8-1992

The relative effectiveness of two psychological training programs on performance and state anxiety of female college basketball players : a multiple baseline time series and single subject evaluation

Carolyn A. Savoy

To the Graduate Council:

I am submitting herewith a dissertation written by Carolyn A. Savoy entitled "The relative effectiveness of two psychological training programs on performance and state anxiety of female college basketball players : a multiple baseline time series and single subject evaluation." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Patricia Beitel, Major Professor

We have read this dissertation and recommend its acceptance:

Charles Thompson, William Calhoun, Joy Desensi

Accepted for the Council:

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Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Dr. Patricia Beitel, Major Professor

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School

THE RELATIVE EFFECTIVENESS OF TWO PSYCHOLOGICAL TRAINING PROGRAMS ON PERFORMANCE AND STATE ANXIETY OF FEMALE COLLEGE BASKETBALL PLAYERS: A MULTIPLE BASELINE TIME SERIES AND SINGLE SUBJECT EVALUATION

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Carolyn A. Savoy

August 1992

DEDICATION

This dissertation is dedicated to
my mother, Doris Savoy
and to
the memory of my father, Valmond Savoy
for their faith in my ability
and their many sacrifices on my behalf.

ACKNOWLEDGEMENTS

I would like to thank my major professor Dr. Patricia Beitel for her guidance, nurturing, and patience throughout my research. A sincere appreciation is expressed to my committee member Dr. Charles Thompson for his concern, counseling, and support over the past two years. To Dr. William Calhoun, a thank-you for encouraging me to pursue my research plan. He knew the timing was right. A thank-you to Dr. Joy Desensi for her comments and assistance. To Coach Pat Head Summitt a thank you for her trust in me and for listening. I would like to thank and acknowledge the subjects for their participation, honesty, and diligence throughout this study. To my colleague Dr. Jerry Singleton, special thanks for encouraging me and for giving me pre-doctoral guidance. I would also like to express my thanks to my husband, Dave Robertson, for his encouragement, sacrifices, and support while I was completing my doctorate.

ABSTRACT

This study was designed to determine the relative effectiveness of a group centered and combined group/individualized psychological training program on state anxiety factors and game performance for closed and open skills of a top 10 nationally ranked NCAA Division I women's basketball team. State anxiety was measured by the Competitive State Anxiety Inventory-2 (Martens, Vealey, and Bump, 1990). The closed skill, foul shooting was measured by foul shooting percentage. The open skills were measured by: (a) field goal percentage; (b) points per minute played; (c) rebounds per minute played; (d) steals per minute played; (e) turnovers per minute played; and (f) fouls per minute played.

Data were collected during the pre-season, regular season, and post season play across a 20 week time period including 11 blocks of 3 games and one block of 2 games. There were 7 athletes in the group centered program and 3 athletes in the combined/collaborative program. A multiple baseline time series design and a single subject design were employed to evaluate the results. Based on a Group x Block ANOVA, with athletes nested in group, planned contrasts were used to compare the two intervention programs on the state anxiety and basketball performance measures. The foul shooting program was evaluated by a time series analysis with planned contrasts in an ABABAB multiple baseline across

subjects design. A single subject design across behaviors for each of the three subjects in the individualized collaborative program was employed to analyze the data.

The findings suggested that: (a) foul shooting performance can be significantly enhanced through the use of a mental and physical training program; (b) the group and collaborative individualized programs significantly effected cognitive and somatic anxiety in a positive direction; and (c) the collaborative individualized program produced significantly greater results on self-confidence and rebounding as compared to the group program. In addition, for athletes in the combined program there were patterns of performance of the remaining open skills which were similar in real world importance, but not as statistically strong as rebounds per minute.

TABLE OF CONTENTS

CHAPTER PAGE

CHAPTER PAGE

CHAPTER PAGE

LIST OF FIGURES

FIGURE PAGE

CHAPTER 1

INTRODUCTION

Gaining a winning edge in game performance has long been of interest to coaches and athletes. In an attempt to create this edge in performance, physiological training methods have been developed which assist coaches and athletes in optimizing physical performance, and coaches have been schooled in the technical and tactical components of their particular sport. However, the psychological training methods have not been made accessible to coaches until recently because of: (a) a lack of funding for teams to have a sport psychology consultant, and (b) a lack of education about psychological skill training. Since the mid-1970s Sport Canada has been exploring the psychological aspect of training in a response to coaches, athletes, and athletic administrators who want the athletes to have optimal performances. The athletic administrators decided to place an emphasis on the psychological training in sport since this was an underdeveloped aspect of sport in Canada. Sport psychologists, such as Botterill, Jensen, Orlick, Partington, and Rushall, were among the first to work with the Canadian National teams in the area of psychological training.

The physical, technical, tactical, and psychological components comprise a total training program. Psychological

training, such as relaxation, imagery, focusing, and positive self-talk, has been found to be of benefit to the athlete's overall performance (Suinn, 1972; Ryan and Simons, 1981), and should be organized around the athlete's characteristics and personal performance requirements (Haslam, 1990). Because psychological training is an important component of the coaching process, it should be one aspect of the total training program presented to athletes.

Several case studies have shown that visuo-motor behavior rehearsal (VMBR) enhanced the transfer of closed skills from the practice session to the actual game or event performance (Buckles, 1984; Hall & Erffmeyer, 1983; Seabourne, Weinberg, Jackson, & Suinn, 1985; Suinn, 1972). Feltz and Landers (1983) concluded that mentally practicing a skill does enhance performance more than no practice at all. Ryan and Simons (1981) concluded that mental practice does not facilitate perfection of a skill, it facilitates consistent skill performance, and if mental practice is performed improperly, no improvement in performance will take place. Andre and Means (1986) suggested that there is no guarantee that a given amount of mental practice alone will enhance the performance of a motor task.

Often, psychological training programs in sport involve multiple techniques such as imagery, relaxation, and positive self-talk (Hall & Rodgers, 1989; McCaffrey &

Orlick, 1989; Orlick & Partington, 1988). Botterill (1986) and Nideffer (1981) suggested that a combination of relaxation, imagery, positive self-talk, energizing, centering, and focusing could improve overall game or event performance. In addition to these psychological training techniques, goal attainment scaling (Kiresuk & Sherman, 1968) can be employed as a way to generate specific psychological skill goals for the subject which are derived through individual counseling (Thompson & Rudolph, 1988). This technique has been successfully applied in several clinical psychology case studies (Emmerson & Neely, 1988; D.L Smith, 1976; R. Smith, 1988; Thompson & Zimmermann, 1969).

One concern of coaches is that players will be over or under aroused for practices and games. The inverted-U hypothesis suggests that performance is best at an optimal level of arousal, and that performance progressively declines as arousal increases or decreases from each individual's optimal level. The psychological ability of an individual to control arousal is a key factor which separates good and poor performances. Better performers are able to control arousal when they perform in anxiety-provoking games or events. When anxiety increases above the moderate level, anxiety control skills are needed. Anxiety control in sport usually implies reducing arousal through anxiety management techniques such as relaxation, imagery,

centering, and focusing (Gill, 1986).

The literature has included group-centered (Ryan and Simons 1982; Wrisberg and Ragsdale, 1979) or athlete-centered studies (Andre and Means, 1986; Kendall, Hyrcaiko, Martin, & Kendall, 1990) dealing with this approach, but no studies which included both techniques and/or the differences in their effectiveness. In addition, there is indication that broader enhancement practices are in use by sport psychology consultants, and broader programs have been suggested, but there is no research to support the use of combining relaxation, centering, positive self-talk, energizing, and focusing. Research has been conducted employing some of these techniques for performance on closed skill tasks (Andre & Means, 1986; Cohn, Rotella, & Lloyd, 1990; Wrisberg & Ragsdale, 1979), open skill tasks (Kendall et al., 1990), and closed and open skill tasks using the same experimentally controlled technique (Buckles, 1984). However, there are no studies to investigate the relative effectiveness of broad combined group centered and individualized programs on state anxiety, and game performance for open and closed skills with focus using principles for the differences between closed/open skills.

Statement of the Problem

Since there is a void in the literature concerning the effectiveness of a combination of intervention techniques,

the purpose of this study is to determine the relative effectiveness of a group centered and combined group/ individualized psychological training program on state anxiety and game performance for closed and open skills.

Hypotheses

The specific hypotheses concerning these effects are listed below.

1. Both the group and combined psychological intervention programs will facilitate a decrease in state anxiety as measured by the Competitive State Anxiety Inventory-2 (CSAI-2, Martens, Vealy, & Burton, 1990) after the psychological intervention training program has been introduced (multiple baseline across subjects design).

2. There will be an improvement for the game performance in the closed skill of foul shooting percentage for the team during applied intervention (B) phases (ABABAB) multiple baseline across subjects design).

3. For both groups game statistics will improve in the open skills of field goal percentage, points, rebounds, steals, turnovers, and fouls per minute played in each game from baseline to the end of the intervention (multiple baseline across subjects design).

4. A single subject design across behaviors for each of the three subjects in the collaborative group will show an improvement in their state anxiety and game performance

of closed and open skills relative to variations in their psychological training program across the season.

Definitions

The following are theoretical and operational definitions to be employed in this study.

1. Centering. An activity which results in one coming to a focus, converging, or concentrating on an immediate task. All athletes learned to center in this study (Appendix A).
2. Energizing. Any activity which results in feelings that one has reserve energy to draw upon for performance (Loehr, 1983). Athletes in the collaborative program were taught how to energize themselves for games and practices (Appendix B).
3. Focus. The ability to concentrate on a skill or situation. All athletes were taught how to focus on the immediate task after they centered (Appendix A).
4. Game performance. An assessment of how the athlete performs on the following closed skill and open skills during each season game using game statistics. These statistics will be recorded and averaged for each game in the study, by player, by treatment group, and by team.

   (a) Closed skill. A skill in which the environment is relatively stable, the situation is predictable, and

there is little concern for rapid perceptual adjustments (Gentile, 1972). In this study, the closed competitive game performance skill was free throw shooting, operationally defined as the successful free throw percentage per game.

(b) Open skill. A skill which is executed in an environment which is unstable and/or changing (Poulton, 1957). In this study, the open skills measured for each game during the competition were: (a) field goal percentage, (b) points per minute played, (c) rebounds per minute played, (d) steals per minute played, (e) turnovers per minute played, and (f) fouls per minute played.

5. Imagery. An experience similar to a sensory experience such as, seeing, feeling, hearing, but arising in absence of the usual external stimuli (Martens, 1987). All athletes will be asked to internally image specific closed or open tasks in game situations, e.g., focusing on foul shooting in a tie game, stealing the ball from an opponent and completing a pass to a teammate who scores (Appendix A).

6. Psychological intervention programs. For the purpose of this study the two techniques were a group centered program and a combined (group centered and individualized) program.

(a) Group centered program. This program included

three instructional sessions per week for five minutes with the investigator. This program included centering, focusing, and imagery (Appendix A).

(b) Combined program. This program included individual meetings with each athlete in the collaborative group to develop an individual psychological training program. This program included individualized elements for centering, focusing, imagery, energizing, and positive self-talk (Appendix B).

7. Positive self-talk. Making positive statements to one's self, reflecting one's ability to be able to achieve the task (i.e., "I can shoot and score."). The group with the combined program had access to audiotapes and given instruction when there was a need (Appendix B).

8. Process. For the purposes of this study, process is defined as the activity occurring during the immediate moment. Subjects were instructed and reminded to stay in the here and now. Focusing on the process meant focusing attention on how they were performing the immediate closed or open skill and not thinking about the past, future, or outcome of the game (Appendix A).

9. State anxiety. An existing or immediate emotional state characterized by apprehension and tension which

can fluctuate within a person due to a stressor variable. In this study, state anxiety is represented by the total score on the Competitive State Anxiety Inventory-2 (CSAI-2 Martens, Vealey, & Burton, 1990) and the three resultant dimensions: (a) cognitive anxiety, (b) somatic anxiety, and (c) self-confidence. The CSAI-2 (Martens et al., 1990) was administered one hour prior to the game.

Assumptions

The following assumptions were made in reference to this study:

1. The Competitive State Anxiety Inventory-2 (Martens et al., 1990) is a valid and reliable measure of pre-competition state anxiety.

2. Team members of a nationally ranked NCAA Division I women's basketball team are highly skilled.

3. Players provided honest responses to questions and surveys/tests in the study.

Limitations

The following were limitations of the study:

1. The players' game statistics improved due to physical practice and experience from one game or week to the next, or throughout the season.

2. The players may have spent more time on the mental

training program outside of the experiment.

3. Players in the collaborative group may have shared information with other team members even though they were asked not to share.

Delimitations

The following are delimitations of the study:

1. Ten subjects received the general imagery training program.

2. Four subjects received the combined collaborative psychological training program including imagery, positive self-talk, and energizing.

3. The coach and researcher selected the four players who received the combined psychological training program based on years on the team, position, and expected playing time.

Significance of the Study

The development of psychological training used in sport actually was not a twentieth century phenomenon, as it was subconsciously used by athletes since early reports of sport participation (Botterill and Winston, 1984). However, in the past decade, these psychological training skills were identified and pursued. Yet, coaches and athletes were not using these skills to their benefit. This study evaluated the relative effects of a group and a combined group and

individualized psychological training program approach, and, in the combined individualized program approach, pinpointed the intervention techniques that affected individual performance measures. Orlick and Partington (1988) indicated that the psychological components of excellence are necessary for performing to an athlete's potential. The authors encouraged those interested in helping athletes nurture these psychological skills to do so in a sporting environment. This study attempted to personalize a psychological training program for four athletes in a field setting. Knowledge and insight was gained from in-depth multiple baseline and single subject design studies with individuals who excel in sport (Orlick, 1986; Orlick and Partington, 1988; Orlick, 1989).

CHAPTER 2

REVIEW OF LITERATURE

Introduction

The purpose of this review is to include literature in the area of research design, identification and measurement of critical variables, and techniques of intervention which relate to the study. The sections of the review included in the dissertation are: (a) single subject across multiple baseline designs, (b) effects of psychological intervention techniques on task performance, (c) effects of psychological intervention techniques on anxiety, and (d) counseling techniques.

Single Subject Across Multiple Baseline Designs

Traditionally, sport psychology research has employed designs in which various groups of subjects are exposed to different treatment conditions. Usually this form of experimentation involves comparing the performance of one group that is exposed to a treatment with that of another group which is not (Bryan, 1987). Zaichkowsky (1980) contends that group designs pose several problems for research in applied sport psychology. First, coaches and athletes frown upon the idea of having a no-treatment control group. They want all individuals who have the same performance problem to receive the experimental treatment.

Second, the process of averaging results to compare groups ignores the impact of an intervention on the individual. This procedure may misrepresent the effects of the treatment on different people. In group designs, data are analyzed statistically to determine the probability that the differences between groups were due to chance. In sport psychology field studies, the within-group variability is often high because control is difficult to achieve. Therefore, performance gains are often small and statistically insignificant, but of practical significance to the individual athlete (Zaichkowski, 1980). Thus, important intervention strategies may be overlooked which might assist future athletes.

This review will examine a methodology for evaluation that eliminates problems posed by group designs as mentioned above. The rationale for single subject designs is similar to the rationale for traditional group research. In single subject research the individual's behavior is observed for a period of time before the treatment is applied. Single subject designs eliminate the need for a no-treatment control group and permit the intensive investigation of athletes who have a specific performance problem. The problems of group averages and lack of statistical significance obscuring an individual's performance are eliminated.

One popular single subject design is the multiple

baseline design (Kazdin, 1989). Multiple baseline designs may be used when data are being collected across behaviors, subjects, situations, settings, and time. Multiple baseline designs consist of separate A-B designs. The initial measurement is referred to as the A phase of the study and is used to establish a baseline of behavior patterns. Baseline lengths will vary for each subject. Hersen and Barlow (1976) recommended a minimum of three separate observation points to demonstrate the desired pattern of stability or the direction of the trend of the data. After baseline measures have been recorded, the treatment phase (B) is introduced. Once again, three separate observation points are recommended to establish the effectiveness of the treatment (Hersen & Barlow, 1976). This literature review includes sport studies utilizing the single subject multiple baseline designs across: (a) behaviors, and (b) individuals.

Multiple baseline across behaviors design

Rushall (1975), Hume, Martin, Gonzales, Cracklen, and Genthon (1985), and Komaki and Barnett (1977) investigated the effectiveness of self-management strategies (which reflect one category of behavioral techniques) in changing behavior. Kirschenbaum (1984) has pointed out that one subcategory of behavioral techniques which shows considerable promise for improving sport performance is the

use of self-management strategies.

In the multiple baseline across behaviors design, baseline data are initially collected on two or more behaviors of one individual. When the baseline has reached a stable rate the intervention is employed for one target behavior, while baseline conditions are continued for the other behaviors. Kazdin (1989) stated that the initial behavior which is affected by the intervention is expected to change and the other behaviors are expected to remain at baseline. When rates become stable during this phase for all behaviors, the intervention is employed on the second target behavior. This procedure is continued until all of the behaviors have been included in the contingency. It is anticipated that each behavior will change once the intervention begins for that particular behavior.

There have only been a few sport studies conducted using the multiple baseline across behaviors design for individual subjects. One such study was done by Rushall (1975) to determine the effects of self-monitoring on negative behaviors. The coach was observed during baseline and during this time negative behaviors were counted, such as the number of times the coach was critical to the swimmers and/or the amount of time the coach monitored the swimmers. After baseline observations were completed, the coach was taught to positively reward the swimmers for desirable behaviors and to provide feedback to swimmers.

This required developing: (a) feedback behaviors, and (b) a repertoire and appropriate vocabulary for rewarding. During intervention the coach used these techniques with the swimmers. The coach also used a checklist of appropriate rewarding and feedback procedures to monitor his feedback. Over a period of several months permanent effective changes in the coach's rewarding and feedback behaviors occurred in the swimming environment.

Komaki and Barnett (1977) in another study used a behavioral coaching package to teach three football plays to five male children. The coach partitioned three offensive plays into five stages. These stages corresponded to the various actions in each play. During the baseline period, the coach employed standard coaching procedures in which he verbally described the plays and referred to the play book distributed at the beginning of the season. When the subjects went through the plays, the coach offered suggestions from the sidelines. During scrimmages the coach gave feedback consisting of what was done incorrectly and what could be done to improve the next time. At the first intervention phase, the coach presented the subjects the appropriate checklist explaining the rationale behind each stage for play A. During scrimmage sessions positive and corrective feedback were given immediately. After each play, the players ran over to the coach on the sidelines to verify how they had done. The coach showed them the

checklist, pointed out what had been done correctly, and noted what stages had been completed successfully. The intervention phase was introduced for each play at one-week intervals. Performance improved, as measured by the coach's checklist, after each intervention was introduced for all three plays.

Hume, Martin, Gonzales, Cracklen, and Genthon (1985) conducted a study on behavioral coaching techniques consisting of instructions, a self-monitoring checklist, and feedback. These techniques were examined at freestyle practice sessions with three female pre-novice figure skaters. The behavioral techniques were compared to normal coaching procedures for their effects on the frequency of jumps and spins performed, the number of times a skater practiced a routine to music, and the amount of time engaged in off-task behaviors (such as excessive socializing and failure to practice the difficult jumps and spins). During baseline, observers recorded the frequency and duration of each athlete's off-task behaviors. They also recorded whether certain moves were being attempted.

When intervention began (Hume et al., 1985), instructions the coach provided were written on the skaters' display board outlining the practice plan for the day. At the end of each session, the skaters recorded the frequency of spins and jumps and compared them to the bar graph showing the mean of their baseline performance. When the

skaters returned their display board, the coach provided feedback such as, "You did a good job in completing your checklist", or "You did better axles today". If the checklist was incomplete or performance was below par the coach would prompt or provide cues for improvement in the next session and then give specific instructions. The display board was left with the coach between sessions and the coach would update the bar graph. At the beginning of each session the boards were given to each skater. The results of this study showed that the behavioral coaching package, using instructions, self-monitoring checklists and coach feedback, facilitated an increase of the frequency of difficult jumps and spins performed by the skaters (Hume et al., 1985).

In another behavioral coaching study, Hazen, Johnstone, Martin, and Srikameswaran (1990) conducted one experiment to examine the effects of a videotape feedback intervention package on freestyle and backstroke racing turns of one male and six female swimmers 8 to 12 years of age. The subjects were identified because they had been resistant to changing their turn techniques. The observers identified 15 components of the freestyle turn and 6 components of the backstroke turn. Three subjects who attended morning swim practices received the treatment package to improve their freestyle turns, and three subjects who attended afternoon sessions received the treatment package to improve their

backstroke turns. The fourth subject served as a control and did not receive any treatment.

The videotape package (Hazen et al., 1990) was introduced sequentially in a multiple baseline design for the three subjects in each session. During baseline conditions the coach was asked to continue his usual coaching techniques. The videotape training package consisted of modeling, role-playing, verbal feedback, and videotape feedback. Training sessions continued until the subject reached the learning criterion of completing 6 turns out of 8 attempts with no errors. Once the learning criterion was achieved, a maintenance phase was implemented (Hazen et al.,1990). During this phase if the average of correct turns dropped below 80% then remedial prompts were provided. The subject was shown the data sheet which contained diagrams and a description of the component behaviors. The subject was prompted to complete the turns according to the data sheet. This experiment indicated that the videotape package was an effective strategy for increasing correct performance and decreasing errors that had been resistant to change under standard coaching procedures.

In a second experiment in the same article, Hazen et al. (1990) employed the same design to compare individual videotape feedback approach to a group videotape feedback procedure that the coach had been using. One male and five

female swimmers ages 8-12 years were the subjects in the study and three additional subjects served as control subjects. The components of the freestyle swimming stroke were selected as target behaviors. Data were collected on each subject on the basis of errors occurring on that component. For example one swimmer had a problem of twisting in the water which was caused by the hand entering the water past the mid-line of the swimmers body. During baseline, swimmers received instruction and feedback under standard coaching procedures.

The first intervention included group videotaped feedback sessions given by the coach (Hazen et al., 1990). Six swimmers were videotaped in a regular session and then watched the videotape as a group. The coach pointed out errors and gave positive and corrective feedback. After all subjects' performances had been viewed, the swimmers returned to the pool to practice correct strokes. In the next intervention session, individualized videotaped feedback was given in the same format as that used for the group feedback. Each swimmer then practiced five more correct strokes while being videotaped. The subject viewed the videotape once again and was given feedback. This sequence continued until a maximum of 10 trials were videotaped. Individual videotaping sessions continued until the subject reached a learning criterion of 6/8 consecutive trials performed correctly in one session. The results of

the second experiment indicated that the group videotaping feedback had little or no effect on the three experimental subjects and only a small effect on the three control subjects. However, the per cent of correct performance increased immediately and dramatically (6/8 trials performed correctly) during the individual videotaped feedback phase. Taken together, Hazen et al. (1990) suggested that the findings of both experiments suggested that an individual videotaping feedback package is effective in producing improvements in performance of the freestyle stroke, the freestyle turn, and the backstroke turn.

Multiple baseline across individuals design

In the multiple baseline across individuals design, baseline data are collected for a behavior across two or more individuals. After the behavior of each individual has stabilized, the intervention is implemented for one subject while baseline conditions are continued for the others (Kazdin 1989). The behavior should change in the individual who has been exposed to the intervention. Once the behavior stabilizes for the first subject, a second one begins the intervention. This procedure continues until all subjects have received the intervention.

There have been a few studies in the field of sport psychology which employed a multiple baseline across subjects design. One such study was conducted by McKenzie

and Rushall (1974) to determine whether public self-recording of work output would increase the amount of work completed by eight competitive swimmers ages 9 to 16. Four program boards with a transparent pocket were used to display the work-unit cards indicating a segment of the training program (i.e., 4 x 100 freestyle). The coaches could alter the training program content between sessions by changing the work-unit cards. As a swimmer completed a work-unit, a check-mark was entered in the appropriate square beside the swimmer's name. The check-mark served to indicate the portion of the training program and the total number of laps that had been completed. The data were then converted to an average rate per minute. Observational periods ranged from 17 to 35 minutes over 19 to 25 uninterrupted swimming sessions. The first baseline condition served to determine pre-experimental work rates. This condition reflected the effect of traditional coaching methods.

During the first program board intervention (McKenzie & Rushall, 1974) the coaches introduced and gave instructions on the use of the program boards. Marked increases in the rates of swimming were observed during the intervention period. The second baseline condition constituted a return to traditional coaching methods. This return to baseline reduced the rates of swimming of all subjects. The second intervention included a program board which replicated the

first intervention. The results revealed that for all subjects, the lowest rates of swimming occurred during baseline conditions and the highest rates occurred during the two experimental conditions. The program boards (interventions) improved the work output of the swimmers by approximately 27 percent from the traditional coaching situation during baseline (McKenzie & Rushall, 1974).

Continuing the review of behavioral coaching studies, Allison and Ayllon (1980) conducted three experiments to evaluate behavioral coaching techniques in football, gymnastics, and tennis using a multiple baseline across individuals design. In the football experiment were five subjects 11 and 12 year old boys were selected by the coach because they had severe difficulties with their blocking technique. During baseline each subject's blocking technique was observed for 10 trials. Each block was recorded as correct or incorrect after each trial according to the checklist provided for a correct block. The coach used his standard method of coaching during baseline. This included giving verbal instructions to the players. If the block was correct the coach said "good". If the block was incorrect the coach yelled at the player or commented on the player's stupidity. If the player continued to block incorrectly the coach modeled the correct block for the player or gave further verbal instructions. Sometimes during this baseline phase, repeated errors were punished by

the coach by having the player run laps.

At the beginning of the intervention phase, the researchers taught the coach behavioral coaching procedures and provided them with techniques for applying these procedures. First, the coach gave instructions to the player regarding the specific play. Then the coach evaluated the quality of execution. For example: (a) if the block was executed properly the coach blew his whistle and said "good job"; or (b) if the block was incorrect the coach blew his whistle and yelled "freeze". Then the coach: (a) described the incorrect position by giving the player specific descriptions of his errors, and (b) modeled the correct position for the player to see. Next, the player was instructed to assume the blocking position while the coach verbally described the position to the player. The behavioral coaching package was shown to be immediately effective in generating and improving football blocking performance for all five boys. Gains in correct blocking performance as measured by the checklist increased from 5% to 51% under the intervention.

In a second experiment, Allison and Ayllon (1980) investigated the effects of the behavioral coaching techniques with six gymnasts attempting to perform backward walkovers, front handsprings, and reverse kips. The same format was used in this experiment, as in the one with football players. Once again the behavioral coaching

techniques were effective in improving the execution of all three skills. Performances increased from a baseline rate of 3% to a rate of 52% following intervention.

In a third experiment (Allison & Ayllon,1980) the intervention of behavioral coaching techniques showed an increase in correct execution of the tennis forehand, backhand, and service skills for twelve adults. Standard coaching practices produced an average of 6% correct performances while the behavioral coaching techniques produced an average of 57% correct for the three strokes. Taken together, Allison & Ayllon (1980) concluded that the results of this study indicate that a behavioral coaching package has more potential to increase skill execution for both children and adults than the results found using standard coaching procedures. This finding has definite implications for the field of applied sport psychology because the coach's presentation will likely influence the performance of athletes of any age.

More recently, Rush and Ayllon (1984) compared standard and behavioral coaching methods employed by a peer coach whose age and size were similar to those of the players. Three soccer skills (heading, throw-ins and goal kicks) were selected for the experiment. Nine males between 8 and 10 years of age participated in the study. The peer assistant coach was 12 years old. The behavioral coaching package was similar to that used by Allison and Ayllon (1980). The

correct responses for all three soccer skills were defined for the observers. During baseline each player was observed for 12 to 18 trials for each of the three soccer skills. Performance was graded as correct or incorrect according to the criteria determined by the experimenter and head coach. The coach used his standard method of coaching during baseline. The intervention employed the behavioral coaching package which consisted of the players executing the skill while the peer coach judged and modeled the skill and the players imitated the modeled behavior. The results revealed an improvement in the execution of all three soccer skills under the behavioral coaching package used by the peer coach. The results supported those of earlier studies on the effectiveness of behavioral coaching techniques and positive reinforcement on athletic performance (Buzas & Ayllon, 1981; Komaki & Barnett, 1977; McKenzie & Rushall, 1974).

Summary

Single subject across multiple baseline designs can be useful in demonstrating the relationship between a behavior and an experimental contingency (Kazdin, 1989). For example, Wollman (1986) has contended that the effect of imagery on motor performance is ideally suited for investigations using a single subject across multiple baseline design. Imagery training could be effectively

introduced over hours, days or weeks. The design also requires no return to baseline conditions to see if the intervention has or has not been effective. Furthermore, successful subjects and or performances can be assessed to see which factors lead to performance improvement.

When dealing with elite players, performance does not improve very much from pre-training rates. Therefore, it may be better to use a single subject across multiple baselines design to identify small improvements in an athlete's performance. A group design using inferential statistics would at best detect only subtle improvements in subjects' performance. With a single subject design the experimenter could introduce the intervention program, monitor its effects, and alter the program for each athlete.

Zaichkowsky (1980) has also suggested that a sport psychologist might employ a single subject across multiple baselines design to assess the effectiveness of some form of biofeedback-assisted relaxation on different target behaviors such as arousal and attention. He suggests that a specific treatment of biofeedback-assisted relaxation can also be sequentially applied to a single subject for a single target behavior (i.e., arousal) but in different settings (i.e., prior to weak competition and prior to difficult competition). Zaichkowsky has also pointed out that a treatment variable (i.e., biofeedback-assisted relaxation) could be applied to different subjects for the

same target behavior (i.e., arousal) with the length of the baseline phase being varied for each athlete and the intervention phase being sequentially introduced. From the examples cited in this paper of sport and non-sport studies it might be concluded that self-monitoring program interventions have good potential to alter behavior. Several authors (Hume et al., 1985; Komaki and Barnett, 1977; and Rushall, 1975) have shown that a self-monitoring package in sport improves athletic performance. Moreover the research reviewed on public goal setting indicates that subjects' performances improve when goals are posted in the form of checklists and/or targets for others to view (Lyman, 1984; McKenzie and Rushall,1974; & Buzas and Ayllon, 1981). This suggests that athletes may be motivated to improve their performances if their goals for performances are made public knowledge.

Psychological Intervention Techniques

Imagery

The studies in the review follow from motor learning mental practice and sport psychology imagery literature. Closed and open skills literature are included in this review because the sport of basketball consists of the closed skill of foul shooting and many open skills such as, dribbling the ball around moving players and passing to a moving player who is guarded. The techniques of imagery

review includes literature written from 1980 to the present.

Feltz and Landers (1983) conducted a meta-analysis of 60 studies which contained groups which received mental practice and had pre-test scores or a control group for comparison. They concluded from their review that using imagery in practice of sport skills influenced performance more than no practice. Furthermore, results of the review indicated that imagery combined with physical practice of a closed or open skill showed greater improvement in learning skills than physical practice alone.

Closed skills. Epstein (1980) studied the effect of mental imagery on immediate performance of the closed skill of dart-throwing. The subjects were 33 female and 42 male undergraduate volunteers. Thirty subjects were randomly assigned to an internal imagery condition, 30 were assigned to an external imagery condition and 15 were assigned to a control condition. External imagery was defined as watching oneself perform a skill from a third person perspective; while internal imagery was described as seeing the performance of the task in the first person, as if that subject were actually doing the skill. The variability of dart-throwing improvement differed significantly ($p < .05$) across experimental conditions for the female but not the male subjects. Epstein (1980) concluded that internal imagery (first person) produces better performance enhancement than external imagery (third person).

Noel (1980) investigated the effect of visuo-motor behavioral research (VMBR) on the closed-open skill of the tennis service performance of 14 male players. The players were randomly assigned to the VMBR high ability, VMBR low ability, control high ability, or control low ability groups. Those in the VMBR groups were trained 10 days before the first tournament match. After a 30 minute introductory session to VMBR each member received a tape recording which contained relaxation instruction on one side and relaxation and visualization methods on side two. The individuals were instructed to practice only side one of the tape (relaxation) for three sessions and then practice side two (relaxation and visualization) for four days. This process took 30 minutes per day to complete. For the first service accuracy only a three-way interaction of treatment by ability level by tournament was close to significance at the $p < .10$ level. This indicated that high-ability players improved with the VMBR practice, while low-ability players decreased their performance. The findings indicated that the high ability subjects using VMBR served better than usual only on the first serve, under actual tournament conditions. A self-report indicated that the high-ability VMBR groups believed they had improved their service.

Two experiments were conducted (Gould, Weinberg, & Jackson, 1980) to determine if different mental preparation strategies produced differential leg strength performance in

15 male and 15 female subjects. The mental preparation conditions were: (a) attentional focus, (b) imagery, (c) preparatory arousal, (d) control rest condition, and (e) counting backwards, a cognitive-distraction condition. Under each condition the subjects were given four trials to test their leg strength. The study concluded that the preparatory arousal and imagery techniques produced significantly ($p < .001$) better performance than the control group.

In a second study, Gould et al. (1980) employed three mental preparation strategies on 30 male and 30 female subjects to observe which strategy made a greater improvement in leg strength. The three mental preparation strategies were preparatory arousal, imagery, and control rest conditions. The same conditions were applied as in the first experiment. However the findings indicated that only the preparatory arousal condition facilitated performance (Gould et al., 1980).

Ryan and Simons (1981) conducted a study to observe the effects of mental practice on two closed perceptual motor tasks, stabilometer and dial-a-maze. The 39 male undergraduate subjects were randomly assigned to one of three groups, a physical practice group, a mental practice group, and a no practice control group. The results showed that the task near the cognitive end was enhanced with mental rehearsal and the task near the motor end of the

continuum showed little or no improvement.

Ryan and Simons (1982) hypothesized that using a person's preferred cognitive style would be most effective for mental rehearsal and that forced use of mental imagery would impair learning. They also hypothesized that an individual who already used mental imagery would not differ from those who had never used mental imagery. The authors randomly selected 80 male police officers to learn a novel closed balancing task during a single session. Based on a pre-test questionnaire three groups were categorized as imagers, nonimagers, or occassional imagers. These three groups were assigned to six groups; imagers asked to use imagery in mental rehearsal, imagers asked to try not to use imagery, nonimagers asked not to use imagery, nonimagers asked to try to use imagery, physical practice, or no practice. The physical practice subjects were evaluated by performance on the stabilometer for 14 trials in 30 seconds and the four mental rehearsal groups were evaluated on two physical trials, 10 mental rehearsal trials, followed by two physical trials. After each physical trial for all groups, there was a 30 second rest period. To prevent mental rehearsal during this time the subjects were shown pictures which they were required to identify. The results were evaluated by ANCOVA and significantly indicated, $p < .001$ level that, contrary to the hypotheses, vivid imagery enhanced performance after mental rehearsal. The groups who

used imagery showed greater mean improvement in performance than the groups who did not use imagery. In addition there was no difference between the physical practice group and the subjects with high imagery ability who used imagery. Ryan & Simons (1982) concluded that imagery enhanced performance of a novel closed balancing task.

Silva (1982) counseled a male college basketball player who had complained of a problem of being a poor foul shooter during games (53.86% in seven games). He said that he had to tell himself forcefully to concentrate whenever he was at the foul line. His muscles became very tight when he held the ball and told himself to concentrate. After discovering that he was relaxed during practice foul shooting sessions it was decided to pair "relax" and "practice" together each time he went to the foul line in a game. After fourteen days of intervention the player improved from 53.86% to 74.91% over the next sixteen games.

Woolfolk, Murphy, Gottesfeld, & Aitken (1985) carried out an investigation on the effect of imagery on putting a golf ball. Fifty male college students were randomly assigned to one of five imagery groups or to a control group after the pretest of 20 putts. The imagery conditions were: (a) positive outcome with performance, (b) negative outcome with performance, (c) performance only, (d) positive outcome only, (e) negative outcome only, and (f) control. The five imagery groups were given imagery instructions for

the preshot routine which they practiced. The post-test consisted of 10 putts with one minute for imagery between each putt for the imagery groups while the control group waited between putts. Duncan's test revealed that subjects in the negative outcome imagery group significantly ($p < .05$) declined in performance. There were no significant ($p < .05$) changes in subjects in the positive outcome or no outcome group. The findings of this study indicate that briefly imaging the outcome of the golf putt prior to putting the ball has greater influence on subsequent performance than does brief mental imagery prior to performance (Woolfolk et al., 1985).

Andre and Means (1986) hypothesized that both mental practice (MP) and slow motion mental practice groups (SMMP) would improve their performance on the putting stroke in Frisbee disc golf. Sixty-six male three groups of university students were randomly placed into three groups of SMMP, MP, and attention placebo control. The pre- and post test task included throwing 50 discs into a target which ranged from 12-30 feet away. They found that there was some improved performance for the mental practice group and slow motion mental practice group. However, this change was not significantly ($p < .05$) different from the improvement by the attention placebo control group.

Straub (1989) designed a study to determine whether three frequently used mental skills training programs

enhanced dart throwing, to compare the relative effectiveness of these programs, and to determine whether these programs were effective with high and low skill subjects. Seventy-five male and female college students were tested with 50 dart throws. The subjects were matched within high and low skill groups and assigned to one of three mental training groups, a control, and a physical practice group.

Mental training groups participated in mental training and physical training. The difference among the three mental training groups was the style of the mental trainer and not the content of their programs. The mental training programs implemented for the three mental training groups were those of Bennett and Pravitz, Gauron, and Unestahl. The three mental training groups practiced throwing 50 darts and did mental training for 30 minutes per day for five days a week. The physical practice group practiced throwing darts for 30 minutes five days per week. The control group participated in the pre- and post-test of throwing 50 darts. The post-test occurred eight weeks after the pre-test. The results showed that all mental training groups did not score significantly ($p < .05$) better than the physical practice group and there was no difference among the mental training groups.

In 1989, Wrisberg and Anshel studied 40 boys skilled in foul shooting, as rated by the camp instructor, to explore

the benefit of types of mental imagery on foul shooting performance. The subjects were between 10 and 12 years of age attending a sports camp. They were randomly assigned to one of four groups: (a) a group that learned and practiced imagery during the treatment phase of the study, (b) a group that learned and attempted an arousal adjustment strategy (relaxation), (c) an imagery and arousal adjustment group, and (d) a control group.

All boys initially shot 20 foul shots with 45 second intervals between each shot (Wrisberg & Anshel, 1989). During the 45 second interval the boys were given written information to read about the game of basketball to keep them from imaging the foul shot. They were told they would be tested on the material after 20 foul shots. After the first baseline trial the boys were instructed and practiced their respective preshot routine. On the second day the boys were instructed again in their respective preshot routine and then shot 10 foul shots. During the 45 second interval the subjects read basketball material for 30 seconds and practiced their preshot routine for 15 seconds. The control group read for the entire 45 seconds. The results indicated that foul shot performance was significantly ($p < .05$) greater for the group who utilized the combination of arousal adjustment and imagery than for other group training conditions.

Forty subjects were assigned to four treatment groups

and tested for peak power on the Wingate cycle ergometer (VanGyn, Wenger, & Gaul, 1990). The treatment groups were: (a) imagery training in the absence of peak power training (IT), (b) imagery training in conjunction with peak power training (IPT), (c) peak power training (PT), and (d) a control group. After the six week training program the subjects were tested again on the ergometer. The results of this study indicated that imagery facilitated the physiological training to performance. The IPT group showed a significant increase, at $p < .05$ level, in peak power scores over time and sprint times between the pre- and post-test (VanGyn et al., 1990).

Open skills. Meyers and Schleser (1980) conducted a study which indicated that cognitive-coping strategies which were presented to a college basketball player showed an improvement in game performance of open skill tasks. This senior male basketball player complained to the authors that he had a concentration problem. Apparently he had lost confidence in his jump shot, that irrelevant thoughts interfered with his shooting performance and he was hesitating when deciding whether or not to shoot. The authors assessed the athlete for one and one half sessions and presented the intervention for the next five and one half sessions. The first intervention consisted of a progressive relaxation and imagery session. The athlete collaborated with the authors to identify scenes where he

had trouble making a decision or scenes where his concentration was disrupted by personal problems. The remaining sessions consisted of relaxation, imagery, and self-instruction statements. The athlete was instructed to practice relaxation and imagery every day as well as during breaks in game action. He was told to use the feeling of the ball in his hands as a cue for relaxation and shooting. The results of the study indicated that the athlete's game performance did improve. Statistically significant ($p < .05$) performance improvements were seen in the athlete's total points per game, field goal percentage, field goals made, and percentage of total team scoring.

Weinberg, Seabourne, and Jackson (1981) conducted a study on 32 males enrolled in a karate club to investigate the effects of VMBR, relaxation, and imagery on an open task karate performance. The subjects were matched according to skill performance. They were then assigned to a VMBR, relaxation, imagery, or attention-placebo condition. Each group was then taken through a practice session of their technique. Following the explanation each subject was given a handout to explain how to practice the cognitive strategy at home. Performance was evaluated by the experimenter and a black belt instructor. Interrater reliability was 90%. The subjects were rated on skill, combinations, and sparring. The Competitive State Anxiety Inventory-2 (CSAI-2, Martens et al., 1990) was administered prior to

performance. Heart rate and state anxiety were assessed prior to the intervention and at the end of the six week experiment. Results indicated that all four groups showed a statistically significant ($p < .01$) decrease in state anxiety over the six weeks. There were no significant differences between heart rates at the pre- and post-tests. Results indicated less precompetitive state anxiety for the relaxation and VMBR groups than the imagery and attention-placebo control groups. Weinberg et al. (1981) concluded that being in a relaxed state combined with the imagery appears to be the best combination for a relaxed concentration and focus on the open task in karate.

Silva (1982) used a cognitive intervention strategy when he counseled a male college basketball player who said he was overaroused when he played, fouled too often, and ended up being fouled out of games. Rebounding and defense were identified as the areas where he committed his fouls. Silva counseled the athlete to replace his old cognitive sets with new ones. He paired "straight and strong" and "control" with an imagery program. This cue control was chosen because the athlete had to play conservatively during certain times of the game and not pick up fouls. The subject imaged himself for four minutes at the start of the game. During this time he used his cue words to remind himself not to foul. The athlete imaged for a minimum of 30 minutes per day broken into several sections of the day such

as training room time and before retiring at night which were convenient for the athlete. The subject reduced fouling by one foul per game following the intervention and increased his playing time by four minutes per game.

In a recent study by Kendall, Hyrcaiko, Martin, and Kendall (1990), a multiple baseline across individuals design was used to evaluate the effect of imagery rehearsal, relaxation, and a self-talk package on an open skill during basketball game performance. Four female intercollegiate varsity basketball players were observed in their attempts to "cut off the baseline" in game situations. Two of the authors watched videotape replays of the games and rated the open defensive skill of each player as either correct or incorrect. Six possible defensive behaviors were identified. The three correct behaviors included cutting off the offensive player's path to the basket and forcing either a pass back out, a missed shot, or a turnover. The three incorrect behaviors included failing to establish the proper defensive positioning, forcing the player to the baseline and getting beat by that player who drives to the basket and scores, or fouling the player. During the baseline phase the dependent variable (cutting off the baseline) was assessed for a maximum of seven games.

After a baseline assessment was made of the first subject the intervention package was introduced (Kendall et al., 1990). The package included imagery rehearsal,

progressive relaxation techniques, and positive self-talk. Sequentially, the intervention was staggered until all four subjects were under experimental conditions. The subjects monitored their own feelings about the intervention and skill progress in a log book. Questionnaires were administered to the subjects to assess the vividness and control of their imagery before and after the intervention. Treatment effects were observed across all subjects and an improvement in "cutting off the baseline" was seen (Kendall et al., 1990).

Closed and open skills. Buckles (1984) conducted a study with 10 university women basketball players to investigate the effects of VMBR on a closed skill and open skills relating to the game of basketball. Five players were assigned to either the no treatment group or the VMBR group. The five subjects in the treatment group met with the researcher individually four times per week. The treatment was presented to the subjects in four sessions of relaxation training, four sessions of imagery, and the remaining sessions of VMBR until the study was completed. The study was completed in four weeks. The performance measures employed in this study were game statistics which included closed and open tasks. The closed skill of foul shooting was measured by the average game foul shooting percentage. The open skills were measured by: (a) average field goal percentage; (b) average points per

minute played; (c) average rebounds per minute played; (d) average turnovers per minute played; (e) average fouls per minute played. She found that VMBR significantly ($p < .05$) contributed to improved game performance of the closed task of foul shooting.

Seabourne, Weinberg, Jackson, and Suinn (1985) studied the effectiveness of different types of mental interventions on karate performance. Subjects were 43 male college students randomly assigned to an individually tailored mental training group, a yoked group, a package group, a placebo group, and a control group. In the individually tailored group the subject and the researcher utilized a VMBR manual in relation to each individual's problems to improve the subject's karate performance. The yoked group was presented the contents of the manual but, it was not related to the subject's individual concerns. The package group met as a group to learn the VMBR steps in the manual and then met individually with the instructor to practice the techniques. Karate performance evaluations were conducted during the fifth, tenth, and fifteenth weeks. The dependent variables were the closed skill of single skill techniques and the open skill of sparring in a competitive setting for a one minute time period. The results indicated that the individualized group performed significantly ($p < .05$) better than the yoked, placebo, and control groups on sparring tasks. These results agree with Meyers and

Schleser (1980) and Silva (1982) that individualized intervention techniques are beneficial to athletic performance.

Summary. The findings of the review articles indicated that imagery intervention produced inconsistent outcomes. Feltz and Landers (1983) concluded from their review of 60 studies that using imagery to enhance physical practice was better than physical practice alone. Some research on closed skill imagery supported the use of imagery to enhance skill performance (Ryan & Simons, 1981, 1982; Silva, 1982; Wrisberg & Anshel, 1989). Andre & Means (1986) and Straub (1989) showed in their research that imagery did not significantly effect performance. The open skill studies reviewed indicated that imagery did enhance performance (Kendall et al., 1990; Meyers & Schleser, 1980; Silva, 1982; Weinberg, Seabourne, & Jackson, 1981). Buckles (1984) found that VMBR contributed to improved performance in a closed skill but not in open skills. Yet, Seabourne et al. (1985) concluded that VMBR enhanced performance in closed and open skills. From the review it can be concluded that there is conflict in the results for both open and closed skills.

Effects of Intervention Techniques on State Anxiety

Martens, Vealey, and Burton (1990) published the Competitive State Anxiety Inventory-2 (CSAI-2) to measure three dimensions: (a) cognitive anxiety, (b) somatic

anxiety, and (c) self-confidence. Gould, Petlichkoff, Simons, and Vevera (1987) confirmed that the CSAI-2 assessed the three dimensions of self-confidence, cognitive anxiety, and somatic anxiety.

Buckles (1984) administered the CSAI-2 (Martens et al., 1990) to measure the state anxiety of all basketball players on the team 30 minutes prior to the game over a five months period. VMBR technique was taught to the athletes in an attempt to investigate the effects of VMBR on state anxiety. Game statistics which included open and closed tasks were the performance measures. She found that the somatic component of state anxiety was significantly ($p < .05$) improved with the use of VMBR.

In 1987, Gould, Petlichkoff, Simons, and Vevera examined the relationships between the CSAI-2 sub-scales and pistol shooting performance. Thirty-nine subjects from a police training institute shot five pistol sequences consisting of six rounds after they had completed the CSAI-2 immediately before each sequence. It was hypothesized that cognitive anxiety would be more related to performance than somatic anxiety, and that self-confidence would be positively related to performance. The authors found that somatic anxiety influenced performance more than cognitive anxiety. Confidence was found to be negatively related to performance. All comparisons of cognitive, somatic, and self-confidence measures were significant at

$p < .01$ level. The findings do support that state anxiety does have separate components which are differentially related to performance.

Jones, Swain, and Cale (1990) conducted a study to examine situational antecedents of multi-dimensional competitive state anxiety and self-confidence in elite middle-distance runners. The subjects were 125 male runners who were currently competing in road races. A pre-race questionnaire (PRQ) was developed by the authors and given to the runners along with the CSAI-2 one hour before the race. Jones et al. (1990) concluded that perceived mental and physical readiness, levels of fatigue, and effectiveness of recent training best predicted cognitive anxiety. Perceived readiness contributed 23% of the total variability of cognitive anxiety. Another predictor of cognitive anxiety was position goal which added an additional 3.3% to cognitive anxiety. They found that cognitive anxiety was positively related to the difficulty of the goal, and negatively related to the athlete's perception as to whether he could achieve that goal. The results did not indicate that the PRQ significantly predicted somatic anxiety. In addition, perceived readiness was the most significant predictor of self-confidence.

Bird and Horn (1990) tested the relationship between mental errors in a game and level of cognitive anxiety in female high school varsity softball players. The coach

administered the CSAI-2 between 45-60 minutes before the game. The coaches evaluated the mental errors made by the players during game play. The players were categorized into two groups of higher in mental errors and lower in mental errors. The subjects selected for the experiment were 161 players based on their mental errors score. The study supported the hypothesis that cognitive anxiety is directly related to mental errors which occur in a sport performance.

In 1991 Jones, Swain, and Cale examined changes in and antecedents of cognitive anxiety, somatic anxiety, and self-confidence of 28 male and 28 female university athletes. The CSAI-2 and a situational variables questionnaire were administered to the subjects at five stages during the precompetition period; i.e., one week, two days, one day, two hours, and within 30 minutes prior to competition. The study significantly ($p < .05$) indicated that cognitive anxiety in males remained stable over the precompetition period, but for females it remained stable for the first three stages and then increased significantly on the day of the competition. Somatic anxiety significantly ($p < .01$) increased in both genders on the day of the competition. Females decreased in self-confidence from two days before competition, and male self-confidence decreased on the day of competition. The interaction between gender and time-to-competition for self-confidence was slightly significant, $p < .06$ level (Jones et al., 1991).

Elko and Ostrow (1991) hypothesized that gymnasts who were counseled using an education program that uses Rational-Emotive Therapy would have: (a) lower levels of cognitive and somatic anxiety, (b) less negative self-statements, and (c) higher levels of performance, compared to their baseline levels. Six female NCAA gymnasts were chosen to participate in this study based on a screening process which administered to the entire gymnastic team. The CSAI-2, SCAT, and a personal interview were conducted with the team before the competitive season began. The six gymnasts who had the highest state and trait anxiety scores and who also demonstrated high anxiety levels during the personal interview were chosen for the study. Baseline assessments using a single subject design were taken of the gymnasts' state anxiety by using the CSAI-2 and performance scores were tabulated by the overall meet score for each gymnast. Thought-listening was also evaluated by having the gymnasts write their thoughts for two minutes after each of the events during a meet. The thoughts were evaluated as positive, negative, or neutral by two trained graduate students. The gymnasts then underwent a three week individual rational-emotive educational program on a staggered entry design. The program was tailored to each subject's anxiety needs.

A single subject ABA design was employed to evaluate the educational program on cognitive and somatic anxiety,

self-confidence, negative self-talk, and performance. A split-middle technique and binomial test was used to analyze the results. It was found that cognitive anxiety was lowered ($p < .05$) in most gymnasts after the intervention, but somatic anxiety showed no reduction. The intervention influenced thought-listening for one gymnast, and an improvement in three gymnasts' performances ($p < .05$). Elko & Ostrow (1991) concluded that the Rational-Emotive Therapy program employed was effective in teaching coping skills to reduce cognitive anxiety and to improve performance.

Summary. Anxiety research in this review indicated that the proximity of competition had an impact on the state anxiety components (Jones et al., 1991). There is some research which indicates that the CSAI-2 is related to performance (Buckles, 1984; Gould et al., 1987; Bird & Horn, 1990). All of these studies support the multidimensional theory of anxiety. Buckles (1984) and Elko and Ostrow (1991) found that cognitive anxiety can be lowered through the use of educational psychological skills programs.

Positive self-talk

According to Rushall (1989) there are three types of athlete self-talk statements which have been shown to enhance sport performance. The first type includes task relevant statements which involve the technical and tactical aspects of the sport. These statements are required to

control the form of the activity (i.e., in a defensive stance; foot and body positioning, leg action, and intensity). A second type is the use of mood words. These are words which, when said or thought, cause a physical reaction to the body (i.e., the phrase, crash the boards, conveys the feeling of power more than does the word, rebound). A third kind of self-talk involves positive self-statements. These are positive phrases that are meaningful to the athlete. They should be relevant to the here-and-now and to the immediate task at hand (e.g.; you are playing great, now get lower on defense). It cannot be assumed that athletes use acceptable forms of thinking. In addition to all the other skills an athlete needs to learn and attend to in sport, the content of their thinking must be coached (Rushall, 1989).

Combined intervention programs

Eighteen elite wrestlers participated in a psychological skills training program consisting of relaxation, imagery, goal setting, and mental preparation (Gould, Hodge, Petlichkoff, and Simons, 1990). The treatment included one hour of instruction. A pre- and post-intervention questionnaire were administered to the athletes. The psychological skills intervention program had a positive impact on the pre- and post-intervention questionnaires. The most consistent improvements were found

in relaxation ($p < .02$) and imagery techniques ($p < .01$). The authors replicated this study with 42 junior elite wrestlers following the same procedures as in the first study. The findings supported their first study showing significant improvements in relaxation ($p < .0001$) and imagery ($p < .0001$).

Mahoney, Gabriel, and Perkins (1987) evaluated the psychological skills in a 51 item questionnaire designed to assess anxiety management, concentration, self-confidence, mental preparation, and team emphasis of 713 male and female athletes from 23 sports. There were 126 elite athletes, 141 pre-elite athletes, and 446 non-elite college athletes in the sample. The results showed that elite athletes tended to be more balanced in performance anxiety, to deploy their concentration before and during competition, experienced stronger self-confidence, relied more on internally focused mental preparation, and invested more motivation in doing well in their sport.

Fenker and Lambiotte (1987) developed and implemented a psychological skills training program for a major college football team consisting of 125 players. The program consisted of two long sessions where the focus was relaxation and imagery skills. The athletes were given a readiness survey on the first evening. In pre-season the authors worked with the athletes every day for 10 minutes on relaxation and imagery. Once regular season play began, the

authors worked with the starters for 50 minutes and later with the entire team for 10 minutes one day per week. The 50 minute session consisted of one psychological skill per week followed by relaxation and imagery for 20 minutes. The 10 minute session consisted of one minute of relaxation, centering, followed by imagining they were out of control and then bringing their attention back under control. Then the athletes were asked to image themselves in the next game playing under control and making great plays. A 56 item questionnaire was given to the team at the end of the season. The player's evaluations strongly suggested that the program was effective.

In a similar study Hellstedt (1987) conducted a psychological skills training program for 43 competitive skiers in grades 8-12. The program started during the precompetition season with four weekend workshops, held once per month, for a total of three hours. The Sport Competitive Anxiety Test was given to the athletes before and after the intervention. During the first weekend, the focus was achievement motivation; during the second weekend, anxiety, motor performance, and relaxation; during the third, imagery, and for the fourth weekend the focus was goal setting. During the competition season the format changed to weekly group meetings of 4-10 athletes for 45 minutes. The athletes turned in their weekly training goals for technical, mental, academic, and life style concerns.

The results showed that the athetes rated the program as very useful particularly the areas of relaxation, imagery, and coping strategies for competition. The SCAT scores declined which indicated that the program may have helped the athletes control their anxiety as the approached competition.

Orlick and Partington (1988) surveyed 160 Canadian Olympic participants from 31 sports to determine the level of mental readiness and control experienced by these athletes. The authors assessed the athletes through an athlete interview guide and an athlete readiness form. The findings showed that the best athletes experienced quality training, set clear daily goals, developed imagery skills which they used daily, followed a precompetition plan, competition plan, and evaluated each competition to learn from their experience. The athletes who had performed at their highest level consistently had excellent strategies for refocusing under adversity. These findings were also supported by McCaffrey and Orlick (1989) in their study of 14 top professional golfers and nine golf teaching professionals.

Cohn, Rotella, & Lloyd (1990) examined the effects of a cognitive-behavioral intervention on adherence to a preshot routine of three elite college golfers. The authors interviewed the golfers about their preshot routines for shots and putts which they employed. A multiple baseline

across subjects design was used in the study. Baseline observations were collected for each subject and intervention was staggered for each golfer. The golfers were observed for a total of 13 golf matches. The treatment was a cognitive-behavioral intervention which was designed to increase the golfer's adherence to a preshot routine. The behavioral routine included proper alignment to the target, good posture, and consistent ball position. The mental component of the preshot routine included making a decision on the club and committing to that selection, the type of shot to be played, and the position of the target. The mental preshot routine was assessed later the same day as the golf match by an interview technique. The results of the interviews revealed that the cognitive-behavioral intervention increased adherence to preshot routines for golfers. Although the improvements were minor Cohn et al. (1990) pointed out that at elite levels of golf one stroke can mean the difference between winning and losing a championship.

Ravizza and Osborne (1991) presented a cognitive-behavioral routing to aid football players from the University of Nebraska in becoming more consistent performers. The routine included three steps to help the players focus on one play at a time. The process begins when the quarterback or defensive signal caller says, "ready". This verbal cue is designed to alert all players

in the huddle to focus on the instructions from the signal caller. The signal "ready" also is a cue for the players to put aside whatever occurred on the last play and refocus to the new instructions. The athlete also has time before the huddle to plan any adjustments, mentally rehearse the last play, acknowledge their feelings, and then move on to the next play. The researchers taught these techniques to the players and coaches at practices. The coaches reinforced the ready, respond, and refocus preperformance routine to the players during practices and in their pre-game talk. The three step program was found by the authors to be an effective technique for football situations where players: (a) focus on mistakes, (b) do not pay attention in the huddle, (c) coping with distractions, or (d) trying not to make a mistake. The emphasis on this program was to keep it simple for the players and integrate the mental skills into the game situation.

Summary. Combined intervention programs supported that relaxation, imagery (Gould et al., 1980; Fenker & Lambiotte, 1987), and coping strategies (Hellstedt, 1987; McCaffrey & Orlick, 1989; Orlick & Partington, 1988;) produced higher outcome performances. A competition plan and quality training also indicated higher performances of elite athletes (Cohn et al., 1990; Orlick & Partington, 1988).

Counseling Technique

Kiresuk and Sherman (1968) developed a goal attainment scale to compare treatments within a mental health setting. The goal attainment scale was flexible enough to be used to study the effects of different treatments upon a population (Emmerson & Neely, 1988). Goal attainment scale research indicated that this approach to counseling is effective for program evaluation by setting up a pre-treatment goal for the individual and an ongoing evaluation during the treatment (Kiresuk & Sherman, 1968). Goals can be set in relation to the needs of the individual client and the assessment made by determining how well those goals were met (Emmerson & Neely, 1988). This method required one or more goals to be set by the counselor and client specifying each problem area or concern the client wishes addressed. Under each concern, behavioral expectations are listed ranging from the best possible outcome through counseling to the worst possible outcome through counseling (Smith, 1976). For each problem or outcome measure a five point scale of specific outcomes are generated from the most unfavorable treatment outcome predicted (-2) to the expected level treatment outcome (0) to the best possible outcome (+2). Ideally the goal statements would be generated by the investigator and the individual athlete. Goal attainment scaling is a method of generating quantifiable goal statements that are tailored to the individual (Smith,

1988).

Thompson and Zimmerman (1969) administered a goal checklist to 315 clients and their 27 counselors at several points during the counseling process. The clients were asked to check the goals on the list which they had for themselves while the counselors checked the goals they had for the client after the first interview. This procedure continued every third interview until the study was completed. It was found that there was a significant ($p < .001$) discrepancy between the goals set by the client and counselor. Thompson and Zimmerman (1969) concluded that counseling would be enhanced if the goals were decided collaboratively between the client and the counselor.

Smith (1976) hypothesized that counseling with the Goal Attainment Scaling (GAS) evaluation procedures would improve counseling. Twenty adolescent subjects were assigned to 20 volunteer counselors. The counselors were assigned to an experimental and control group. The experimental group learned the GAS counseling techniques. Prior to the first visit with a counselor and after eight counseling sessions, the subjects were administered a Children's Locus of Control Scale. After the eighth session the subjects were also administered the outcome assessment questionnaire and the Consumer Satisfaction Questionnaire. The experimental group attained a significantly higher score on the outcome assessment sheet ($p < .05$), Consumer Satisfaction

Questionnaire ($p < .005$), and Locus of Control Scale ($p < .0005$). The results of this study indicate that GAS enhances counseling outcome.

Summary

It can be concluded from the literature review that use of the Goal Attainment Scale (GAS) is an effective individual counseling technique (Emmerson & Neely, 1988; Kiresuk & Sherman, 1968; Smith, D.L., 1976; Smith, R., 1988). However, there were no sport studies found which studied the effectiveness of the GAS in relation to performance enhancement or as a counseling technique used by sport psychologists.

CHAPTER 3

METHODOLOGY

This chapter provides a description of the methods employed while conducting this research. Each of the following areas is discussed individually: (a) selection of subjects; (b) research design; (c) rationale for intervention phenomenon; (d) rationale for variables and measures; (e) procedures for the group intervention program; and (f) procedures for the combined/collaborative intervention program.

Subjects

The subjects were 10 members of a National Collegiate Athletic Association (NCAA) Division I nationally ranked women's basketball team. The study was discussed with the coach and she was asked to sign a letter of consent (Appendix C). Each subject was given a copy of a letter of explanation, instructions for game days, and asked to sign an informed consent statement before participating in the study (Appendix C).

All 10 subjects were exposed to a general psychological training program. Four of the 10 subjects were selected for the combined psychological intervention program. The researcher assigned these four players subject identification numbers, which were not uniform numbers.

None of the subjects were paid for their participation in this study. Each athlete who agreed to participate in the combined psychological training intervention program kept a log of the length of time they spent per day and the focus of their psychological training program for each day.

The assignment of the four subjects for the collaborative group to receive the combined psychological training program was decided by the head coach and the researcher. The four athletes were chosen by the coach and researcher according to position and years of experience on the team. The combined group and collaborative program included two first, one second, and one fourth year player from the positions of guard, forward, and post. The athletes who received only the group approach included the remaining six players, one first year, one second year, and four third year players from the positions of guard, forward, and post.

Design

A single subject multiple baseline across individuals design was employed for the study. The baseline basketball performance statistics used were the season game statistics for each player. For all subjects the first psychological training program began on the official NCAA starting date, October 15. The combined collaborative group psychological training program began for the first subject with six games

remaining in regular season play; the next subject began her intervention with five games remaining; the third subject began with four games remaining; and the fourth subject began with three games remaining. The staggered start was employed in order to see whether the treatment was affecting the player's performance and not other situational variables. An ABABAB design was used to evaluate the foul shooting intervention for the 10 players.

Rationale for Selection of Intervention Phenomenon

The interventions included imagery, energizing, and positive self-talk; each of the former included centering and focusing (Appendix A & B). Centering was chosen because it was a method of relaxing by controlling breathing through inhaling and exhaling. Once the subject completed this relaxation response, she was able to focus on the immediate task/situation. In this study, centering was always used in conjunction with focusing or refocusing. The subject received instruction in centering, then focusing, and practiced centering and focusing before imagery was introduced to the team.

Imagery was employed by all 10 players in this study because research indicated that imagery in conjunction with physical practice resulted in greater improvement in learning skills than physical practice alone (Feltz & Landers, 1983). The subjects were physically practicing

their open and closed skills related to the game of basketball on a daily basis. Imagery was controlled by the researcher in relation to the team practice focus of the coach. It was added to the players' practice routine for a five-to-ten minute segment at the beginning of each of three practices per week during the study. The athletes were encouraged to use imagery on their own, but they did not keep a log of their imagery, nor were they asked for feedback about their imagery.

Positive self-talk was employed in this study only for the athletes in the combined program (Appendix B). Positive self-talk has been shown to enhance performance when used with athletes because it reinforces the athlete's self-confidence (Rushall, 1989). The athletes in the collaborative group used positive self-talk when they were doubting their abilities and losing their self-confidence. Athletes in the combined group using the collaborative program were informed about the benefits of positive self-talk (Appendix B) when they met with the investigator. If the investigator and the athlete thought the athlete could benefit from positive self-talk the investigator assisted the athlete in designing a psychological training program to reflect this need. Two of the four athletes chose to include this in their psychological training program.

Energizing (psyching up) was used in this study as part of the program only for the combined/collaborative group

because it was necessary to assist athletes who were under-aroused for practices and games. Athletes in the combined/collaborative group were given written materials on energizing (Botterill, 1986), informed about the benefits, and given the opportunity to use it in their mental training program (Appendix B). Two out of the four athletes employed energizing techniques to "psych-up" for practices.

Measures and Variables

Game statistics were employed in this study to measure performance of closed and open skills. These statistics were recorded and averaged for each block of three games in the study: (a) by player to evaluate Hypothesis 4, (b) by treatment group to evaluate Hypothesis 2, and (c) by team to evaluate Hypothesis 3. For the closed skill foul shooting percentage was used.

The open skills evaluated for each game were: (a) field goal percentage, (b) points per minute played, (c) rebounds per minute played, (d) steals per minute played, (e) turnovers per minute played, and (f) fouls per minute played. The reason these statistics were averaged over minutes played was to give a clearer picture of the player's productivity while on the basketball court because all players do not receive the same amount of playing time.

The Competitive State Anxiety Inventory-2 (Martens et al., 1990) was used to measure state anxiety. The test

contains 27 items which measure cognitive and somatic anxiety, and self-confidence. There are nine items for each anxiety measure. The subject was instructed to answer the inventory by how she felt right now (Appendix C). Research has indicated that the CSAI-2 (Martens et al., 1990) is a valid and reliable inventory for evaluating state anxiety in sport specific settings (Gould, Petlichkoff, Simons, & Vevera, 1987; Martens et al., 1990).

Procedures

Group intervention program

At the first three team meetings in pre-season the subjects completed the following: (a) personal goal assessment form, (b) knowing your competitive self, (c) precompetition plan, (d) on-site pre-event plan, (e) competition focus plan, and (f) refocus plan (Orlick, 1986). These forms provided information to the players which assisted them in psychological preparation for future games. The researcher conducted three one hour meetings with all 10 subjects explaining sport psychology and how athletes use psychological skills to improve their game performance. At each session, the athletes were given two forms to complete and bring to the next meeting. During the first meeting, the athletes were given the personal goals form and knowing your competitive self form to complete. After the second meeting, they were asked to complete the

precompetition and on-site pre-event plans. At the third mental training meeting, the researcher included an explanation of visualization and a videotape, What You See Is What You Get (Coaching Association of Canada, 1987). Following the third meeting the athletes were asked to complete the competition focus and refocus plans.

The mental training program for all athletes in this investigation included centering, focusing, and imagery for closed and open skills. Centering included a demonstration of breathing control, i.e., feeling the tension leave the body with each exhalation, and energy coming into the body with each inhalation (Botterill, 1986). After centering, the athletes were instructed to focus on a specific task provided for the group by the researcher. Then, the use of this in the game situation was explained so that centering and focusing were used in combination for each specific open and closed skill when it occurred in the game (Appendix A).

Closed skill. In addition, the 10 players were instructed to image making 20 foul shots per night before retiring for 20 out of 30 days. This procedure occurred while the researcher was absent from practices from mid-December to mid-January. The players were requested to keep a log of their foul shots. Following the 30 days the athletes gave the log to the researcher and were told the experiment was over. Game statistics were used during intervention to see whether the imagery helped the players

to improve their foul shooting percentage. There was a return to a no treatment condition for seven days followed by a second intervention (Appendix A).

During the second intervention, the athletes were paired with a partner during practice. One partner attempted two foul shots at one hoop and then rotated to the hoop at the other end. They stopped shooting after eight fouls shots had been attempted. The player recorded the number of foul shots she made out of eight attempts. The player's partner mentally practiced making foul shots as many times as she could in the time her teammate was attempting the eight foul shots and she recorded the number she imaged. Then the players reversed roles so that each player physically practiced shooting eight foul shots and mentally practiced making as many as possible in the time available. The treatment technique was repeated twice during each practice so that each player physically attempted 16 foul shots. On alternate days, each of the partners was designated to physically shoot first. The second intervention continued for three practices per week over a six week period until the end of the season. The ABABAB design was employed to evaluate the effect of the intervention on this closed skill task.

After three games into post season play, a third program was employed which included mental and physical practice with distractions. For the mental practice with

distractions, the players were divided into groups of two. For a period of 30 seconds, one partner imaged making as many foul shots as possible while the other player talked to her in an attempt to distract the player mentally shooting. Roles were reversed and the mental practice program was repeated two times.

Later in the practice each day, the partners physically shot eight bonus foul shots. One partner shot while the other said distracting comments related to missing the foul shot or the importance of the shot at this time of the game. Basically the players distracted or disturbed the shooter. Since two hoops were used for the physical foul shooting procedure, quite often there was more than one person talking "trash" (as the players called it) to the shooter in an attempt to disturb their focus of attention. This mental and physical foul shooting with distractions continued until the end of post season play.

Open skills. The researcher guided the subjects through a series of five open skills to image three times per week for five minutes immediately prior to the team practice during the pre- and regular season practices. Prior to practice, the researcher consulted with the coach on her practice emphasis for the day and/or week. The researcher described an offensive or defensive open skill play series, which the coach planned to use during the practice or next game, for the subjects to image. For

example, the subject was told to image the following; " a player rebounds the ball, outlets it to you, you lead the fast break up the court, pass to a teammate who scores." It was emphasized that the athletes should focus on their own process at all times; that is they should focus on what they are doing in detail, including information they are taking in, the response/actions they are making in relation to that information, and the positive results of their actions. Sometimes the players were given offensive images of their plays, offensive images of their opponent's plays, defensive images which they would employ during the game, and defensive images which their opponent would use against them.

The intervention for open skills began for both groups on October 15 during three practices per week. From mid-December to mid-January the researcher did not attend team practices, thus the open skill intervention program ceased to exist for six games during blocks 3 and 4. The open skill intervention program for the both groups re-started at block 5 and continued until the end of post season play.

State anxiety. All athletes were asked to complete the CSAI-2 one to two hours before the competition (Martens et al., 1990). Following the game, the subjects were asked to complete a game evaluation form (Orlick, 1986) to assess their psychological performance during the competition. This allowed each player to see their anxiety level prior to

the game and evaluate their performance during the game. They were informed that they could use this information to alter their anxiety through visualization. All players were told to center, focus, and visualize before games to assist them in reaching their optimal level of arousal/state anxiety.

Combined group and collaborative program

The combined psychological training program for the four collaborative subjects included each subject initially meeting with the investigator for one hour to establish their individualized mental training program. Each subject in this program was assigned a subject number (i.e. #31, 41, and 51; these numbers are not uniform numbers). Initially, the study included three subjects, with the first subject (#31) beginning her individualized program during the off-season; the second subject (#51) with five games remaining; the third subject (#21) with four games remaining in regular season play. However, one of these three athletes was injured immediately after the initiation of her intervention, had begun and it was uncertain whether she would be playing in the remaining season games. A fourth athlete was added to the combined/collaborative program with three games remaining in regular season. The athlete added (#41) was selected because she had requested assistance from the researcher earlier and had received some individual

consultation when there were eight games remaining in the regular season.

The intervention for the athletes was staggered in order to control for game results and situational variables and to determine the relative effects of the intervention on each athlete. At the initial meeting, with each athlete the historical forms which the athlete had completed (Orlick, 1986), their game performance statistics, and their state anxiety graphs were discussed. Only the four subjects in the collaborative program were taught to identify their optimal level of arousal and counseled in alternative methods to control their anxiety level. Each week they were given feedback on their pre-competition anxiety level and encouraged to continue to use the techniques which lowered their anxiety. Any concerns or problem areas related to the historical forms, state anxiety, or game performance were included in the collaborative psychological training program. Each subject was asked if there were any special areas in which she wanted to improve during the season. Each subject, the investigator, and the coach determined the areas which were included in the player's individual psychological training program.

In addition to the centering, focusing, and imagery program employed in the group centered program the athlete centered collaborative program included information on the benefits of positive self-talk and energizing. Two subjects

chose to use positive self-talk (#31 & 51), two chose energizing techniques (#31 & 41), and all subjects chose imagery, centering, and focusing. Positive self-talk can be achieved through listening to audiotapes which stress relaxing to music and opening your mind to positive self-statements which are on the tape (Kellner,1987). The four players were each given a copy of the audiotape, Living the Miracle (Kellner, 1987), and instructed to listen to side one daily before going to sleep and side two before attending practice or a game. Each athlete evaluated the effectiveness of this tape over the period of the intervention. Positive self-talk also included self-statements which included the use of mood words, task-relevant statements, and positive self-statements (Appendix B). For example, an athlete could say to herself, "I am ready to play aggressive defense today", "I can stop any player I guard today", "I am invincible" or "No one can stop me when I drive to the basket". Energizing was explained to the four athletes as a method of: (a) psyching-up for games which were considered unimportant or not challenging to the player, and (b) preparing to go to a routine practice which they considered boring. The players were informed that research findings indicate that quality practice carries over to quality game performance. The four subjects wrote a daily log to enable them to monitor their own feelings and program throughout the study.

After the first counseling session with each athlete, the researcher explained the goal attainment scale (Thompson & Rudolph, 1988) as a method to focus the athlete's attention on specific tasks. Three of the four athletes (#21, 31, & 41) decided that the goal attainment scale (Thompson & Rudolph, 1988) would be helpful to them and wanted to try it. The athlete and coach were asked to list five areas where they wanted to see an improvement in the athlete's performance. The researcher and the athlete completed the scale and marked an "x" for the baseline performance of each area. Each week the athlete and researcher evaluated the athlete's performance for the week and placed a different color check mark on the scale to reflect her performance.

An individualized psychological practice routine was established for each player in the combined program for the practices, pre-competition, competition, and refocus situations. The investigator met weekly for 30-60 minutes with each subject in the combined/collaborative program to evaluate their log and progress to date in relation to their goal attainment scale and performance. The investigator also talked to the subjects before or after three practices per week and after all home games to check on their progress. At this time, any changes to their psychological training program were negotiated.

The first subject (#31) employed the goal attainment

scale in her program with six games remaining in the regular season. Her five goals related to: (a) communication with the coach, (b) mental toughness, (c) physical toughness on defense, (d) offensive rebounding, and (e) self-confidence. She employed imagery and positive self-talk to achieve these goals.

The second subject (#51) was counseled with five games remaining in regular season play. She chose not to use the goal attainment scale in her program. She thought her problem on the court related to being physically tired during the game and wanted to remind herself to exhale and refocus on the immediate task. She wanted to talk to the researcher and use her as a sounding board. She felt her game performance was where it should be and was happy for the most part with her performance.

The third subject (#21) was injured after the first meeting so it was unclear whether she would be able to play in the remaining four regular season games. She had to learn to control her breathing so she would not become tense during the game. Each time she became tense she would hold her breath and become more tense. She was taught to exhale at every whistle and focus on the immediate task. During the game, she was told to say "you got it" after each error and focus on the immediate task. However, the injury became her focus and she was not counseled weekly after the first session.

The fourth subject (#41) was counseled with three regular season games remaining over a two week period. This subject had lost her confidence in her ability and was intimidated by her outstanding opponents. She had come to the researcher with 8 regular season games remaining to discuss her lack of confidence. At that time the researcher had talked with her about her concerns. When the opportunity arose to add another subject it was decided to add subject #41. With three regular season games remaining the athlete (#41) began her second intervention. She employed the goal attainment scale and set five goals which were: (a) boxing out, (b) becoming physical when rebounding and playing defense, (c) refocus on the immediate task after a repetitive error, (d) focus on the task while being physically pushed, and (e) improve non-verbal communication with the coaches. She used imagery at home, during practices, immediately prior to and during games. This athlete liked to sit with the researcher approximately one hour prior to the last three regular season games and image scenes which would occur during the game.

Evaluation of performance

Athletes were asked to limit their imagery to the amount of time requested by the investigator during this study. Players in the combined group using the collaborative program were asked not to share any

information imparted to them with the rest of the team until the study was completed. The collaborative group was told that once the study was completed all players would be given the opportunity to employ the techniques used by the combined group if they chose to do so.

Each athlete also completed a game evaluation form (Orlick, 1986) on her performance. This form assisted the athlete in evaluating the mental aspects of her game performance. After completing nine of these forms, the athlete began to see a profile of her performance. Once she had this information she could choose the psychological training program which might assist her in improving her performance. The athletes in the combined group using the collaborative program discussed these forms with the researcher weekly. The intervention employed in this study could enhance the athlete's quality of play because she had the information to change her future programs of mental preparation for the game. Game performance was measured by the game statistics of each player's performance immediately following the game and the athlete's evaluation of her performance (Orlick, 1986) immediately following the game.

Closed skill. Game performance of the closed skill, foul shooting, was measured by the game statistic, foul shooting percentage, which was tabulated immediately following the game. The coach kept a log including the date

and number of foul shots which the players mentally and physically completed during all practice sessions.

Open skills. Game statistics were used to measure the open skills of points-, rebounds-, steals-, turnovers-, and fouls per minute played, as well as field goal percentage. The group centered psychological training program involved the athletes imaging open skills as designed by the investigator (Appendix A). These open skills were described to the subjects prior to three practices per week. Prior to practice, athletes were asked to image open skills in game situations relative to practice emphasis of the coach. This practice and imagery occurred for five minutes on the court with the investigator.

State anxiety. State anxiety was measured by the CSAI-2 (Martens et al, 1990) one to two hours prior to the game. All subjects in both the group centered and combined psychological programs completed this form from the last week in January to the end of the regular season. The state anxiety results were only discussed with the athletes in the combined/collaborative program during their weekly meeting with the investigator. These results indicated to the athlete where her level of arousal was before the game and whether that was where it should be. She then used centering, focusing, energizing, or imagery to improve her performance when her performance was less than optimal. If

her performance was acceptable to the coach and athlete, then she continued to do the same pre-game mental preparation.

The six athletes in the group program received feedback on their scores at the end of regular season play. Their scores on the CSAI-2 and performance measures were explained and they were asked if they wanted any of the reading materials or audiotape (Kellner, 1987) which the combined/collaborative had employed.

CHAPTER 4

RESULTS AND DISCUSSION

The purpose of this study was to determine the relative effectiveness of a group centered and combined group/individualized psychological training program on state anxiety and game performance for open and closed skills. Data were collected on a nationally ranked Division I women's basketball team over a four month period which included pre season, regular, and post season games. For the purposes of this study, off-season was defined as the time including April to the end of August, pre season was from late August to mid November (Block 1), regular season was from mid-November to the end of February (Blocks 2-9), and post season was the Month of March (Blocks 10-12). There were 11 blocks of 3 games each, while Block 12 included only 2 games, the maximum number in the final post season tournament. Post season was not included in the original proposal for this study because there was no guarantee that the team would be playing in post season competition, or for how long they would be playing, if, indeed, they were chosen for post season play. However, as a result of their regular season play and performance during post season they played eight post season games (Blocks 10-12).

A single subject multiple baseline across individuals

design was used to investigate the relative effects of the combined group centered and individualized programs on the performance measures and three sub-scales of the Competitive State Anxiety Inventory-2, CSAI-2 (Martens et al., 1990). State anxiety was assessed and evaluated for each subject for three blocks across nine regular season games (Appendix D). Game statistics were analyzed over 12 blocks of 35 games. The performance measures included game statistics for each subject and treatment group for the closed and open skills (Appendices F and G). The closed skill performance was calculated by foul shooting percentage. The open skill measures included: (a) field goal percentage, (b) points per minute played, (c) rebounds per minute played, (d) steals per minute played, (e) turnovers per minute played, and (f) fouls per minute played.

The results have been organized in the order of the hypotheses (Chapter 1, p. 5) dealing with effects on: (a) state anxiety, (b) closed skill performance, (c) open skill performance, and (d) individual performance of the former. Discussion of the interpretation of these results and the relationship to the literature follows each results section.

State Anxiety

The first hypothesis (Chapter 1, p. 5) stated that both the group and collaborative intervention programs would

facilitate a decrease in state anxiety as measured by the CSAI-2 (Martens et al., 1990). Results were evaluated using planned contrasts based on a 2 x 3, Group x Block, analysis of variance with subjects nested in group. Descriptive statistics for the Group x Blocks results are included (Appendix D).

Results

The Group x Block interaction for cognitive and somatic anxiety were significant ($F(1, 80) = 2.79$, $p = .023$; and $F(1, 80) = 3.39$, $p = .008$, respectively). However, the interaction effect for the self confidence variable was not significant ($F(1, 80) = 1.38$, $p = .243$).

The three subjects in group 2 who had individualized programs lowered their score from Block 7 to 9 on the cognitive anxiety scale from 13.222 to 10.444 (-2.778) which was statistically significant ($F(1, 80) = 4.02$, $p = .049$). Across the same three blocks, group 1 (group program) cognitive anxiety scores decreased from 13.778 to 11.222 (-2.556) which was statistically significant ($F(1, 80) = 6.81$, $p = .011$). Although the groups were not significantly different from each other at any of the three blocks ($p > .05$), both groups improved significantly with their respective treatments. Thus, Hypothesis 1 was supported for cognitive anxiety (Figure 1).

On the somatic anxiety scale, Group 2 decreased their scores from 14.556 to 10.444 (-4.112) which was significant

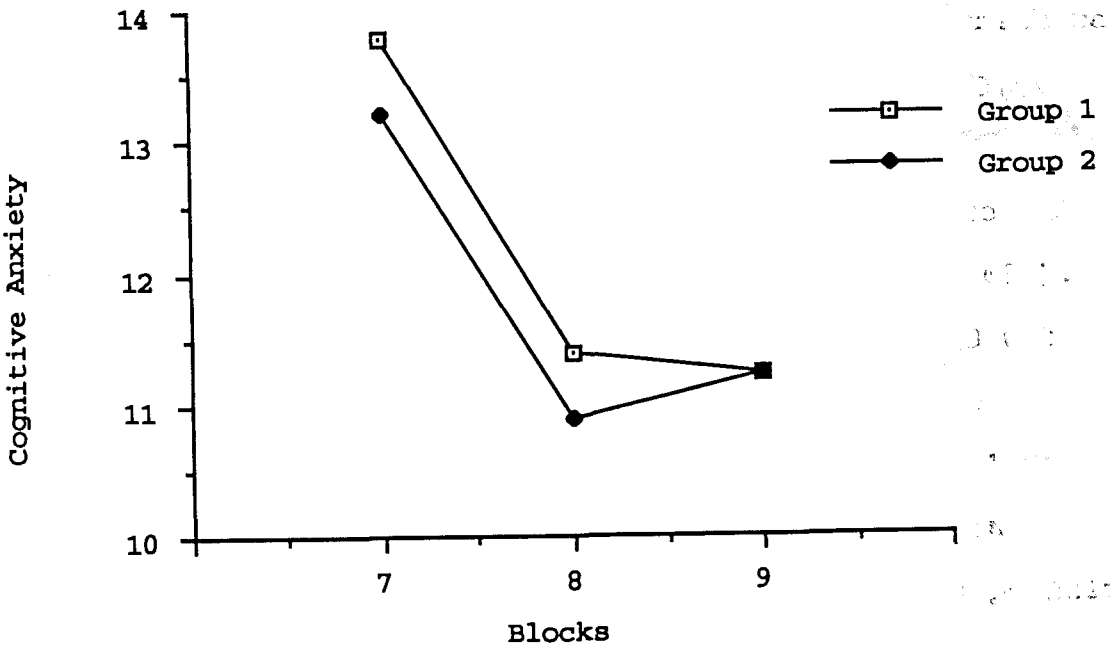

Figure 1. Group 1 and 2 cognitive anxiety scores

($F(1, 80) = 8.69$, $p = .004$). Group 1 somatic anxiety scores decreased from 13.278 to 11 (-2.278) which was also significant ($F(1, 80) = 5.33$, $p = .024$). The two groups were not significantly different from each other throughout the evaluated period. However, both groups did improve significantly, thus supporting Hypothesis 1 for somatic anxiety (Figure 2).

Group 2 raised their self-confidence score from 30.222 to 34.222 (+4.000) over a period of Blocks 7 to 9; which was statistically significant ($F(1, 80) = 4.16$, $p = .045$). Group 1 also had a position change in their self-confidence score from 30.778 to 31.444 (+0.666) but the increase was not statistically significant ($F(1, 80) = .23$, $p = .632$). The athletes who had the group program, Group 1, did not improve as much as Group 2, the athletes who had the individualized program (Figure 3). Thus Hypothesis 1 was only partially supported for self-confidence; i.e. the combined/collaborative program produced significant positive results, but the group approach program did not.

Discussion

The athletes in both the group program and combined/collaborative program showed a steady improvement from Block 7 to 9 in cognitive and somatic anxiety (Figures 1 & 2). Although previous research (Bird & Horn, 1990; Buckles, 1984; Gould et al., 1987) produced the same result

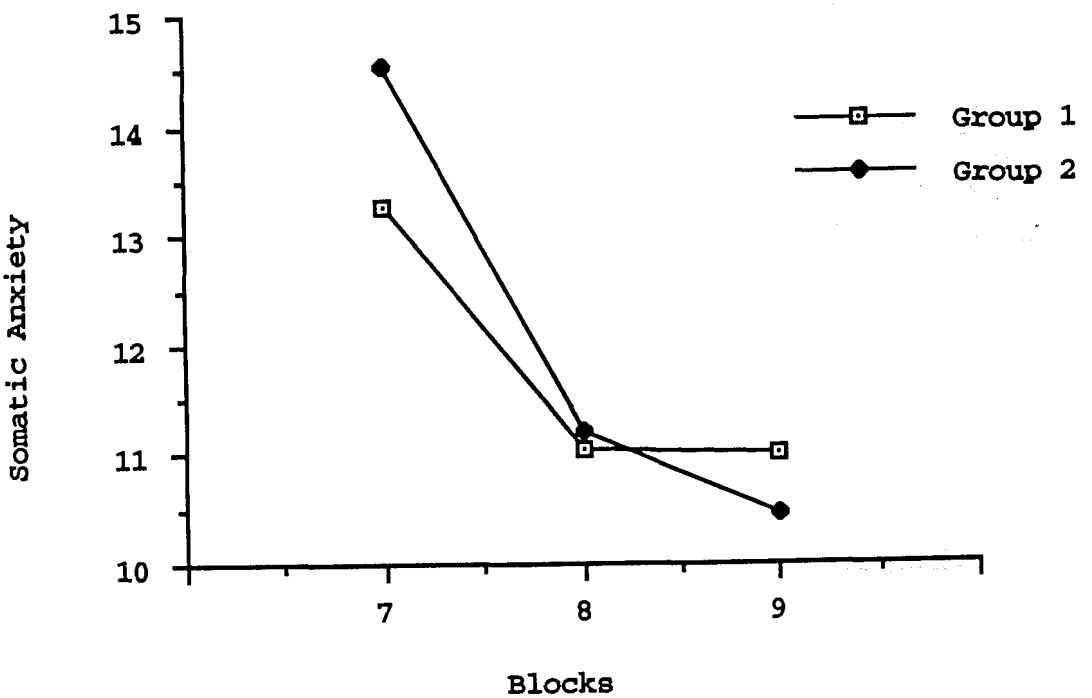

Figure 2. Group 1 and 2 somatic anxiety scores

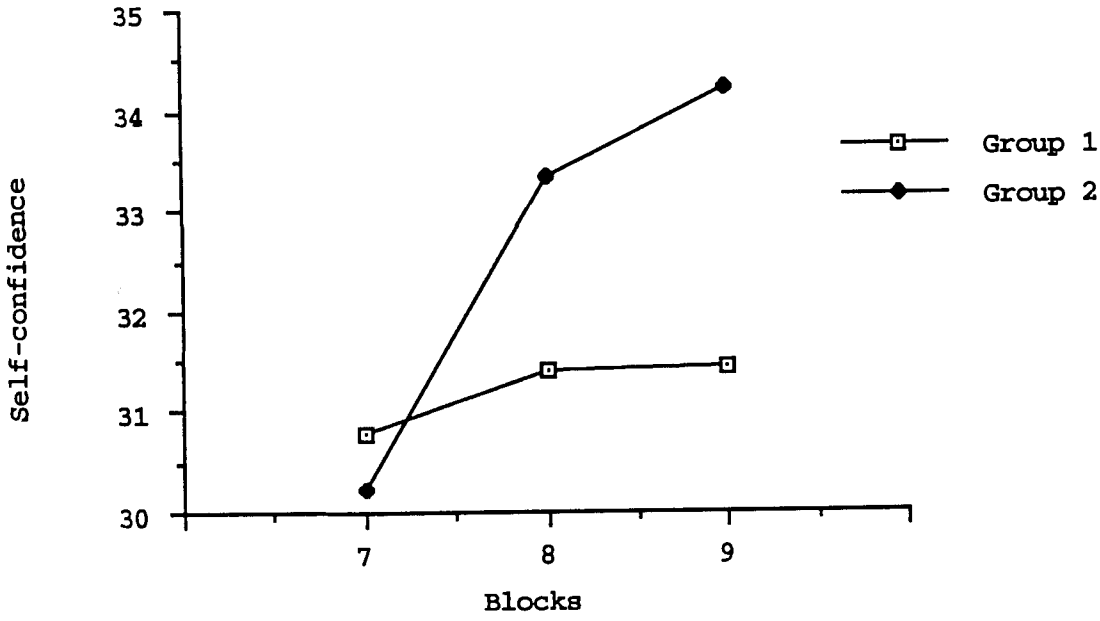

Figure 3. Group 1 and 2 self-confidence scores

for somatic anxiety, no studies were found which were able to effect a positive change on cognitive anxiety.

In contrast, only the athletes in the combined/collaborative program showed a positive significant change in self-confidence, and there were no studies found which produced any effects on self-confidence. Thus, the results suggest that, although a group centered program can produce positive results in anxiety and the best approach is a combined group/collaborative program with individualization of factors in order to affect self-confidence along with cognitive and somatic anxiety to even greater degrees.

Closed Skill Performance

An ABABAB multiple baseline across subjects design was employed to analyze the closed skill performance using foul shooting percentage for the team's game performance during 35 pre-season, regular, and post season games (Hypothesis 2, Chapter 1, p. 5). A time-series analysis with planned contrasts was used to evaluate the A1-B1-A2-B2-A3-B3 design (Hypothesis 2, Chapter 1, p. 5). A1 included Blocks 1 and 2; B1 included Blocks 3, 4, and 5; A2 included Block 6; B2 included Blocks 7, 8, and 9; A3 included Block 10; and B3 included Blocks 11 and 12. It was hypothesized that there would be an improvement for the game performance in foul shooting percentage for the team during applied intervention

(B) phases. Planned contrasts were calculated based on an all-within repeated measures design using a one-way analysis of variance. One dependent variable, team foul shooting percentage was evaluated using the independent variable of 12 blocks across 35 games. The number of subjects (n) varied in the block comparisons because all subjects did not shoot foul shots in every game that they played. Descriptive statistics and graphs across all blocks are included (Appendix E).

Treatment Results Analysis

When evaluating the blocks within the time series analysis (Figure 4) it was found that the treatment produced a significant blocks main effect, ($F(1, 191) = 2.09$, $p = .006$). Planned contrasts were used to determine the differences between specific treatment phases. The first intervention (B1, Blocks 3, 4, & 5) produced a significant ($F(1, 191) = 8.54$, $p = .004$) improvement of 18% in the team's foul shooting percentage in comparison to the first baseline (A1, Blocks 1 & 2). However, when the treatment was withdrawn (A2, Figure 4) the drop in foul shot percentage was not significant ($F(1, 191) = 0.74$, $p = .39$). This indicates that, although there was a 7.7% drop in the team foul shooting percentage, the scores did not significantly drop from B1, nor did they totally return to the same level as the baseline in A1 (Figure 4).

The second intervention (B2, Blocks 7, 8, & 9, Figure

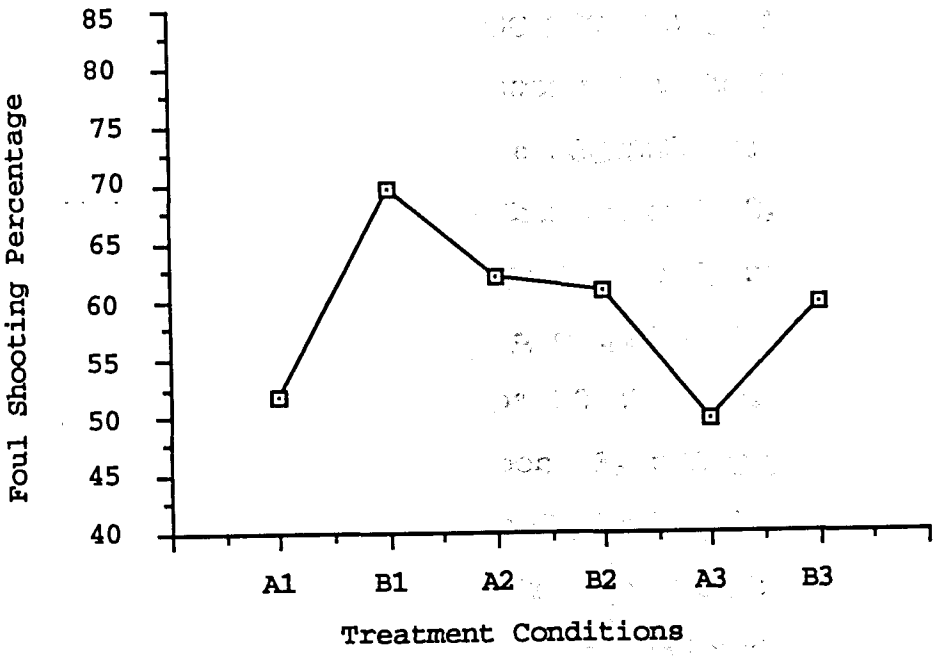

Figure 4. Foul shooting percentage for treatment conditions

4) produced no significant ($F(1, 191) = .11$, $p = .74$) change in team foul shooting percentage in contrast to the withdrawal of the treatment condition (A2, Figure 4). There was no significant difference ($F(1, 191) = 1.89$, $p = .17$) between the second intervention (B2, Blocks 7, 8, & 9) and the second withdrawal of treatment (A3), although foul shooting percentage dropped 11% when the treatment was withdrawn. A 10% foul shooting percentage improvement from A3, the second withdrawal of treatment, to B3, the third intervention, did not produce a significant difference ($F(1, 191) = .72$, $p = .40$). When A1 and A2, two of the three no treatment blocks, were compared, no significant difference ($F(1, 191) = 2.08$, $p = .15$) was found, yet, team foul shooting was 10% higher at A2 than A1. Even though the foul shooting percentage between B1, using physical and mental practice, and B3, bonus foul shooting using mental and physical practice with distractions intervention, showed a 10% decrease the difference was not found to be statistically significant ($F(1, 191) = 3.29$, $p = .07$). However the first intervention, B1, produced a significantly better ($F(1, 191) = 6.45$, $p = .01$) team foul shooting percentage when contrasted to the second no treatment phase, A3. At B1, players had a 20% higher foul shooting performance than at A3 (Figure 4).

Blocks by Treatment Phase Results

When contrasting the individual blocks between adjacent ABABAB components of the design (Figure 5), the following specific results in foul shooting percentage were identified. There was a statistically significant difference ($F(1, 191) = 14.74$, $p = .0002$) when Block 1, the first no treatment phase, was compared with Block 3, during the first intervention of physical and mental practice. There was a 25% improvement in foul shooting performance from Block 1 to Block 3 (Figure 5). There was no statistically significant difference in foul shooting percentage between Blocks 1 and 2 which employed physical practice alone ($F(1, 191) = 2.95$, $p = .09$).

Comparisons between Blocks 2 and 3 showed an increase of 5% but, there was no significant difference ($F(1, 191) = .58$, $p = .45$ between the two blocks. There was no significant difference between Blocks 3 and 4 ($F(1, 191) = 1.86$, $p = .17$), yet there was an improvement in foul shot performance of 14%. This 14% improvement may be a direct result of the mental practice and physical practice intervention. There was also no significant difference between Blocks 4 and 5 ($F(1, 191) = 3.53$, $p = .06$) in the first intervention (B1) using mental and physical practice. There was a 20% higher foul shooting percentage at Block 4 than at Block 5 (Figure 5).

At this time during the season, the athletes were home

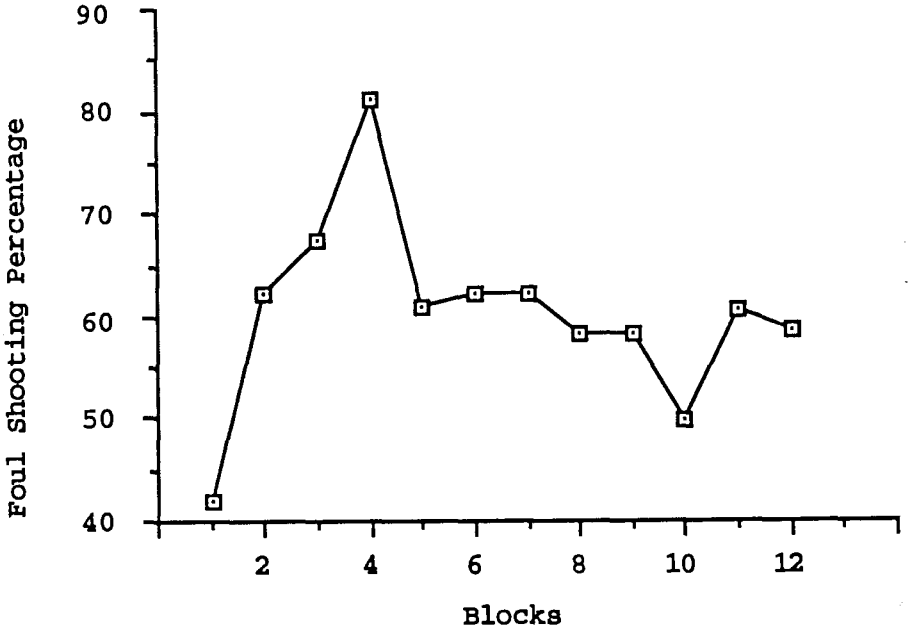

Figure 5. Block foul shooting percentage

for Christmas break so they were without basketball practice for four days. The withdrawal of treatment (A2) at Block 6 showed no statistically significant difference when contrasted with Block 4 in the second intervention phase, even though there was a 19% lower score at Block 6 than Block 5 (Figure 5). Within the second intervention the contrast of Block 7 and 8 also produced no significant difference ($F(1, 191) = 1.36$, $p = .25$).

There was no significant difference ($F(1, 191) = .49$, $p = .49$) in the contrast between Block 9 within the second intervention (B2) and the return to a no treatment condition at Block 10 (A3), but foul shooting percentage dropped 8% from Block 9 to 10 (Figure 5). When Block 11, within the third intervention, was compared to the third no treatment phase at Block 10, there was no statistical difference ($F(1, 191) = .77$, $p = .38$), even though the foul shooting percentage increased approximately 11%.

There was not a significant decline ($F(1, 191 = 2.69$, $p = .1$) in the team foul shooting performance from Block 4, with the imagery intervention, to Block 6, when the imagery practice was not used (Figure 5), but the foul shooting percentage at Block 6 was 19% lower than at Block 4 (Figure 5). In reality a 19% decrease in foul shooting percentage can have a negative effect on the outcome of a basketball game. There was also no significant change ($F(1, 191) = .47$, $p = .5$) from Block 6, without imagery, to

Block 8 with the combined imagery/physical practice component (Figure 5).

Discussion

This study utilized a foul shooting intervention program and tested the relative effects on foul shooting percentage over the course of a season. Statistically the only significant improvement was seen between Blocks A1 and B1 which showed an 18% improvement in foul shooting percentage when mental and physical practice was used after the initial administration of the treatment. Although there was a 7.7% decrease in foul shooting percentage from B1 to the return to the no treatment phase at A2 it was not statistically significant, and the percentage at A2 was 10% higher than at A1 (Figure 4). This improvement may be attributed to the fact that the intervention at B1 was still having its effects on player performance at A2.

Within and between the intervention Blocks B1, B2, and B3 there was no significant difference in foul shooting performance. Also, between the no treatment Blocks A1 and A2 there was no statistically significant difference found. However, foul shot performance at B1 was significantly better than at A1 ($p = .004$) and A3 ($p = .01$) when they were contrasted (Figure 4). This suggests that the treatment made a positive difference in the team foul shooting percentage. Although there were not always significant

adjacent changes between the blocks for foul shooting percentage it is apparent that no treatment followed by play in a new situation, Blocks 1 (regular games with no treatment) and 10 (prior to the first post season game), produced the two lowest sets of scores in foul shooting percentage (Figure 5).

These findings indicate that imagery in conjunction with physical practice enhanced the team's foul shooting percentage within this A1-B1-A2-B2-A3-B3 design. There was an improvement for the game performance in the closed skill of foul shooting percentage for the team during the first applied intervention (B1) phase. After imagery was introduced to the team their performance during the treatment Blocks, B1, B2, and B3 were never as low as the initial baseline (A1) which supported Hypothesis 2 (Figure 4).

The previously reported research findings on closed skill imagery have produced conflicting results. Some research on closed skill imagery has supported the use of imagery to enhance skill performance (Ryan & Simons, 1981, 1982; Silva, 1982; Wrisberg & Anshel, 1989). Andre & Means (1986) and Straub (1989) indicated in their research that imagery did not significantly effect performance of a closed skill. Buckles (1984) and Seabourne et al., (1985) found that visuo-motor behavior rehearsal (VMBR) enhanced performance of a closed skill. The literature does contain

support for imagery in the closed skill of basketball foul shooting, but there are mixed age, sex, and skill level findings (Buckles, 1984; Wrisberg & Anshel, 1989).

There were no studies found in the literature regarding removal of the treatment and/or a second intervention. This current study showed that imagery combined with physical practice does enhance foul shooting in elite basketball players even when the treatment is removed. It also suggests that: (a) mental and physical practice with distractions, and (b) changes in the nature of competition are important variables in any intervention program.

In collaboration, specific results provide some additional insights. One foul shot may actually cause the game to be won or lost. During Block 12, at the final game in post season play the team shot 65.7% from the foul line for a total of 23 points. That particular game was won by 3 points. Yet, before the intervention at A1 (Figure 4) the team's foul shooting percentage was 52%. If they had continued to shoot close to that percentage the final game in Block 12 would have been a defeat and not a victory. That is the reality of the results of this intervention.

Again in Block 11 during the treatment condition using physical and mental practice with distractions, the last game was won by two points. Subject #10 (not a uniform number), in the group program, was on the foul line to shoot bonus foul shots when the team was ahead by two points with

less than 15 seconds remaining to play. An opponent started talking to the player saying that she was going to miss the shot and they would get the rebound score at the other end and send the game into overtime. Subject #10 made the foul shot. The opponent told the player at the line that the first was a nice shot but, the player would miss the second shot and the opponents would rebound it and score a three point shot to send the game into overtime. The player made the shot so that the team was ahead by four points. The opponents scored again, but it was too late and the team in the study won the game. After the game, subject #10 said it was just like practice (mental and physical practice with distractions), so she was not surprised or distracted when the opponent talked "trash" to her.

Another variable which should be considered when evaluating these results is timing and nature of the practice and competitive environment of the games during the season. This study indicated that once imagery was introduced in combination with physical practice and the type of competitive situation (e.g., regular season games) the players' foul shooting performance fluctuated but not significantly; and there was retention of the imagery effects even when the group imagery intervention was withdrawn (A2, Figure 4). However when the type of competitive situation changed as post season play began and the intervention was dropped from the program, the team's

foul shooting performance dropped to 50% at Block A3 (Figure 4). This was a new experience because post season involves play-offs and the team was facing this for the first time this season so they were probably more tense during this conference tournament (A3). Block B3 showed a 10% foul shooting percentage improvement over Block A3 which in reality is significant to a team's play. This is an important result because there is more anxiety during post season due to the fact that the winner of each game continues to play in post season and the loser's season is over. To improve 10% at B3 indicates that the intervention was very effective in that the players had to overcome each do-or-die game situation.

During B1 (Figure 4) the foul shooting intervention was a novel task, so the players may have been motivated to practice because of its newness which could explain the 18% improvement from A1 (first no treatment phase). During B2 the coach was not satisfied with the team's performance in general and was more negative than positive during practices. The team's performance seemed to get worse from Blocks 7 to 8 (Figure 4) which indicated that the coach's yelling and negative feedback was not helping to improve the team's performance as the coach had intended. The coach did not become more positive with the team until Block 8 of B2 (Figures 4 & 5). Block 9 showed approximately the same foul shooting percentage as in Block 8 so the positive feedback

had not yet taken its effect. The team did not win the conference championships (A3), but the team's regular season record allowed them to be chosen for post season play. At the new experience of post season play, Block 10, the team dropped 8% from Block 9. The next change in the treatment occurred at B3 (Figures 4 & 5). The players seemed ready for a change in their foul shooting program so the researcher incorporated mental and physical practice with distractions. The players responded in a positive manner to the program and the results during B3 indicated a 10% improvement over A3.

At B1 the highest foul shooting percentage occurred within this study. This was the time when the researcher had: (a) first introduced the mental practice program for foul shooting to the team, (b) instructed them to mentally practice foul shots on their own, and (c) asked the players to write down the date and the fact that they imaged 20 foul shots. When the researcher returned to the team setting one month later the players handed in their completed log sheets to the researcher. The players were able to mentally practice on their own time without distractions. Perhaps a mental practice foul shooting program for basketball players in addition to physical practice may be satisfactory to improve foul shooting performance. However, the researcher believed that game-like mental practice and physical practice situations would be the most beneficial so the

study was designed in that matter.

The results of this study in foul shot intervention indicate that coaches can create an environment for their players to improve their foul shooting percentage by incorporating mental practice during practice time in addition to their regular physical foul shooting practice. The cost for such a program is 10-20 minutes for three practices per week and/or each athlete could use some individual time outside of practice thus reducing the amount of time in formal team practice.

If coaches believe that games are won or lost from the foul line, then they must make a commitment to spend practice time on an intervention which allows this to occur. The results of the intervention indicate that foul shooting improved when the intervention was employed. The coach indicated that this program was instrumental to the team's success over the season.

Open Skill Performance

Hypothesis 2 stated that both Group 1 and 2 would improve their game statistics in the open skills of field goal percentage, as well as points, rebounds, steals, fouls, and turnovers per minute played in each game from the beginning to the end of the season (Chapter 1, p. 5). Planned contrasts based on a 2 x 12, Group x Blocks, analysis of variance with subjects nested in group were

calculated for each of the six dependent variables. The Group x Blocks results for each of the open skill variables are presented, followed by discussion of the open skill results. Statistical difference is difficult to obtain for these highly variable skills with small group numbers. Group x Block descriptive statistics are included for the open skills (Appendix F).

The treatment condition (Chapter 3, p. 59 & 63; Appendix A & B) was the same for both Group 1 and 2 until Blocks 7, 8, and 9 when Group 2 was receiving the collaborative individualized program. One critical time period was at Blocks 3 and 4 when the researcher was not working with the team during games or practices, thus there was no treatment intervention for open skills for four weeks. The collaborative program had a staggered start for the three subjects in Group 2 (Chapter 3, p.64) during Block 7, which affected any group delays in affect until Blocks 8 and 9. There were two major changes between Blocks 9 and 10: (a) change from regular to post season tournament play beginning with all games in Block 10, and (b) removal of all sport psychology intervention programs beginning immediately after Block 9 and continuing through Block 10, which was a 10 day period of time before and during the conference championships. The group centered and combined treatment programs were reinstated following Block 10, and were continued during practices and games (Blocks 11 & 12) for

the remaining tournaments in post season play. Therefore, the important periods to observe include: (a) group treatment applied from Blocks 1 to 3, (b) group treatment absent Blocks 3 and 4, (c) group differences from Blocks 7 to 12, (d) changes at Block 10 when treatment was absent and the nature of competition changed to tournament play, and (e) Blocks 11 and 12 when treatments were resumed.

Results

Field goal percentage. The results of the planned contrasts did not show statistically significant group differences or within group increases or decreases between block comparisons (Figure 6). However, there was an upward trend in field goal percentage for both Groups 1 and 2 (10.5%, 13.1% respectively) from Blocks 1 to 3 when all athletes were receiving the group approach treatment. When the researcher was gone for the four week time period and intervention halted, there was a downward trend: (a) for Group 1, a 14.3% drop to Block 6; and (b) for Group 2, a 21% drop to Block 7. Following the reinstatement of the group program for all athletes and the addition of the combined/collaborative program for Group 2 during Block 7. There was a positive upward change in field goal percentage through Block 9: (a) for Group 1, a 7.8% improvement; and (b) for Group 2, a 15.6% increase. After the conference championships, considering the removal of the interventions, there was a negative change for both groups. The nature and

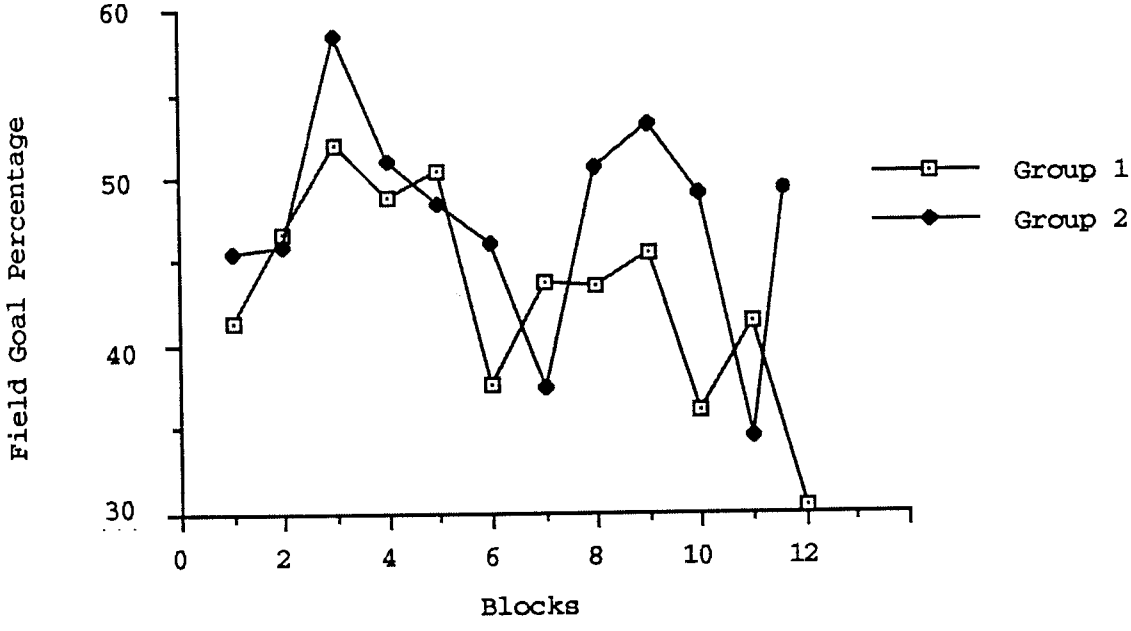

Figure 6. Group 1 and 2 field goal percentages

consistency of the subsequent upward swing when both treatment programs were re-established were varied (Figure 6). There were greater positive effects when treatment was added, and greater negative changes when intervention was removed, for the combined/collaborative program (Group 2) than the group only program (Group 1). There were percentage gains/loses in the hypothesized directions although statistical significance at $p <= .05$ was not attained.

Points per minute played. The results for points per minute played (Figure 7) followed the same pattern as field goal percentage. There was a decline after Block 3 continuing through Block 6 for both groups. After the intervention was initiated with a staggered start at Block 7, the combined/ collaborative athletes, Group 2, improved to another of their highest levels of points per minute played at Block 9 (.549). Similarly, when the group centered treatment was reinstated for Group 1, they returned to a relative high of .368 points per minute. At Block 10 (conference play-offs) both groups decreased their performance. In the final analysis, at Block 10, the collaborative group scored .331 points per minute played, and Group 1 scored .225 points per minute played. Once the collaborative individualized intervention was initiated following Block 7, Group 2 never dropped below Group 1 again. The effects of removal of intervention tended to

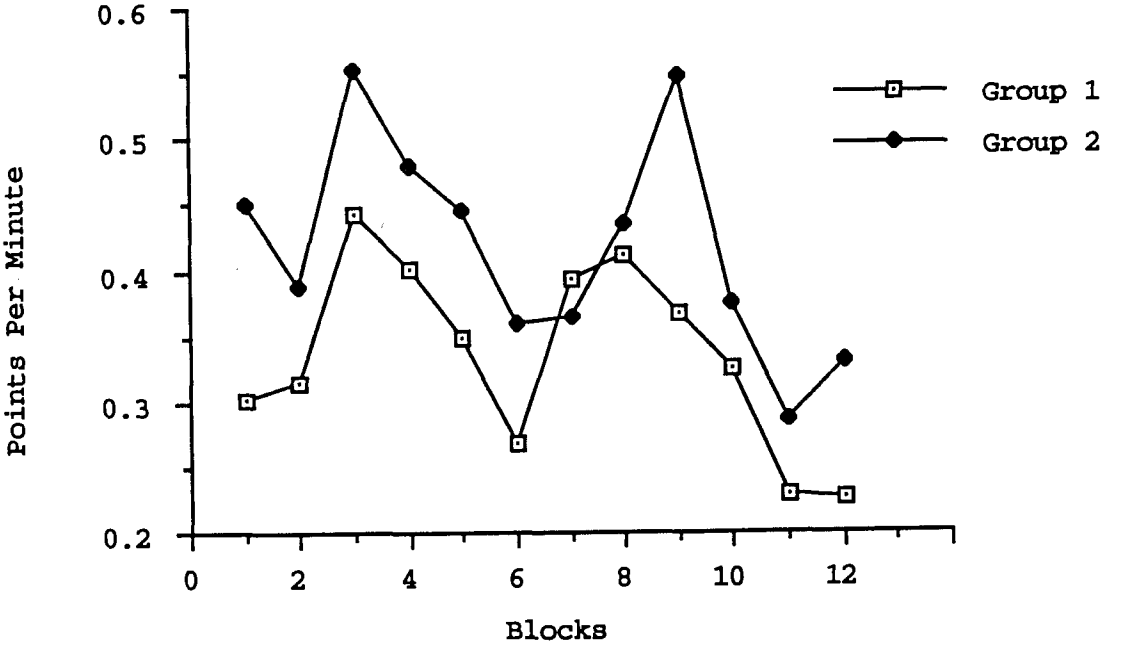

Figure 7. Group 1 and 2 points per minute played

persist more for Group 1 than Group 2 (Figure 7).

Rebounds per minute played. The Group x Block planned contrasts for rebounds (Figure 8) were statistically significant ($F(1, 301) = 1.75$, $p = .02$). Although the groups were not statistically different at Blocks 1 and 2 there was a significant difference at Block 3 between Group 1 (.179) and Group 2 (.290) of .111 rebounds per minute played ($F(1, 301) = 4.26$, $p = .04$). As in the previous two sections, when the intervention was withdrawn for 4 weeks, there was a decline in performance from Blocks 3 to 4 (Figure 8). At Block 4 the groups were not significantly different, and remained so until Block 9. Following the initiation of the combined/collaborative program, Group 2 significantly improved ($p = .02$) while Group 1 remained about the same until at Block 9 athletes in the combined/collaborative program, Group 2, had significantly higher ($F(1, 301) = 5.53$, $p = .02$) rebounds per minute than Group 1. Once again at Block 10 (conference play-offs), both groups declined in their rebounding statistics. The researcher was not with the team during Block 10, but returned to the team for Blocks 11 and 12 (Figure 8). There was a statistically significant difference between the groups again at Block 11 ($F(1, 301) = 6.90$, $p = .010$) with Group 2 performing better than Group 1 in the open skill of rebounding. At Block 12 the athletes in the combined/ collaborative program, Group 2 had .252 rebounds per minute

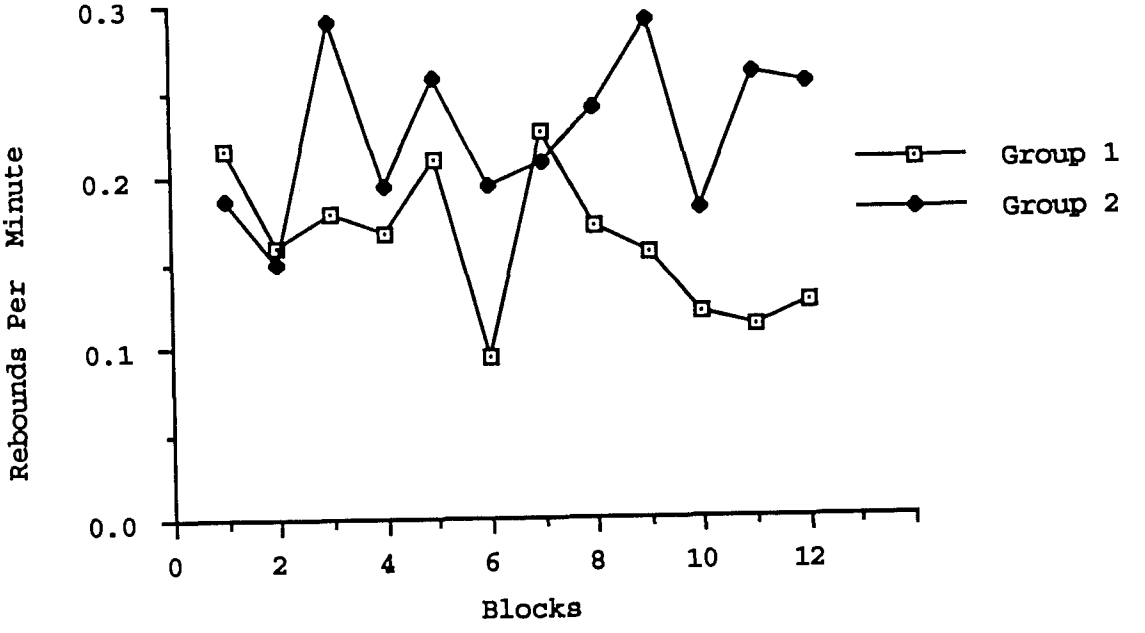

Figure 8. Group 1 and 2 rebounds per minute played

played and Group 1 (group program) had .126 rebounds per minute played. The combined/collaborative program, Group 2, produced superior performance changes and the athletes in that group consistently had more rebounds per minute than the Group 1 athletes once the individualized treatment was introduced (Figure 8). Thus, Hypothesis 3 was only partially supported for rebounding performance.

Steals, fouls, and turnovers per minute played. The results of the planned contrasts for steals, fouls, and turnovers per minute played showed no statistically significant differences when Group x Block interactions were contrasted (Figures 9, 10, & 11, respectively). The pattern of trends in improvement and decline for Group 2 had a basically consistent pattern for these three open skill variables as for the previous three variables. However, the pattern for the performance of Group 1 for the three open skills was more varied than for the previous three variables. Steals are similar to turnovers in that a player will usually have less than five per game (Figure 9). Fouls per minute played may not be significant due to the fact that the game has a ceiling of five fouls per person (Figure 10). Turnovers may not be significant because elite basketball players usually do not create more than four or five turnovers per game (Figure 11). The low numbers for steals, turnovers, and fouls per minute played show no significant difference between and within group differences

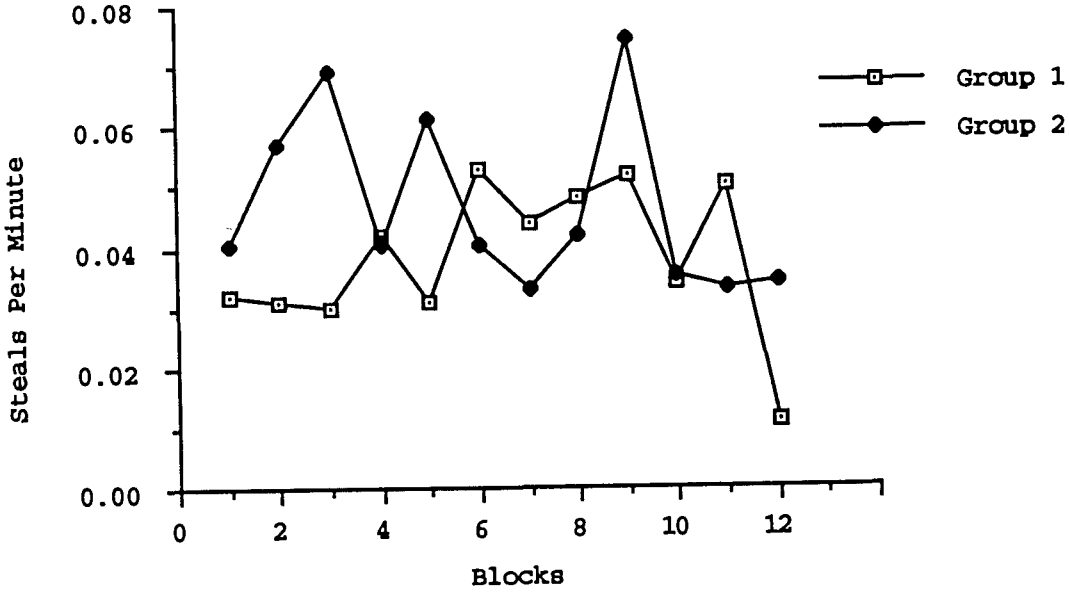

Figure 9. Group 1 and 2 steals per minute played

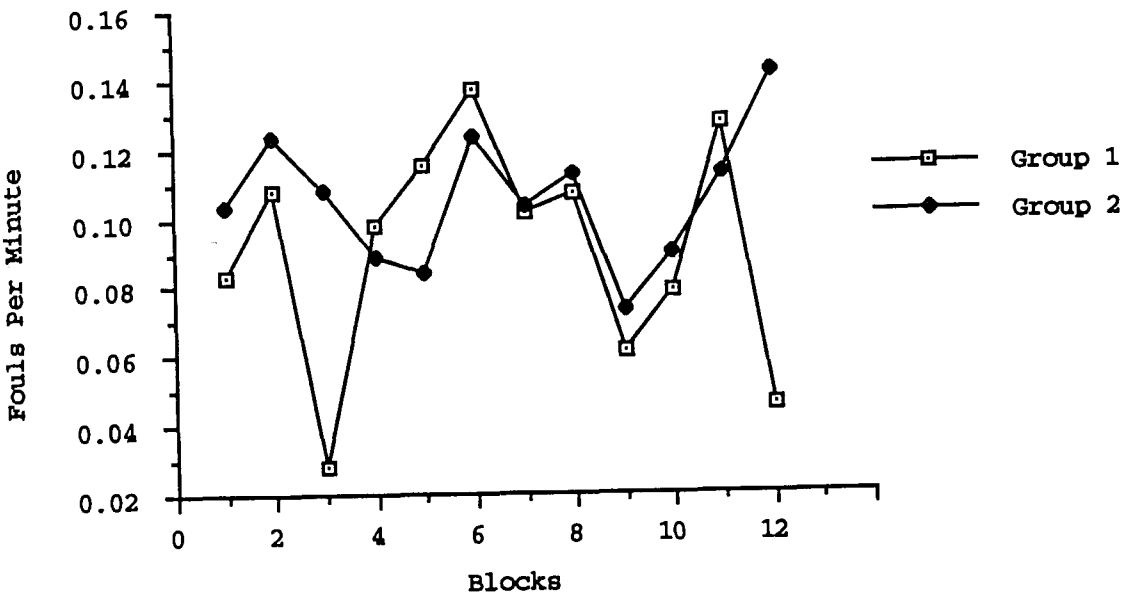

Figure 10. Group 1 and 2 personal fouls per minute played

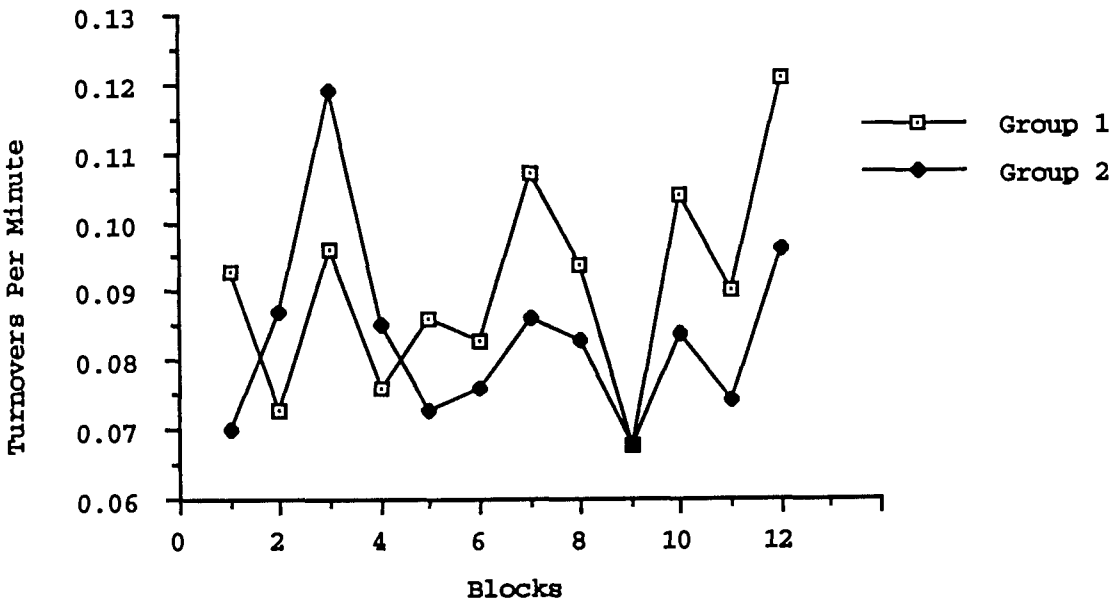

Figure 11. Group 1 and 2 turnovers per minute played

for the planned contrasts in the Group x Block interaction. The fact that there were so few subjects in the study and high variance in the scores may have caused the contrasts of these variables with ceiling effects to be insignificant.

Discussion

The coach of the team kept saying throughout the season that defense, rebounds, and foul shots win championships. This study has already shown that two of the three, rebounds and foul shots, can be improved using a combined/ collaborative program and a foul shooting program, respectively. The coach felt that the most important open skill was rebounding and Group 2 was superior in that category at the end of post season play and the coach was pleased with this performance from Group 2.

In the open skills it was obvious that the rebounding statistics, as well as field goal percentage and points per minute played, were superior for Group 2 as compared to Group 1. Blocks 11 and 12 showed that the collaborative group had a superior rebounding performance against the best competition in the nation. However, both groups had low point per minute production at Block 12. Since the competition was the best in the nation at Block 12 it may have been a factor for the low point production. However, Group 2 was more accurate shooting from the field than Group 1 at Block 12. Group 2, who had the individualized

treatment shot 18.2% higher than Group 1 (group program) at Block 12.

Some research on open skill studies indicated that imagery enhanced performance (Kendall, Hrycaiko, Martin, & Kendall, 1990; Meyers & Schleser, 1980; Silva, 1982; Weinberg, Seabourne, & Jackson, 1981). Buckles (1984) reported that visuo-motor behavior rehearsal (VMBR) did not contribute to improved performance in open skills but Seabourne, Weinberg, Jackson, & Suinn (1981) found that VMBR enhanced performance of open skills. This study indicated that open skill performances of rebounds per minute played, field goal percentage, and points per minute played were positively enhanced during combined/collaborative intervention and negatively affected when this treatment was withdrawn.

A similar pattern, although less obvious, was indicated for the open skill variables of steals, turnovers, and fouls per minute played. Group 1 did not perform as well as Group 2 on the open skills of field goal percentage, points and rebounds per minute played, and the effect of the group centered program did not produce as much improvement as the individualized program. Thus, Hypothesis 3 was supported by the combined/collaborative program, but only partially by the group program.

Combined Group and Individualized Program

Initially four athletes were chosen to be in the combined group/collaborative mental training program. The researcher assigned each athlete with a number which does not reflect a uniform number but rather a code number set by the researcher. Following the first individual meeting with subject #21 (not a uniform number), an athletic related injury was serious enough that she was going to be unable to play for the remainder of the regular season. Thus, she was excluded from the study, leaving three subjects. A single subject multiple baseline across individuals design was used to investigate the relative effects of the intervention upon game performance and state anxiety for the subjects #31, 41, and 51 (not uniform numbers). It was hypothesized that a single subject design across behaviors for each of the three subjects in the collaborative group would represent changes in their state anxiety and game performance of open and closed skills relative to variations in their psychological training program across the season. The subjects began their individualized program on a staggered basis so that: (a) their performance could be attributed to the intervention if there was an improvement in their play, and (b) ruled out specific game or situation affects across the three athletes.

Subject #31

Descriptive statistics for the performance of closed and open skills as well as the state anxiety factors of athlete #31 (not a uniform number) are included (Appendix G).

Off-season Assessment. Subject #31 was counseled prior to the beginning of this research because the coach believed that the athlete had the potential to be a superior basketball player and was currently not playing up to her potential in the eyes of the coach. The researcher met with the athlete in August of the off-season. The first part of the assessment of the athlete included a forty-minute interview to discuss the stress factors which the athlete experienced before, during, and after her performances. A series of questions was posed to the athlete. Following her reply to the questions, the athlete was shown Kroll's (1979) inventory and asked to circle any items which had affected her performance in a positive or negative fashion. She was asked to circle all items which affected her performance even if she had already reported them in the interview. She was told that Kroll's list of athletic stressors had been identified by other elite athletes as factors which affected their performance. This seemed to reassure her and put her at ease when doing this task.

The results of the interview indicated that the athlete felt stressed because: (a) she feared failing, and (b) she

felt inadequate. She said that her performance deteriorated when she became too anxious. Major reasons for these feelings were her fears that she did not want to disappoint the coach and/or significant others, and she became personally dissatisfied and embarrassed when she did not play to her potential.

Both the coach and athlete separately felt the athlete had potential to be an outstanding university player. Yet there was inconsistency in the athlete's performance and lack of communication between the athlete and coach. These were stressors for the athlete because she felt the coach had lost faith in her and no longer thought she had the elite basketball ability she demonstrated at the beginning of the season. The athlete worried that the coach thought she was not mentally tough on the court. The athlete internalized the coach's criticism and avoidance as a personal slight and not in a basketball context. She felt the coach was disappointed in her as a person and not just in her poor basketball performance.

The athlete revealed she was stressed when the coach gave her performance goals for each game because she: (a) felt that she had to get the number of points and rebounds assigned to her as a goal or she would be seen as a failure by letting the team down, and (b) focused on the outcome of her performance and not the process. In addition, if she reached her goals in the immediate game she

fretted over whether she would reach them the next game. Another stressor the athlete was worrying about included phenomena which were out of her control, i.e., boisterous spectators, poor spectator turnout, the playing surface, and being injured. She also indicated that her low foul shooting percentage concerned her.

In the second meeting the athlete was given Nideffer's Test of Attentional and Interpersonal Style (TAIS). The following day her scores on the test were shared with and interpreted for her. The TAIS revealed that the athlete had a higher score on overloaded by external stimuli (OET, 21) than broad external attentional focus (BET, 13). The athlete was told that individuals who have a higher OET score than BET score tend to shy away from busy situations because of the difficulty in dealing with large amounts of information. These athletes usually like one-on-one situations. The athlete verified this to be true for her. For example, when asked whether she liked five-on-five situations or transition better, the athlete responded that she loved transition offense. She said that she felt overloaded in five-on-five quarter court situations.

The athlete also had a higher score on the factor indicating she was overloaded by internal stimuli (OIT, 16) than the factor indicating broad internal attentional focus (BIT, 18). It was explained to the athlete when the OIT score is higher than the BIT score it indicates that the

athlete tends to be overloaded by thoughts to the point of interfering with their ability to function or attend to what is going on around them; i.e., they are "in their head". The researcher explained that this may be a reason for this athlete's poor foul shooting, as she could be overloaded with her own thoughts/emotions and not focused on the task at hand. The athlete agreed that she was distracted when she went to the foul line and was thinking about missing the shot or about the crowd. According to Nideffer (1981) when an athlete becomes too anxious, this overloading of internal (OIT) and external (OET) stimuli will dominate her attentional focus. This athlete became overloaded with external and/or internal stimuli when she was too anxious and made mistakes when she was performing. She became confused with too many choices in the environment.

In the sport of basketball, the mental demands of the game necessitate using both a broad focus and a narrow focus, depending on the situation. Most of the skills in basketball are open skills where the environment changes and the athlete must read and react to the situation. When shooting, the athlete must have a narrow focus of attention, but when playing help-defense a broad focus is required. In addition, the athlete must be adept at switching from broad to narrow, and vice-versa. Basketball is a sport which requires a moderate level of arousal for good performance. High arousal levels create muscle tension which negatively

affects the fine motor movements required for accuracy in the game (Gill, 1986; Martens, 1987).

At the end of the second session, the athlete was asked if there were any other concerns which she wanted to address in her psychological training program. She said that she wanted to: (a) become a 70% foul shooter; (b) become a more consistent practice player; (c) learn how to get "psyched up" for practices; (d) have improved communication with the coach; (e) handle distractions during games; and (f) play to her potential.

Off-season Intervention. Based on the information provided by the assessment and the specific mental demands for performing the varied offensive and defensive open and closed tasks of the sport of basketball, the researcher designed an individualized collaborative mental training program for this athlete. During the pre-season, the researcher suggested two areas where the athlete should begin her psychological training, i.e.: (a) dealing with distractions, and (b) getting psyched-up for practices.

The athlete was informed of Nideffer's (1981) recommendations for athletes who were overloaded by external stimuli, like this athlete. He suggested that these athletes should learn a relaxation technique. While relaxed, the athlete was told to close her eyes and practice broadening her focus. Nideffer also stated that these athletes should use a mental checklist or outline to help

them organize their game plans. Often these athletes need outside direction to help them learn to relax or organize their thoughts. He also suggested that athletes with an obsession score (OBS, 17) leaning to the high side like subject #31, should have a structured environment and priority list to help them deal with distractions (Nideffer, 1981). Thus, a two part program to be used during the off-season was created for this athlete including: (a) an OET control program, and (b) an OIT control program.

The OET control program. When consulted, the athlete decided that she could relax by leaning back in a comfortable chair or bed with her eyes closed. She said it was easy for her to relax in a quiet environment. She was given a worksheet of offensive images to use while she was in this relaxed state. Then, during relaxation she used imagery to practice broadening her focus by visualizing herself playing a basketball game in an environment which was distracting for her. For example she imaged herself playing in a gym with boisterous spectators. If she became anxious during this imagery, she focused on her breathing to release tension in her muscles and gave a passive response to this image. Once she lowered her level of arousal she thought about the boisterous spectators, then shooting the basketball and scoring with this distracting noise in the background. She imaged herself passing, shooting, dribbling, and penetrating to the basket with noise all

around her. She imaged scenes like this until she believed she could play well in this environment. She imaged: (a) the same scene with a different outcome several times, or (b) the same scene with the same outcome. The outcome was always positive such as a score by the athlete or her teammate or a completed pass to her teammate.

Nideffer (1981) also suggested a priority list for individuals who tend to be higher on the OIT scale than BIT scale. Because the athlete focused on the outcome she did not attend to the immediate task, i.e., the process. This athlete was assisted by a mental checklist for five-on-five situations in a quarter court game, since she agreed that this situation caused her to become overloaded. While she was in her daily relaxed state for fifteen minutes she imaged her mental checklist. The athlete was told that she must practice the checklist until it became automatic because an athlete should not think about each step as the game is going on around them.

After athlete #31 read the prescription, she believed these were concrete helpful suggestions. She immediately agreed to try all suggestions which dealt with distractions to see if her imagery would decrease her anxiety about distractions. She also said that she would use the suggestions for getting "psyched-up" for practices when they began the fall physical training program. The athlete responded positively to the prospect that this prescription

would help improve her basketball performance. Following this session, and until team practices began two months later, the researcher had little contact with the player regarding her program. However, the athlete said that she used the worksheet for examples of offensive images and the mental checklist for five-on-five.

OIT control program was developed which included five areas of concentration: (a) internal distractions which were stressors when the athlete had too many thoughts, (b) disappointing the coach, (c) reaching her game goal which the coach had set, (d) fear of failing, and (e) feeling inadequate. As the second part of the off-season program, the athlete was also told to verbalize positive self-statements about her ability while she was relaxing. She was instructed to recall her past successes and to tell herself that she could perform well on this court. She told herself that she was a good player and she could relax and play to her potential. This helped her confidence in dealing with distractions. In fact, she found that she had to do this before she was able to actually see herself performing in a situation which was stressful to her. The athlete was told that if she struggled with using the technique described here, she should image herself playing basketball in a non-stressful situation where she easily completed her passes to teammates or scored after she did a penetrating dribble to the hoop. Once she felt secure

in imaging herself performing in a non-stressful environment, she was to image herself penetrating and scoring in a gym full of boisterous spectators. This gave the athlete some flexibility in her program. Imagery and relaxation conducted in this manner took fifteen to twenty minutes to complete. However, the researcher told the athlete that it was imperative that she learn to relax in three or four breaths under game-like conditions. This enabled the athlete to quickly refocus as the game was in progress. The athlete was taught this technique during pre-season practices and scrimmages.

Off-season Results. Off-season results were not seen until pre-season practices began in mid-October. At pre-season practices the coach said that she was very pleased with the player's effort. The coach saw a marked improvement in the player's performance and attitude compared to last season. Her improved quality of work allowed the coach: (a) to give her praise which the player indicated she needed from the coach, and (b) acknowledge her efforts in front of the team as the kind of effort required in the basketball program. The coach acknowledged that the player's effort continued during 80% of the season. Communication between the coach and player was much improved during the pre-season as compared to the previous year, and both were pleased. This outcome appeared to be a direct result of the application of positive self-talk in the

player's mental training program over the course of the season.

Pre-season Assessment. During October, pre-season basketball practices began. The researcher had three team meetings to explain the team sport psychology training program which the team would be using throughout the year. Athlete #31 had an advantage over the rest of the team because she had already been having and would continue to have individual attention as well as the team sport psychology training program. The athlete began the pre-season practices with a vengeance. She was one of the best players at practice and the coach was very pleased.

Pre-season Intervention. Since athlete #31 also requested ideas to help her "psych-up" for practices, it was suggested that the athlete use the pre-practice individual warm-up time to do this. The researcher told the athlete that when she felt lethargic before practice, she should think of positive images from her past performances which excited her. It was suggested that she needed to feel her skin prickle or her heart beat accelerate when she was imaging. When she recognized some of these signs, then she would know that she was ready to have a good practice. She verbalized this to herself as she felt her arousal level increasing.

The researcher also instructed athlete #31 to use positive self-talk and imagery (Rushall, 1989) on the way to

practice each day. Even when she did not feel like practicing, she talked herself into it by pointing out all the positive reasons why she should look forward to this practice. She was encouraged by the researcher to set a practice goal for these days to help her get ready for the practice.

During the team pre-season practice she energized herself by positive communication in a team setting. Williams and Long (1983) described reciprocal reinforcement as a principle which stated that others will value you to the extent that your behavior was reinforcing to them. People reciprocate according to what they perceive themselves as receiving. If an athlete were positively reinforcing teammate(s) the probability would be greater for reciprocal reinforcement. When this happened, the athlete was energized because she was giving and receiving positive reinforcement. Often, athlete #31 performed the ritual of slapping another teammate's hands five times before practice began to help her become energized. If she were talking and encouraging her teammates during practice, then she was likely not thinking about practice being too long or too boring, because her focus was on her teammate(s) and the task which the team was doing at that moment. The athlete also stated that she liked to be reinforced for good play and this helped her to receive praise. When the athlete felt energized because she was being praised, she continued

to perform well in order to receive more praise.

Imagery and relaxation had already been discussed with the athlete during the off-season. However, it was imperative that she learn to relax in three or four breaths under game-like conditions. This was accomplished at every whistle, during a time-out, during a foul shot, when the referee was reporting a foul to the score table, during half-time, before the team warm-up, and during the team warm-up. It took only fifteen seconds to relax and image a positive scene of herself shooting and scoring, once she became proficient with relaxation and imagery. This was a goal for athlete #31 throughout the season. It took practice by the athlete and was a slow process. The researcher told her to ask for a substitution to refocus when she had a problem with distractions and could not refocus on the court.

Pre-season Results. In the three pre-season scrimmages and two exhibition games the performance of athlete #31 was acceptable to the coach. In the pre-season exhibition games the athlete scored 20 points in each game, secured 8 and 7 rebounds, and stole the ball 2 and 5 times. She scored .701 points/minute played, made .268 rebounds/minute played, and had .127 steals/minute played (Figure 12), as well as scoring .571 field goal percentage, and .25 foul shooting percentage in Block 1 (Figure 13). This was an outstanding performance so early in the season for this athlete and it

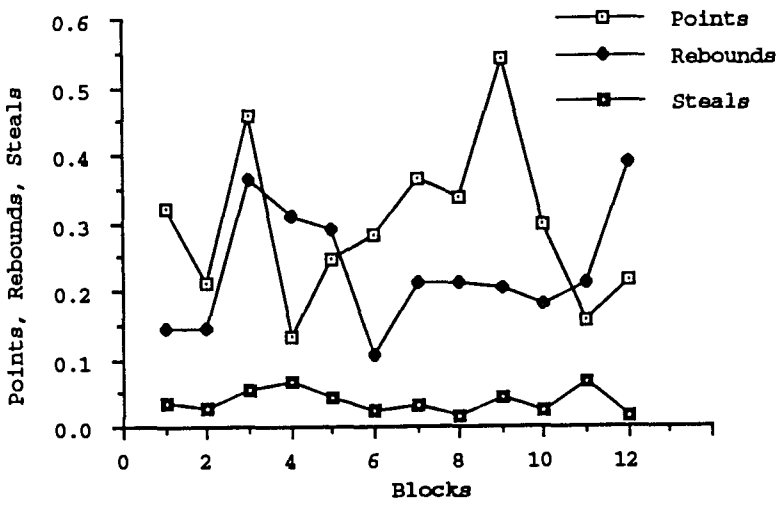

Figure 12. Subject #31 points, rebounds, and steals per minute played

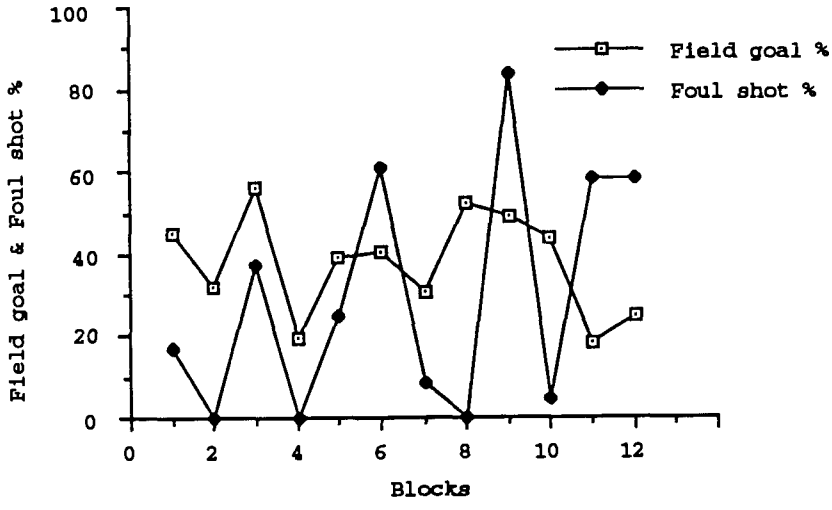

Figure 13. Subject #31 field goal and foul shot percentage

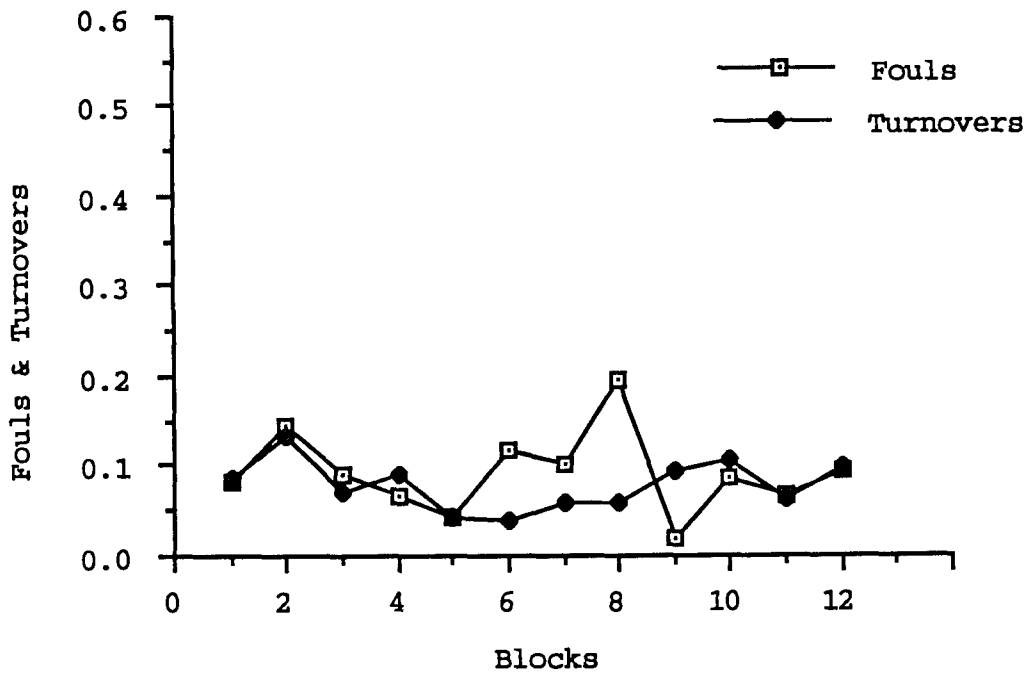

Figure 14. Subject #31 fouls and turnovers per minute played

made her feel more confident about her scoring potential. Subject #31's contribution during these two games made the coach raise her level of expectation for this player.

Regular Season Assessment. In early December the game performance of athlete #31 began to deteriorate, and the coach was not pleased with her lack of productivity during games. The team had lost two games and the coach was visibly upset with the team's performance. The player had not scored as well in Block 2 as she had in Block 1 (Figure 13). Based on the athlete's pre-season performance the coach had set a higher level of point production than the athlete was currently contributing to the team, so she was angry with the athlete. Simultaneously, the researcher was not available to the team for one month (Figures 12, 13, & 14, Blocks 3 & 4), so there was no communication with the coach or athlete #31. After the researcher re-entered the team setting in early January (Block 5), the coach informed the researcher that the player had not played well during games in the past month, but that her practices were 80% acceptable.

On the first day that the researcher attended practice this athlete had a good practice as evaluated by the coach and athlete. She played very hard in the next game (Block 5, Figure 12) according to the coach. For the next three weeks (Blocks 5, 6, & 7, Figures 12, 13, & 14) the athlete worked hard in practices and games. However, the coach was

still not pleased with the player's offensive game performance and began to pressure her to play up to her potential. The coach felt the player did not perform well in the important pressure games. The athlete reported to the researcher that she was losing confidence in herself and felt the coach had also lost confidence in her during this time period.

Regular Season Intervention. A collaborative assessment and intervention program was initiated during regular season play in late January. The researcher administered the Competitive State Anxiety Inventory-2 (Martens, Vealey, & Burton, 1990) to all the athletes one hour before the game to assess their pre-game anxiety. Following the game, a performance evaluation form was completed by each athlete (Orlick, 1987). This procedure before and after each game continued until the last regular season game was played.

After the CSAI-2 was administered for three games in late January, athlete #31 met with the researcher for two hours to discuss her CSAI-2 results, the coach's comments, and her own concerns about her game performance. The CSAI-2 scores indicated that the athlete had anxiety scores of 57, 55, and 57. In particular she had low pre-competition self-confidence scores of 24, 23, and 21 (Figure 15).

The self-confidence scores for athlete #31 were the lowest or second lowest on the team for these three games

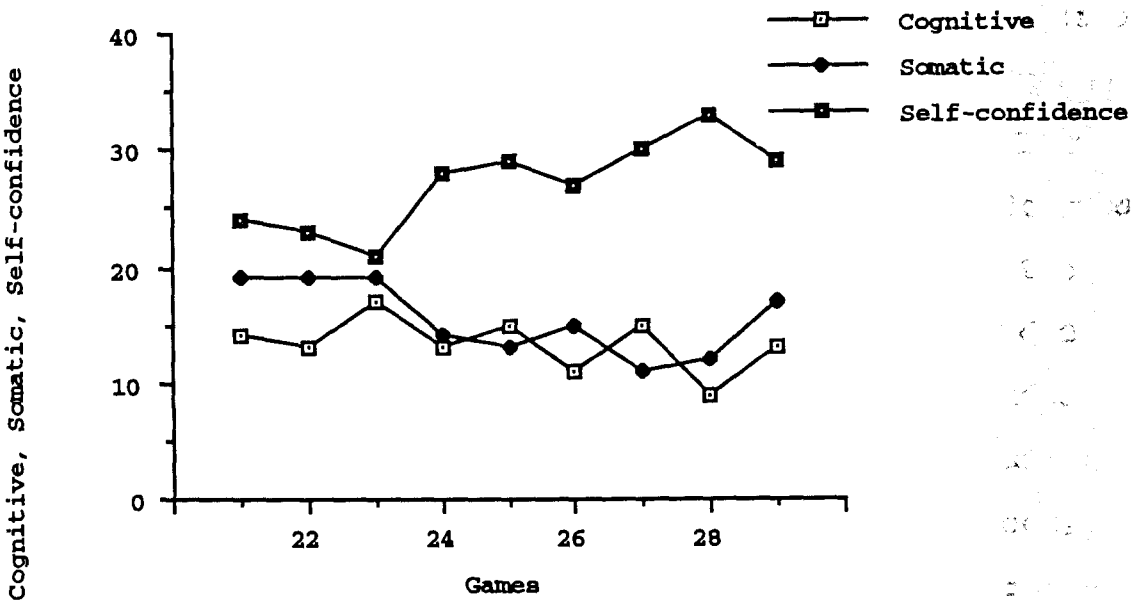

Figure 15. Subject #31 CSAI-2 scores

which the CSAI-2 was administered, so, she was given a positive self-talk tape (Kellner, 1987) to listen to during the next week. She was told that she should listen to side one and two on alternate days. Side one should be listened to before going to sleep and side two should be heard before practice or the game. She agreed that she should lower her cognitive anxiety and raise her self-confidence scores. Before games she also thought that she should image positive situations and outcomes to help lower her state anxiety.

In addition, athlete #31 identified that the coach had lost confidence in her and changed her position from forward to post in order to make her a more physical player. The coach also told the athlete that it appeared that she did not care about the basketball program because she acted so cool and played without emotion on the court. When the researcher asked the athlete what she had in her control, the athlete said that she: (a) had her play under her control, (b) could do something about her play, and (c) wanted to do something about her play. Communication with the coach seemed to be a problem for this player, thus the researcher and the athlete agreed that she should try to communicate with the coach on a one-on-one basis during the next week. She would try to ask the coach questions about concerns she had as the practice was going on, and indicate when she wanted to talk to the coach about the concerns she had with her play. The researcher suggested that the

athlete could prove to the coach that she was serious by performing with the aggressive style that the coach said she expected from her. If she would demonstrate this type of performance over and over in practice, the coach would be inclined to give her a chance in games. It took some hard work over the next three weeks, but athlete #31 did show the coach that she could play in the big games, and the coach rewarded her for this with more playing time.

In early February during Block 8, the researcher showed the player the graphs of her CSAI-2 scores; points, rebounds, steals, fouls, and turnovers/minute played; and field goal and foul shooting percentages (Figures 12-15). The athlete believed that: (a) listening to the Kellner (1987) audiotape helped her to reduce the anxiety that she felt before games, and (b) that her performance per minute improved when she raised her self-confidence scores to 27 and 28 on the CSAI-2. The player said the audiotape helped her to relax and be more confident about her ability. During the week, the coach talked to her about her role on the team, and the athlete decided that she would play the role which the coach had outlined to her. The athlete said that she was committed to do whatever was best for the team. The athlete agreed that she needed to set some goals for the next week. Athlete #31 set five goals using Thompson and Rudolph's (1988) goal attainment scale. The five goals related to: (a) communication with the coach, (b) mental

toughness, (c) physical toughness, (d) going up the line on defense, and (e) offensive rebounding. She said that she would focus on these skills and image: (a) rebounding, (b) playing more aggressive defense, and (c) communicating with the coach.

In mid-February, the athlete and researcher evaluated the athlete's progress toward her five goals (Blocks 8 & 9, Figures 12, 13, & 14). She had shown improvement on all five with a major improvement in: (a) her self-confidence, (b) being mentally tough, and (c) offensive rebounding. She said the coach still showed a lack of confidence in her and did not reward her enough when she did well. She described a practice situation where she hit all four of her foul shots when the coach put her on the foul line while practicing pressure foul shots. She said the coach did not acknowledge that she made the foul shots. In addition she made a three point shot to tie the game at the buzzer during a scrimmage and the coach did not even say "good shot" to her. This bothered and hurt the player. She said her teammates and the assistant coaches praised her, but not the head coach.

The researcher pointed out to the player that the coach had high expectations for her, but may be frustrated because she could not help the athlete to become a better player. In fact, the coach could have been frustrated with herself because the player had potential to be a good basketball

player, but the coach felt that she had not been able to help this athlete achieve that potential.

There appeared to be a large communication gap between the coach and player #31. Although attempts from both sides were made, they were short term. A long term solution was suggested to the coach that the athlete and coach get to know each other and spend some time around each other in a summer employment opportunity where they were away from basketball. In the meantime the researcher continued to encourage communication between the coach and player with both parties. The researcher asked the coach to show confidence in player #31 by telling the player what was expected and telling her that she thought the player could do what was expected (Rosenthal & Jacobson, cited in Glasser, 1969). For example it was suggested she say, "Demand the ball late in the game and score for us, you are the best person to do this on your squad!"

Regular Season Results. After an outstanding pre-season start, and several variation points in her performance, the athlete continued to perform acceptably at the offensive end of the court. In the first two games of the regular season the athlete scored 10 and 11 points and rebounded 5 and 3 boards. Although the athlete felt she was not playing as well as she had during pre-season, she was at an acceptable level of performance on the statistical sheet. The team lost the second regular season game and the coach

was angry with the outcome. After this expression of anger by the coach to the group as a whole, the athlete's performance began to deteriorate on the statistical chart and in the coach's opinion. The coach observed that the athlete was too concerned with scoring and was not playing defense at her ability level. The coach still allowed her to play approximately 20+ minutes per game. However, there were some games in which the athlete played 17 and 14 minutes while the researcher was not with the team. During this time period the athlete admitted that she: (a) lost her confidence, and (b) focused on the amount of playing time and not on the quality of her performance.

Until the last month of season play, athlete #31 performed inconsistently on offense and defense as seen in Blocks 2-7 (Figures 12, 13, and 14). As a result her playing time was also inconsistent. Once she began weekly meetings with the researcher in Block 8, the athlete began to focus on process and not on outcome and her performance started to improve on rebounds per minute played and points per minute played (Figure 12), as well as field goal percentage and free throw percentage (Figure 13). The athlete began to focus on her goals: (a) rebounding, (b) aggressive defense, (c) communicating with the coach, (d) being mentally tough, and (e) strengthening her self-confidence. Accordingly, the athlete was rewarded by the coach with more playing time because she was: (a) being

more aggressive on defense, and (b) rebounding more boards (Figures 12-14, Blocks 8 & 9). Because she was playing more she believed the coach had confidence in her ability, so she relaxed and performed at an acceptable level.

After the regular season play ended the researcher met with the athlete. The study was finished and the athlete was in a confident frame of mind and ranked herself +2 out of +2 for self-confidence this week, +1 on self-initiated communication with the coach, +2 for mentally tough, +1 for offensive rebounding, and +1 for physically tough on screens. She said she found this scale helpful to chart her progress over the season and to give her some realistic goals which she felt she could attain.

Her CSAI-2 self-confidence scores (Figure 15) were interpreted to her for the last two games and it was pointed out that she was less confident before the last season game (SC = 29) than the game before (SC = 33). Athlete #31 explained that she felt that her teammates made her nervous and that she had not listened to the tape for three days. She said she would listen to the tape the night before the game in the post season. The athlete also indicated that the logbook was a good idea for her because it helped her to vent her feelings from the day, to look at her day and to look back over her log to re-read the good days and try to transfer it to the present.

Post-season Results. The researcher was not with the

team for one week which included Block 10 (Figures 12-14), and the collaborative program with this athlete stopped. At the conference championships (Block 10), the player had one of her better performances according to her coach against three top teams, even though there was a .233 drop in her points per minute, a decrease in her steals per minute (Figure 12), and an increase in her fouls and turnovers per minute (Figure 14). The coach was extremely pleased with the performance of athlete #31 because she was playing well for the first time against this level of competition. The coach said that, usually in the close games, this player played passively and did not look for the ball in the pressure situations. During all three games, the player was looking for the ball and working hard at both ends of the court to help her team win. The coach congratulated the athlete on her superior performance and she received much praise for her efforts during the tournament from teammates and the media. The researcher was not in attendance during Block 10 and did not see the team for seven days.

Following the conference championships the athlete continued to perform to the coach's expectations and play the role which the coach had outlined for her in post-season play. In her last two games of post-season the athlete secured a total of 23 boards to lead the team but only scored a total of 14 points (Block 12, Figure 12). She did not allow the fact that she was not scoring keep her from

helping the team by rebounding and playing defense.

The coach commented that the psychological skills training program helped athlete #31 to develop a fighting spirit, to play with emotion, and not to be afraid to show positive emotion on the court. It allowed her to play with confidence and to realize that she could contribute to the team not only by scoring but, through defense and rebounding. The coach also stated that the athlete "gave of herself" to the program by openly communicating with the coach and playing her role on the team. In reality, the statistics employed by the coach became a secondary measure for the athlete's level of performance.

Subject #41

Descriptive statistics for the performance of closed and open skills as well as the state anxiety factors of athlete #41 (not a uniform number) are included (Appendix H).

Regular Season Assessment. Subject #41 approached the researcher in late January with eight games remaining in regular season play regarding her inconsistent play. Concurrently the intervention program began with this athlete at the end of Block 7 (Figure 16, 17, 18, & 19). On the CSAI-2 (Martens et al., 1990) she has a score of 27 on the self-confidence scale (Figure 19, Game 21) but she described herself as losing self-confidence in her ability.

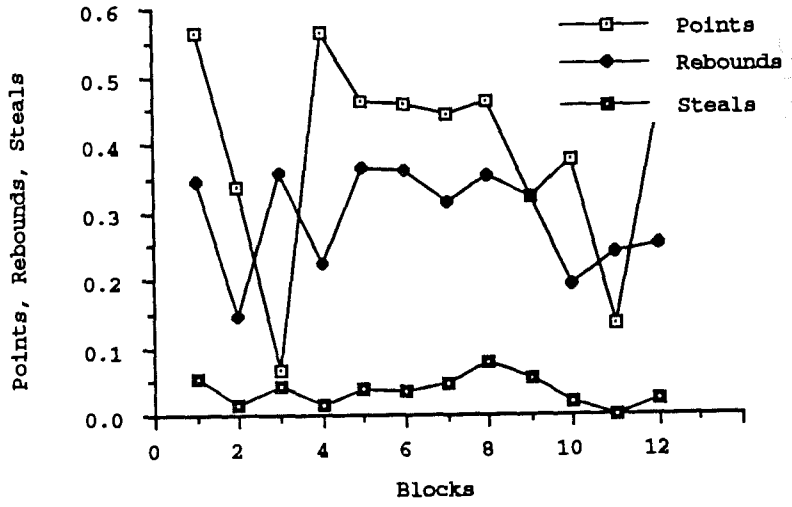

Figure 16. Subject #41 points, rebounds,and steals per minute played

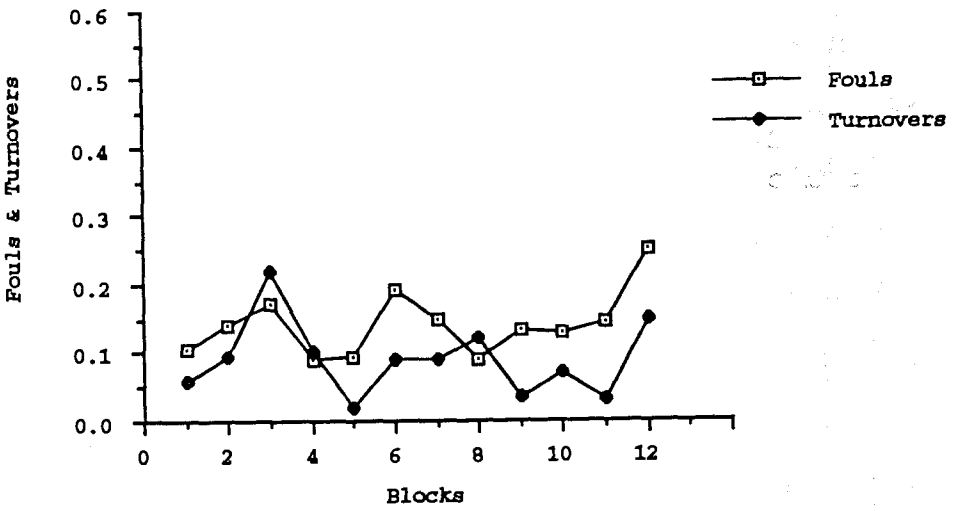

Figure 17. Subject #41 fouls and turnovers per minute played

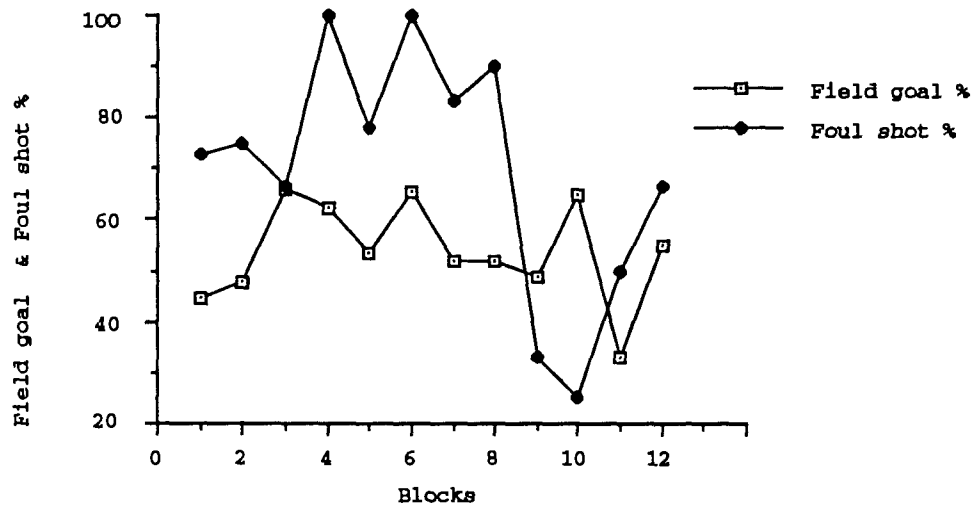

Figure 18. Subject #41 field goal and foul shot percentage

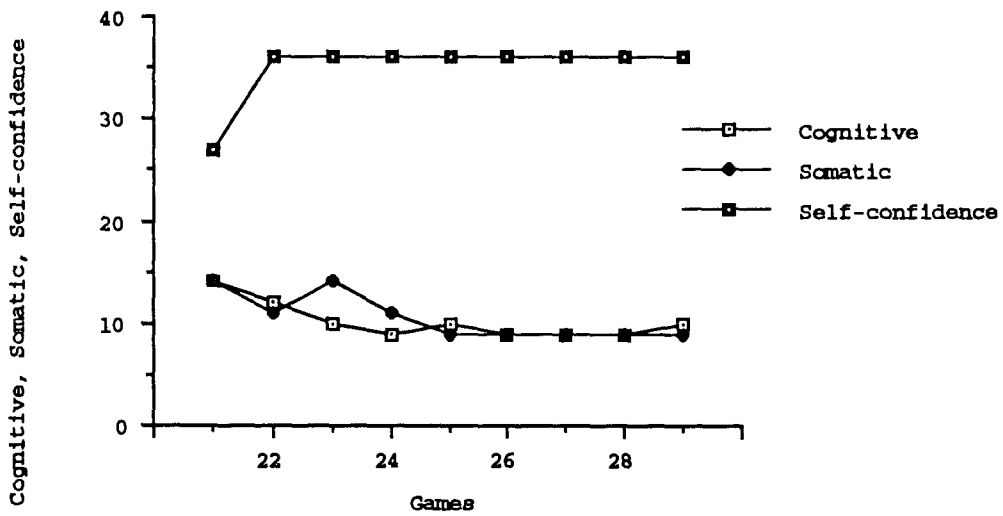

Figure 19. Subject #41 CSAI-2 scores

She described her problem as not being able to put two halves of the game together. She said that she only played well in the second half because she was nervous and felt inadequate in the first half. She said that she began to get nervous during the pre-game talk when the coach discussed the opponent's strengths. Yet one hour before Game 21 (Figure 19) she had a score of 14 on the somatic and cognitive anxiety scale and 27 on the self-confidence scale (CSAI-2, Martens et al., 1990), which indicated her pre-game anxiety was low (lowest possible score is 9 on the somatic and cognitive anxiety scale). The highest score possible for self-confidence is 36 and her confidence level was above average for the team. After the pre-game talk she began to think that she was not as good a player as the opponent she would guard, that game and lost her confidence. She said that she did not regain her confidence until the second half.

Regular Season Intervention. Since rebounding was an important skill for her position and for the opponent whom she would guard it was decided that imagery for rebounding would be a priority. It was suggested that she image herself boxing out an opponent who was a good rebounder because the opponent cannot rebound if she is boxed out. It was decided that subject #41 should image the skills where she felt inadequate in a game setting. The athlete felt that she was getting out-rebounded by the opponent (Block 7,

Figure 16) and being pushed around under the boards. The researcher stressed to the athlete that she image herself successfully completing a play series daily before the next game and one hour before the next game. Before the next game the athlete met with the researcher one hour prior to the game to get help in preparing for the competition. The researcher told her to center herself and focus on the situations that the researcher would present to her. The situations presented to her were: (a) on defense, box out your opponent and get the rebound; (b) catch the ball around the foul line, go one-on-one with your opponent and score as she is fouling you; (c) play aggressive defense on your opponent and intercept a pass being thrown to her; and (d) you are boxed out at the offensive end by an opponent, spin around her, get the offensive rebound, and score.

Regular Season Results. After this imagery with the researcher the athlete reported that she felt prepared for the game and was going to try to focus on these images and not on her fear of the opponent. During the game the athlete was in a situation where she actually completed the four images presented above. When this was discussed with her after the game she said that she was more self-confident during the game and remembered accomplishing the above scenarios (Figure 16, Block 8). This athlete scored 36 on the self-confidence scale for the remaining regular season (Games 22-29, Figure 19). She also lowered her cognitive

anxiety scores immediately to 10 and her somatic anxiety scores were 9 for the remaining games.

The athlete asked to meet with the researcher before the next three games so that she could become proficient with her precompetition imagery plan. She said it helped her to have the researcher there to lead her through the images. Gradually the researcher asked the athlete to decide what she should image for the game so that she could learn to do this on a regular basis without the researcher. By post-season the athlete was able to create her own images. She still liked to sit with the researcher before the game to do her imaging, even though the researcher no longer presented images to her, because she said that she felt calmer with the researcher there. From Block 7 to 8 the subject improved her scores on points, rebounds, steals and fouls per minute played (Figures 16 & 17), and foul shooting percentage (Figure 18).

At the next individual meeting with three games remaining in regular season play, subject #41 was given a log book to complete, the CSAI-2 results (cognitive anxiety, 9; somatic anxiety, 9; and self-confidence, 36), and game statistics (Figures 16, 17, 18, & 19) were shown and explained to her. In addition, an article on Jay Triano in Psyched (Orlick & Partington, 1986) was presented to her to read. The researcher complemented her on the scores she achieved on the CSAI-2. The athlete also set five goals on

the goal attainment scale (Thompson & Rudolph, 1988) which she wanted to work on during the next week. Her goals were: (a) box out her opponent; (b) be more physical under the boards especially when she was tired; (c) focus on the task at hand when being pushed by the opponent; (d) refocus after making a defensive error to offense; and (e) make eye contact when listening to the coaches. To help her relax and image she was given a tape (Kellner, 1987) to which she could listen on a daily basis.

During the next meeting she said that the tape (Kellner, 1987) assisted in relaxing her and made her feel self-confident. In relation to the five goals she had set in the previous week she felt that she had improved her box outs and focused better when the game was physical under the boards. However, she said that she did not refocus to the immediate task after she had made several errors during the game. She said that she wanted to refocus on the immediate task and not let her previous errors bother her. Her CSAI-2 total score results for Blocks 8 and 9 were 55 and 54.3 respectively. She had the highest possible score for self-confidence (SC = 36) in both of these blocks (Figure 19). It was collaboratively decided that subject #41 would continue to work on her five goals which she had set by using her tape (Kellner, 1987) daily and employing the same precompetition plan.

At the last individual meeting in regular season during

Block 9 the athlete requested information on getting up for practice. She said that she was not practicing to her ability, did not feel comfortable with her role on the team, was overloaded with school work, had no time for herself, and was always studying or playing basketball. She believed that her play had deteriorated which was reflected in her points, rebounds, and steals per minute played during Blocks 9 and 10 (Figure 16).

To improve her attitude toward practices she was given some of the same suggestions as subject #31 for pre-practice "psych-up" routines. It was suggested to the player that the athlete meet with the coach to discuss her role and what she could do to help the team. The player indicated that her role had changed from being a starter to coming off the bench. It was difficult for her to get into the flow of the game because she did not touch the ball as often as she had in games where she started. The researcher suggested that she might center and focus while she was on the bench and use imagery of boxing out, making a shot, or rebounding after each whistle to keep her focused. For her time management concerns it was suggested to the athlete that she try to compartmentalize her time so that she thought only about studying when it was time for studying and only of basketball when she was at basketball practice.

Post Season Results. Subject #41 was able to understand and accept her role on the team once she had

talked with the coach. She used the "psych-up" routines to help her practice at the level where she thought she should be. Prior to and during Block 10 (Figures 16-18) the researcher was not with the team for a period of one week and the individualized program ceased. This athlete's performance dropped in rebounds, steals, fouls, and turnovers/minute played, and in foul shooting percentage. She improved her performance in field goals/minute played and field goal percentage. In the post-season Blocks 11 and 12 she was not performing to her best level of production that she had accomplished during the regular season (Figures 16-18, Blocks 2-9) but the coach approved of the role she was playing and continued to reward her play by giving her floor time. During Block 12 she played 20 minutes per game against the two top teams in the nation.

Subject #51

Descriptive statistics for the performance of closed and open skills as well as the state anxiety factors of athlete #51 (not a uniform number) are included (Appendix I).

Regular Season Assessment. Subject #51 was the last subject in the combined group and individualized collaborative program to begin her treatment. She began her treatment during Block 8 (Figures 20-23). The athlete was visibly upset at the first meeting because of the way in

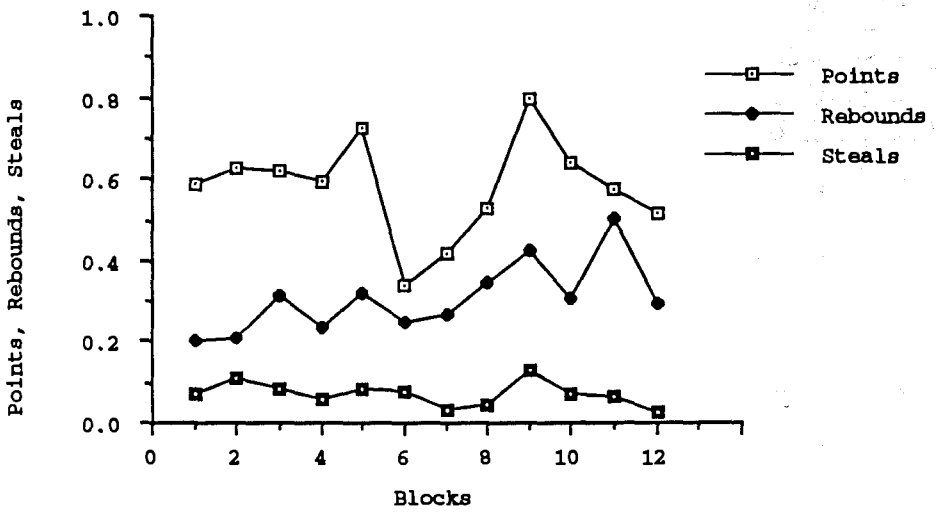

Figure 20. Subject #51 points, rebounds, and steals per minute played

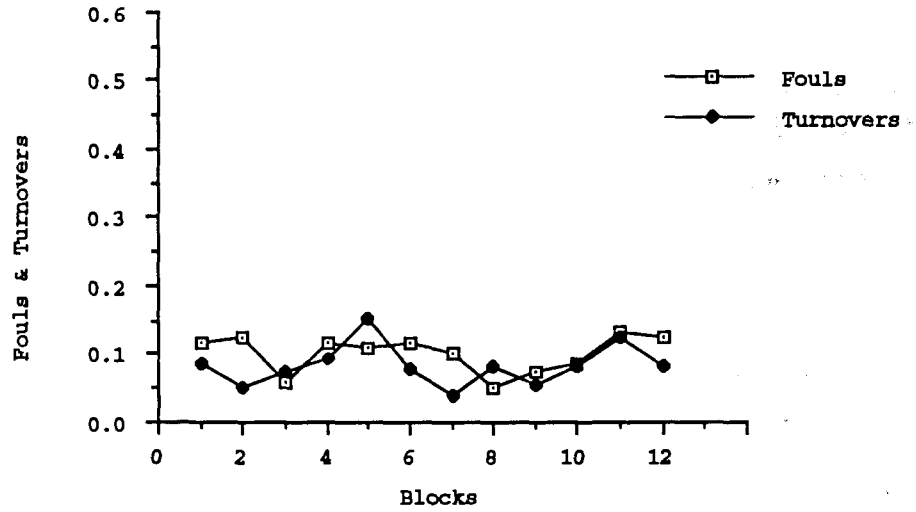

Figure 21. Subject #51 fouls and turnovers per minute played

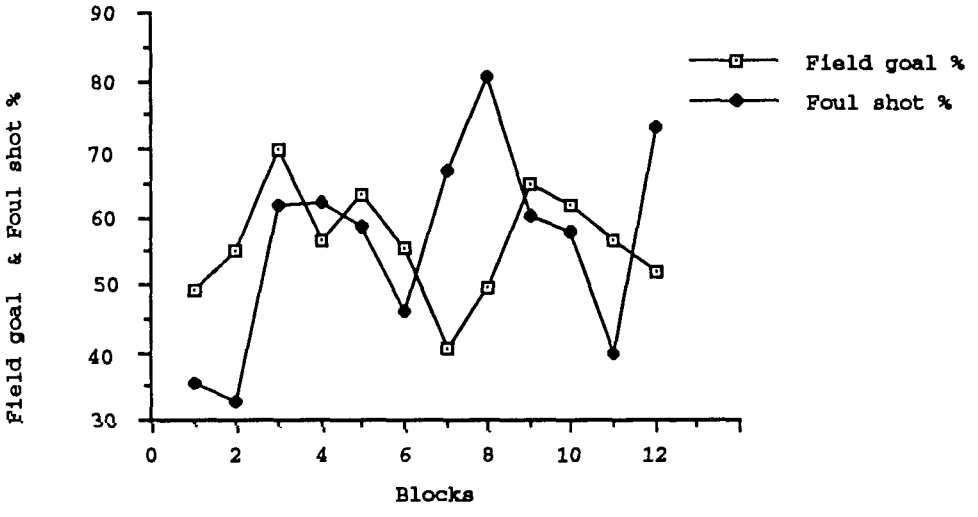

Figure 22. Subject #51 field goal and foul shot percentage

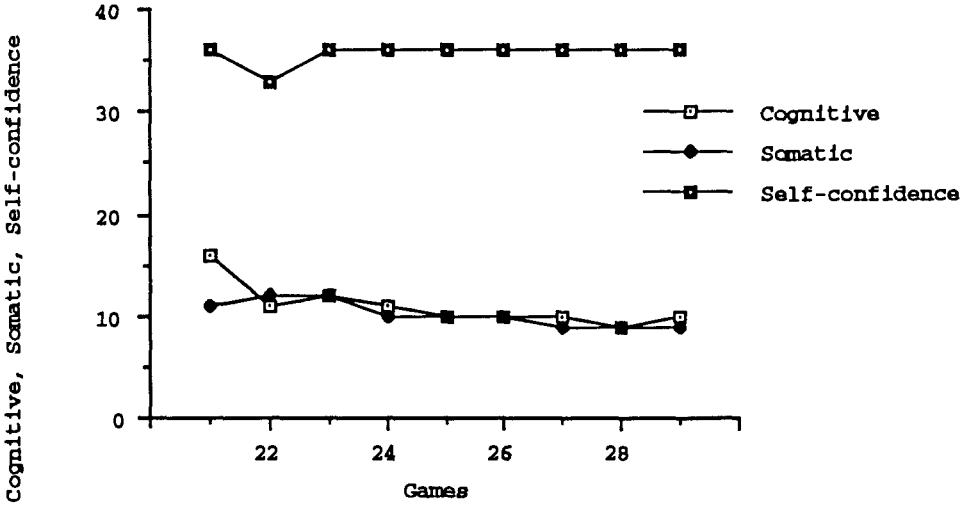

Figure 23. Subject #51 CSAI-2 scores

which the coach was treating her. The coach expected the player to perform at a higher level than she was currently. The player thought that the coach was blaming her for the team's poor performance. However the player thought that she was not playing that badly. The athlete wanted to help the team but she played a position where she had to rely on the perimeter to pass her the ball. When they passed her the ball frequently she would focus on getting open to receive the ball and scoring. When they did not pass her the ball frequently, she would get into her rebounding mode where she would focus on getting good position so she could rebound the ball once someone else shot it. It was determined that when she did not touch the ball often in the offensive end, she did not work as hard to get open because she was not being rewarded for her efforts by receiving a pass. At these times she only thought about rebounding and not getting open. The coach wanted her to get open and demand the ball from the perimeter.

Regular Season Results. The researcher gave her the Kellner (1987) audiotape to assist her with positive self-talk about her ability and performance and an article on Jay Triano in Psyched (Orlick & Partington, 1986). It was suggested that she say to herself: (a) I should have the ball because I can score; (b) the coach wants me to have the ball, so I will get open and demand it from the perimeter; and (c) no one can stop me, so give me the ball. Two days

later she had a career high point performance (Figure 11, Block 9) and indicated that the tape (Kellner, 1987) and talk with the researcher had helped her confidence. Her state anxiety scores (Figure 23) did not indicate that she was in need of confidence building because she always had high self-confidence scores (36) and low cognitive (9-16) and somatic anxiety scores (9-12). She said that she did not want to use the goal attainment scale to monitor herself. She preferred to use the researcher as a sounding board.

During the second meeting with the researcher the athlete brought her log book with her and said that she liked writing down her feelings because it made her reflect on the day. She also said that she liked listening to the tape (Kellner, 1987) because it made her relax and feel good. She indicated that she thought about her breathing when she was tired. The researcher suggested that she attempt to focus on sprinting the floor and not on her breathing during the next game. The athlete also said that she wanted to rebound 10 boards per game and decrease her fouling of the opponent. To play smarter on defense, she said that she could: (a) change her position when she was guarding her player, and (b) resist reaching for the ball when she was not in an advantageous position. Since she was one of the best players on the team, the opponents were always trying to get her into foul trouble; so she had to

play smart. She felt that she could make an effort to play smarter and use imagery when she was listening to the tape (Kellner, 1987) to help her with this.

At her last individual meeting she said that she liked to receive feedback on her performance and state anxiety because it helped her to focus her attention for the next game, and refocus during games. She also said that it helped her to talk to the researcher because she could express her feelings and some of the pressures she felt.

Post Season Results. The researcher was not with the team for one week prior to and during Block 10 (Figures 20-22) so the individualized program ceased to exist. From Block 9 to 10 all of her statistics moved in a negative direction. Points, rebounds, and steals/minute played decreased (Figure 20); fouls and turnovers increased (Figure 21); and field goal and foul shooting percentage declined (Figure 22). During the post-season Blocks 11 and 12, her points and steals per minute decreased and her fouls per minute increased. The coach still felt that subject #51 was an important cog in the wheel for this team and was a major reason for this team's post season successes. Since she was one of the best players in the nation she was always guarded by the best player from the opposing team so this factor may have impeded her performance during Blocks 10, 11, and 12 (Figures 20, 21, & 22).

Discussion

The collaborative program produced positive results for subjects #31, 41, and 51 (not uniform numbers) according to the game statistics, coach, and player opinions, thus Hypothesis 4 was supported. Sometimes improvements in game performance were not apparent, although the coach was pleased with the player's performance. State anxiety scores moved in a positive direction after the intervention had begun for subjects # 41 & 51 which supports the findings of Buckles (1984). This study supported the finding that the CSAI-2 may be related to performance (Buckles, 1984; Gould et al., 1987; Bird & Horn, 1990) as shown by the game statistics for each subject. Most importantly the players believed that the intervention had a positive effect upon their play. The coach also agreed that the intervention enhanced the players' performances (athletes #31, 41, & 51). The coach did not always monitor the player's performance by game statistics, but rather by their overall contribution to the team. Although statistics are used nationally to rate player's performances, quite often successful coaches will overlook them when a player is helping her team by playing a necessary role. Perhaps statistics may not be an accurate method of measuring a player's performance. A coach should use game statistics with discretion and not as an absolute measure of game performance.

This part of study supported the finding that imagery

enhanced game performance similar to the findings of Meyers & Schleser (1980), Weinberg, Seabourne, & Jackson (1981), Silva (1982), Buckles (1984), and Kendall et al. (1990). There were few individualized intervention programs found in the literature, but this study also supported the findings of Silva (1982) and Kendall et al. (1990) that an individualized intervention program can produce positive results in game performance.

The goal attainment scale which was employed in the study produced positive outcomes for the two subjects who used it. This study supported the findings of Thompson & Zimmerman (1969) and Smith (1976) that counseling and performance outcome would be enhanced with the use of the goal attainment scale. There were no sport studies found which employed the goal attainment scale as a counseling technique. This study supports the notion that a goal attainment scale is a useful counseling technique for sport psychologists, coaches, and athletes because of the results it produced and the support received by the subjects who used it.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

The purpose of this study was to determine the relative effectiveness of a group centered and combined/collaborative individualized program on state anxiety and game performance for closed and open skills of a top 10 nationally ranked NCAA Division I women's basketball team. The group centered program consisted of 5 to 10 minutes of centering and imagery at the beginning of each practice for three practices per week from October 15 to the end of post season play. The collaborative individualized program included the same content as the group program and an additional weekly meeting over a four week time period with the researcher to discuss each subject's concerns and performance. Performance measures for closed and open skills were collected for 12 blocks of 35 regular and post season games. There were 11 blocks of 3 games each, while block 12 included only 2 games. The Competitive State Anxiety Inventory-2 (Martens, Vealey, & Burton, 1990) was utilized to measure precompetition state anxiety. Foul shooting was selected as the closed skill to be assessed. The open skills consisted of field goal percentage; as well as points, rebounds, steals, turnovers, and fouls per minute played.

A time-series analysis with planned contrasts (Group x Block) was utilized to evaluate the performance measures and state anxiety. A single subject multiple baseline across individuals design was used to investigate the relative effects of the group centered program and the combined/collaborative individualized program on the performance measures for the closed and open skills and state anxiety.

Research had indicated that the CSAI-2 was related to performance (Buckles, 1984; Gould, Petlichkoff, Simons, & Vevera, 1987; Bird & Horn, 1990). Buckles, 1984 found that somatic anxiety was lowered through the use of visuo-motor behavior rehearsal (VMBR) which supports the findings of this study. However, no studies were found which supported the findings of this study that cognitive anxiety can be lowered through the use of a group program and an individualized program.

In contrast, only the athletes in the combined/collaborative program showed a positive significant change in self-confidence, and there were no studies found which produced any effects on self-confidence. Thus, the results suggest that, a group centered program can produce positive results, an individualization of factors affects self-confidence along with cognitive and somatic anxiety to an even greater degree.

For the closed skill, foul shooting, the findings in

this study indicated that imagery in conjunction with physical practice enhanced the team's foul shooting percentage within this A1-B1-A2-B2-A3-B3 design. There was an improvement for the game performance in the closed skill of foul shooting percentage for the team during the first applied intervention (B1) phase. After imagery was introduced to the team, their performance during the treatment blocks, B1, B2, and B3 were never as low as the initial baseline (A1), which supported Hypothesis 2 (Figure 4).

The previously reported research findings on closed skill imagery have produced conflicting results. Some research on closed skill imagery has supported the use of imagery to enhance skill performance (Ryan & Simons, 1981, 1982; Silva, 1982; Wrisberg & Anshel, 1989). Andre & Means (1986) and Straub (1989) indicated in their research that imagery did not significantly effect performance of a closed skill. Buckles (1984) and Seabourne et al., (1985) found that visuo-motor behavior rehearsal (VMBR) enhanced performance of a closed skill. The literature does contain support for imagery in the closed skill of basketball foul shooting but, there are mixed age, sex, and skill level findings (Buckles, 1984; Wrisberg & Anshel, 1989).

There were no studies found in the literature regarding removal of the treatment and/or a second intervention. This current study showed that imagery combined with physical

practice does enhance foul shooting in elite basketball players even when the treatment is removed. It also suggests that: (a) mental and physical practice with distractions, and (b) changes in the nature of competition are important variables in any foul shot intervention program. The collaborative individualized program was also shown to be effective for all three subjects in the study. A single subject design across individuals was employed for this part of the study. It showed that athletes in the collaborative individualized program improved their open skills and state anxiety scores more than the athletes in the group centered program.

Some research on open skill studies indicated that imagery enhanced performance (Kendall, Hrycaiko, Martin, & Kendall, 1990; Meyers & Schleser, 1980; Silva, 1982; Weinberg, Seabourne, & Jackson, 1981). Buckles (1984) reported that visuo-motor behavior rehearsal (VMBR) did not contribute to improved performance in open skills but Seabourne, Weinberg, Jackson, & Suinn (1981) found that VMBR enhanced performance of open skills. This study indicated that open skill performances of rebounds per minute played, field goal percentage, and points per minute played were positively enhanced during combined/collaborative intervention and negatively affected when this treatment was withdrawn. A similar pattern, but less obvious, was indicated for the open skill variables of steals, turnovers,

and fouls per minute played. Athletes in the group centered program did not perform as well as athletes in the individualized program on the open skills of field goal percentage, points and rebounds per minute played, and the effect of the group program did not produce as much improvement as the individualized program. Thus, Hypothesis 3 was supported by the combined/collaborative program, but only partially by the group program.

The collaborative program produced positive results for subjects #31, 41, and 51 according to the game statistics, coach, and player opinions. Sometimes improvements in game performance were not apparent, although the coach was pleased with the player's performance. State anxiety scores moved in a positive direction after the intervention had begun for subjects #41 & 51 which supports the findings of Buckles (1984). This study supported the finding that the CSAI-2 may be related to performance (Buckles, 1984; Gould et al., 1987; Bird & Horn, 1990) as shown by the game statistics for each subject. Most importantly the players believed that the intervention had a positive effect upon their play. The coach also agreed that the intervention enhanced the players' performances (athletes #31, 41, & 51). The coach did not always monitor the player's performance by game statistics, but rather by their overall contribution to the team. Although statistics are used nationally to rate player's performances, quite often successful coaches will

overlook them when a player is helping her team by playing a necessary role. Perhaps statistics may not be an accurate method of measuring a player's performance. A coach should use game statistics with discretion and not as an absolute measure of game performance.

This part of the study supported the finding that imagery enhanced game performance similar to the findings of Meyers & Schleser (1980), Weinberg, Seabourne, & Jackson (1981), Silva (1982), Buckles (1984), and Kendall et al. (1990). There were few individualized intervention programs found in the literature but this study also supported the findings of Silva (1982) and Kendall et al. (1990) that an individualized intervention program can produce positive results in game performance.

The goal attainment scale which was employed in the study produced positive outcomes for the two subjects who used it. This study supported the findings of Thompson & Zimmerman (1969) and Smith (1976) that performance outcome would be enhanced with the use of the goal attainment scale in counseling. There were no sport studies found which employed the goal attainment scale as a counseling technique. This study supported the notion that a goal attainment scale could be a useful counseling technique for sport psychologists, coaches, and athletes because of the results it produced and the support received by the subjects who used it.

The coach of the team is a good judge of the effects of the two mental training programs on the players because the coach sets the expectations and then evaluates results based upon the players' delivery of those expectations. The coach in this study was extremely supportive of the study and its results. The coach said that the team may not have achieved such outstanding results without the use of the group and collaborative individualized programs. Initially the coach believed the team was not as physically talented as other teams in the nation, but the mental training program helped to lower anxiety and increase self-confidence so that they could perform at a higher level. The coach credited the foul shooting mental and physical program for the team's success in post season play. The coach also stated that the three players in the collaborative group performed extremely well throughout post season play and were major factors in the team's success.

Conclusions

This study was designed to investigate the relative effectiveness of two psychological training programs on performance and state anxiety of a top 10 nationally ranked NCAA Division I women's basketball team. The hypotheses were tested using planned contrasts of the Group x Block interaction, and a multiple baseline across subjects design. Based on the analysis of results the following conclusions

are presented.

1. The group and collaborative individualized programs facilitated a decrease in cognitive and somatic anxiety as measured by the CSAI-2. Athletes in the individualized program improved self-confidence significantly more than those in the group centered program.
2. Foul shooting performance can be enhanced through the use of a mental and physical training program.
3. The group and the individualized program did not produce a statistically significant improvement in open skill performances after the intervention. However, it should be noted that an improvement in basketball performance can mean the difference in winning or losing a game even if it is not statistically significant.
4. A collaborative individualized program for athletes seems to produce the greatest effect upon performance of closed and open skills and state anxiety components across a season of play.
5. Consistent usage of the psychological training skills and having the sport psychology consultant available to the athletes is paramount to the success of this program.

Implications for Future Research

This study has demonstrated that the group program enhanced performance in the closed skill of foul shooting. It has also shown that both the group and individualized program can lower state anxiety and raise self-confidence. The study has also indicated that an individualized collaborative program can produce better performance on open skills of rebounding and field goal percentage and pre-game state anxiety. It is suggested that the following research ideas are possible to be investigated.

1. Evaluate the effects of a mental training program upon open skill performance.
2. Evaluate the effects of state anxiety during a competition.
3. Evaluate the effects of a mental training program on the performance of an individual across a season.

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APPENDICES

APPENDIX A

GROUP CENTERED PROGRAM FOR PRACTICES

GROUP CENTERED PROGRAM FOR PRACTICES

The first five on-court sessions with the 10 players included instructions in centering and focusing (concentrating). The players sat in a circle on the floor at center court and were instructed to inhale slowly, exhale slowly and focus on tension leaving specific muscles in their body as they exhaled. They were instructed to stretch a muscle by inhaling, exhaling, and feeling the tension leave that muscle. To check whether they were using the proper technique they were told that they should feel the muscle stretch further each time they perform the inhaling, exhaling, and focusing technique. For five practices the researcher instructed the athletes in their pre-practice stretching routine to assist them in understanding the mechanics of centering and focusing. Once the players practiced the centering and focusing routine for five practices the cue words of "center" and "focus" were used by the researcher before they began their imagery practice session.

Immediately following the first intervention, a second intervention was introduced. For five minutes prior to practice the players were instructed to inhale, exhale, and focus on the situations presented to them. Sample situations which the players were told to image were: (a) The team is playing 22 defense. You intercept the ball, lead a fast break and pass to a teammate who scores; (b) We

are playing a match-up zone. They make three passes, followed by a skip pass to the opposite wing who shoots. Find someone in your area and box out then get the rebound; (c) We are playing player-to-player defense. The opponent runs their motion offense and shoots after five passes. Box out and grab the boards; or (d) An opposing player fouled you with five seconds remaining and you are up by one point. Shoot one and one and make them both.

During the situations presented to the players the researcher inserted the names of the next opponent they were to play in order to have the players focus on the here-and - now. This helped the players to identify with the situations which they would face in the immediate future.

A second example of an imagery session was: (a) You are in your offensive end of the court and playing your #3 offense. After three passes the ball is in your hands. Make a move on the defender and score; (b) You were fouled on that last shot, so make the foul shot for a three point play; (c) You are on the helpside of the defense. An opposing player drives to the basket on the strong side, your teammate goes to help, you rotate to the weakside boards and intercept the pass to the weakside opponent; (d) The ball is passed to you on a fast break, you score a 15 foot shot; or (e) There is five seconds remaining in a tie game. The ball comes to you at the three point line and you shoot and score to win the game.

Free Throw Practice Program

The ten players were instructed to image shooting and making 20 foul shots daily. They were instructed to shoot the foul shots from the point where they had the ball in their hands. They were required to do this for 20 out of 30 days and they recorded the 20 days they used the imagery of making 20 foul shots. They kept a log of the days they imaged making their foul shots and returned it to the researcher after the 30 day period. It was stressed that it was important for them to be honest in order to determine whether mental practice would enhance their foul shooting percentage. After the 30 day period of this intervention was completed, the players were told the experiment was finished and the researcher collected their logs.

Five practice sessions and three games followed during which no mention was made about imaging foul shooting. Then the athletes were instructed in the second intervention which included combined mental and physical practice. The athletes were placed in pairs for this intervention. One player of each pair shot two foul shots at one end of the court and then two foul shots at the other end of the court until she completed eight foul shots. Meanwhile, the shooter's partner sat quietly on the sideline and imaged herself shooting and making as many foul shots as she could in the time her partner was physically shooting the eight foul shots. The players recorded the number she made out of

eight attempts of physical practice and the number she made when she mentally practiced. There were five players rotating between the two hoops at all times. This procedure was repeated once again for a total of two repetitions of mental and physical practice per day. The mental and physical practice routine continued to the end of regular season play. For two weeks which included five days of practice and three games of post season play the players did not employ this routine of mental and physical practice for foul shooting. They only physically practiced foul shooting during this time frame.

A third program was employed which included mental and physical practice with distractions. For the mental practice with distractions the players were divided into groups of two. For a period of 30 seconds one partner imaged making as many foul shots as possible while the other player talked to her in an attempt to distract the player mentally shooting. Roles were reversed and the mental practice program was repeated two times. Later in the practice the partners physically shot eight bonus foul shots. One partner shot while the other said distracting comments related to missing the foul shot or the importance of the shot at this time of the game. Basically the players distracted or disturbed the shooter. Since two hoops were used for the physical foul shooting procedure quite often there was more than one person talking "trash" (as the

players called it) to the shooter in an attempt to disturb their focus of attention. This mental and physical foul shooting with distractions continued until the end of post season play.

INSTRUCTIONS TO ATHLETES FOR GAME DAYS

Before and after each of the next nine games you will be given pre- and post-game evaluation forms to complete.

1. Pre-game form.

The CSAI-2 form will be placed in your locker two hours before the game. CIRCLE YOUR IMMEDIATE REACTION TO THE QUESTIONS. Please complete the form prior to the game and leave the completed form in your locker. These forms will be collected prior to the game.

2. Post-game form.

The game evaluation form will be in your locker immediately following the game. Please complete this form before you leave the locker room. This form is important for you to refer to when planning your pre-competition routine.

You will be given a copy of these forms to keep in your log book. It is advisable to read these forms over once per week to assist you in reaching optimal performance. Your own evaluation of your play can help you be mentally prepared for the next competition.

APPENDIX B

COMBINED GROUP/COLLABORATIVE PROGRAM FOR PRACTICES

COMBINED GROUP AND COLLABORATIVE PROGRAM FOR PRACTICES

In addition to the centering, focusing, and imagery program employed in the group centered program the athlete centered collaborative program included information on the benefits of energizing and positive self-talk. Energizing was explained to the four athletes as a method of psyching-up for games which are considered unimportant or not challenging to the player and preparing to go to a routine practice which they consider boring. The players were informed that research indicates that quality practice carries over to quality game performance. The four players will be given an article on energizing methods to read (Botterill, 1986). They were instructed in techniques of energizing by the researcher. For example the players were told energizing things you can image are: (a) Vividly image shooting and scoring a game winning basket; (b) Image yourself crashing the boards and tearing down the rebound; or (c) Image a highlight of your career where your team won a big game. Recall the feeling you had at that moment. Energizing things you can physically do are: (a) Take a shower; (b) Slap your own hands or your teammates hands; (c) Talk during drills in practices and in games. Say positive statements or give specific feedback to your teammates; (d) Communicate non verbally to your teammates with eye contact, pointing to acknowledge a pass, or clap for their effort; or (e) Listen to energizing music to

prepare you for practice or games (Botterill, 1986).

The four players in the athlete centered collaborative group were given instruction in positive self-talk. Positive self-talk was explained to them as knowing their realistic ability as a basketball player and telling themselves they could do it. Specifically, the athlete assessed their role on the team in conjunction with the coach's feedback regarding her expected role on the team for this player and selected appropriate points for her focus. Once they had assessed this they chose the open and closed skills which could be employed in the game. They would then tell themselves that they could achieve the specific tasks which they would be using during the game.

They were told that positive self-talk can be achieved through listening to audiotapes which stress relaxing to music and opening your mind to the positive self-statements which are on the tape (Kellner,1987). The four players were: (a) given a copy of the audiotape Living the Miracle (Kellner, 1987), and (b) instructed to listen to side one daily before going to sleep, and (c) told to listen to side two daily before attending a practice or a game. After listening to this tape for five days each athlete was offered an individualized tape. This individualized tape would be composed by the investigator for each athlete which would serve to reaffirm her ability as a basketball player. It would include past highlights of her career and present

abilities she possessed. The athletes did not choose to have a specific tape made for them as the preferred Living the Miracle (Kellner, 1987).

Each player also made self-affirmations such as: (a) I can score from 15 feet; (b) I am a threat on offense when I have the ball; (c) I can finish this game with energy; (d) I can score from three point range; and/or (e) I will make both of my bonus foul shots.

In addition, cues were also given to the athlete to help them focus on the immediate task with confidence. A cue word, such as penetrate, gave the athlete the message that to penetrate and score is their strength. Another cue suggested was the feel of the ball which could act as a trigger for the athlete to focus on scoring. Each cue word depended on the concerns of each athlete and the problem areas each had identified during the collaboration with the investigator. After collaboration with the investigator a program was designed for each athlete.

APPENDIX C

LETTERS OF INFORMED CONSENT

Topic: Letter and Informed Consent from Subjects

Investigator: Carolyn Savoy

Information: All inquiries should be directed to Carolyn Savoy, Project Director, 2521 Kingston Pike, Knoxville, TN 37919. Phone # 521-1729.

Dear Subject:

You have been selected for inclusion in a study concerning the performance of highly skilled players in a competitive situation. The purpose of this study is to determine the relative effectiveness of two mental training programs on imagery ability, state anxiety, and game performance. I have received permission from your head coach for your participation in this study. Your agreement to participate in this study would include the following:

(a) Completion of six historical information forms at the beginning and end of the study.

(b) Completion of one questionnaire one hour before and after eight basketball games.

(c) Participation in team imagery sessions for five minutes before practice on five days per week.

Your game statistics of rebounding, field goal percentage, foul shot percentage, steals, turnovers, and fouls per minute played in eight games during the 1990-91 season will be used in the study. The statistics used will be those that are regularly recorded for use in the women's basketball program.

All information will be kept strictly confidential. No one including coaches will have access to any of the information on the questionnaires except the researcher. No names will be attached to the data; and individual players will never be identified in reporting the results and conclusions of the study. I will be happy to answer any questions during or following the study.

Your participation in the study is voluntary, and you may choose not to participate or withdraw from participating at any time. Neither your participation nor your withdrawal from the study will have any effect on your academic status or your standing with the basketball team or coaches.

After having read the attached letter, I understand the purpose of the study and what is expected of me. I agree to participate in this study during the 1990-91 basketball season.

Subject's name	Subject's signature
Local phone #	Date
	Witness

Topic: Letter and Informed Consent from Coach

Investigator: Carolyn Savoy

Information: All inquiries should be directed to Carolyn Savoy, Project Director, 2521 Kingston Pike, Knoxville, TN 37919. Phone # 521-1729.

Dear Coach:

Enclosed please find a copy of the letter of informed consent for subjects on your team. Your agreement to participate in this study would include completion of one questionnaire immediately following eight basketball games.

All information will be kept strictly confidential. No one will have access to any of the information on the questionnaire except the researcher. No names will be attached to the data; the coach's name and the team name will not be identified in reporting the results and conclusions of the study. I will be happy to answer any questions during or after the study. Your participation in the study is voluntary, and you may choose not to participate or withdraw from participating at any time.

APPENDIX D

GROUP 1 AND 2 CSAI-2 DESCRIPTIVE STATISTICS

GROUP 1 CSAI-2 DESCRIPTIVE STATISTICS			
BLOCK	COGNITIVE ANXIETY	SOMATIC ANXIETY	SELF-CONFIDENCE
7	M 13.778 s (3.490)	13.278 (3.988)	30.778 (3.766)
8	M 11.388 s (3.071)	11.056 (2.413)	31.389 (3.791)
9	M 11.222 s (3.173)	11.000 (2.450)	31.444 (4.119)

GROUP 2 CSAI-2 DESCRIPTIVE STATISTICS			
BLOCK	COGNITIVE ANXIETY	SOMATIC ANXIETY	SELF-CONFIDENCE
7	M 13.222 s (2.791)	14.556 (3.504)	30.222 (6.399)
8	M 10.889 s (1.965)	11.222 (2.224)	33.333 (4.031)
9	M 10.444 s (2.128)	10.444 (2.698)	34.222 (2.863)

APPENDIX E

CLOSED SKILL PERFORMANCE DESCRIPTIVE STATISTICS

TEAM FOUL SHOOTING DESCRIPTIVE STATISTICS			
TREATMENT CONDITIONS	MEAN	STANDARD DEVIATION	n
A1	.519	.101	32
B1	.698	.084	60
A2	.621	.291	19
B2	.609	.037	56
A3	.498	.339	18
B3	.596	.254	27

TEAM FOUL SHOOTING DESCRIPTIVE STATISTICS			
BLOCKS	MEAN	STANDARD DEVIATION	n
1	.418	.401	16
2	.621	.317	16
3	.673	.351	21
4	.811	.264	20
5	.610	.387	19
6	.621	.291	19
7	.662	.356	19
8	.583	.387	19
9	.582	.333	18
10	.498	.339	18
11	.606	.262	15
12	.586	.247	12

APPENDIX F

GROUP 1 AND 2 OPEN SKILL DESCRIPTIVE STATISTICS

GROUP 1
DESCRIPTIVE STATISTICS

BLOCK		PTS/ MIN	REBS/ MIN	STLS/ MIN	FOULS / MIN	TURNS / MIN	n	FG%
1	M	.303	.215	.032	.083	.093	17	.414
	s	.223	.212	.066	.091	.071		.270
								n 16
2	M	.316	.159	.031	.108	.073	18	.467
	s	.258	.166	.048	.080	.091		.262
								n 16
3	M	.444	.179	.030	.028	.096	18	.519
	s	.243	.125	.033	.053	.074		.228
								n 18
4	M	.401	.167	.042	.098	.076	17	.488
	s	.191	.113	.048	.128	.055		.178
								n 15
5	M	.348	.210	.031	.115	.086	17	.503
	s	.200	.209	.047	.082	.077		.242
								n 16
6	M	.268	.094	.053	.137	.083	16	.376
	s	.179	.114	.125	.165	.116		.348
								n 15
7	M	.394	.225	.044	.101	.107	17	.438
	s	.473	.215	.084	.110	.101		.296
								n 14
8	M	.411	.170	.048	.107	.094	17	.436
	s	.307	.094	.043	.080	.081		.287
								n 17
9	M	.368	.154	.052	.061	.068	16	.454
	s	.247	.113	.059	.054	.067		.266
								n 16
10	M	.326	.119	.034	.079	.104	11	.361
	s	.270	.111	.031	.051	.085		.299
								n 11
11	M	.230	.112	.050	.127	.090	15	.413
	s	.169	.107	.050	.247	.077		.252
								n 12
12	M	.225	.126	.011	.046	.121	9	.304
	s	.244	.115	.025	.040	.134		.257
								n 7

GROUP 2
DESCRIPTIVE STATISTICS

BLOCK		PTS/ MIN	REBS/ MIN	STLS/ MIN	FOULS / MIN	TURNS / MIN	FG%	n
1	M	.452	.187	.040	.103	.070	.454	12
	s	.265	.133	.041	.047	.063	.144	
2	M	.389	.149	.057	.123	.087	.459	12
	s	.215	.087	.067	.071	.056	.162	
3	M	.554	.290	.069	.108	.119	.585	12
	s	.185	.119	.048	.084	.077	.153	
4	M	.481	.194	.040	.089	.085	.510	11
	s	.236	.121	.035	.042	.056	.174	
5	M	.447	.257	.061	.084	.073	.485	12
	s	.260	.174	.049	.064	.070	.208	
6	M	.360	.194	.040	.123	.076	.460	12
	s	.124	.133	.037	.067	.059	.169	
7	M	.364	.208	.033	.103	.086	.375	12
	s	.215	.113	.027	.067	.087	.224	
8	M	.436	.240	.042	.112	.083	.505	12
	s	.218	.135	.039	.137	.047	.074	
9	M	.549	.290	.074	.073	.068	.531	10
	s	.292	.135	.070	.064	.066	.170	
10	M	.375	.180	.035	.090	.084	.490	12
	s	.225	.114	.037	.060	.050	.227	
11	M	.286	.259	.033	.112	.074	.345	12
	s	.239	.187	.037	.068	.079	.204	
12	M	.331	.252	.034	.142	.096	.486	8
	s	.179	.151	.033	.064	.052	.254	

APPENDIX G

SUBJECT # 31 DESCRIPTIVE STATISTICS

SUBJECT # 31
DESCRIPTIVE STATISTICS

BLOCK		PTS/ MIN	REBS/ MIN	STLS/ MIN	FOULS / MIN	TURNS / MIN	FG%	FS%	n
1	M	.321	.146	.036	.084	.087	.448	.167	3
	s	.066	.036	.034	.016	.033	.156	.235	
2	M	.213	.144	.027	.145	.132	.323	.000	3
	s	.088	.077	.023	.080	.019	.184	.	
3	M	.458	.364	.053	.090	.072	.559	.395	3
	s	.277	.023	.052	.084	.062	.160	.530	
4	M	.134	.309	.067	.066	.089	.195	.000	2
	s	.067	.116	.034	.029	.003	.039	.	
5	M	.247	.292	.044	.043	.044	.394	.250	3
	s	.154	.006	.013	.038	.013	.218	.354	
6	M	.281	.104	.023	.119	.040	.407	.611	3
	s	.015	.050	.040	.084	.041	.208	.347	
7	M	.364	.210	.032	.100	.057	.309	.083	3
	s	.429	.043	.055	.037	.051	.376	.235	
8	M	.338	.212	.014	.196	.057	.524	.000	3
	s	.159	.066	.024	.264	.063	.041	.	
9	M	.541	.203	.042	.018	.094	.491	.834	3
	s	.378	.069	.072	.030	.085	.179	.235	
10	M	.298	.182	.023	.087	.107	.437	.044	3
	s	.116	.078	.021	.072	.055	.055	.096	
11	M	.156	.210	.066	.065	.064	.186	.584	3
	s	.139	.110	.028	.048	.084	.162	.118	
12	M	.215	.387	.014	.093	.097	.250	.584	2
	s	.011	.037	.020	.014	.058	.071	.118	

APPENDIX H

SUBJECT # 41 DESCRIPTIVE STATISTICS

SUBJECT # 41
DESCRIPTIVE STATISTICS

BLOCK		PTS/ MIN	REBS/ MIN	STLS/ MIN	FOULS / MIN	TURNS / MIN	FG%	FS%	n
1	M	.563	.345	.054	.106	.058	.444	.730	3
	s	.241	.023	.048	.058	.070	.096	.351	
2	M	.338	.145	.014	.141	.095	.479	.750	3
	s	.196	.115	.025	.088	.088	.247	.354	
3	M	.065	.356	.042	.172	.220	.660	.667	3
	s	.135	.116	.038	.141	.056	.057	.472	
4	M	.566	.222	.014	.091	.102	.621	1.00	3
	s	.175	.090	.024	.036	.092	.048	.000	
5	M	.462	.366	.039	.096	.020	.537	.778	3
	s	.218	.190	.068	.070	.034	.116	.192	
6	M	.458	.362	.036	.193	.091	.653	1.00	3
	s	.085	.080	.032	.059	.091	.137	.000	
7	M	.443	.312	.047	.150	.091	.519	.834	3
	s	.079	.055	.012	.104	.045	.032	.235	
8	M	.464	.351	.078	.092	.123	.518	.900	3
	s	.331	.059	.029	.046	.019	.074	.141	
9	M	.322	.323	.053	.132	.035	.488	.333	3
	s	.223	.086	.091	.081	.061	.232	.289	
10	M	.378	.193	.020	.130	.070	.650	.250	3
	s	.134	.047	.034	.065	.076	.218	.354	
11	M	.133	.238	.000	.146	.033	.333	.500	3
	s	.126	.119	.000	.044	.058	.000	.	
12	M	.450	.250	.035	.250	.150	.550	.667	2
	s	.141	.212	.025	.000	.000	.071	.472	

APPENDIX I

SUBJECT # 51 DESCRIPTIVE STATISTICS

SUBJECT # 51
DESCRIPTIVE STATISTICS

BLOCK		PTS/ MIN	REBS/ MIN	STLS/ MIN	FOULS / MIN	TURNS / MIN	FG%	FS%	n
1	M	.588	.202	.069	.119	.086	.494	.333	3
	s	.372	.140	.045	.079	.087	.142	.334	
2	M	.629	.211	.109	.126	.052	.550	.329	3
	s	.218	.090	.098	.046	.037	.087	.154	
3	M	.619	.314	.088	.060	.073	.701	.616	3
	s	.079	.017	.045	.035	.029	.156	.144	
4	M	.593	.235	.062	.117	.093	.567	.622	3
	s	.257	.093	.043	.070	.032	.107	.204	
5	M	.728	.323	.085	.111	.153	.632	.587	3
	s	.125	.197	.073	.085	.061	.028	.361	
6	M	.343	.247	.078	.119	.077	.556	.459	3
	s	.092	.054	.016	.034	.067	.106	.134	
7	M	.421	.270	.030	.101	.040	.406	.670	3
	s	.049	.012	.001	.021	.015	.118	.112	
8	M	.528	.346	.043	.052	.082	.497	.806	3
	s	.217	.050	.049	.068	.016	.107	.173	
9	M	.800	.422	.130	.074	.056	.648	.600	3
	s	.132	.068	.036	.028	.064	.113	.100	
10	M	.642	.309	.069	.086	.083	.616	.579	3
	s	.223	.067	.038	.063	.030	.154	.291	
11	M	.575	.504	.065	.132	.126	.565	.397	3
	s	.172	.143	.017	.104	.089	.063	.255	
12	M	.519	.291	.025	.125	.084	.520	.732	2
	s	.062	.013	.035	.000	.013	.028	.025	

VITA

Carolyn Savoy was born in Saint John, New Brunswick, Canada on July 21, 1947. She attended elementary school there and graduated from Saint John High School in 1965. In the fall of 1965 she entered the University of New Brunswick and graduated in 1969 with a Bachelor of Physical Education degree. Beginning in 1969 she coached basketball and field hockey and taught physical education activity courses at Saint Francis Xavier University in Antigonish, Nova Scotia for two years. She then attended Boston University for one year and graduated in 1972 with her Educational Masters degree. She continued to work at Saint Francis Xavier University until 1977. From 1977-present she has been employed at Dalhousie University in Halifax, Nova Scotia where she is the head women's basketball coach and an associate professor in the School of Recreation, Physical, and Health Education. In 1979 she was the Canadian women's junior national team assistant coach. During 1990-91 she was on sabbatical from Dalhousie University to attend the University of Tennessee to pursue a doctoral program in the area of sport psychology. During that time she was the sport psychology consultant for the University of Tennessee Lady Vols women's basketball N.C.A.A. Division 1 national champions. She will receive the Doctor of Philosophy degree with a major emphasis in Sport Psychology in August 1992.