential learning processes. Indoor sport climbing as well as rock climbing techniques are challenging yet rewarding to their participant. Many beneficial outcomes are developed through the trust and responsibilities of the active participants in each of these sports.

The levels of stress apparent in individuals varies as much as the actual climbing abilities amongst participants varies. Statistics support evidence that physical fitness levels of participants contribute to the amount of stress transformed through various skills and tasks. It can be assumed that a reasonable amount of stress is present in the majority of indoor sport climbers. Evidence also supports the belief that if controlled, this stress becomes beneficial and an important ingredient for quality performance of the skills required to successfully climb indoor rock walls. However, if this stress is not controlled and continues to rise, the performance level diminishes.

CHAPTER III

METHODS AND PROCEDURES

Introduction

The primary purpose of this study was to measure sport climbing improvement as a result of eight weeks of relaxation training techniques with physical practice of male and female college students. Subjects learned relaxation strategies and climbing fundamentals to develop skills required to successfully rock climb. This chapter presents information concerning: a) subjects, b) instruction, c) the indoor climbing wall, d) testing procedures, e) scoring, f) instrumentation, g) the relaxation techniques, and h) statistical treatment of data.

Subjects

College students were qualified as subjects after they enrolled in one of four indoor rock climbing courses (ESS 100) during the spring 1998 semester at the University of Wisconsin-La Crosse (UW-L). Participation in the study was on a volunteer basis. The subjects ranged in age from 18 to 42. Control and treatment groups were randomly chosen via a coin toss.

The control groups met from January 20, 1998 to March 5 from 1:10 to 3:00 p.m. on Tuesdays and Thursdays for a total of 14 class days or approximately 26 contact hours. The treatment group met from March 17 to April 30 on Tuesday and Thursday from 1:10 to 3:00 p.m. for a total of 15 class days or approximately 28 contact hours.

Instruction

The control and treatment groups were taught by qualified UW-L instructors. All instructors followed the same format for teaching skills, progressions, and techniques used in rock climbing (see Appendix B). On the first day of each class, the researcher met with students in the classes to explain the overall study and benefits of climbing and relaxation. Once students were informed of the combination of relaxation and rock climbing, volunteers were accepted and asked to complete the Informed Consent Form (see Appendix C). The Informed Consent Form and all procedures were thoroughly explained and questions were answered.

The treatment group went through a series of eight relaxation regiments (see Appendix A). The groups were introduced to and practiced various approaches and methods of relaxation training. Each of these sessions was approximately 15 minutes in length. A total time of 120 minutes was contributed to actual relaxation training time. The treatment groups were presented an additional instruction day (110 minutes) to equalize climbing practice opportunity for all groups.

Indoor Climbing Wall

The indoor rock climbing wall located in Mitchell Hall is 33 feet tall. It is constructed of a plywood base with hand and foot holds bolted into the face to simulate actual rock. The climbing wall consists of 12 different routes. Each route is identified by color coordinated hand and foot holds. Holds are placed on the wall at different space

intervals to create a challenging environment. The holds also come in an assortment of shapes and sizes. These shapes and sizes combined with the spacing intervals, slope or angle of the rock, and an overhang all determine the difficulty of the different routes. The 12 routes were categorized from easiest to most difficult.

Testing Procedures

This study used a pre- and posttest design to determine improvements of the subjects. Both groups were given identical tests in both testing situations. On testing days, subjects were instructed to dress appropriately for the type of climbing exercise to be performed. The tests were given during the second and final weeks of the study. Individually, subjects chose a route in which they felt would be challenging for them. If the route was successfully climbed without falling or an infraction, the subject was placed on the next difficult route. An infraction is the result of touching a hold (piece of rock for hand/foot placement) not on the designated route being attempted to climb. This same testing procedure has proven successful in studies conducted by Barton (1996) and McNamee (1997) at UW-L.

Scoring

There are 12 established climbing routes on the UW-L climbing wall. These routes are rated in difficulty from 1 to 12, one being the easiest and 12 the hardest. Subject performance was judged until a fall or infraction occurred, as is done during American Sport Climbers Federation (ASCF) and sport climbing competitions (Darmi, 1992). The subjects get credit for the highest hold touched on the highest level route attempted.

Instrumentation

The score card used for the purposes of this study is a remodeled version of the score card used in all major ASCF sanctioned competitions. The score card was a similar reproduction of the score card used in a study completed by Barton in 1996 (see Appendix D). Information on the card included: a) a portion of the subjects' social security number (used only for temporary identification), b) gender, c) age, d) weight, e) height, f) the number of the highest hold touched on a specific route attempted without a fall or infractions, g) the route number where a fall or infraction occurred to end the test, and h) the participants previous climbing experience.

Stress Management Program

In addition to physical practice and training, subjects in the treatment group were taught relaxation strategies. A combination of strategies from a variety of sources was used to develop the stress management/relaxation training program for this study.

Material was derived from readings in the following books: Learn to Relax: A 14-Day Program (Curtis, 1991), The Mindset for Winning (Curtis, 1991), Stress Management for Sport (Sime & Zaichowsky, 1982), Sporting Body Sporting Mind (Syer & Connolly, 1984), The Personal STRESS Reduction Program (Forman, 1987), and How To Relax: A Holistic Approach to Stress Management (Curtis & Detert, 1981).

The primary objective of the relaxation strategies was to create the proper mind set for improvement in the preparation phase as well as the climbing performance of the participants. It was also derived so that participants would be able to identify and control

the increased anxiety level when confronted with a high adrenaline activity so that the anxiety would not hinder their performance. Exhalation exercises, affirmation statements, and sequential exercises were the three major methods used in administering the relaxation training to the subjects. See Appendix A for an outline of the complete stress management program.

Statistical Treatment of Data

Standard descriptive techniques were computed for subject biographical characteristics and sport climbing performance results. Independent t-tests were used for differences between pre- and posttest scores for control, treatment, and gender groups. An analysis of covariance (ANCOVA) was used to determine if significant changes occurred between the control and experimental groups as a result of the training protocol. Different variables included: a) age, b) height c) weight, d) gain score, and e) gender. For this study, the .05 level of significance was used for all analyses.

CHAPTER IV
RESULTS AND DISCUSSION

Introduction

This chapter presents the results and discussion for the following data: a) biographical information of subjects, b) climbing performance scores for the control and treatment groups, c) pretest analysis, d) posttest analysis, and e) analysis of covariance (ANCOVA) results of climbing performance scores. The .05 level of significance was used for all statistical calculations.

Biographical Information

The biographical information of the subjects who participated in this study is presented in Table 1. A total of 90 subjects between the ages of 18 and 42 years participated as either control or treatment group subjects. Subjects in the control group (n = 47) had a mean age of 20.2 years, while subjects of the treatment group (n = 43) had a mean age of 20.7 years.

Table 1. Subjects' Biographical Characteristics (N = 90)

Variable	Control (n = 47)	Treatment (n = 43)	Male (c) (n = 22)	Female (c) (n = 25)	Male (t) (n = 21)	Female (t) (n = 22)
Age	20.2* 1.7**	20.7 4.7	20.7 2.0	19.8 1.3	22.2 6.4	19.2 1.2
Height (in)	68 4	67.9 3.6	71.3 2.0	65.6 3.0	70.0 3.2	66.0 2.9
Weight (lbs)	150.6 28	156.7 30.7	175.0 17.6	129.2 14.7	175.9 32.5	139.0 12.7

* = Mean ** = Standard Deviation (c) = control (t) = treatment

The control group which included students/volunteers from two UW-L climbing classes consisted of 48 subjects. One subject was not present for the posttest dates, thus 47 subjects were used in the control group's final analyses. The mean height of participants in the control group was 68 inches and the mean weight for this group was 150.1 pounds.

The treatment group that was also made up of two UW-L classes originally consisted of 45 subjects. However, two of the subjects were not present for posttesting and could not be included in the treatment group's final analyses. The mean height of participants in the treatment group was 67.9 inches and the mean weight was 156.7 pounds.

Climbing Performance Scores

Table 2 presents the pretest, posttest, and gain climbing performance scores of subjects by group. Both control and treatment subjects were given the same pre- and posttest to determine sport climbing performance ability. Gain performance scores were derived by subtracting the subject's pretest scores from their posttest scores.

Table 2. Subject's Sport Climbing Performance Results

Group	Pretest	Posttest	Gain Score	p-value
Control	81.3*	108.6	27.3	p < .05
	61.1**	56.7		
Treatment	70.3	105.5	35.2	p < .05
	47.3	47.3		

* = Mean ** = Standard Deviation

Pretest Analysis

Independent t-tests were calculated to compare pretest scores between control and treatment groups. No significant ($p > .05$) difference was found between groups for pretesting climbing performance. The mean climbing performance score on the pretest for the control group was 81.3. The mean climbing performance score on the pretest was slightly lower at 70.3 for the treatment group.

A significant difference ($p < .05$) was found between males and females in pretest climbing performance. The females involved in both control and treatment groups ($n = 47$) had a mean climbing performance score of 54.6. For the total males ($n = 43$) in both groups a mean climbing performance score of 100 was produced. These results are presented in Table 3.

Table 3. T-test Results for Control vs. Treatment Groups and Male vs. Female in Pretest Climbing Performance Scores

Group	t-value	df	p-value
Treatment vs. Control	-.946	88	.347
Male vs. Female (Combined)	-.423	88	.000*

* Indicates a significant difference between groups ($p < .05$)

Posttest Analysis

A one-way ANCOVA comparison of posttest scores for the control group and the treatment group was calculated. A p-value of .168 was computed. The results of the one-way ANCOVA indicated no significant ($p > .05$) difference between posttest scores of the control and treatment groups. These results indicated that the relaxation techniques and training had no effect on the treatment group. Both groups improved in climbing ability at a similar level. The treatment group did improve dramatically on the posttest with the mean climbing performance score being 105.5. However, the control group also had significant improvement and finished the posttest with 108.6 being the mean climbing performance score. Results of ANCOVA also showed no significant ($p > .05$) difference between posttest scores by gender. These results are presented in Table 4.

Table 4. ANCOVA Comparison of Posttest Scores of Females
(n = 47) and Males (n = 43)

F	df	p-value
.065	1	.80

* Indicates a significant difference between groups ($p < .05$)

These results indicate that the relaxation techniques had no significant effect on any single gender. Both males and females in the control and treatment groups improved in climbing performance at a similar level.

Pre- and posttest mean climbing performance scores for control and treatment groups depicting the extent and direction of improved performance are presented in the following figure.

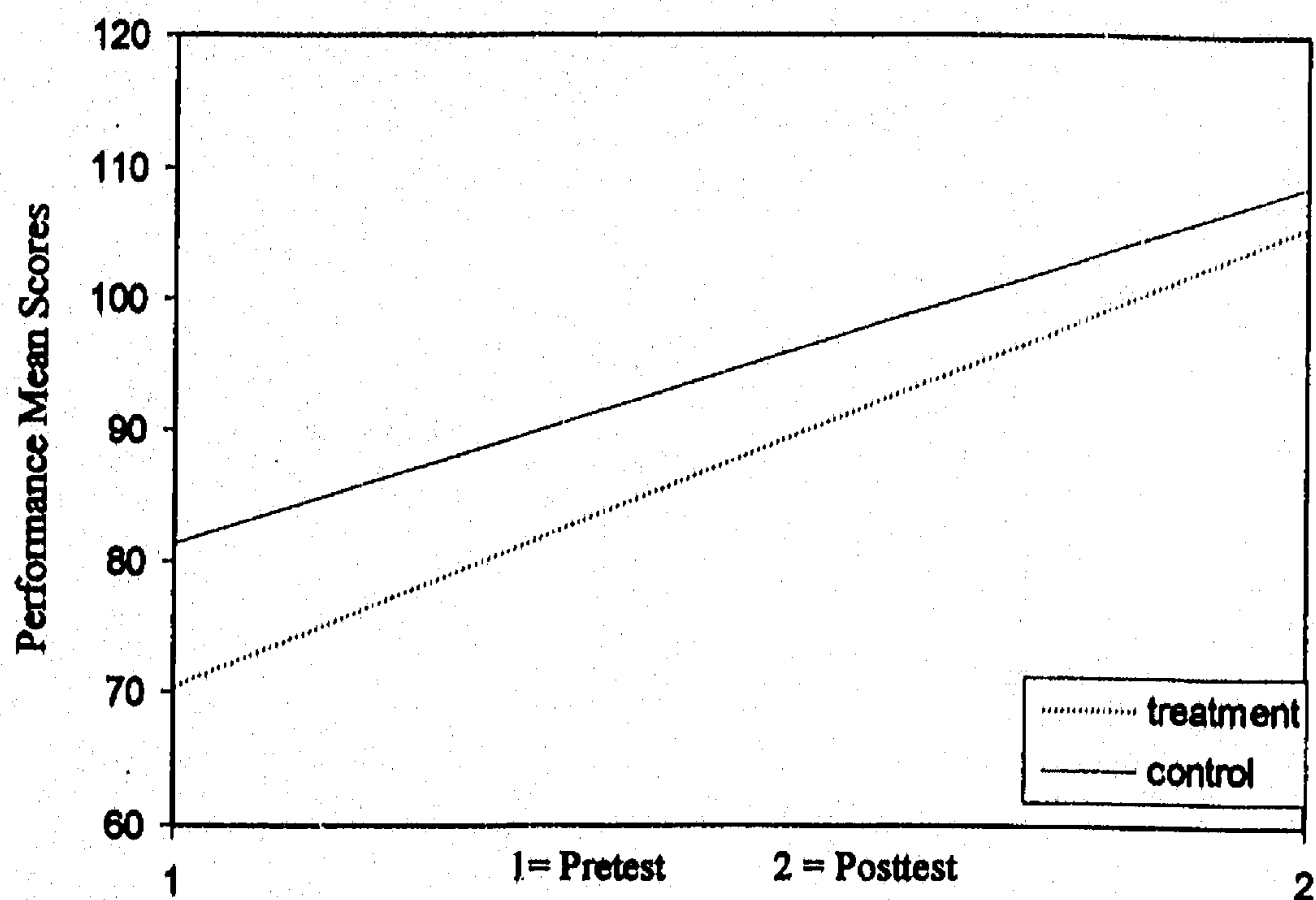


Figure 1. Mean Climbing Performance Scores for Control and Treatment Groups

Discussion

After examining the statistical analysis an overall improvement among subjects' climbing performance from pre- to posttest scores was observed. Both the control and treatment groups' gain scores improved over the course of the 8-week introductory rock climbing classes. However, with the rates of improvement being fairly similar, no significant differences were found in performance. Therefore, the first hypothesis that there would be no significant differences in indoor sport climbing performance between the control and experimental groups failed to be rejected. With no significant difference

between groups it can be assumed that the results of this study indicate relaxation techniques combined with physical practice do not improve performance more than physical practice alone. In other words, both methods (physical practice and physical practice combined with relaxation techniques) are equally effective when incorporated into the teaching of indoor rock climbing. This contention is in agreement with research that suggest the quality of information that can be processed at any time is limited (Navon & Gopher, 1979). With the majority of the subjects in the current study being beginning rock climbers (88%) it can be presumed that subjects were learning climbing strategies in conjunction with relaxation strategies. This idea is supported by Chan, Weinberg, and Jackson (1983) who suggest that due to the complexity of mental preparation techniques, it may be difficult for subjects to cognitively integrate their strategies. It appears a more substantial period of time needs to be devoted to practicing the use of these techniques. The current researcher did provide subjects with a log (see Appendix E) to record relaxation practice sessions outside of the class setting, but no required assignments were made.

Results indicated that there was no significant difference between male and female participants involved in the study. Therefore, the second hypothesis that there would be no significant differences between indoor sport climbing performance between males and females was accepted. This indicates that gender was not a limiting factor of performance. A similar study (Barton, 1996) focused on imagery and its effect on climbing ability. The research also showed no significant difference between gender performance. Barton (1996) indicated male mean gain score was similar whether one was

in the control or treatment group, and female mean gain score improvement was similar whether one was in the control or treatment group. Barton's conclusion agrees with the findings of the current study.

With no significant differences in performance improvements of the various groups it can be assumed for the sport of indoor rock climbing, relaxation techniques will not enhance performance. The results from the present study and Barton's (1996) mental imagery findings are in agreement with previous researchers (Feltz, 1988; Hird et al., 1991), who found that mental practice and/or combined with physical practice is not more effective than physical practice alone. One explanation for the findings of this study could be supported by Breivik (1996) when he suggested that high sensation seekers (risk takers) accept higher risks to reach their goals. In 1996 Breivik reported, "it may seem as if the risk in high risk sports sometimes is experienced as positive in itself, adding some spice to the total situation" (p. 310). More relaxation training research involving a variety of different sports is recommended. Another concern of the researcher includes the idea that the actual stress and/or anxiety apparent in sport climbing subjects is substantially less at posttest time than at the beginning of the course or pretest time. The researcher believes that during the course of the 8-week study students/subjects became confident in themselves, equipment, and belayers. Some type of activity or consequence that would require the subjects to perform at a certain level might create a more stressful environment. The implementation of a new or different challenge for the subjects to face might constitute the grounds to show a difference between groups in terms of how they identify and adjust for the new situation.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to measure sport climbing improvement as a result of stress management and relaxation techniques combined with physical practice. Ninety subjects between the ages of 18 and 42 years completed the study. The control group, consisting of 47 subjects, took part in 8 weeks of an introductory indoor rock climbing class (ESS 100). The treatment group, consisting of 43 subjects, also took part in a 8-week introductory rock climbing class (ESS 100). All rock climbing was conducted inside Mitchell Hall Fieldhouse at the University of Wisconsin-La Crosse on the indoor rock climbing wall. The control and treatment groups had the same amount of time and opportunity to physically practice rock climbing. In addition, the treatment group also received eight stress management/relaxation training sessions that the control group did not receive.

All subjects participated in pre- and posttesting in which they received a score that measured their ability to successfully climb the preestablished routes on the indoor climbing wall. At the beginning of the stress management/relaxation training, subjects in the treatment group were given logs to create positive affirmation statements in writing and to keep track of actual relaxation methods and experiences.

Pre- and posttest data from both groups were collected and statistically analyzed to determine if significant improvement occurred in response to instruction, physical

practice, and stress management/relaxation training. Results from the analysis of covariance (ANCOVA) indicated that there was no significant ($p > .05$) interaction for gain score performance between the control and treatment groups.

Conclusions

Based on the results of this study, the following null hypotheses failed to be rejected or were rejected:

1. There will be no significant differences in indoor sport climbing performance between the control and experimental (relaxation trained) groups. The null hypothesis failed to be rejected.
2. There will be no significant differences in indoor sport climbing performance between males and females. The null hypothesis failed to be rejected.

Recommendations

Based on the conclusions of this study, the following recommendations for future studies were presented:

1. Examine similar variables with larger sample sizes to strengthen the significance of the results.
2. It is recommended that future studies be done with experienced rock climbers.
3. It is recommended that future studies be done for a period longer than 8 weeks.
4. It is recommended that in future studies all groups be instructed by the same rock climbing instructor.

5. It is recommended that in future studies all treatment groups are taught stress management/relaxation techniques by a professional in this area.
6. It is recommended that future studies be done with pre-, mid-, and posttests.
7. It is recommended that future studies be done with more than one criteria of judging a climb, such as the speed it takes a climber to complete a route.
8. It is recommended that future studies incorporate video equipment or other forms of modern technology. This addition would allow pre-, mid-, and posttests to be recorded, ensuring climbers' scores are accurate.

REFERENCES

Anshel, M. (1991). Relaxation training in sport: Pros and cons. Sport Health: Official Gazette of Australian Sports Medicine Federation, 9, 23-24.

Barton, K. (1996). The effect of mental imagery on sport climbing performance of college students. Unpublished master's thesis, University of Wisconsin-La Crosse, La Crosse.

Billat, V., Palleja, P., Charlaix, T., Rizzardo, P., & Janel, N. (1995). Energy specificity of rock climbers and aerobic capacity in competitive sport rock climbers. The Journal of Sports Medicine and Physical Fitness, 35, 20-24.

Brehm, B. (1994). The benefits of relaxation training. Fitness Management, 10, 26-28.

Breivik, G. (1996). Personality, sensation seeking and risk taking among Everest climbers. International Journal of Sport Psychology, 27, 308-320.

Bunting, C., Little, M., Tolson, H., & Jessup, G. (1986). Physical fitness and eustress in the adventure activities of rock climbing and rappelling. The Journal of Sports Medicine and Physical Fitness, 26, 11-20.

Carlisle, C., & Cole, S. (1994). Skillful movers. Dubuque, IA: Brown & Benchmark.

Chan, R., Weinberg, R., & Jackson, A. (1983). Mental preparation strategies and performance: Is a combination of techniques better than a single technique? Journal of Sports Sciences, 1, 211-216.

Curtis, J. (1991a). The mindset for winning. La Crosse, WI: Coulee Press.

Curtis, J. (1991b). Learn to relax: A 14-day program. La Crosse, WI: Coulee Press.

Curtis, J., & Detert, R. (1981). How to relax: A holistic approach to stress management. Mountainview, CA: Mayfield Publishing.

Darmi, P. (1992). The sport climbing competition handbook (Rev. ed.). Evergreen, CO: Chockstone.

Darst, P. (1991). Outdoor adventure activities for school and recreation programs. Prospect Heights, IL: Waveland Press.

Feltz, D. (1988). Self-confidence and sport performance. Exercise and Sport Sciences Reviews, 16, 423-457.

Forman, J. (1987). The personal stress reduction program. Englewood Cliffs, NJ: Prentice-Hall.

Gass, M. (1993). The evolution of processing adventure therapy experiences. In M.A. Gass (Ed.), Adventure therapy: Therapeutic applications of adventure programming, (pp. 219-229). Dubuque, IA: Kendall/Hunt.

Gass, M., & Williamson, J. (1995). Accreditation for adventure programs. Journal of Physical Education, Recreation, and Dance, 66, 22-27.

Gray, J., Haring, M., & Banks, N. (1984). Mental rehearsal for sport performance: Exploring the relaxation-imagery paradigm. Journal of Sport Behavior, 7, 68-78.

Graydon, D. (1992). Mountaineering: The freedom of the hills. Seattle, WA: The Mountaineers.

Hird, J., Landers, D., Thomas, J., & Horan, J. (1991). Physical practice is superior to mental practice in enhancing cognitive and motor task performance. Journal of Sport and Exercise Psychology, 8, 281-293.

Hopkins, D., & Putnam, R. (1993). Personal growth through adventure. London, Great Britain: David Fulton.

Jacobson, E. (1938). Progressive relaxation. Chicago: University of Chicago.

Kimball, R., & Bacon, S. (1993). The wilderness challenge model. In M.A. Gass (Ed.), Adventure therapy: Therapeutic applications of adventure programming (pp. 11-41). Dubuque, IA: Kendall/Hunt.

Loehr, J. (1994). The new toughness training for sports. New York, NY: Penguin Books.

- Loughman, M. (1981). Learning to rock climb. San Francisco, CA: Sierra Club.
- Luckner, J., & Nadler, R. (1997). Processing the experience: Strategies to enhance and generalize learning. (2nd ed.). Dubuque, IA: Kendall/Hunt.
- Magill, R. (1989). Motor learning: Concepts and applications. Dubuque, IA: Brown.
- McNamee, J. (1997). Task analysis and performance cues for beginning sport climbers. Unpublished master's thesis, University of Wisconsin-La Crosse, La Crosse.
- Maynard, I., MacDonald, A., & Warwick-Evans, L. (1997). Anxiety in novice rock climbers: A further test of matching hypothesis in a field setting. International Journal of Sport Psychology, 28, 67-78.
- Nadler, R., & Luckner, J. (1992). Processing the adventure experience. Dubuque, IA: Kendall/Hunt.
- Navon, D., & Gopher, D. (1979). On the economy of the human information processing system. Psychological Review, 86, 214-255.
- Pargman, D. (1986). Stress and motor performance: Understanding and coping. Ithaca, NY: Movement.
- Priest, S. (1990). Adventure education. State College, PA: Venture.
- Ronke, K. (1989). Cowstails and cobras II: A guide to initiatives, ropes courses, and adventure curriculum. Dubuque, IA: Kendall/Hunt.
- Sime, E., & Zaichkowsky, L. (1982). Stress management for sport. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance.
- Skinner, T., & McMullen, J. (1993). Modern rock climbing. Merrillville, IN: ICS Books.
- Steffen, J., & Stiehl, J. (1995). Does your gym have six walls? Journal of Physical Education, Recreation, and Dance, 66, 43-47.

Syer, J., & Connolly, C. (1984). Sporting body sporting mind. New York, NY: Cambridge.

Weinberg, R., Seabourne, T., & Jackson, A. (1987). Arousal and relaxation instructions prior to the use of imagery. International Journal of Sport Psychology, 18, 205-214.

Wescott, W. (1992). Fitness benefits of rock climbing. American Fitness Quarterly, 10, 28-31.

APPENDIX A

STRESS MANAGEMENT/RELAXATION PROGRAM OUTLINE

**Stress Management/Relaxation
Program Outline**

NOTE: All sessions were approximately 15 minutes in duration.

- Session 1:** General introduction and overview
Introduce the importance of mental preparation for better performance
Discuss stress, relaxation techniques, and positive affirmation statements
- Session 2:** Hand out and explain relaxation logs
Introduce and lead students through exhalation exercise
Discuss Positive Affirmation Statements (PAS)
- Session 3:** Lead exhalation exercise
Incorporate PAS
- Session 4:** Introduce and lead sequential exercise
- Session 5:** Lead sequential exercise
Incorporate PAS
- Session 6:** Lead exhalation exercise
Incorporate PAS
- Session 7:** Lead sequential exercise
Incorporate PAS
- Session 8:** Lead sequential exercise
Incorporate PAS
Collect relaxation logs
Closure

APPENDIX B

INDOOR ROCK CLIMBING COURSE OUTLINE

University of Wisconsin-LaCrosse
College of HPER
Department of Exercise and Sport Science

Indoor Rock Climbing

I. Course Description:

This course presents the content, method, and safety of indoor sport climbing. Students will learn to use and implement a wide variety of climbing equipment and knots. Emphasis will be placed on the acquisition of basic skills and techniques for improving performance in climbing indoor rock walls.

II. Student Objectives:

Upon completion of this course the student will be able to:

1. Acknowledge and follow safety procedures.
2. Identify and perform a wide variety of knots involved with climbing.
3. Demonstrate proper rope care and management techniques.
4. Utilize the basic skills needed to successfully climb indoor walls.
5. Become proficient in technical skills associated with climbing (i.e., belaying, knot tying, rope management, and climbing harnesses).

III. Course Content:

1. Preconditioning activities, physical warm-up, and psychological preparation.
2. Safety, spotting, and belaying techniques.
3. Specific bouldering and climbing movements.
4. Materials and equipment necessary for indoor climbing.
5. Elements of climbing techniques and conditioning.

IV. Course Evaluation:

50% Participation

50% Following Safety Procedures

Attendance Policy: Students are allowed 2 absences, MORE THAN 2 ABSENCES THE STUDENT FAILS the course.

V. Resources:

The Basic Essentials of Rock Climbing by Mike Strassman

APPENDIX C
INFORMED CONSENT FORM

INFORMED CONSENT FORM

University of Wisconsin-LaCrosse
LaCrosse, Wisconsin 54601

Project Title: The effect of relaxation training on sport climbing performance of college students

Principal Investigator: Robert Fraser

I _____ give my informed consent to participate in this study on the effect of stress management on my climbing performance. I consent to presentation and publication or other dissemination of study results so long as the information is anonymous and disguised so that no identification can be made. I further understand that although a record will be kept of having participated in the experiment, all experimental data collected from my participation will be identified by number only.

I have been informed that the purpose of this study is to determine whether or not stress management techniques coupled with physical practice will elicit greater rock climbing performance than physical practice alone. I understand that I will experience stress management techniques and strategies.

I have been informed that there are no known risks in learning and practicing stress management. I may, however, benefit from this study on stress management throughout my daily routines. Examples of improvement may include one's performance in activities, schoolwork, dealing with problems, relaxing and sleeping, etc.

I understand there are no "disguised" procedures in this experiment. The researcher will meet with all voluntary participants individually. The subjects will be identified using the last four digits of their student ID number issued by the university. Only the researcher and committee members will have access to these numbers and scores of participants.

I have been informed that the investigator will answer questions regarding the procedures of this study upon completion of the project.

I have been informed that I am free to withdraw from the experiment at any time without penalty.

Concerns about any aspects of this study or project may be referred to the principal researcher Rob Fraser at 796-0838 or the thesis advisor, Dr. Jeffrey Steffen at 785-6535.

I acknowledge that my part in this study will include me as a member of the experimental or control group. (circle one)

Investigator or Researcher Date

Participant Date

APPENDIX D

CLIMBING PERFORMANCE SCORING CARD

SCORING CARD

Date:
Group:

Name of Researcher: Robert Fraser

SS#	GENDER	AGE	WEIGHT	HEIGHT	ROUTE#	HOLD# REACHED
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
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19						
20						
21						
22						

APPENDIX E

POSITIVE AFFIRMATION/RELAXATION LOG

University of Wisconsin-La Crosse
ESS 100 Rock Climbing
Relaxation Log

Last 4 #'s of student # _____

Positive Affirmation Statements:

- 1 _____
- 2 _____
- 3 _____

Relaxation Log

<u>Date</u>	<u>Relaxation Time</u>	<u>Relaxation Technique</u>	<u>Did Relaxation Occur?</u> (Y or N)
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____
8	_____	_____	_____
9	_____	_____	_____