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thesis entitled

EFFECTS OF SELECTED MENTAL PRACTICE TECHNIQUES ON PERFORMANCE RATINGS, SELF-EFFICACY, AND STATE ANXIETY OF COMPETITIVE FIGURE SKATERS

presented by

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has been accepted towards fulfillment
of the requirements for

MASTER OF SCIENCE degree in PHYSICAL EDUCATION AND EXERCISE SCIENCE

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Date August 2, 1996

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By

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Submitted to
Michigan State University
In partial fulfillment of the requirements
for the degree of

MASTER OF EDUCATION

Department of Physical Education and Exercise Science

1996

ABSTRACT

EFFECTS OF SELECTED MENTAL PRACTICE TECHNIQUES ON PERFORMANCE RATINGS, SELF-EFFICACY, AND STATE ANXIETY OF COMPETITIVE FIGURE SKATERS

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This study examined the effectiveness of mental practice techniques for improving figure skating performance, self-efficacy, and state anxiety. Two interventions, paper freestyle drawing (PFD) and walk through on floor (WTF), were compared to a stretching control group. Subjects (N=27) were members of the United States Figure Skating Association and were randomly assigned to one of the two interventions or the control group. The study included procedural reliability checks such as pre and post manipulation checks; structured seminars; and homework workbooks. Results indicated that the two mental practice treatment groups significantly improved in their performance in jumps, spins, and connecting moves compared to the stretching control group. Results also indicated that the WTF mental practice group increased their spinning self-efficacy beliefs compared to the PFD mental practice treatment and the stretching control group. Furthermore, the two mental practice groups improved their self-confidence as measured by the CSAI-2 (Martens, Vealey, & Burton, 1990). However, state anxiety and somatic anxiety did not significantly improve with the use of this intervention.

DEDICATION

This Masters Thesis is dedicated to the memory of my dearly departed father Ronald David Garza. I know that you will be unable to read this. Although for all who do I would like them to know that without your teachings of drive, desire, determination, responsibility, and organization I could never have come this far. You have taught me more than I will ever learn in college. I couldn't have done it without you. You are in my thoughts always.

ACKNOWLEDGEMENTS

I would like to acknowledge the efforts of a number of people who provided me with their expertise, encouragement, love and support during the development and completion of my Masters degree and this Masters thesis.

To my mother Elizabeth and sister Sandy. Thank you for always being their when I needed you both. Your love, support and words of encouragement have been of great help to me.

I would like to thank Dr. Deborah Feltz, my Masters advisor and Thesis committee chair. Thank you for the last two years of assistance, guidance, and time. I would also like to express my gratitude to the other members of my committee for their knowledge, support, and time. They are professors Dr. Richard Albrecht, and Dr. Lynette Overby.

I would also like to mention the direct and indirect contributions of my many friends at MSU. I will always be grateful of your interest, assistance, and support in my pursuit of higher education. Especially for all the love and support of my dear friends Allison, Claudia, Judy, Charlie, and Doug. Thank you for making the last two years ones to happily remember.

To Dr. Judy Walters, you have made a definite impact on my life, thanks for believing in me, and giving me the courage to believe in myself to pursue my dreams. I'll never forget you.

My education could not have been complete without the teaching, guidance and encouragement of three important past professors. They are: Anne Bowers Jr., Dr. Peggy Foss, and Dr. Robert Hymes. You are all greatly appreciated and will always be remembered.

I would be remise if I did not acknowledge B2 without your encouragement of higher education I would have never gone to college. Although we will not share the future, we will always share the past.

I would also like to thank all of the Garden City Figure Skating Club coaches and skaters who participated in this study. Including the GCFSC president Mike Fearon.

May all of those listed above, find others who support their dreams as they have supported mine. God Bless.

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CHAPTER I

INTRODUCTION

Statement of the Problem

This study was designed to investigate the effects of two selected mental practice techniques compared to a stretching control group on performance ratings, self-efficacy, and state anxiety of competitive figure skaters. The selected practice techniques consisted of paper freestyle drawing (PFD), and walk through on the floor (WTF).

The WTF and PFD interventions were adaptations of Palmer's (1992, 1993b) and Martin's (1993) prior mental rehearsal techniques used on compulsory figures. As of May, 1995 compulsory figures were no longer a mandatory requirement for the sport of competitive figure skating. Therefore, this study adapted both the WTF and the PFD for freestyle skating routines. Review of the literature indicated that there was a point of contention between Martin and Palmer regarding the efficacy of their methods. (Palmer 1993a, Martin 1993). The point of contention centered on whether there was treatment integrity in place when Palmer (1992) compared the two methods.

Nature of the Problem

Martin (1992) developed a behavioral intervention program for figure skaters to improve their compulsory

figures. The skaters in Martin's intervention had a choice of using the following two types of "walk-out" techniques: (a) walking out the figure pattern on the floor or (b) mentally going through the movements of the figure in a stationary position.

The original Martin method was as follows:

1. Skaters were asked to determine key words to help them concentrate on the correct specific elements of each figure.
2. During the on-ice practice, the skaters used the keywords while performing the figures.
3. They performed a "walk out" activity on the floor three times per week as if they were skating in a test situation (three tracings per figure).
4. While doing this, the skaters said keywords out loud and were also asked to try to "feel" and imagine the correct response as they were walking the figures.
5. Following each session of the Martin self-talk and walk-out technique, the skaters had a witness sign a sheet. The signature sheet was submitted at the end of the 4-week period to verify the subject's compliance with the intervention.

Palmer (1992) conducted a study to compare the Martin self-talk and walk-out technique (Martin, 1992) to another mental practice technique which she developed. Palmer's technique consisted of drawing out one's figures on a piece of paper, on top of a figure eight or serpentine diagram.

The "paper patch" was designed as off-ice training to practice one's figures. The layout papers that were originally provided to the subjects aided them in practicing exactly what their figure should look like on the ice - long and short axis, line up of the sides of the circles, and perfectly round circles.

The original Palmer method was as follows:

1. Skaters were given paper patch workbooks containing outlines of figures they were currently practicing.
2. Skaters were asked to determine keywords to help them concentrate on the correct specific elements of each figure.
3. Skaters traced the figure on paper over the outline in their workbooks while saying keywords out loud and timing the rehearsal so that it took approximately the same time as actually skating the figure.
4. They performed this activity three times per week as if they were skating in a test situation(three tracings per figure).
5. The skaters were also asked to try to "feel" and imagine the correct response as they were drawing the figures.
6. At the end of the 4-week session, the skaters handed in their workbooks to verify their compliance with the intervention.

Palmer (1992) compared the Martin technique, paper-patch technique and a no treatment control group on the performance of compulsory figures. The subjects ($\underline{N}$ = 12)

were randomly assigned to either the paper patch test, Martin technique, or a control group. The results indicated that the paper patch test, (trace a figure on a piece of paper while saying key words outloud) was an effective strategy which significantly improved performance; whereas, the Martin technique, (performing "walkouts" of the figure on the floor, or in a stationary position, while timing it correctly, simulating the judges being on the ice with you, and "feeling" the correct movements) was no more effective than the control group in improving performance.

However, Martin (1993) criticized Palmer's (1992) methodology. Specifically, he stated that Palmer (a) did not use all of the components of his technique and (b) that her study lacked procedural reliability assessments. Procedural reliability involves the representation of the treatment as it is typically practiced or as it appears in the treatment manual (Martin 1993). For mental practice, procedural reliability ensures treatment integrity by including procedures for checking both the quality and quantity of imagery, cognition, and affect that subjects experience during mental practice sessions (Hazen, Johnstone, Martin, & Srikameswaran, 1990; McCaffrey & Orlick, 1989). Such procedures in this study included having skaters write down cue words that they used in their skating routines, and having them keep notebooks which were later assessed for treatment integrity. Although, Palmer

(1993a) claimed that all Martin's components were incorporated, procedural reliability assessments were, in fact, lacking.

One of the difficulties in comparing the Martin technique to any other mental practice technique is that Martin (1992) did not distinguish between "walk-out" the movements verses mentally performing them in a stationary position. These are two different strategies and one cannot determine if one strategy is better than the other from his design or Palmer's test of his technique. The walk-out strategy would appear to be more directly related to the skater's performance than merely mentally practicing the technique. Therefore, a better test of the two interventions would be to compare Palmer's paper-drawing technique to Martin's walk-out technique.

In addition to the need for methodological improvements in order to compare these two mental rehearsal techniques, dependent measures other than skating performance are also important to assess. For instance, athletes often have to deal with numerous sources of potentially severe stress especially in competition. Competitive figure skating, in particular has the potential for eliciting a great deal of stress because it is an individual sport that is also subjectively scored. These two factors create evaluation apprehension among athletes (Martens, Vealey, & Burton, 1990). Mental practice techniques have the potential to

reduce athletes' anxiety levels, because they help ensure psychological readiness (Vealey, 1988). Which mental practice technique is most effective at reducing anxiety is uncertain.

Self-efficacy or self-confidence is another dependent variable that should benefit from mental practice techniques. In terms of self-efficacy or self-confidence factors, results from various studies have generally shown positive correlations between an individual's efficacy expectations and sport performance (Feltz, 1988b; George, 1994; Kane, Marks, Zaccavo & Blair, 1996; Lee, 1988; Martin & Gill, 1991; Treasure, Monsom & Lox 1996; Weiss, Wiese & Klint, 1989). Feltz and Weiss (1982) outlined the importance of self-efficacy strategies that coaches and teachers could use to strengthen self-efficacy. These investigators recommended imagery (visualizing performance success), as one way to improve self-efficacy.

Although the proposed research was not an exact replication of Martin's and Palmer's compulsory figure methods, this study used their procedures adapted to freestyle skating routines. The original works of Palmer (1992) and Ming (1992) examined only performance improvement in compulsory figures. This study examined mental rehearsal training effects on performance, self-efficacy, and state anxiety. An attempt was also made to resolve the

controversy between the two researcher's prior discrepancies.

Hypotheses

To fulfill the purposes of this research, three hypotheses were formulated:

1. The mental practice treatments improve the performance of figure skaters compared to a no mental practice control group.
2. The mental practice treatments improve the self-efficacy of figure skaters compared to a no mental practice control group.
3. The mental practice treatments improve the state anxiety of figure skaters compared to a no mental practice control group.
4. Their is no difference between the two mental practice treatments on performance, self-efficacy, or state anxiety.

Delimitations

The subjects in this study were limited to female subjects. All of the subjects voluntarily participated in this study. Furthermore, the subjects were limited to competitive athletes who belong to the United States Figure Skating Association (USFSA) skating levels pre-preliminary, preliminary, pre-juvenile, juvenile, intermediate, or novice. Due to the ability level of the research

participants, results from this research cannot be generalized to those athletes performing at the elite or junior or senior skating levels. Generalizability of the results obtained in this study are, therefore, limited to the specific level of the subject population employed. Also, due to the fact that figure skating is an individual, self-paced sport, generalization of results to team, or reactive, sports would be inappropriate.

Definitions

The following operational definitions apply to this study:

Concentration -- is to focus on the task at hand. The skater's total involvement in the present moment is essential to taking control of the situation.

Consistency -- is a repetition of the same movements, a transfer of perfect routines during practice sessions to the competitive situation.

Cognitive anxiety -- score on the cognitive anxiety subscale of the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, et al., 1990).

Intermediate Free Skating Ability -- As outlined in the 1995 USFSA Official Rulebook, this level of skating involves a 2 1/2 minute program demonstrating command of the following required elements: Jumps: (a) single loop, flip and lutz; (b) axel; (c) one double jump: double salchow or double toe loop; (d) one jump combination consisting of two single

jumps; (e) one jump combination consisting of either one single and one double jump or consisting of two double jumps (no turn or change of foot between jumps). Spins: (a) sit spin to change foot sit spin (four revolutions on each foot in position); (b) camel spin to backward camel spin (four revolutions on each foot in position); (c) spin combination consisting of one change of foot and one change of positions (four revolutions on each foot). Steps: connecting moves incorporating spirals, spread eagles, etc., strong edges, fairly good use of music, and full utilization of the ice surface.

Juvenile Free Skating Ability -- As outlined in the 1995 USFSA Official Rulebook, this level of skating involves a 2 minute program demonstrating command of the following required elements: Jumps: (a) three single jumps, one of which must be an axel; (b) One jump from the following: split jump, stag jump, falling leaf, half loop jump; (c) One jump combination incorporating two single jumps (no turn or change of foot between jumps). Spins: (a) forward sit spin (four revolutions); (b) forward camel spin (four revolutions); (c) one combination spin and one change of foot (four revolutions each foot) - camel, sit, or attitude positions. Steps: connecting moves incorporating spirals, strong edges, fair use of music and full utilization of ice surface.

Novice Free Skating Ability -- As outlined in the 1995 Official USFSA Rulebook, this level of skating involves a 2-2 1/2 minute program demonstrating command of the following required elements: Jumps: (a) axel; (b) double salchow; (c) double toe loop; (d) double Loop; (e) two jump combinations consisting of two double jumps (no turn or change of foot between jumps). Spins: (a) lay back or attitude (six revolutions); (b) flying camel (four revolutions); (c) two spin combinations consisting of one change of foot and one change of position (four revolutions on each foot). Steps: connecting moves incorporating mohawks and three turns, spirals, spread eagles, etc., strong edges, good use of music, and full utilization of the ice surface.

Paper freestyle drawing -- An intervention package designed to have skaters listen to their skating music while drawing out their routine on paper, and imagining they are at an actual competition.

Performance -- in this study, performance was measured before and after intervention by one's own coach. The emphasis was on how well the individual performs according to her current level of ability.

Preliminary Free Skating Ability -- As outlined in the 1995 USFSA Official Rulebook, this level of skating involves a 1 1/2 minute program demonstrating command of the following required elements: Jumps: (a) waltz jump; (b) salchow; (c) loop; (d) flip; (e) one jump combination - waltz jump, toe

loop (no turn or change of foot between jumps). Spins: (a) one foot upright spin, optional free foot, (three revolutions); (b) one foot back spin - entry optional (three revolutions); (c) sit spin - in recognizable sit position (three revolutions). Steps: connecting moves and steps should be demonstrated throughout the program.

Pre-Juvenile Free Skating Ability -- As outlined in the 1995 USFSA Official Rulebook, this level of skating involves a 2 minute program demonstrating command of the following required elements: Jumps: (a) loop; (b) flip; (c) lutz; (d) one jump combination - choice of above with a loop lump (no turn or change of foot between jumps). Spins: (a) one camel spin (three revolutions); (b) one attitude or layback spin (three revolutions in position); (c) one combination spin: camel spin to sitspin. No change of foot (six revolutions in positions); (d) front scratch to back scratch - exit on spinning foot (four revolutions on each foot). Steps: connecting moves and steps should be demonstrated throughout the program.

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

Self-efficacy -- one's belief in one's ability to perform a task. The cognitive scenarios one generates is affected by one's beliefs concerning one's efficacy (Bandura, 1977; Sarason, 1975)

State anxiety -- anxiety that is evoked by a particular situation. Much depends on how the individual actually interprets a particular situation. One's interpretation is influenced by many factors like past experiences, ability, and the training in the management of stress. (Davies, 1989; Vealey, 1990).

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

Walk through on the floor -- an intervention package designed to have skaters listen to their skating music and walking out their routine on the floor, while imagining that they are at an actual competition.

Basic Assumptions

Despite the fact that performance was assessed, the self-report instruments used in this experiment have all of the assumption as all self-report measures. Such as the assumption that subjects were honest about their self-reports. It was also assumed that stratified randomized assignment would result in equal groups prior to intervention. Finally, it was assumed that subjects accurately completed their homework assignments.

Limitations

Having a randomly assigned experiment within a skating club may lead to contamination of my subjects. The

researcher instructed the skaters' not to discuss with or show to anyone but their parents or guardians their homework workbooks. Also, a manipulation check questionnaire called Off-Ice Skating Training was assessed at the beginning and end of this experiment to see if contamination had taken place.

Chapter II

REVIEW OF THE LITERATURE

Introduction

Research in the field of sport psychology has supported consistently the relationships among self-efficacy, state anxiety, and sport performance (Feltz, 1988a; LaGuardia & Labbe, 1993; Lox, 1992; Martin & Gill, 1991). Research has also shown that imagery has been one of the most effective techniques used to control one's self-efficacy, state anxiety, and ultimately sport performance.

This chapter is divided into three reviews of pertinent literature associated with the areas of (a) research on anxiety in sport, (b) research on self-efficacy in sport, and (c) research on mental practice in sport.

Research on Anxiety in Sport

Competitive anxiety deals with an individual's perceptions of competitive situations as threatening (Martens, 1977). Anxiety has been presumed to have two major components: state and trait. State anxiety (A-state) is anxiety that is evoked by particular situations. Trait anxiety (A-trait) is a tendency to perceive certain situations as threatening and to react to these situations with varying levels of A-state (Spielberger, 1966). One's interpretation of anxiety is influenced by many factors such

as past experiences, ability, and the training in the management of stress. (Davies, 1989). Regardless of one's trait anxiety tendencies, highly stressful situations will cause increases in everyone's level of state anxiety. Therefore state anxiety is the variable that athletes need to keep under control. Within sport, state anxiety has been typically measured using the Competitive State Anxiety Inventory-2 (CSAI-2) (Martens, et al., 1990).

Martens, Burton, Vealey, Bump, and Smith (1990) developed the CSAI-2 to assess sport-specific somatic A-state, cognitive A-state and state self-confidence. The CSAI-2 is a multidimensional questionnaire consisting of 36 questions, representing three factors: somatic anxiety, cognitive anxiety, and self-confidence. Somatic A-state consists of the physiological elements of the anxiety ordeal that develop directly from autonomic arousal. Some symptoms of somatic A-state are clammy hands, tense muscles, and rapid heart rate. Cognitive A-state is a negative expectation and cognitive regard about oneself, the situation at hand and possible consequences. Some examples of cognitive A-state are negative thoughts, and/or disturbing visual images. State self-confidence deals with one's confidence level just prior to competition.

Numerous studies have confirmed the test-retest reliability, internal consistency, and construct validity of this instrument (Burton 1988; Krane 1994; Lacey 1984).

Swain, Jones, and Cale (1990) examined whether the relationship between the cognitive and somatic anxiety subscale scores of the CSAI-2 changed as a function of the proximity of competition. On five separate occasions they found intercorrelations between somatic and cognitive anxiety which suggested a progressive increase in the magnitude of the relationship between cognitive and somatic anxiety as the event approached. These findings support the hypothesis that as the event approached there was a progressive increase in the magnitude of the relationship between cognitive and somatic anxiety.

Barnes, Sime, Dienstbier, and Plake (1986) investigated the validity of the three components of the CSAI-2 in predicting athletic performance. This instrument was administered to 14 male college swimmers prior to their event. The results of this study indicated that cognitive anxiety, but not somatic anxiety, was a significant predictor of performance.

Although past research on the relationship between anxiety and motor performance is ambiguous, evidence seems to support the inverted-U hypothesis (Martens, 1974; Raglin, & Turner, 1993; Sonstroem, & Bernardo, 1982). The inverted-U hypothesis states that performance will improve as arousal increases up to an optimal level, after which further increases in arousal decrease performance (Martens, et al., 1990). An optimal level of anxiety is associated

with maximum performance. Both high levels of anxiety and low levels of anxiety are associated with relatively poor standards of performance. High levels of anxiety are generally associated with feelings of insecurity, with over-caution and with indecision. Why performance deteriorates when athletes reach high levels of A-state is uncertain. Weinberg (1978) suggests that the increased muscular tension (somatic A-state) causes performance deterioration. Whereas Wine (1980) believes that it is self-doubts or turning attention inward rather than on the task at hand (cognitive A-state), that causes performance deterioration.

State anxiety is associated with insufficient self-confidence and lack of preparation (Nideffer, 1976). Mental rehearsal is proported to help one to perform under high anxiety conditions (Karolczak-Biernacka, 1986). Anxiety is also reduced by teaching individuals to modify their appraisals of threat that are based on irrational beliefs (i.e., I can't do it, I am going to fall) (Ellis, 1962). If individuals are taught how to monitor their thoughts, then they can identify, analyze and challenge those beliefs, thus controlling one's irrational beliefs (Ellis, 1962; Karolczak-Biernacka, 1986).

Burton (1988) used the CSAI-2 to measure the relationship between anxiety and performance in anxious swimmers. The results confirmed the original hypotheses: (a) cognitive anxiety was strongly related to performance;

(b) somatic anxiety demonstrated an inverted-U relationship with performance; and (c) somatic anxiety and performance depended on the duration and complexity, of events. The shorter the duration and higher the complexity the stronger the relationship between somatic anxiety and performance. The results confirmed the original hypotheses and provided additional construct validity for the CSAI-2.

Numerous research has positively linked imagery with the control of one's anxiety. Highlen and Bennett (1983), in a study of elite divers and wrestlers, compared the difference in anxiety between open and closed skill athletes. They hypothesized that imagery use would differentiate between qualifying and nonqualifying divers and wrestlers. In both diving and wrestling, nonqualifiers reported having higher levels of anxiety during competition.

Savoy (1993) implemented a mental training program which included imagery, centering, focusing, and energizing on one NCAA Division I female basketball player across a season of play. The results showed that the mental training decreased pregame anxiety, improved game performance statistics, practice performance, and the coach's overall evaluation of the athlete. Research by Meyers, Schleser, Cooks, & Cuvillier (1979); Tremayne and Barry (1990); and Weinberg, Seavourne, & Jackson (1981) also found that imagery can have a positive effect on anxiety control, and

may be considered an effective alternative to an actual competitive situation.

Research on Self-Efficacy in Sport

Self-efficacy is defined as the extent to which an individual believes he or she can execute the behaviors (e.g. double axel) needed to produce a certain outcome (e.g. satisfaction with performance) (Bandura, 1977, 1986). Bandura's theory suggests that efficacy expectations are obtained from four informational sources: performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. Of these four, past performance accomplishments have been considered as the most dependable sources of efficacy information because they is based on one's personal mastery experiences. According to Bandura (1986), efficacy expectations predict thought patterns, behavior, and emotional reactions. How one perceives the difficulty of the task, the amount of effort expended and the tangible patterns of success and failure all effect one's efficacy expectations. In addition, self-efficacy is a significant determinant of behavior only when proper incentives and skills are present (Bandura, 1986).

The cognitive scenarios one generates are affected by one's beliefs concerning one's efficacy. Individuals who have a strong sense of efficacy envision success scenarios that foster a problem-solving approach to different

situations they may encounter. On the other hand, individuals who are plagued by self-doubts tend to dwell on their personal deficiencies and envision failure scenarios that bring about adverse consequences. Such intrusive thinking undermines effective use of capabilities by devoting attention from how best to master problems to concerns over personal deficiencies and possible adversity. (Sarason, 1975).

In sport, self-efficacy is partly a reflection of one's own prior competitive experience. Positive experiences contribute significantly to an athletes' self-confidence. Whereas, negative experiences contribute significantly to an athletes' lack of self-confidence. Also, less experienced athletes are often less confident than more experienced ones (Weiss, Wiese, & Klint 1989).

In the past 15 years there have been over 50 studies published on the topic of self-efficacy in sport and physical activity. Positive relationships between self-efficacy expectations and performance have been reported in numerous motor activities. These include leg endurance (Feltz & Riessinger, 1990; Gould, Weiss, & Weinberg 1981; Weinberg, Gould, & Jackson., 1979; 1980; 1981), reaction time and motor coordination (Ryckman, Robbin, Thornton & Cantell, 1982), and handgrip strength (Kavanagh & Hausfeld, 1986). Regarding sports, Feltz (1988b), in her review of research on self-confidence and sports performance, found

that in every sport situation studied, there is clear evidence of the direct relationship between self-confidence (self-efficacy) and performance.

Research on Mental Practice in Sport

Mental practice is a symbolic representation and reinforcement of learning new or previously learned motor skills. Mental practice consists of all the thinking and practicing of specific skills, and is concerned with the process rather than the end results (Biddle, 1985).

Fuson (1979) postulates that mental practice is a type of verbal rehearsal that serves to selectively focus one's attention on only the task appropriate cues and on remembering what to do. Thomas (1980) hypothesized that motor acquisition and performance requires the individual to attend to instructional input in order to plan the correct movement, monitor and assess performance, and then make the necessary changes for the next performance. He also found that verbal repetition, verbal labeling and verbal self-instruction can help young children in their attempts to recall and perform motor skills. Although Sage (1984) postulates that unless attention is cued on important and specific aspects of the task, the learners will be unable and perhaps unwilling to change what they are doing.

The research on mental practice/imagery training for athletes has generally shown that it improves performance.

Feltz and Landers, (1983) performed a comprehensive meta-analysis of existing research which support that mentally practicing a motor skill influences performance only somewhat better than no practice at all. Other researchers support the research findings that imagery training for athletes has generally shown that it improves performance. (Corbin, 1972; Hall & Erffmeyer, 1983; Hecker & Kaczor, 1988; Li-Wei, Qi-Wei, Orlick & Zitzelsberger, 1992; Murphy, Woolfolk, & Budney, 1988; Onestak, 1991). Rodgers, Hall, & Buckolz (1991) investigated the effects of an imagery training program on imagery ability, imagery use, and figure skating performance. Rodgers and his colleagues also examined the influence that imagery training had on skating performance compared to verbalization training. The results showed that the imagery group improved more than the verbalization group and showed several changes in imagery use (e.g., use of before and after skating practice, visualize parts of their jumps more easily, see themselves winning competitions more often, and kinetic "feeling" of their skating performance). In addition to improving performance, mental practice is used to boost one's confidence. Mental practice can change a person's attitude by raising self-efficacy, persistence, and a willingness to accept more instruction and new challenges (Asaronow & Meichenbaum, 1979; Winne, 1985).

Regarding the mental practice/self-efficacy relationship, Rushall (1988), in a single-sample study of an elite wrestler, found that covert modeling was a viable method of eliminating fear, a loss of confidence, and negative self-appraisal in athletes. Martin and Hall (1995) found similar results with beginner golfers who were first taught to putt a golf ball, and then taught an imagery program designed for the golf putting task. They found that the subjects who used imagery had a higher level of self-confidence than the control group. Meyers, Schleser, & Okwumabus (1982) taught coping, progressive relaxation and self-instruction strategies to two female collegiate basketball players who were experiencing anxiety during games and concentration problems. The results of their study indicated that as a result of these strategies performance improved, anxiety was reduced, and self-efficacy was raised.

Coaches, as well as athletes, report that imagery is one of the most utilized mental skills techniques and that it improves performance (Hall & Rodgers, 1989). However athletes in different sports and at different levels use it and benefit from it differently (Hall, Rodgers, & Barr, 1990). Hall et al. (1990) administered a 37-item imagery questionnaire aimed at examining differences in the use of imagery among individual and team sports as well as competitive and recreational athletes. The cross sectional

study was investigated with 381 male and female elite and non-elite athletes. Results showed that athletes in individual sports (e.g., gymnastics and figure skating) could feel themselves performing more than athletes in team sports (e.g, ice hockey, squash, soccer and football). The study also showed that a major focus of competitive athletes is having a high motivation goal of winning, imagining themselves achieving that goal, which made them feel more confident. Whereas, in recreational sports, however, the athletes played for fun and fitness, not setting the goal on winning. Competitive athletes found it fairly easy to visualize and feel themselves performing their skills. They also preferred internal kinesthetic imagery, and were likely to use imagery before going to sleep. Recreational athletes, on the other have, very rarely used imagery.

Comparison of Palmer's and Martin's Mental Practice Techniques

Martin (1992) developed a behavioral intervention program for figure skaters to improve their compulsory figures. This intervention consisted of walking out the figure pattern on the floor or mentally going through the movements of the figure in a stationary position.

The original Martin method was as follows:

1. Skaters were asked to determine key words to help them concentrate on the correct specific elements of each figure.

2. During the on-ice practice, the skaters used the keywords while performing the figures.

3. They performed a "walk out" activity on the floor three times per week as if they were skating in a test situation (three tracings per figure).

4. While doing this, the skaters said keywords outloud and were also asked to try to "feel" and imagine the correct response as they were walking the figures.

5. Following each session of the Martin self-talk and walk-out technique, the skaters had a witness sign a sheet. The signature sheet was submitted at the end of the 4-week period to verify the subject's participation.

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1. Skaters were given paper patch workbooks containing outlines of figures they were currently practicing.

2. Skaters were asked to determine keywords to help them concentrate on the correct specific elements of each figure.
3. Skaters traced the figure on paper over the outline in their workbooks while saying keywords outloud and timing the rehearsal so that it took approximately the same time as actually skating the figure.
4. They performed this activity three times per week as if they were skating in a test situation(three tracings per figure).
5. The skaters were also asked to try to "feel" and imagine the correct response as they were drawing the figures.
6. At the end of the 4-week session, the skaters handed in their workbooks to verify their participation.

Palmer (1992) compared the mental practice techniques of Martin's and her paper patch test to help pre-novice level 12 to 17 years old competitive figure skaters improve performance of compulsory figures. The subjects were randomly assigned to either the paper patch test, Martin technique, or a control group. The results indicated that the paper patch test, (trace a figure on a piece of paper while saying key words out loud) was an effective strategy; whereas the Martin technique, (performing "walkouts" of the figure on the floor, or in a stationary position, while timing it correctly, simulating the judges being on the ice with you, and "feeling" the correct movements) was no more effective than the control group. Martin (1993), in the

comment section of The Sport Psychologist, accused Palmer of not implementing the intervention correctly because she had left out three important components. Martin (1993) felt that Palmer did not include procedures for checking both the quantity and quality of imagery, cognitions, and affect that subjects experienced during mental practice sessions. Palmer, (1993a) defended her position in saying that these components were included.

Martin's technique consists of keywords or self-talk to cue correct performance while skating a compulsory figure. Off-ice rehearsal consists of three components: (a) timing of the practice so that the time matches as closely as possible the actual skating time of the figure on the ice; (b) making the simulation as vivid as possible by having skaters visualize that they are at a competition, that judges are standing nearby, and so on; and (c) encouraging skaters to "feel" the precise movements when they say the key words (Martin, 1992). This package has been shown to be useful in terms of self-report measurements from skaters (Martin, 1989b) and in a multiple-baseline design across four subjects (Ming, 1992).

Ming (1992) used Martin's self-talk technique in a multiple-baseline design across four subjects. The purpose of her study was to determine if the self-talk package would more effectively improve performance of compulsory figures than would regular physical practice. Her subjects

consisted of four pre-novice or novice level skaters ranging in age from 11 to 13. The self-talk package was the same as Martin's (1992) self-talk techniques listed in the preceding paragraph, except viewing Part I of the videotape "Sport Psyching for Figure Skaters" (Martin, 1989a) was added as the first component of the intervention. Subjects were trained to use the self-talk and walk-out package for one figure while performing one other figure with only usual on-ice practice with no cue words. The results indicated that the Martin self-talk package figure increased performance levels of all four subjects. While performance on the "untreated" figure, using only regular on-ice practice and no cue words remained the same.

Summary

The information presented in this review of literature supports a relationship between anxiety, self-efficacy, and mental practice. This research shows that mental imagery practice can influence one's anxiety, and self-efficacy levels. Figure skating is a sport that depends on mental concentration and precise movement. Both of these areas, as well as, one's perceptions to stressors can lead to anxiety. This anxiety can then decrease one's self-efficacy, and decline in optimal performance. Therefore, the research above has shown that mental practice can assist in the control of anxiety, self-efficacy, and performance.

The research also shows that mental practice may help individuals pay closer attention to the relevant features of the skill, to plan performances more carefully and thoughtfully, to self-analyze results, and to feel more responsible for their own learning, which in turn, may elevate self-efficacy. An athlete's feelings of confidence can have an important impact on his or her performance. Therefore, it is important that sport psychologists keep studying confidence enhancement so athletes can maximize their athletic performance.

CHAPTER III

METHOD

Subjects

The subjects in this study were 27 female competitive figure skaters who were members of the United States Figure Skating Association (USFSA). The subjects' ages ranged from 10 to 18 years of age. The mean age of the subjects who participated in this experiment was 12.37, (SD=2.19). There were seven participants who were 10 years of age, four participants who were 11 years of age, six participants who were 12 years of age, two participants who were 13 years of age, one participant who was 14 years of age, six participants who were 15 years of age, and one participant who was 18 years of age. The mean age per group was 12.33 (SD = 1.80) for stretching, 12.22 (SD = 2.68) for walk-through on the floor (WTF), and 12.56 (SD = 2.24) for paper freestyle drawing (PFD).

The subjects' skating ability levels ranged from USFSA pre-preliminary through novice. There were six pre-preliminary subjects, six preliminary subjects, three pre-juvenile subjects, three juvenile subjects, six intermediate subjects, and three novice subjects. Multiple levels of ability were comparable in this study because the questionnaires were developed using an individualized approach.

All of the subjects participated in the Garden City Figure Skating Clubs Annual Competition which was approximately 1 month after the start of this experiment. There were nine coaches who coached the 27 participants. Eight of the coaches were women and one was a man.

Design

This study employed a 3 X 2 (Group x Pre/Post) factorial design with repeated measures on the last factor. A stratified random assignment was used. Specifically, skaters were randomly assigned, within each ability level, to the PFD intervention, the WTF intervention, or the stretching practice control group. Measures were administered before and after the interventions. The dependent variables included coaches' ratings of skaters' performance, skaters' self-efficacy, and skaters' state anxiety.

Measures

Skaters' performance ratings. The performance ratings consisted of three separate measures. Skaters performances were determined by their coaches'/instructors' subjective ratings. The skaters' performances were measured both pre and post intervention and consisted of quantitative measures based on jumps, spins and step/connecting moves. These three measures comprise every skating program regardless of

skating level. Each skill was scored as follows: 1 - never completed successfully, 2 -inferior ability, 3 -below average ability, 4 - average ability, 5 - above average ability, and 6 - exceptional ability. For skills that skaters never tried before, the coaches marked "not applicable." (See Appendix A for a copy of the Skaters' Performance Evaluation forms). Performance ratings were analyzed by averaging the scores on each of the performance measures of jumps, spins, and steps/connecting moves. The skaters' competitive placement in the competition were not used as a measure of performance for various reasons such as, USFSA judges score subjectively, skaters' compete against different competitors at each competition, and the fact that skaters can perform to their greatest ability and still not place.

Self-efficacy. The present study also employed three separate self-efficacy measures. Individualized, program-specific measures of self-efficacy were constructed using Bandura's (1977) microanalytic approach and an individualized approach to assessing self-efficacy (Miller, McCrady, Abrams, & Labouvie, 1994). A questionnaire called the Skating Skill Evaluation, was developed to emphasize the skaters' own current skating level of ability in the areas of jumps, spins, and steps/connecting moves. The self-efficacy questionnaire contained items regarding jumps, spins, and steps/connecting moves because these moves

comprise a skaters' skating routine no matter what level of skating ability. Specifically, subjects were asked "what is the most difficult jump or combination jump, spin or spin combination, and step/connecting move in your skating routine?" Skaters were then asked to indicate, the strength of their belief in correctly performing this skill from at least 1 out of 10 times to 10 out of 10 times. Each efficacy rating was made on an 11-point probability scale ranging from 0 (I am certain I can't do this), to 10 (I am very certain I can do this). Efficacy scores were analyzed by summing each of the items within a category (jumps, spins, steps/connecting moves) and averaging across those 10 items. (See Appendix B for a copy of the Skating Skill Evaluation, a task-specific measure of self-efficacy.) This questionnaire was used both as a pre and post-test measure.

State anxiety. The CSAI-2 (Martens, et al., 1990) was used in the present study to analyze cognitive anxiety, somatic anxiety, and confidence of the subjects. Cognitive state anxiety indicated what the competitor was thinking regarding negative feelings. The cognitive anxiety subscale contained 9 items. The somatic anxiety scale dealt with the body-function changes perceived at the time of subscale testing and contained 9 items. The state of self-confidence subscale reflected the athlete's positive feelings toward a competitive situation and also contained 9 items. Each item

on the CSAI-2 was scored on a 4-point Likert scale from 1 (not at all) to 4 (very much so).

For the purpose of this study, the instructions were modified from "Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now--at this moment... choose the answer which describes your feelings right now," to the following: "Try to imagine that you are to compete in a competition in one week. Close your eyes and try to visualize yourself as clearly as possible while preparing to skate in that particular environment and condition. Once you can vividly imagine yourself at that competition, open your eyes and read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now." The CSAI-2 was titled the Michigan Competitive Questionnaire for purposes of concealing the true name of the questionnaire. (See Appendix C for a copy of the Michigan Competitive Questionnaire).

Manipulation checks. This area consisted of three measures; (a) Off-Ice Skating Training questionnaire, (b) Intervention Effectiveness Questionnaire, and (c) workbooks. The three manipulation checks that were designed for this experiment were used to help assure treatment integrity. Greenspan and Feltz (1989) believe that individuals experience various interventions differently. For this reason, there is a need for manipulation checks in sport

psychology intervention research. Yet Greenspan and Feltz indicated that only 20% of the studies they reviewed had a manipulation check that they considered adequate. According to Greenspan and Feltz, an adequate manipulation check is one that involves an assessment of how much subjects are affected by each component of the intervention. The procedural checks in the present study evaluated how much the subject accurately used the intervention.

Off-ice skating training questionnaire. This questionnaire was administered pre and post-treatment. The pretreatment assessment was used to determine the extent to which individuals already perform the skills used in the interventions. The posttreatment assessment was used to see if subjects used the treatment techniques provided for their group. This questionnaire included nine different off-ice skating training items such as psychological training, physical training, and types of classes that assist with skating (e.g., dance training). A working definition was used beside words that subjects may not have known (e.g. muscle relaxation - tensing and relaxing specific body parts). Subjects were asked how many times in a typical week they usually performed the training item. Each item was rated on a 5-point scale from 1 (Never) to 5 (7 or more times). Items 4 "walking out your entire routine on the floor" and 6 "drawing out your entire skating routine on paper" were the only answers of interest during the pre-

intervention assessment for they pertained to the interventions that were implemented. The other eight measures were used as filler items. If the subjects had a score of four or higher (5 or more times per week) on Item 4 or 6 they were not used as a subject in this study. Two skaters were eliminated from the study as a result of this assessment. (See Appendix D for a copy of the Off-Ice Skating Training Questionnaire).

The Intervention Effectiveness questionnaire was adapted for the sport of skating. This questionnaire consisted of seven questions, divided into three sections (a) imagery practice (one item), (b) imagery effectiveness (five items), and (c) intervention helpfulness (one item). Item one of this questionnaire was designed to assess the skaters' use of their workbooks. Questions two through six were designed to assess the skaters imagery effectiveness. Ratings for this section of the questionnaire were made on a 0 - 6 point scale. Ratings for this part of the questionnaire were done using a seven point scale, with a rating of 0 being used for rarely used imagery, and a rating of 6 being used if one used imagery often. Analyses for this part of the questionnaire consisted of the five items being summed to provide a single score. The Cronbach alpha for internal consistency was .99. Question seven of this questionnaire consisted of a four point scale in which skaters assessed the helpfulness of intervention. (See

Appendix E for a copy of the Intervention Effectiveness questionnaire).

The stretching, PFD, and WTF workbooks were designed as a procedural check to see how often the skater performed the intervention in which she was randomly assigned. The PFD workbook is detailed in Appendix F, the WTF workbook is detailed in Appendix G and the workbook for the stretching group is detailed in Appendix H. Parents were asked to sign and date their child's workbook to show completion of this work being done. These were handed in at the second intervention meeting.

Experimental Treatments

Interventions PFD and WTF were originally developed for compulsory figures. However, as of May 1995 compulsory figures are not mandatory in order to skate freestyle as was in the past. Therefore, this study modified Palmer's and Martin's ideas to freestyle skating.

Both the originals (paper patch, and Martin technique) and this study's adaptations (paper freestyle drawing, and walk through on the floor) contained three components of off-ice rehearsal that were consistent with widely accepted guidelines for imagery rehearsal (Orlick, 1986: Smith, 1987). These components/guidelines were (a) that the off-ice practice last the same duration of time as the actual performance, (b) that the subject try to imagine the actual

competitive setting in which the skills were being performed, and (c) that the subject try to "feel" the skills being performed.

PFD. The PFD intervention came from Palmer's (1992, 1993b) paper patch intervention which consisted of mental practice for compulsory figures. It included drawing out one's figures on a piece of paper overtop of a figure eight or serpentine diagram. The paper patch was designed as off-ice training to practice one's figures. The layout papers that were originally provided to the subjects aided them to practice exactly what their figure should look like on the ice (i.e., long and short axis, line up of the sides of the circles, and perfectly round circles).

Original compulsory figure method was as follows

1. Skaters were given paper patch workbooks containing outlines of figures they were currently practicing.
2. Skaters were asked to determine key words to help them concentrate on the correct specific elements of each figure.
3. Skaters traced the figure on paper over the outline in their workbooks while saying keywords out loud, and timing the rehearsal so that it took approximately the same time as actually skating the figure.
4. They performed this activity three times per week as if they were skating in a test situation (three tracings per figure).
5. The skaters were also asked to try to imagine feeling and

seeing the correct response as they were drawing the figures.

6. At the end of the 4-week session, the skaters handed in their workbooks to verify their participation.

Adaptation of Palmer's technique for freestyle skating (PFD)

1. Skaters were asked to list all the elements of their figure skating program out on paper.

2. Skaters were asked to develop cue words (Palmer 1993b). The cue words were designed to help increase attention and concentration and help avoid the skater from being distracted. Cue words are phrases that can be repeated to oneself while skating, help prompt correct positioning and movement (e.g. slow, push, hold, etc.). They also helped the skater concentrate on each specific element of each move, spin, or jump.

3. This simulation needed to be as real as possible, so skaters needed to visualize themselves as if they were at a real competitive setting. They needed to see themselves on the ice, see their own coach at the skating door, see themselves in their own skating costume, and see the judging panel before them. They needed to "feel" themselves skating their own routine to the best of their ability. After skaters had visualized this, they were asked to play their skating music and draw their own routine in the workbook provided, while saying their cue words outloud. Skaters were instructed to be sure to place the moves, jumps, and

spins in their proper placement in the workbook as on the ice surface. The skaters' were asked to play their skating music on a tape recorder while doing this exercise. This helped the skaters' keep the time of their drawing off-ice to the same time or speed that it takes to do it on-ice.

4. After completing their assignment, the skaters dated and signed each worksheet, as well as had their parent or guardian sign and date it. The workbooks were handed in at the second meeting as proof of homework completion.

5. The skaters' were asked to perform their exercise once a day for four weeks. This was to be done in a quiet area of one's home, and was to be performed just before going to sleep.

6. Before going on the ice to compete, the skaters' were asked to perform their assignment one last time. This would help the skater to automatically move towards their performance and serve to relax and improve concentration. This was also an easy way to decrease distraction from their performance to come. (Palmer, 1993b). (See Appendix I for a complete outline of this seminar).

WTF. The WTF intervention was originally called Martin self-talk (stimulus cueing) technique (Palmer 1992, 1993a; Ming 1992; Martin 1993). It was designed to improve skill development on compulsory figures and to produce generalization from practice to competition of compulsory

figures. It consisted of the skater walking out their figure pattern on the floor or going through the movements of the figure in a stationary position.

Original compulsory figure method was as follows

1. Skaters were asked to determine keywords to help them concentrate on the correct specific elements of each figure.
2. During the on-ice practice the skaters used the keywords while performing the figures.
3. They performed this activity "walk out" three times per week as if they were skating in a test situation (three tracings per figure).
4. While doing this the skaters said keywords outloud and were also asked to try to imagine feeling and seeing the correct response as they were drawing the figures.
5. Following each Martin self-talk technique session, the skaters had a witness sign a sheet. The signature sheet was submitted at the end of the 4-week period to verify the subject's participation.

Adaptation of Martin's technique for freestyle skating (WTF)

Steps 1, 2, 4, 5, and 6 were the same as the adaptation of PFD. Only Step 3 was uniquely different as follows:

3. Instead of playing their skating music and drawing their own routine, skaters in the WTF were asked to play their own skating music and walk through their routine on the floor while saying their cue words outloud. Skaters were instructed to be sure to attempt all their moves, jumps, and

spins. (See Appendix J for a complete outline of this seminar).

Stretching

The stretching or control group for this study did not include mental training. Skaters were taught in a 1 hour seminar the benefits of stretching, proper warm-up, and stretching techniques. Subjects were instructed to perform their stretches once each evening, and to have their parents sign their workbooks upon completion of their homework. (See Appendix K for a complete outline of the stretching seminar).

Procedure

Prior to the collection of data, approval was obtained from the Michigan State University Committee of Research Involving Human Subjects (See Appendix L). Prior to this study both the participating figure skating club received complete details of this experiment. The GCFSC provided the researcher with a list of names, skating test levels, addresses, and phone numbers of their clubs skating members. This list helped compose the subject sample for this experiment.

Skating coaches/instructors were mailed permission slips and a brief explanation of the purpose of the study and what they and their students would be doing. (See

Appendix M for a copy of the coaches' first letter of information and consent). The coaches/instructors then signed their permission slip and returned it to the researcher via self addressed stamped envelope (SASE).

Because the subjects were minors, consent forms were mailed to parents or guardians of the skaters. The parent or guardian and the subject signed the forms, and the subjects completed the Off-Ice Skating Training questionnaire enclosed with their consent forms. (See Appendix N for a copy of the parents' first letter of information and consent). Both of these were mailed back to the researcher via SASE.

To participate in this study one needed to do three things: (a) have at least one prior competitive experience; (b) be competing in the Garden City Figure Skating Club's Annual Competition which was March 8, 9, 10, 1996; and (c) not score more than a 4 on a 7-more point scale in any of the intervention areas on the Off-Ice Skating Training questionnaire. A score higher than a 4 indicated that the subject had prior experience with the intervention and was eliminated from this study because she could possibly skew the results. The subjects were eliminated through this process. The subjects who were remaining were placed in piles according to their skating level. To ensure confidentiality, subjects were assigned a name/number combination. Only the subject, parent or guardian and

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principle researcher had access to this information. The subjects were then stratified randomly assigned to one of the three interventions.

Prior to the intervention, coaches were mailed Skaters Performance Evaluations. These evaluations consisted of their skating students' current skating ability relating to other skaters' their own age and skating level. These were completed and mailed to the researcher prior to the intervention seminar. Athletes were mailed another letter explaining in detail the location and time for their intervention seminar. Each intervention had its own separate meeting time. All of the interventions were given at the Log Cabin Community Center in Garden City, Michigan.

When the subjects arrived at the seminar, they were instructed to complete the Michigan Competitive Questionnaire, and Skating Skill Evaluation. They then partook in one of the intervention seminars. These seminars lasted for approximately 90 minutes. At the end of the seminar, subjects were instructed to take their workbooks home with them and to perform their given intervention every evening before going to sleep for 1 month. This took approximately 2 to 5 minutes each night depending on the skater's ability level. Also, to control for contamination, the researcher instructed the subjects not to discuss their seminar and/or show their workbook to anyone except their parent or guardian.

The subjects were telephoned on February 10 which was 2 weeks after their seminar and 2 weeks before their skating competition. All of the subjects were asked the same questions pertaining to their workbook progress. (See Appendix O for a transcription of the phone questions). Skaters were mailed a second letter of information regarding meeting time and place for second session. (See Appendix P for a copy of the skaters second letter of information).

On March 8, 9, and 10, the participants competed at the GCFSC competition. The following day, the coaches were mailed a second package with their students' Skaters Performance Evaluation forms. (See Appendix Q for a copy of the coaches second letter of information). These were completed and mailed back to the researcher.

The subjects then returned to their first meeting place on March 19. At that time the subjects handed in their workbooks, completed the Off-Ice Skating Training, Skating Skill Evaluation, Michigan Competition Questionnaire, and Intervention Effectiveness Questionnaire. The subjects were than debriefed regarding the purpose of this study.

Treatment of the Data

As a method of checking for individual variation, pre-intervention scores were assessed. Pre-intervention differences among groups were examined through separate one-way analyses of variance (ANOVA) for each dependent

variable. No pretreatment differences occurred among the groups on any of the dependent measures. To test the hypotheses a 3 x 2 (Group x pre/post) ANOVA was conducted on each dependent measure. All analyses employed an alpha level of .05.

CHAPTER IV

RESULTS

The purpose of this research was to investigate the effects that selected mental practice techniques had on performance ratings, self-efficacy, and state anxiety in competitive figure skaters. The results of this study have been organized into preliminary and descriptive analyses, performance ratings results, self-efficacy results, and finally state anxiety results. Post hoc analyses, in the event of a significant treatment effect or interaction were conducted using a Tukey WSD procedure (Winer, 1971). All of the results in this chapter are reported at the .05 level of significance.

Preliminary Analyses

A preliminary analysis of the treatment groups was conducted to determine whether there were any significant differences among the pretreatment dependent variables of the groups. One-way ANOVAs were conducted for each of the nine dependent measures. Results indicated no significant differences among the groups for any of the dependent measures. Summary ANOVA tables are contained in Appendix R. The means and standard deviations for all measures, pre and post are contained in Table 1.

Table 1

Pre and Post Means and Standard Deviations for Dependent Variables

		PRE[a]			POST[a]		
Variables		PFD	WTF	STRETCH	PFD	WTF	STRETCH
Performance							
Jumps	M	3.67	3.86	3.87	4.22	4.42	3.90
	SD	1.64	1.24	1.77	1.34	1.15	1.77
Spins	M	3.82	3.88	3.78	4.00	4.22	3.67
	SD	1.29	1.11	1.77	.94	.86	.85
Moves	M	3.31	3.38	3.27	4.29	4.50	4.00
	SD	.88	.86	.77	1.43	1.19	1.63
Self-Efficacy							
Jumps	M	42.67	44.89	46.78	54.89	63.67	59.00
	SD	17.84	19.44	19.72	19.67	15.87	30.35
Spins	M	66.67	53.44	60.78	69.33	72.33	63.33
	SD	23.10	22.81	28.24	18.55	18.89	28.03
Moves	M	58.56	51.78	53.67	61.89	60.11	54.11
	SD	28.76	30.02	33.69	31.39	25.12	33.77
CSAI-2							
Cognitive	M	20.44	20.89	24.11	16.89	16.56	21.56
	SD	6.93	7.88	4.91	5.11	5.41	8.50
Somatic	M	21.22	22.22	22.78	17.78	17.33	21.00
	SD	6.76	6.72	8.03	5.74	3.77	7.87
Confidence	M	21.44	22.56	20.56	25.56	28.00	21.00
	SD	6.54	4.72	8.19	6.79	4.06	6.63

[a] $n = 9$ for each group.

There were three manipulation checks designed for this study. The manipulation checks consisted of (a) determining, with the Off-Ice Skating Training questionnaire, whether or not skaters were already using the intervention techniques prior to treatment and that skaters only used the techniques they were taught; (b) determining, with the Intervention Effectiveness Questionnaire, how often skaters practiced imagery, used imagery, and how helpful they thought their intervention was; and (c) a procedural reliability check of faithfulness to their homework assignments.

The first manipulation check, using the Off-ice skating training questionnaire, was designed as both a pre and post treatment measure. This questionnaire included six different off-ice skating training items which were goal setting, stretching, dance class, walking-out skating routine, muscle relaxation, and drawing skating routine. Skaters rated how often they engaged in these skills. The pretreatment scores for walk-out skating routine and drawing skating routine were examined to determine whether any skaters used either mental practice technique five or more times per week. Two of the skaters did so. Of the remaining skaters, the highest response reported was 3 to 4 times per week. Seven skaters reported using WTF 3 to 4 times per week and two skaters reported using PFD 3 to 4 times per week.

To determine whether skaters used only the technique they were taught, a separate score was computed for stretching, walking-out routine, and paper freestyle drawing and analyzed separately within a 3 X 2 (Group X Pre/Post) ANOVA with repeated measure on the last factor. Also, means and standard deviations were calculated for the entire questionnaire, and are located in Table 2.

The ANOVA results for each of the three intervention area of skills indicated significant effects for group, pre/post, and group by pre/post interactions. A summary table of these ANOVA analyses on the Off-Ice Skating Training Questionnaire are contained in Appendix R.

Post hoc analyses for the question on, stretching, indicated that only the stretching group significantly increased their use of stretching practice training and also used stretching techniques significantly more than the other two groups at post test. Post hoc analyses for the question on, walking out routine, indicated that only the WTF group significantly increased their use of WTF practice training and also used WTF techniques significantly more than the other two groups at post test. Post hoc analyses for the item on, drawing out routine, indicated that only the PFD group significantly increased their use of PFD practice training and also used PFD techniques significantly more than the other two groups at post test. These results insured that treatment integrity was considered present.

Table 2

Pre and Post Means and Standard Deviations for Off-Ice Skating Training Questionnaire

		PRE[a]			POST[a]		
Variables		PFD	WTF	STRETCH	PFD	WTF	STRETCH
Goal Setting	M	1.33	1.89	1.00	1.67	2.11	1.67
	SD	.87	1.36	1.00	1.22	1.54	1.41
Stretching	M	1.33	1.44	1.11	1.56	2.00	3.89
	SD	1.41	1.33	1.27	1.51	1.50	.33
Dance Class	M	.56	.78	.33	.56	.67	.44
	SD	.73	.67	.50	.73	.71	.53
Walking out routine	M	.89	1.33	.89	.89	4.00	1.00
	SD	.60	.71	.78	.60	.00	.71
Muscle Relax	M	1.00	1.11	.56	1.11	1.22	.44
	SD	1.41	1.54	.88	1.36	1.56	.73
Drawing out routine	M	.22	.56	.67	4.00	.56	.67
	SD	.44	.53	1.00	.00	.53	.87

[a]n = 9 for each group.

The Intervention Effectiveness Questionnaire consisted of seven questions, divided into three sections (a) imagery practice (one item), (b) imagery effectiveness (five items), and (c) intervention helpfulness (one item). This questionnaire was designed to assess the skaters' use of their workbooks, imagery, and helpfulness of intervention. (See Appendix E for a copy of the Intervention Effectiveness Questionnaire.)

A separate score was computed for each of the three sections of this questionnaire which were analyzed separately within a one-way ANOVA. The ANOVA summary table is contained in Appendix R. Means and standard deviations are contained in Table 3.

The first section of this questionnaire consisted of one question which dealt with the skaters' imagery practice. The question specifically asked the skater "How many times did you practice your imagery during your skating homework assignment?" ANOVA results indicated a significant main effect for group. Post hoc analysis indicated that the PFD and WTF groups were significantly higher than the stretching group in use of imagery practice. In fact, none of the stretching skaters indicated that they practiced imagery.

The second section of this questionnaire consisted of five questions that measured the effectiveness of the skaters' imagery. These questions were scored on a 7-point Likert scale of 1 (rarely used imagery) to 7 (used imagery

Table 3

Means and Standard Deviations for Intervention Effectiveness Questionnaire

Variables		PFD[a]	WTF[a]	STRETCH[a]
Imagery Practice	M	29.56	28.33	.001
	SD	.88	2.18	.001
Imagery Effectiveness	M	27.33	27.11	.001
	SD	2.29	2.20	.001
Intervention Helpfulness	M	4.00	3.78	3.56
	SD	.01	.44	.53

[a]n = 9 for each group.

often) and summed for a single score. ANOVA results indicated a significant main effect for group. Again, none of the stretching skaters indicated use of imagery.

The third area of this questionnaire consisted of one question which dealt with the interventions effectiveness, rated on a 4-point Likert scale of 1 (not at all helpful) to 4 (very helpful). This question specifically asked the subject "How would you rate the helpfulness of your intervention to your skating routine?" ANOVA results revealed only a trend toward significance ($p < .08$). The PFD group thought their treatment was slightly more effective than what the stretching group thought. In fact, there was no variance in responses among the PFD group. All skaters in this group reported that they thought the intervention was very helpful.

The stretching, PFD, and WTF workbooks were designed as a procedural check to see how often the skaters performed the intervention to which they were randomly assigned. Procedural reliability appeared intact. Skaters were called 2 weeks after the start of this experiment and all reported they were doing their homework. Parents were also asked to sign and date their child's workbook daily to show completion of this work being done daily. Furthermore, an examination of the submitted workbooks showed that all were completed.

Descriptive Statistics

In examining the pretreatment subjective performance ratings, contained in Table 1, coaches rated skaters as slightly above average. Coaches rated skaters highest for spins, and lowest for connecting moves. (Mean scores for groups ranged from 3.27 to 3.88).

Pretreatment self-efficacy scores show that the skaters had moderate self-efficacy. Self-efficacy was highest for spins and lowest for jumps.

For pretreatment cognitive state anxiety scores, the skaters' cognitive state anxiety and confidence appeared to be average, and their somatic anxiety appeared to be high, compared to the published norms for the CSAI-2 which are M = 21.61 (SD = 6.77) for cognitive anxiety, M = 18.92 (SD = 5.97) for somatic anxiety, and M = 22.50 (SD = 5.51) for confidence (Martens, et al., 1990).

Pearson Correlations were analyzed for both pre and post intervention training to see if correlations existed between performance, self-efficacy, and state anxiety. These are contained in Appendix S. All three performance scores correlated significantly with each other with jumps and spins correlating the highest. The correlation between jump performance and spin performance was r=.86 (p=.001) for the pre test and r=.85 (p=.001) for the post test. All three self-efficacy scores correlated significantly with each other with moves and spins correlating the highest.

The correlation between spin self-efficacy and move self-efficacy was r=.82 (p=.001) for pretest and r=.80 (p=.001) for posttest.

Strangely, only spin self-efficacy and spin performance significantly correlated r=.51 (p=.007) with each other on pretest and jump self-efficacy and spin self-efficacy correlated r=.59 (p=.001) with their respective performance measures on posttest.

Two of the CSAI-2 state anxiety scores correlated negatively with each other on both pre and post, and cognitive anxiety and somatic anxiety correlated very high. The correlation between somatic anxiety and cognitive anxiety was r=.73 (p=.001) for the pre test and r=.79 (p=.001) for the post test. Cognitive anxiety and confidence showed a correlation of r=-.47 (p=.014) for the pretest and r=-.63 (p=.001) for the post test. The correlation between somatic anxiety and confidence was r= -.66 (p=.000) for pretest and r=-.55 (p=.003) for posttest.

Skaters' Performance Ratings

The first hypothesis stated that the mental practice treatments improve the subjective ratings of figure skaters' performance compared to a no mental practice control group. The subjective ratings of performance were determined by the skaters' coaches/instructors. (See Appendix A for a copy of

the Skaters' Performance Evaluation forms). Performance ratings were computed for each of the performance areas of jumps, spins, and steps/connecting moves and were each analyzed separately within a 3 X 2 (Group X Pre/Post) ANOVA with repeated measures on the last factor. (These are contained in Table 4).

The ANOVA results for jumping, spinning, and connecting move performance all indicated a significant effect for pre/post differences and for group by pre/post interactions. Skaters' performance in their jumping, spinning, and connecting moves significantly increased across the 4 weeks.

Post hoc analyses indicated that the PFD and WTF groups significantly improved their jumping performance compared to the stretching group over the course of the treatment. This interaction is illustrated in Figure 1. The two mental practice treatment groups also significantly improved in their spinning performance. This interaction is illustrated in Figure 2.

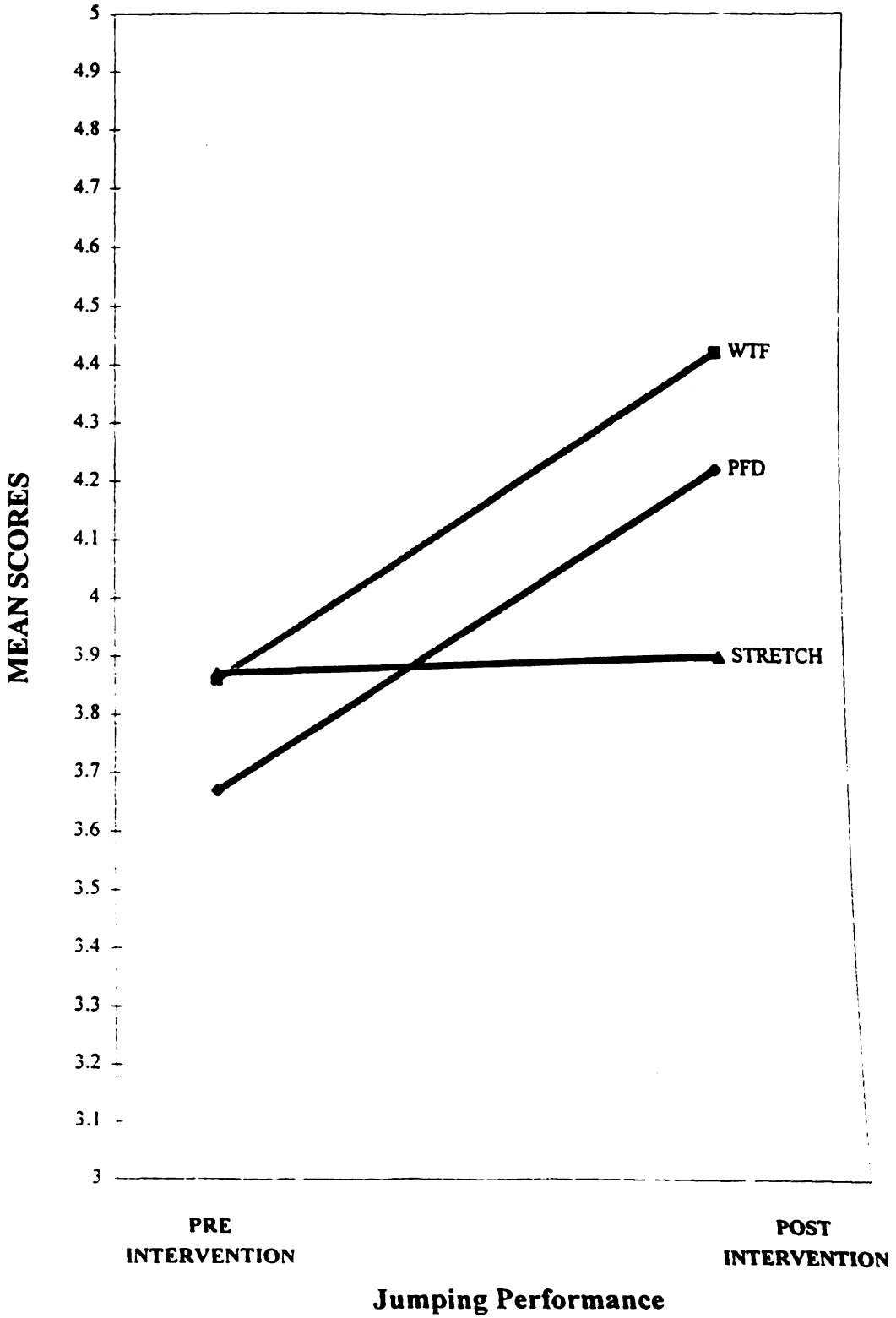
Although all three groups significantly improved in their connecting move performances, the PFD (ES = 1.11) and WTF (ES = 1.30) groups showed greater improvement than the stretching group (ES = .95). This interaction is illustrated in Figure 3. Therefore, the results supported the first hypothesis. A summary table of all ANOVA analyses on skaters' performance are contained in Appendix R.

Table 4

Summary Table of Repeated Measure ANOVAs For Dependent Variables (3 X 2) (Group X Pre/Post)

DEPENDENT VARIABLES	df	MS	F	p
Performance Jump				
Intervent	2	85.91	.07	.928
Pre/Post	1	498.07	33.78	.000
Intervent by Pre/Post	2	107.02	7.26	.003
Within cells error	24	14.75		
Performance Spin				
Intervent	2	43.85	.12	.891
Pre/Post	1	249.19	74.04	.000
Intervent by Pre/Post	2	20.52	6.10	.007
Within cells error	24	3.37		
Performance Move				
Intervent	2	10.91	.31	.734
Pre/Post	1	140.17	67.88	.000
Intervent by Pre/Post	2	7.39	3.58	.044
Within cells error	24	2.06		
Self-Efficacy Jump				
Intervent	2	147.24	.20	.824
Pre/Post	1	2812.24	21.86	.000
Intervent by Pre/Post	2	64.46	.50	.611
Within cells error	24	128.18		
Self-Efficacy Spin				
Intervent	2	186.46	.18	.837
Pre/Post	1	872.02	12.36	.002
Intervent by Pre/Post	2	397.46	5.64	.010
Within cells error	24	70.52		
Self-Efficacy Move				
Intervent	2	187.91	.10	.903
Pre/Post	1	220.02	5.73	.025
Intervent by Pre/Post	2	71.69	1.87	.177
Within cells error	24	38.42		
CSAI-2 Cognitive				
Intervent	2	102.80	1.33	.283
Pre/Post	1	163.63	16.15	.001
Intervent by Pre/Post	2	3.57	.35	.706
Within cells error	24	10.13		
CSAI-2 Somatic				
Intervent	2	30.72	.38	.688
Pre/Post	1	153.35	21.36	.000
Intervent by Pre/Post	2	10.91	1.52	.239
Within cells error	24	7.18		
CSAI-2 Confidence				
Intervent	2	92.46	1.29	.293
Pre/Post	1	150.00	18.98	.000
Intervent by Pre/Post	2	30.17	3.82	.036
Within cells error	24	7.90		

Figure 1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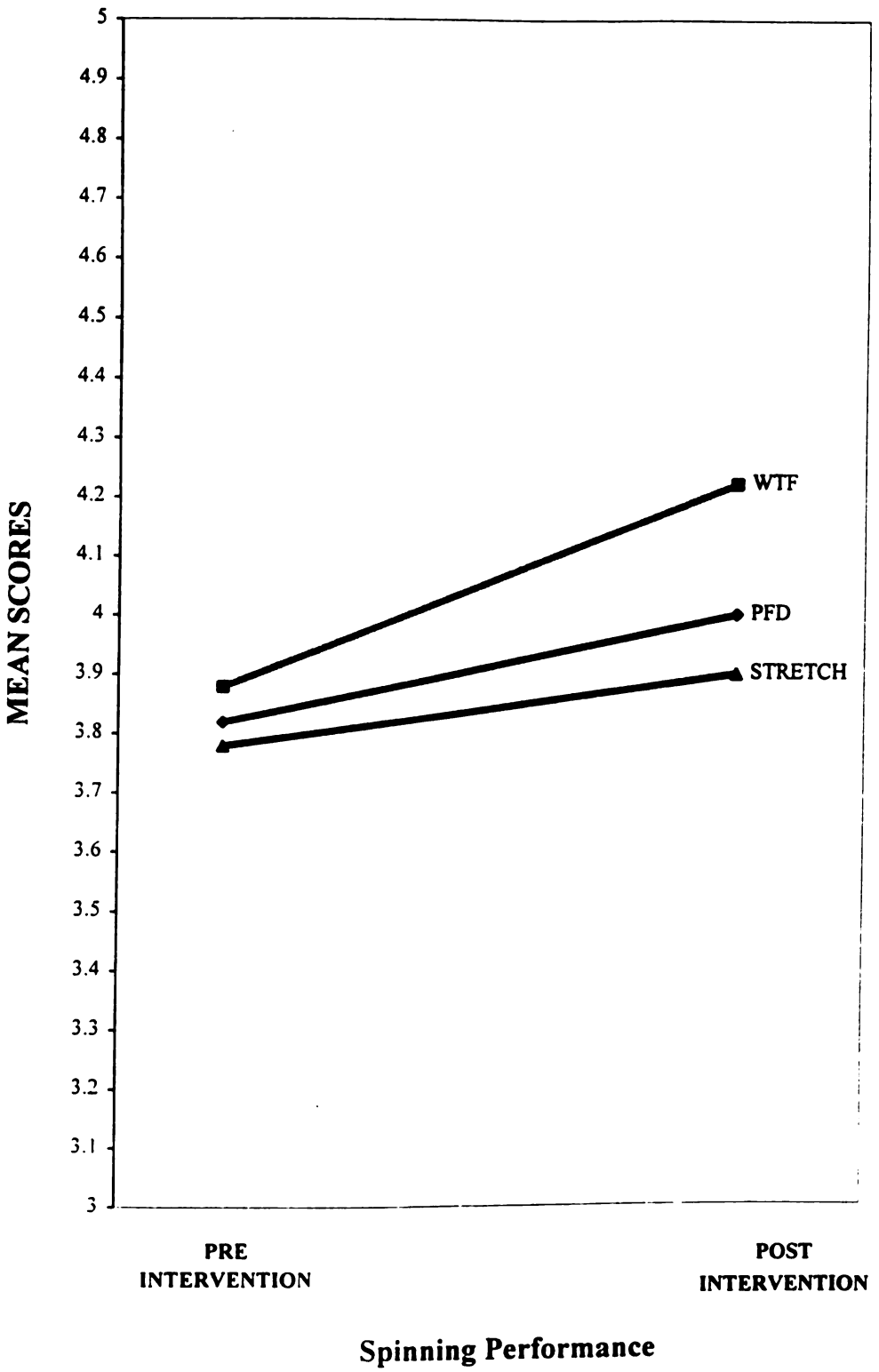
MEAN SCORES
WTF
PFD
STRETCH
PRE INTERVENTION
POST INTERVENTION
Jumping Performance

Figure 2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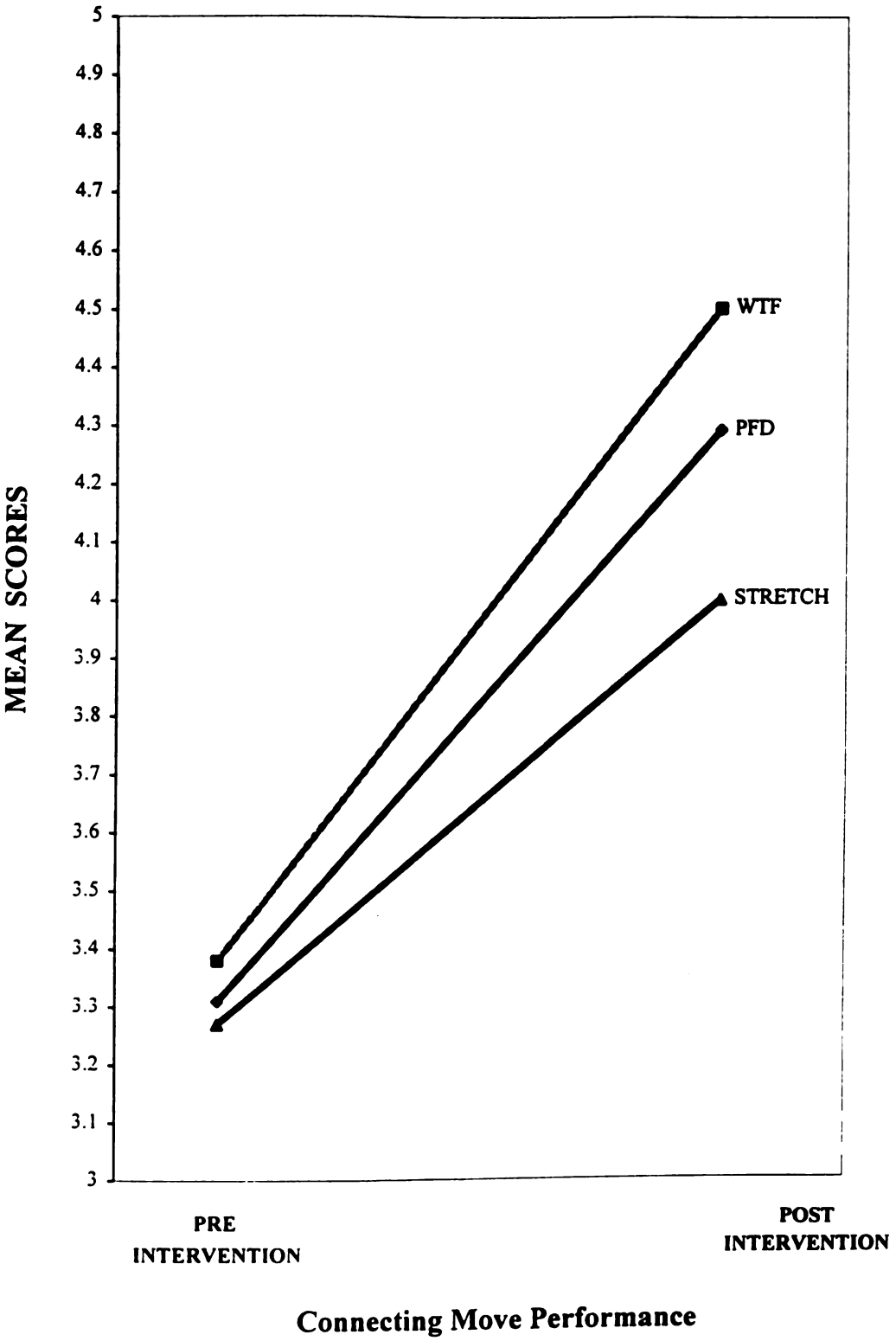
PFD
STRETCH
PRE INTERVENTION
POST INTERVENTION
Spinning Performance

Figure 3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MEAN SCORES
WTF
PFD
STRETCH
PRE
INTERVENTION
POST
INTERVENTION
Connecting Move Performance

Skaters' Self-Efficacy

The second hypothesis stated that the mental practice treatments improve the self-efficacy of figure skaters compared to a no mental practice control group. A questionnaire called the Skating Skill Evaluation was used for skaters to assess their own current skating self-efficacy in the areas of jumps, spins, and connecting moves (See Appendix B for a copy of the Skating Skill Evaluation questionnaire). This task-specific measure of self-efficacy asked the skater to indicate the strength of her belief in correctly performing her most difficult jump, spin, and connecting move. A score was computed for each of the three areas and analyzed separately within a 3 X 2 (Group X Pre/Post) ANOVA with repeated measures on the last factor. These are contained in Table 4.

The ANOVA results for self-efficacy jump and self-efficacy move indicated a significant effect for pre/post differences only. However, the WTF group had a stronger effect size for self-efficacy in jumps (ES = .97), spins (ES = 83) and connecting moves (ES = .28) compared to the self-efficacy of the PFD group in jumps (ES = .68), spins (ES = .12) and connecting moves (ES = .12). The effect sizes for both intervention groups are much higher (pre to post) than the stretching control group in jumps (ES = .62), spins (ES = .09) and connecting moves (ES = .01).

Results for self-efficacy spin indicated significant

effects for pre/post differences and a group by pre/post interaction. Post hoc analyses indicated that only the WTF group significantly improved their spin self-efficacy compared to the PFD and stretching groups over the course of the treatment. This interaction is illustrated in Figure 4. Therefore, the results partially supported the second hypothesis.

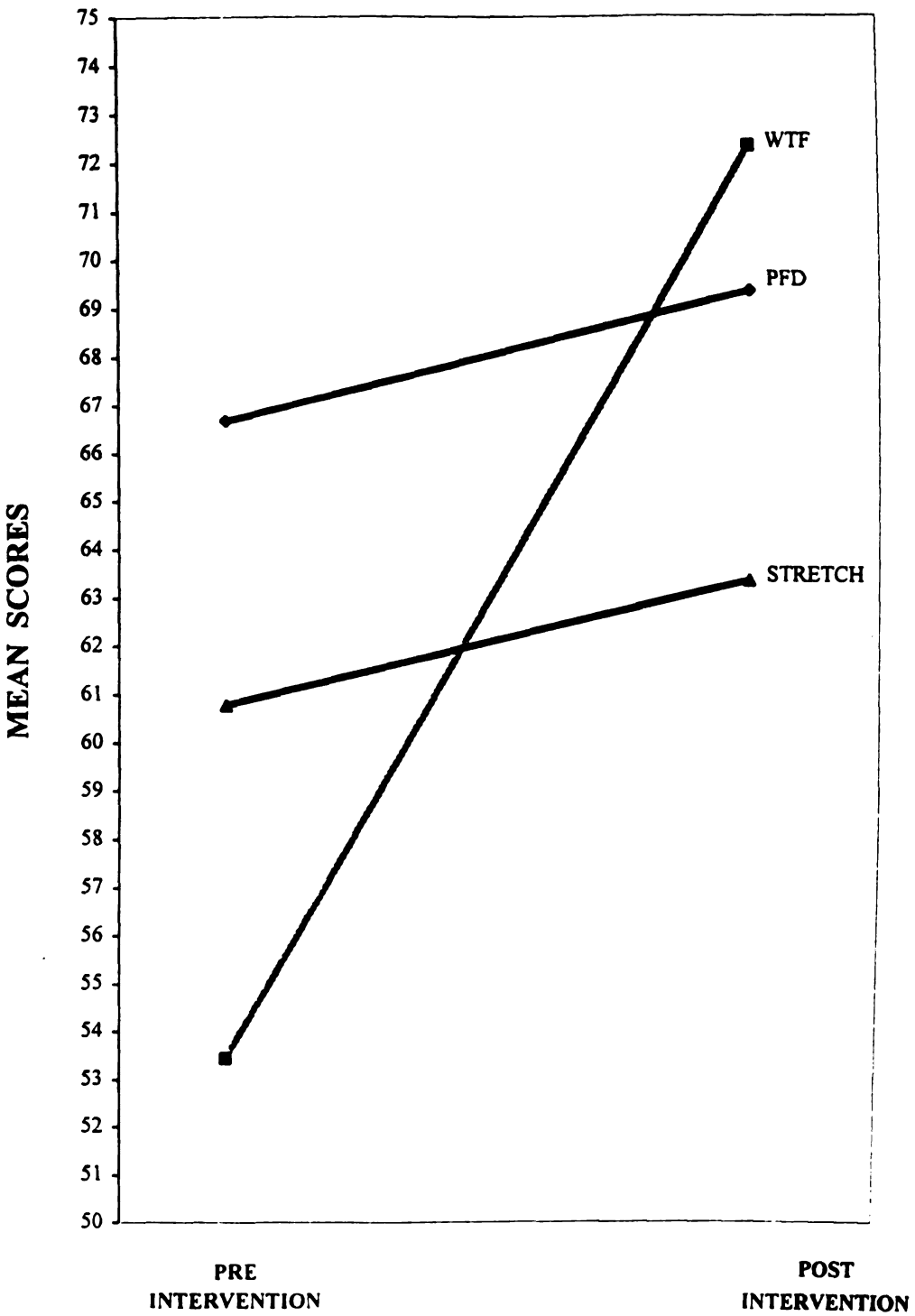
Skaters' State Anxiety

The third hypothesis stated that the mental practice treatments improve the state anxiety of figure skaters compared to a no mental practice control group. The CSAI-2 (Martens, Vealey, & Burton, 1990) was used to measure skaters cognitive anxiety, somatic anxiety, and confidence. A score was computed for each of the three areas and were each analyzed separately within a 3 X 2 (Group X Pre/Post) ANOVA with repeated measures on the last factor. (These are contained in Table 4).

The ANOVA results for cognitive and somatic anxiety indicated a significant effect for pre/post differences only. Skaters' cognitive and somatic anxiety significantly decreased across the 4 weeks, although for somatic anxiety the WTF showed a stronger effect size (ES = .73) than did the PFD group (ES = .51) and stretching group (ES = .22).

The ANOVA results for the confidence subscale of the CSAI-2 also indicated a significant effect for pre/post.

Figure 4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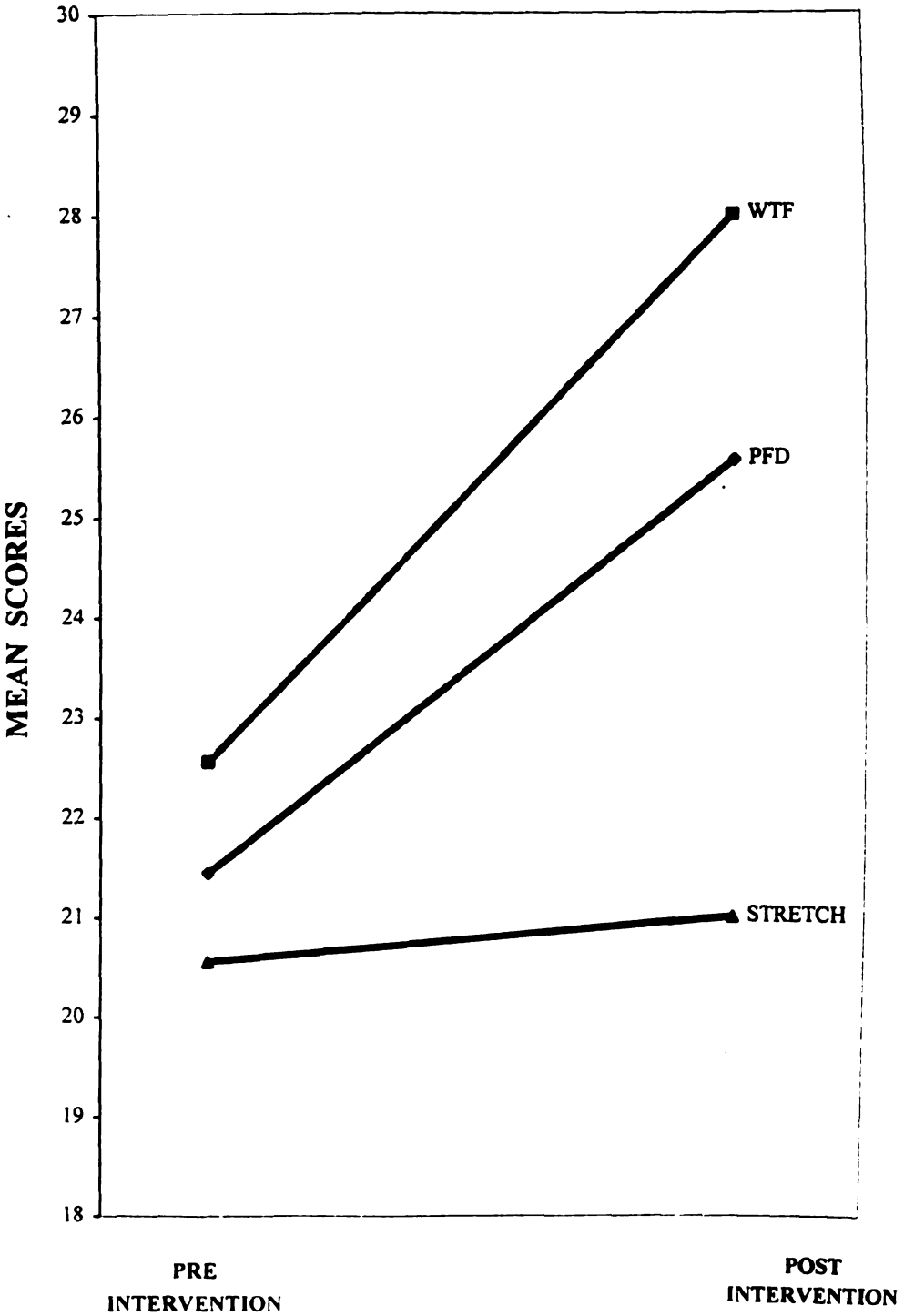
MEAN SCORES
WTF
PFD
STRETCH
PRE
INTERVENTION
POST
INTERVENTION
Self-Efficacy Spin

However, a significant Group X Pre/Post interaction superseded this main effect. Post hoc analyses indicated that the PFD and WTF groups significantly improved their confidence compared to the stretching group over the course of the treatment. Moreover the WTF group had a stronger effect size (ES = 1.15) than the PFD group (ES = .63) and control stretching group (ES = .05). This interaction is illustrated in Figure 5. Because self-confidence cannot really be considered the same concept as "non-anxiety" (Bandura, 1986), the results do not support the third hypothesis.

Comparison of WTF and PFD

The forth hypothesis stated that there were no differences between the WTF and PFD methods on performance, self-efficacy and state anxiety. From the preceding analyses, results indicated partial support for the null hypothesis. In terms of performance and anxiety, there were no differences between the WTF and PFD. However, in terms of self-efficacy, the WTF was significantly more effective than PFD in raising self-perceptions for spins. Furthermore, even though this was the only significant difference between the WTF and PFD, the WTF had stronger effect sizes than the PFD in connecting move performance, jumping, spinning, and connecting move efficacy, and self-confidence on the CSAI-2.

Figure 5



CSAI-2 Confidence

CHAPTER V

DISCUSSION AND CONCLUSIONS

This chapter has been organized into three sections. The first section presents a discussion of this study and its findings. The second section states the conclusions of this investigation, while the third section offers implications and suggestions for future research.

Discussion

The purpose of this experiment was to investigate the effects that the two selected mental practice groups (PFD and WTF), and a no mental practice control group (stretching) had on performance, self-efficacy, and state anxiety of competitive figure skaters. Contrary to Palmer's (1992) findings, both mental practice techniques "paper drawing, and walk out" showed significant improvements compared to a stretching control on skating performance, self-efficacy, and self-confidence. Palmer (1992) found only significant improvements for the paper drawing intervention.

Martin (1993) criticized Palmer's (1992) study for her methodology. Specifically he stated that Palmer's study (a) did not include all of the components of his procedure and (b) lacked procedural reliability assessments. The present study included detailed seminar outlines to be sure that all

components were used correctly. Both mental practice intervention seminars and workbooks were similar in design and only the intervention portion was different.

The present study also contained rigorous procedural reliability checks. Procedural reliability was evident in the present study because (a) the investigator used workbooks to insure the skaters were performing the intervention in which they were randomly assigned; (b) skaters used keywords to help them focus on the positive and present moment; (c) the intervention practice was conducted with skating music to ensure correct timing and; (d) the investigator made phone calls to skaters two weeks into this experiment to check that homework was being completed. These procedures help support Martin's (1993) belief that in order to have an effective strategy one must use the correct procedures. Procedural reliability that was present throughout this study added rigor to both mental practice techniques.

This study also contained a placebo control group which was lacking in Palmer's (1992) study. The control group learned proper stretching techniques. The subjects were given a seminar, a workbook, and a flexibility sit-and-reach test both pre and post intervention.

A major difference between the present study and Palmer's 1992 study was that Palmer used compulsory figures; whereas the present study used free skating performance.

Her finding, that the walk-out technique did not show performance improvements may be due to the difference in how the physical movements that occur in compulsory figures (e.g., turns and loops) are felt off the ice versus on the ice (Palmer 1992). In other words, the walk-out technique may have used different movements than the on-ice practice. In the present study, the WTF mental practice technique actually showed slightly stronger effects than the PFD mental practice technique on performance and self-efficacy. This may be because the WTF mental practice technique used kinesthetic movements (floor movements); whereas, the PFD mental practice technique used a hand motor response (drawing of ones skating routine). Therefore, the physical movements of the WTF were more similar to, and representative of, optimal freestyle figure skating routine. This supports past research by Rodgers, Hall, & Buckolz (1991) who examined relationships between physical practice and imagery in figure skating performance. They found that skaters who could "feel" or kinesthetically imagine themselves freestyle skating were more successful at completing their program elements than those who did not.

Palmer's study measured only skating performance; whereas, the present study also measured self-efficacy and the CSAI-2 measure of state anxiety and self-confidence. This study supports research showing the effectiveness of mental and physical practice on self-efficacy expectation

(Feltz & Riessinger, 1990; Martin & Hall 1995) and confirms that mental practice is an effective way of improving ones performance and self-efficacy (Feltz & Doyle, 1981; Feltz & Weiss, 1982).

The present study showed that of the three areas measured for self-efficacy -jumps, spins, and connecting moves- only self-efficacy spin had significant results. A tentative explanation for lack of significant findings in self-efficacy jumps and connecting moves may be that the skaters' past performances or experiences influenced their self-efficacy ratings (Bandura, 1977). Regardless of type of intervention, skaters had more opportunity to perform jumps and connecting moves than they did spins. A typical performance routine has only three spins compared to seven jumps and connecting moves throughout one's routine. Therefore, the skaters' belief in their capacity to execute jumps and connecting moves were based more on physical performance than on their intervention experience.

The present study showed that of the CSAI-2 (Martens, et al., 1990) measures for state anxiety only self-confidence showed in a significant interaction between groups from pre-to-post-intervention. A possible explanation for the lack of significant interactions for somatic and cognitive anxiety may be that the CSAI-2 in this experiment was not assessed just prior to skating competitions. One's anxiety level may not have been

experienced at the time that the questionnaire was issued even through skaters were asked to imagine themselves being just prior to competition.

Another tentative explanation for the inability to determine significant differences in both cognitive and somatic anxiety may be due to lack of power necessary for determining significant effects. The power of a test is determined by the probability of rejecting the null hypothesis. Power in the present study, may have been low due to the small cell size (n = 9). In terms of power, the larger the sample size the smaller the sampling fluctuation of a statistic (e.g., standard error). By increasing the sample size, the standard error of the sampling distribution is reduced; in addition, the power to detect significant effects is increased. Therefore, significant experimental effects could have been increased if the total sample size (N = 27) was increased.

Conclusions

Based upon the findings and within the limitations of this study, the following conclusions were reached:

1. The two mental practice treatment groups improved in their performance of their jumps, spins, and connecting moves compared to the stretching control group.

2. The WTF mental practice treatment group improved in their spinning self-efficacy compared to the PFD mental practice treatment and the stretching control group.

3. The two mental practice treatment groups improved in their self-confidence as measured by the CSAI-2 compared to the stretching control group.

Suggestions for Future Research

Several suggestions concerning future research on mental practice can be stated. Research should be conducted using similar procedures like WTF and PFD to enhance individual activities/sports that have predesigned routines like figure skating. These could include gymnastics floor and beam routines, synchronized swimming, and dance routines.

Secondly, regarding sample size, the relatively small number of subjects (N = 27) could have masked any significant effects for cognitive anxiety and somatic anxiety. Therefore, the sample size per treatment condition should be tripled (n = 27) in order to increase power to approximately 80% (Kramer & Thiemann, 1987).

The third recommendation would be to employ mental practice techniques along with the use of cognitive restructuring. This would support past researchers (Hall & Erffmeyer 1983; Kendall, Hrycaiko, Martin, & Kendall, 1990; Straub, 1989; Wrisberg & Anshel, 1989,) who have found that

packaged mental training programs that include mental practice and cognitive restructuring implemented with athletes over a period of time have been known to enhance sport performance.

The final recommendation would be to investigate the use of these mental practice techniques on athletes who are injured. Past research has found those who used mental practice had remarkable recoveries from injury and quick returns to their former skill level (Asken & Goodling, 1986; Lazarus, 1979; Moss, 1979; Romero & Silvestri, 1990).

APPENDICES

APPENDIX A

Skaters Performance Evaluation

PLEASE CIRCLE ONLY ONE ANSWER

How good is _____ skating performance compared to others of the same age and skating level.

Skaters current competitive level: Preliminary Pre-Juvenile Juvenile

Intermediate Novice

JUMPS:	**Never Tried Before**	**Never Completed Successfully**	**Inferior Ability**	**Below Average Ability**	**Average Ability**	**Above Average Ability**	**Exceptional Ability**
Waltz Jump	n/a	1	2	3	4	5	6
Salchow	n/a	1	2	3	4	5	6
Loop	n/a	1	2	3	4	5	6
Flip	n/a	1	2	3	4	5	6
Waltz-toe loop	n/a	1	2	3	4	5	6
Lutz	n/a	1	2	3	4	5	6
Combination Jump with loop	n/a	1	2	3	4	5	6
Axel	n/a	1	2	3	4	5	6
Split Jump, stag, half-loop, or falling leaf	n/a	1	2	3	4	5	6
Combination two single jumps	n/a	1	2	3	4	5	6
Double Salchow	n/a	1	2	3	4	5	6
Combination one single/double jump	n/a	1	2	3	4	5	6
Double toe loop	n/a	1	2	3	4	5	6
Double loop	n/a	1	2	3	4	5	6
Double Flip	n/a	1	2	3	4	5	6
Double Lutz	n/a	1	2	3	4	5	6

SPINS:	**Never Tried Before**	**Never Completed Successfully**	**Inferior Ability**	**Below Average Ability**	**Average Ability**	**Above Average Ability**	**Exceptional Ability**
1 foot upright spin	n/a	1	2	3	4	5	6
1 foot back spin	n/a	1	2	3	4	5	6
Sit spin	n/a	1	2	3	4	5	6
Camel	n/a	1	2	3	4	5	6
Layback or attitude	n/a	1	2	3	4	5	6
Camel - sit (same foot)	n/a	1	2	3	4	5	6
Change foot upright	n/a	1	2	3	4	5	6
Camel-sit (Change foot)	n/a	1	2	3	4	5	6

	Never Tried Before	Never Completed Successfully	Inferior Ability	Below Average Ability	Average Ability	Above Average Ability	Exceptional Ability
Sit-change sit	n/a	1	2	3	4	5	6
Camel-change camel	n/a	1	2	3	4	5	6
<u>Steps/Connecting Moves:</u>							
Forward Spiral	n/a	1	2	3	4	5	6
Footwork	n/a	1	2	3	4	5	6
Backward Spiral	n/a	1	2	3	4	5	6
Inside spread eagle	n/a	1	2	3	4	5	6
Outside spread eagle	n/a	1	2	3	4	5	6

Attached you will find explanations of the terminology for the Skater's Performance Evaluations. Please use it as a guide to help you fill out your students' questionnaires.

Jumps

1. Never Completed Successfully - never landed on one foot

2. Inferior Ability - Fully rotated, lands about 2 of 10

3. Below Average Ability - lands about 4 of 10

4. Average - lands about 6 of 10

5. Above Average Ability - lands about 8 of 10

6. Exceptional Ability - lands about 10 of 10

Spins

1. Never Completed Successfully - not in correct body position, no timing to spin, rotates only one or two times.

2. Inferior Ability - not in correct body position, holds for two or three times, out of control.

3. Below Average Ability - sometimes in correct body position, but traveling, and only two or three rotations.

4. Average Ability - Majority of the time in correct body position, in control, centered and holds for students skating levels correct number of rotations.

5. Above Average Ability - good speed throughout spin, in control of body positions, centered and holds for longer than skating levels, correct number of rotations.

6. Exceptional Ability - great speed throughout spin, always in control of body positions, centered and holds for a long time, and good edge quality.

Connecting Moves

1. Never Completed Successfully - not in correct body position, holds for very short period of time, out of control.

2. Inferior Ability - coming closer to correct body positioning sometimes, no speed, holds for short period of time.

3. Below Average Ability - correct body position, but slow in speed, and does not hold for very long.

4. Average Ability - majority of the time in control, holds for long period of time, correct body positioning.

5. Above Average Ability - good speed, holds for correct length of time for levels expectations, good body positioning, and in control.

6. Exceptional Ability - great speed, edge quality, holds for extensive period of time, great body positioning, and always in control.

APPENDIX B

Skating Skill Evaluation

Directions: Please circle the one number regarding the skill above. PLEASE CIRCLE THE NUMBER -- DO NOT MARK BETWEEN THE NUMBERS.

I. What is the most **difficult** jump or combination jump **in your skating routine**? Fill in element _____

Regarding the skill above, how confident are you that you will be able to perform this element correctly --

	I'm certain I can't do this				I'm moderately certain I can do this						I'm very certain I can do this
1. at least 1 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
2. at least 2 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
3. at least 3 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
4. at least 4 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
5. at least 5 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
6. at least 6 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
7. at least 7 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
8. at least 8 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
9. at least 9 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
10. at least 10 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10

II. What is the most **difficult** spin or combination spin **in your skating routine**? Fill in element _____

Regarding the skill above, how confident are you that you will be able to perform this element correctly --

	I'm certain I can't do this				I'm moderately certain I can do this						I'm very certain I can do this
1. at least 1 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
2. at least 2 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
3. at least 3 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
4. at least 4 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
5. at least 5 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
6. at least 6 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
7. at least 7 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
8. at least 8 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
9. at least 9 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
10. at least 10 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10

III. **What is the most difficult connecting move in your skating routine?** Some **examples could be: spread eagle, bauer, forward spiral, or footwork.**
Fill in element _____

Regarding the skill above, how confident are you that you will be able to perform this element correctly --

	I'm certain I <u>can't</u> do this				I'm <u>moderately</u> certain I can do this				I'm very certain I <u>can</u> do this		
1. <u>at least</u> 1 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
2. <u>at least</u> 2 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
3. <u>at least</u> 3 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
4. <u>at least</u> 4 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
5. <u>at least</u> 5 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
6. <u>at least</u> 6 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
7. <u>at least</u> 7 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
8. <u>at least</u> 8 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
9. <u>at least</u> 9 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10
10. <u>at least</u> 10 of 10 attempts?	0	1	2	3	4	5	6	7	8	9	10

APPENDIX C

MICHIGAN COMPETITION QUESTIONNAIRE

Try to imagine that you are to compete in a competition next week. Close your eyes and try to visualize yourself as clearly as possible while preparing to skate in that particular environment and condition. Once you can vividly imagine yourself at that competition, open your eyes and read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now. There are no right or wrong answers. Do not spend too much time on any one statement, but chose the answer which describes your feelings at that time.

PLEASE CIRCLE THE NUMBER -- DO NOT MARK BETWEEN THE NUMBERS

	Not At All	Somewhat	Moderately So	Very Much So
1. I am concerned about this competition	1	2	3	4
2. I feel nervous	1	2	3	4
3. I feel at ease	1	2	3	4
4. I have self-doubts	1	2	3	4
5. I feel jittery	1	2	3	4
6. I feel comfortable	1	2	3	4
7. I am concerned that I may not do as well in that competition as I could have	1	2	3	4
8. My body feels tense	1	2	3	4
9. I feel self-confident	1	2	3	4
10. I am concerned about losing	1	2	3	4
11. I feel tense in my stomach	1	2	3	4
12. I feel secure	1	2	3	4
13. I am concerned about choking under pressure	1	2	3	4
14. My body feels relaxed	1	2	3	4
15. I'm confident I could meet the challenge	1	2	3	4
16. I'm concerned about performing poorly	1	2	3	4
17. My heart is racing	1	2	3	4

	Not At All	Somewhat	Moderately So	Very Much So
18. I'm confident about performing well	1	2	3	4
19. I'm concerned about reaching my goal	1	2	3	4
20. I feel my stomach sinking	1	2	3	4
21. I feel mentally relaxed	1	2	3	4
22. I'm concerned that others would be disappointed with my performance	1	2	3	4
23. My hands are clammy	1	2	3	4
24. I'm confident because I mentally pictured myself reaching my goal	1	2	3	4
25. I'm concerned that I would not be able to concentrate	1	2	3	4
26. My body feel tight	1	2	3	4
27. I'm confident of coming through under pressure	1	2	3	4

APPENDIX D

Off-Ice Skating Training

In a typical week, how many times a week do you usually perform the following:

PLEASE CIRCLE ONLY ONE RESPONSE

1. Goal Setting

Never 1-2 3-4 5-6 7-more

2. Stretching at home for approximately 20 minutes

Never 1-2 3-4 5-6 7-more

3. Attend an off ice dance class

Never 1-2 3-4 5-6 7-more

4. Walking out your entire skating routine on the floor

Never 1-2 3-4 5-6 7-more

5. Muscle Relaxation (tensing and relaxing specific body parts)

Never 1-2 3-4 5-6 7-more

6. Drawing out your entire skating routine on paper

Never 1-2 3-4 5-6 7-more

APPENDIX E

Intervention Effectiveness Questionnaire

You were to perform your homework 30 times. For question #1 answer from 1 - 30 how many times you performed the following questions. Please write the number on the line below the question.

1. How many times did you practice your imagery during your skating homework assignment?

_____ times

For questions 2 - 7 circle the answer that best applies to you when you are imaging your skating routine.

2. When imaging, I am able to break down each skill into its component parts.

Rarely able to — Often able to

0 1 2 3 4 5 6

3. I imagined the actual competitive setting (e.g. costume, panel of judges, crowd, etc.)?

Rarely did — Often did

0 1 2 3 4 5 6

4. During my homework assignment for my intervention, I could "feel" myself skating my routine?

Rarely could — Often could

0 1 2 3 4 5 6

5. When imaging, I see my skating abilities improving (e.g., becoming consistent in my jumps and spins).

Rarely can — Often can

0 1 2 3 4 5 6

6. I image myself appearing self-confident in front of my audience.

Rarely can						Often can
0	1	2	3	4	5	6

7. How would you rate the helpfulness of your intervention to your skating routine?

Not at all Helpful	Somewhat Helpful	Moderately Helpful	Very Helpful
1	2	3	4

APPENDIX F

HOMEWORK ASSIGNMENT PACKAGE - PAPER FREESTYLE DRAWING

INTRODUCTION

Thank you for agreeing to participate in this research project. I hope that this sport psychology intervention can help you improve your state anxiety, self-efficacy, and freestyle skating performance.

Things you will need:

A copy of your skating music.

A tape recorder

Preferably a quiet place

Your workbook

Pen or Pencil

Guidelines to follow:

1. This exercise is to be done once a day preferably just before you go to bed.

2. I want you to make this simulation as real as possible, so I want you to visualize yourself as if you are in a competitive setting. See only yourself on the ice, see your coach at the skating door, see yourself in your skating costume, and see the judging panel before you. Try to "feel" yourself skating your routine to the best of your ability. Play your skating music and draw your routine in the workbook while saying the cue words outloud, be sure to

place the moves, jumps, and spins in their proper placement in the workbook as on the ice surface. I want you to play your skating music on a tape recorder while you are doing this so you can keep the time of your walkout off-ice to the same time or speed that it takes to do it on-ice.

3. Sign and date each worksheet, as well as have your parent or guardian sign and date it. You will be handing these workbooks in to me as proof of your homework completion.

4. Before going on the ice to compete, I would like you to perform this assignment one last time. It will help you move automatically towards your performance and serve to relax and improve your concentration. It is also an easy way to decrease your distraction from your performance to come (Palmer, 1993 p. 44-45.) Please label this worksheet competition.

Key Words Defined

Key words help increase your attention and concentration and help you avoid being distracted. Key words are phrases that you can repeat to yourself while skating that prompt correct positioning and movement (e.g., slow, push, hold, etc.) They help you concentrate on each specific element of each move, spin, or jump (Palmer, 1993, p29).

There are three types of key words: (a) placement type words or words that tell you what to look at, such as "double flip in center of ice" to remind you to utilize the entire ice surface and spread items throughout; (b) "body tension," or body control, or tempo type words such as "slow and graceful" or "control" to remind you to skate while relaxed rather than all tensed up; and (c) technique type words which pertain to specific movements such as "explode" or "check" on take off or landing of jumps. Key words will help you concentrate on one thing at a time, and are known to help with nervousness (Martin, 1992; Ming, 1992).

Writing out Key Words

1. List out all of the elements of your figure skating program on the next page.

2. You may have already developed key words for your program, if so list them beside the element. If you have not developed them do so. Be sure that the key words are positive and remind you about what you're supposed to do, rather than negative and what you're not supposed to do. Examples are listed below.

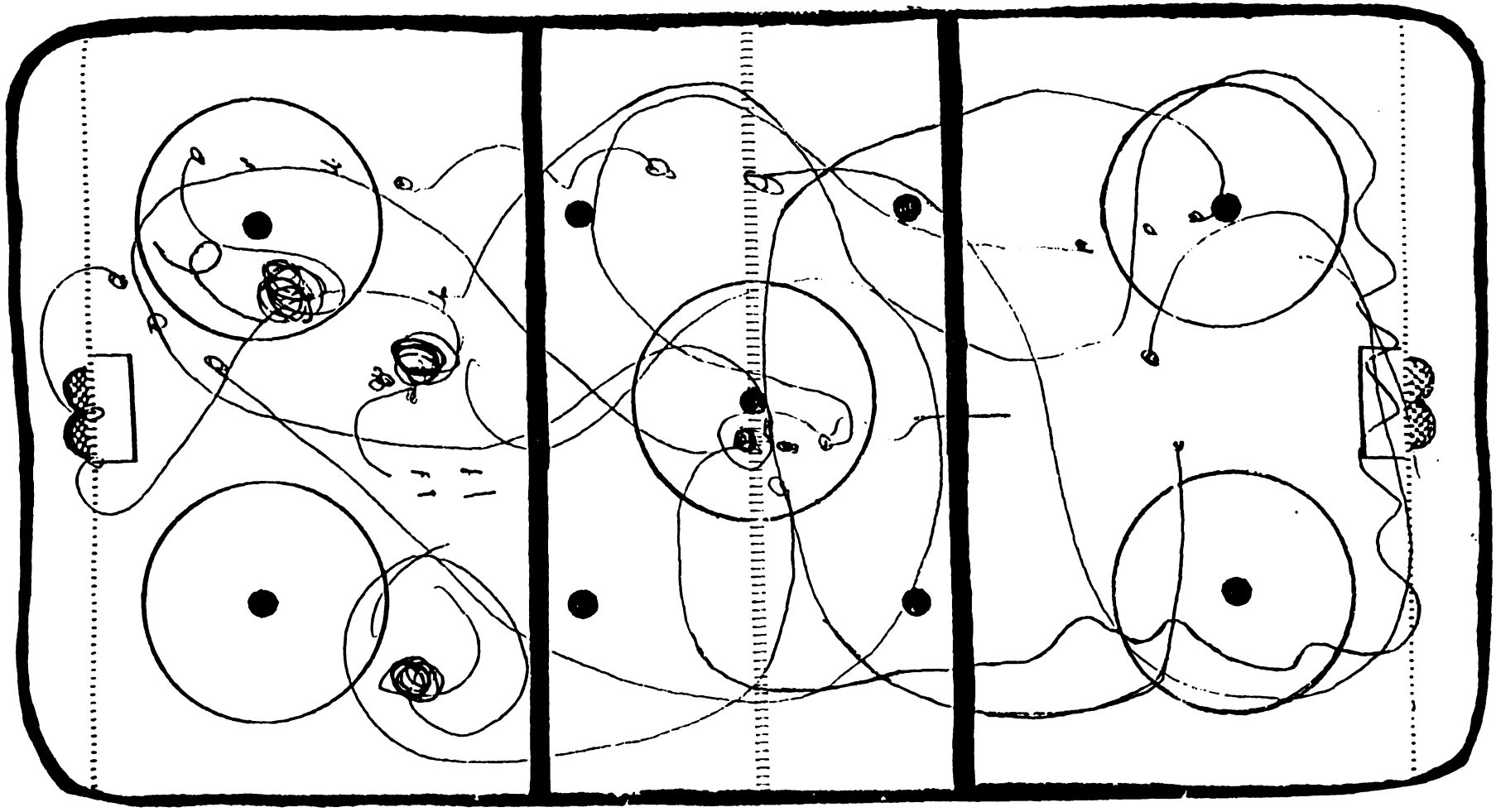
PROGRAM ELEMENTS	KEY WORDS
Sit Spin	Throw the ball and catch Thighs tight
Double Toe Loop	Right Leg
Spiral	Back flat - Stretch and hold

_____ Skating Routine

PROGRAM ELEMENTS KEY WORDS

SAMPLE HOMEWORK ASSIGNMENT PACKAGE - PAPER FREESTYLE DRAWING

NAME:_____ DATE:_____



90

Parent/Guardian:_____ Date:_____

APPENDIX G

HOMEWORK ASSIGNMENT PACKAGE - WALK THROUGH ON THE FLOOR

INTRODUCTION

Thank you for agreeing to participate in this research project. I hope that this sport psychology intervention can help you improve your state anxiety, self-efficacy, and freestyle skating performance.

Things you will need:

A copy of your skating music.

A tape recorder

Preferably a quiet place

Your workbook

Pen or Pencil

Guidelines to follow:

1. This exercise is to be done once a day preferably just before you go to bed.

2. I want you to make this simulation as real as possible, so I want you to visualize yourself as if you are in a competitive setting. See only yourself on the ice, see your coach at the skating door, see yourself in your skating costume, and see the judging panel before you. Try to "feel" yourself skating your routine to the best of your ability. Play your skating music and walk though your routine on the floor while saying the cue words outloud, be

sure to attempt the moves, jumps, and spins. I want you to play your skating music on a tape recorder while you are doing this so you can keep the time of your walkout off-ice to the same time or speed that it takes to do it on-ice.

3. Sign and date each worksheet, as well as have your parent or guardian sign and date it. You will be handing in these workbooks to me as proof of your homework completion.

4. Before going on the ice to compete, I would like you to perform this assignment one last time. It will help you move automatically towards your performance and serve to relax and improve your concentration. It is also an easy way to decrease your distraction from your performance to come (Palmer, 1993 p. 44-45.) Please label this worksheet competition.

Key Words Defined

Key words help increase your attention and concentration and help you avoid being distracted. Key words are phrases that you can repeat to yourself while skating that prompt correct positioning and movement (e.g., slow, push, hold, etc.) They help you concentrate on each specific element of each move, spin, or jump (Palmer, 1993, p29).

There are three types of key words: (a) placement type words or words that tell you what to look at, such as "double flip in center of ice" to remind you to utilize the entire ice surface and spread items throughout; (b) "body tension," or body control, or tempo type words such as "slow and graceful" or "control" to remind you to skate while relaxed rather than all tensed up; and (c) technique type words which pertain to specific movements such as "explode" or "check" on take off or landing of jumps. Key words will help you concentrate on one thing at a time, and are known to help with nervousness (Martin, 1992; Ming, 1992).

Writing out Key Words

1. List out all of the elements of your figure skating program on the next page.

2. You may have already developed key words for your program, if so list them beside the element. If you have not developed them do so. Be sure that the key words are positive and remind you about what you're supposed to do, rather than negative and what you're not supposed to do. Examples are listed below.

PROGRAM ELEMENTS	KEY WORDS
Sit Spin	Throw the ball and catch Thighs tight
Double Toe Loop	Right Leg
Spiral	Back flat - Stretch and
hold	

_____ Skating Routine

PROGRAM ELEMENTS KEY WORDS

HOMEWORK ASSIGNMENT PACKAGE - WALK THROUGH ON FLOOR

NAME:_____

DATE:_____

Parent/Guardian:_____

Date:_____

APPENDIX H

HOMEWORK ASSIGNMENT PACKAGE - FIGURE SKATING STRETCHES

* Note the attached set of stretching instructions and photographs are used with permission from Bob & Jean Anderson. Figure Skating Stretches copyright 1982 from Stretching Inc. Poster. For a free catalog of publications, contact Stretching Inc., P.O. Box 767 Palmer Lake CO 80133-0767, 1-800-333-1307.

INTRODUCTION

Thank you for agreeing to participate in this research project. I hope that this sport psychology intervention can help you improve your flexibility and freestyle skating performance.

Things you will need:

Your workbook

A watch with a second hand or a digital watch

Pen or Pencil

Guidelines to follow:

1. This exercise is to be done every evening just before you go to bed.

2. I want you to make sure you are using proper diaphragm breathing (in through your nose, out through your mouth). So I want you to begin by taking 10 deep breaths and holding them, and then exhaling. Then begin the attached 16

stretches. Be sure that you do not bounce. Stretch to where you feel a slight pain then hold for 20 - 30 seconds. You should feel the slight pain decrease. Be sure to relax and concentrate on the area being stretched. Your breathing should be slow, deep and rhythmical.

3. Sign and date each worksheet, as well as have your parent or guardian sign and date it. You will be handing in these workbooks to me as proof of your homework completion.

4. Before going on the ice to compete, I would like you to perform this assignment one last time. It will help you automatically move towards your performance and serve to relax and improve your concentration.

HOMEWORK ASSIGNMENT PACKAGE - FIGURE SKATING STRETCHES

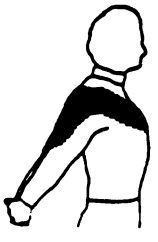
NAME: _____

DATE: _____

ARMS AND SHOULDERS:

While standing, interlock your finger above your head. Now, with your palms facing upward, push your arms slightly back and up. Feel the stretch in arms, shoulders, and upper back. Hold stretch for 15 seconds. Do not hold your breath.

With arms overhead, hold the elbow of one arm with the hand of the other arm. Keeping knees slightly bent about 1 inch; gently pull your elbow behind your head as you bend from you hips to the side. Repeat opposite side.



Interlock your fingers behind your back. Slowly rotate your elbows inward while elevating your arms upward. Be sure to keep your back straight.

NECK AND BACK:

Bend your leg, and with your opposite hand, pull the bent knee up and over your other leg as shown above. Turn your head to look toward the Knee that is bent. Try to keep both your shoulders flat on the floor. Repeat with opposite leg.

Laying on your back. Straighten your arms and legs while pointing your fingers and toes. Stretch and then relax.

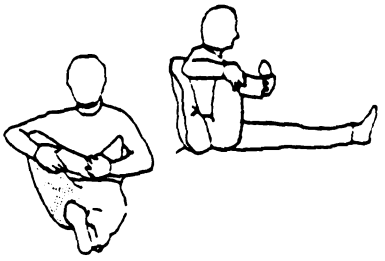
Parent/Guardian: _____

Date: _____

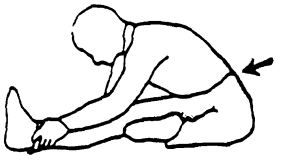
HOMEWORK ASSIGNMENT PACKAGE - FIGURE SKATING STRETCHES

LEGS AND HIPS:

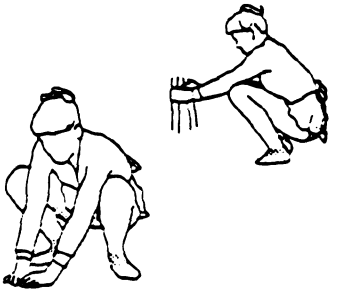
Hold on to the outside of your ankle with one hand, with your other hand and forearm around your bent knee. Gently pull the leg as one unit toward your chest until you feel an easy stretch in the back of your upper leg. Repeat with other leg.



Sit in a V position, then bend your right knee and place your right foot on side of your left knee. Lean slightly forward from the hips and try to place your forehead on your left knee. Repeat with other leg.

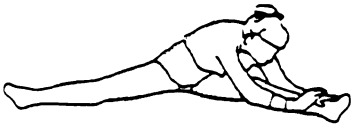


With your feet shoulder width apart and pointed out to about 15 degree angle. Bend your knees and squat down while keeping your heels on the floor.
Move your right leg forward until your knee is straight with your toes. Keep your left leg straight behind you with your heal off the ground. Repeat with other leg.



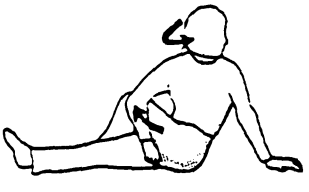
Sit with your legs spread in a V position. Slowly lean forward from the hips. Keep your hands out in front of you for balance and stability. Do not strain.

Remaining in the V position. Slowly lean towards your left side, hold. Then repeat on your right side.



Place the soles of your feet together with your heels a comfortable distance from your groin. Place your hands around your feet and slowly pull yourself forward until you feel an easy stretch in the groin. Be sure to bend from the hips not your shoulders. Keeping your elbows on the outside of your lower legs will give you greater stability during the stretch.

While sitting, straighten your right leg. Bend your left leg, and cross your left foot over the and rest it on the outside of your upper left thigh, just above your knee. With your left hand resting behind you, slowly rotate your head to look over your left shoulder, and at the same time turn you upper body toward your left hand and arm. Repeat with the other side.



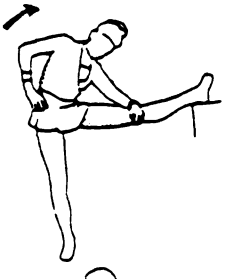
HOMEWORK ASSIGNMENT PACKAGE - FIGURE SKATING STRETCHES

CONTINUED

Stand a little ways from a solid support and lean on it with your forearms, your head resting on your hands.
Bend one leg and place our foot on the ground in front of you leaving the other leg straight, behind you. Slowly move your hips forward until you feel a stretch in the calf of your straight leg. Be sure to keep the heel of your foot on the ground with your toes pointed straight ahead of you. Repeat with your other leg.

Now, bend your back knee slightly downward while keeping the foot flat on the ground.

While standing. Place your right leg up beside parallel to you. Face your upper body in the same direction and turn your left hip slightly to the inside. Slowly bend sideways with your right shoulder going towards your knee. Repeat with your other leg.



While standing. Grab your opposite left foot with your opposite right hand. Gently pull your heel toward your buttocks. Repeat with your other leg.

APPENDIX I

PAPER FREESTYLE DRAWING SEMINAR

Introduction - This introduction was designed using Rushall, 1979.

1. Who knows what it is like to feel afraid? EXAMPLES - PICTURE

Throw up, sweat, shake, don't want to skate --

2. There are two types of fear. They are emotional fear, and physical fear of being injured.

3. Can anyone give me an example of a physical fear in skating? Fear of falling.

4. Can anyone give me an example of an emotional fear in skating? Fear of losing.

5. How many of you have ever been afraid while performing in practice?

6. How many of you have ever been afraid before or during a competition?

7. Which one are you more afraid of? Practice? Competition?

8. As you can see practice makes one physically afraid where the competition environment makes one emotionally afraid.

9. Who knows why you become emotionally afraid in competition? You are not doing anything you haven't done before. You become emotionally afraid at competition because of skating all alone, wanting to win, everyone is watching and judging your ability, etc.

10. Unfortunately many athletes never learn to control their fears and either drop out of skating, or do not perform well in competition usually resulting in a near last place finish.

11. Today I am going to teach you one way to control your fears of competing. So that you can skate as well in competition as you have been in practice.

12. How many of you would like to be able to do that?

13. How many of you have heard of mental rehearsal? (show of hands) Who can tell me what mental rehearsal is? (show of hands) Mental rehearsal is a way of simulating or blueprinting an image in you mind.

14. Who can give me an example of "mental rehearsal" (hands). An example of this would be before you call your friends on the phone, you rehearse in you mind, the important things you are going to say.

15. Who knows why mental rehearsal is good for your skating? Because it organizes your thoughts, and movements inside your head so you can have a consistent skating program.

16. Similarly, before you take a test in school, you often mentally rehearse possible test questions.

17. These same principles can be applied to practice skills associated with the sport of figure skating.

18. It is a fact that athletes who do physical practice and mental practice perform better than athletes that just physically practice -- picture.

19. This is because practicing your skill gives you physical ability and mental practice give you your belief in your ability because you picture yourself succeeding.

20. Mentally training off the ice is known as simulation training. This is to reproduce your skating program over and over either by a. visualizing it in your mind, b. walking it out on the floor, or c. by drawing it out on paper. Many of you have at one time or another probably done one of these mental rehearsal techniques for your skating program or at least bits and pieces of your program.

21. When you mentally rehearse, your body is recording its thought pattern, so when you go to reproduce these thoughts your body reacts to the preprogrammed thoughts. An EXAMPLE would be words to songs. Can anyone here sing me a line or two from a song? Maybe specify a popular song.

PICTURE

CONSISTENCY ---------- CONFIDENCE ---------- GOOD PERFORMANCE

22. Think back to when you learned how to ride your two wheel bike. You were probably pushed by someone. They let go and you fell. You got up and tried again which is the CONSISTENCY part, the more you tried and succeeded the more confident you got, then you performed without falling and thought it was a lot of fun.

23. Simulation training can improve the consistency in your sport, your confidence will improve, thus effecting your performance.

24. Mentally rehearsing prepares the mind and body to work together as one unit. When you are mentally rehearsing be sure that you are rehearsing things accurately, and imagine your whole skating program from beginning to end, not just bits and pieces.

INTERVENTION

1. What I would like you to do now is list all the elements of your figure skating program out on paper.

2. We are now going to watch Martin video tape (only part two on ice skating cue word portion).

3. Who knows what cue words are? Cue words are phrases that you can repeat to yourself while skating that prompt correct positioning and movement (e.g. slow, push, hold, etc.).

4. What I want you to do now is to develop your own cue words for your skating elements.

5. Why do we use cue words? they help us concentrate on each part of our program, and help us avoid distraction.

6. What I want you to do now is to turn to the page that is labeled trial 1 in your workbooks. (Walk around and be sure everyone is on the correct page). On this diagram I want you to draw out your skating program. Be sure to place the elements in their proper order and where they are done on

the ice. Do everything including turns into and out of spins and jumps.

7. What I want you to do now is to turn to the next page which is labeled trial 2 in your workbooks. On this diagram I want you to draw out your skating program again. Although this time as you draw I want you to say the cue words that you have assigned to your elements. Once again be sure to place the elements where they belong on the ice and in the order you normally perform them in.

8. Would everyone please turn to the next page labeled trial 3 in your workbooks. What I want you to do now is to do this one last time today. I want you to make this simulation as real as possible, so before you start drawing I want you to close your eyes and visualize yourself as if you are in a competitive setting. See only yourself on the ice, see your coach at the skating door, see yourself in your skating costume, and see the judging panel before you. Now open your eyes. Play your skating music. When you are drawing say the cue words and try to "feel" yourself skating your routine to the best of your ability.

9. (About the homework workbooks) I want you to perform this exercise once a day for one month. I prefer that you do it in a quiet area of your home, and that it is performed just before you go to sleep.

10. When you are at home doing this exercise I want you to play your skating music and draw your routine in the

workbook provided, while saying the cue words out loud, be sure to place the moves, jumps, and spins in their proper placement in the workbook as on the ice surface. The reason I need you to play your skating music on a tape recorder while you are doing this so you can keep the time of your drawing off-ice to the same time or speed that it takes to do it on-ice.

11. Be sure to date and sign each worksheet, as well as have your parent or guardian sign and date it. You will be handing in these workbooks to me as proof of your homework completion

12. Before going on the ice to compete at the Garden City competition, I would like you to perform this assignment one last time. This should help you relax and concentrate on your performance to come.

13. Are their any questions?

Closing

1. It is important that just like you practice physically on the ice that you practice mentally off ice.

2. Therefore this exercise must be repeated everyday.

3. Be sure to follow all of the directions in your workbooks.

4. Remember successful athletes both mentally and physically practice their skating skills.

5. Thank you for coming. I hope that coming here today will

help you perform better in practice and competition. Good luck to all of you, and I look forward to seeing you after the competition.

APPENDIX J

WALK THOUGH ON THE FLOOR SEMINAR

Introduction - This introduction was designed using Rushall, 1979.

1. Who knows what it is like to feel afraid? EXAMPLES - PICTURE

Throw up, sweat, shake, don't want to skate --

2. There are two types of fear. They are emotional fear, and physical fear of being injured.

3. Can anyone give me an example of a physical fear in skating? Fear of falling.

4. Can anyone give me an example of an emotional fear in skating? Fear of losing.

5. How many of you have ever been afraid while performing in practice?

6. How many of you have ever been afraid before or during a competition?

7. Which one are you more afraid of? Practice? Competition?

8. As you can see the competition environment has made you afraid where the competition environment makes one emotionally afraid.

9. Who knows why you become emotionally afraid in competition? You are not doing anything you haven't done before. You become emotionally afraid at competition because of skating all alone, wanting to win, everyone is watching and judging your ability, etc.

10. Unfortunately many athletes never learn to control their fears and either drop out of skating, or do not perform well in competition usually resulting in a near last place finish.

11. Today I am going to teach you one way to control your fears of competing. So that you can skate as well in competition as you have been in practice.

12. How many of you would like to be able to do that?

13. How many of you have heard of "mental rehearsal?" (show of hands) Who can tell me what mental rehearsal is? (show of hands). Mental rehearsal is a way of simulating or blueprinting an image in you mind.

14. Who can give me an example of mental rehearsal? An example of this would be before you call your friends on the phone, you rehearse in you mind, the important things you are going to say.

15. Who knows why mental rehearsal is good for your skating? Because it organizes your thoughts, and movements inside your head so you can have a consistent skating program.

16. Similarly, before you take a test in school, you often mentally rehearse possible test questions.

17. These same principles can be applied to practice skills associated with the sport of figure skating.

18. It is a fact that athletes who do physical practice and mental practice perform better than athletes that just physically practice -- picture.

19. This is because practicing your skill gives you physical ability and mental practice give you your belief in your ability because you picture yourself succeeding.

20. Mentally training off the ice is known as simulation training. This is to reproduce your skating program over and over either by a. visualizing it in your mind, b. walking it out on the floor, or c. by drawing it out on paper. Many of you have at one time or another probably done one of these mental rehearsal techniques for your skating program or at least bits and pieces of your program.

21. When you mentally rehearse, your body is recording its thought pattern, so when you go to reproduce these thoughts your body reacts to the preprogrammed thoughts. An EXAMPLE would be words to songs. Can anyone here sing me a line or two from a song? Maybe specify a popular song.

PICTURE

CONSISTENCY ---------- CONFIDENCE ---------- GOOD PERFORMANCE

22. Think back to when you learned how to ride your two wheel bike. You were probably pushed by someone they let go and you fell. You got up and tried again which is the CONSISTENCY part, the more you tried and succeeded the more confident you got, then you performed without falling and thought it was a lot of fun.

23. Simulation training can improve the consistency in your sport, your confidence will improve, thus effecting your performance.

24. Mentally rehearsing prepares the mind and body to work together as one unit. When you are mentally rehearsing be sure that you are rehearsing things accurately, and imagine your whole skating program from beginning to end, not just bits and pieces.

INTERVENTION

1. What I would like you to do now is list all the elements of your figure skating program out on paper.

2. We are now going to watch Martin video tape (part two cue words, both demonstration off-ice and on ice). (See Appendix S for a letter of permission from Martin).

3. Who knows what cue words are? Cue words are phrases that you can repeat to yourself while skating that prompt correct positioning and movement (e.g. slow, push, hold, etc.).

4. What I want you to do now is to develop your own cue words for your skating elements.

5. Why do we use cue words? they help us concentrate on each part of our program, and help us avoid distraction.

6. What I want you to do now is to turn to the page that is labeled trial 1 in your workbooks. (Walk around and be sure everyone is on the correct page). I want you to stand up and walk out your skating program. Be sure to place the

elements in their proper order. Do everything including turns into and out of spins and jumps. Sign and date the page.

7. What I want you to do now is to turn to the next page which is labeled trial 2 in your workbooks. I want you to stand up and walk out your skating program again. Although this time as you do it I want you to say the cue words that you have assigned to your elements. Once again be sure to perform all the elements in the order you normally perform them in your program. Sign and date the page.

8. Would everyone please turn to the next page labeled trial 3 in your workbooks. What I want you to do now is to do this one last time today. I want you to make this simulation as real as possible, so before you start I want you to close your eyes and visualize yourself as if you are in a competitive setting. See only yourself on the ice, see your coach at the skating door, see yourself in your skating costume, and see the judging panel before you. Now open your eyes. Play your skating music, and when you are walking out your program say the cue words and try to "feel" yourself skating your routine to the best of your ability. Sign and date the page.

9. (About the homework workbooks) I want you to perform this exercise once a day for one month. I prefer that you do it in a quiet area of your home, and that it is performed just before you go to bed.

10. Although when you are at home doing this exercise I want you to play your skating music while you walk out your routine. The reason I need you to play your skating music on a tape recorder while you are doing this is so you can keep the time of your walk out off-ice to the same time or speed that it takes to do it on-ice.

11. Be sure to date and sign each worksheet, as well as have your parent or guardian sign and date it. You will be handing in these workbooks to me as proof of your homework completion

12. Before going on the ice to compete at the Garden City competition, I would like you to perform this assignment one last time. This should help you relax and concentrate on your performance to come.

13. Are their any questions?

Closing

1. It is important that just like you practice physically on the ice that you practice mentally off ice.

2. Therefore this exercise must be repeated everyday.

3. Be sure to follow all of the directions in your workbooks.

4. Remember successful athletes both mentally and physically practice their skating skills.

5. Thank you for coming. I hope that coming here today will help you perform better in practice and competition. Good

luck to all of you, and I look forward to seeing you after the competition.

APPENDIX K

STRETCHING SEMINAR - CONTROL GROUP

Introduction

1. How many of you would like to have high spirals, beautifully positioned spread eagles and Ina bauers, and lunges? PICTURE

2. How many of you would like to come off the ice and your muscles not ache?

3. Who knows why we stretch? To increase our flexibility in our joint and muscles.

4. Why do we want our joints and muscles to be more flexible? To prevent injury to these areas.

5. What I want you to do now is to take the piece of taffy in front of you and pull it. What happens? It breaks in two.

6. Now I want you to roll the taffy in your hand for about 30 seconds and then pull it. What happens? It stretches.

7. Well your muscles are a lot like the taffy. If you stretch a cold muscles without warming it up you can tear the muscle resulting in injury. But if you heat up your muscles and then stretch your muscles will stretch and prevent injury because they are now more flexible.

8. So why is it important to warm up and then stretch? To increase your core body temperature, since muscles stretch better and resist injury better when warm.

9. Who knows what a static stretch is? It is a stretch that is held.

10. How long do we hold a stretch for? For approximately 20- 30 seconds.

11. When you stretch how should it feel - a lot of tension/pain, minimal tension/pain, or no tension/pain? Minimal tension/pain

should be felt and should diminish throughout the 20 - 30 seconds that the stretch is held.

12. How often should you stretch? Everyday

13. What will happen if you do not stretch everyday? Your muscles will decrease in their mobility.

14. How many of you stretch everyday off the ice?

15. Today I am going to teach you how to become more flexible so you can have better mobility on the ice. Especially for flexible moves like spirals, spread eagles, bauers, and lunges.

Intervention

1. Everyone is to stand up and march in place for one minute. Then do 20 jumping jacks. This is to get ones core body temperature up.

2. Turn to page three in your workbooks. Exercises one through four are for the arm and shoulder areas. Perform these together, hold for 20-30 seconds. Explain to them using a poster of the human body which muscles they are stretching.

3. Continue on to the neck and back area stretches on page three and four of their workbooks. Perform these together, hold for 20-30 seconds. Explain to them which muscles they are stretching.

4. Continue on to the leg and hip area stretches on page four of the workbook. Perform these together, hold for 20-30 seconds. Explain to them which muscles they are stretching.

5. (About the homework workbooks) I want you to perform these stretches once a day for one month. I prefer that you do it in a quiet area of your home, and that it is performed just before you go to bed.

6. Be sure to date and sign each worksheet, as well as have your parent or guardian sign and date it. You will be handing in these workbooks to me as proof of your homework completion
7. Before going on the ice to compete at the Garden City competition, I would like you to perform this assignment one last time. This should help you relax and concentrate on your performance to come.
8. Are their any questions?

Closing

1. Remember it is important to stretch both on and off the ice.
2. Therefore this exercise must be repeated everyday.
3. Be sure to follow all of the directions in your workbooks.
4. Thank you for coming. I hope that coming here today will help you perform better in practice and competition. Good luck to all of you, and I look forward to seeing you after the competition.

MICHIGAN STATE
UNIVERSITY

February 2, 1996

TO: Deborah L. Garza
215 Arbor Glen Drive #201
E. Lansing, MI 48823

RE: IRB#: 95-612
TITLE: THE EFFECTS THAT SELECTED MENTAL PRACTICE TECHNIQUES HAVE ON SELF-EFFICACY, STATE ANXIETY, AND PERFORMANCE IN COMPETITIVE FIGURE SKATERS
REVISION REQUESTED: N/A
CATEGORY: 1-A,B
APPROVAL DATE: 02/02/96

The University Committee on Research Involving Human Subjects'(UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revise approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable

PROBLEMS/ CHANGES: Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)432-1171.

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:bed

cc: Deborah L. Feltz

OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES
Assistant Vice President
for Research
Michigan State University
232 Administration Building
East Lansing, Michigan
48824-1046
517 355-2180
FAX 517 432-1171

APPENDIX L

APPENDIX M

First Letter of Information

Dear Parents:

On February 10, 1996 from 11:30 a.m. - 12:30 p.m. at the log cabin which is next to the Garden City ice arena. Deborah Garza will be implementing a sport psychology seminar. Your child as a member of the Garden City figure skating club, is invited to participate in a study to determine if the use of mental techniques are instrumental in improving self-confidence, state anxiety, and performance in competitive figure skaters. Your child will be randomly assigned to one of three different intervention groups.

Previous research using this technique has had neutral or positive effects.

To participate requires very little effort and hopefully will have positive effects on your child's skating in both practice and competition.

If you choose to participate in the study you are asked to:

1. Give permission for your child to take part in the study by signing the attached permission slip.

2. Have your child attend the first sport psychology seminar on February 10.

3. Have your child enter and compete in the Garden City figure skating competition, which is one March 7 - 10, 1996.

4. Have your child attend the second sport psychology seminar on March 16.

5. Have your child fill out the enclosed <u>off-ice skating training questionnaire</u>, and have them and yourself sign the permission slip.

Your child will be assigned a number so that they are assured complete confidentiality. Only the parent, child and the principal researcher will have access to the name/number combinations. Your child will be given a workbook in which they will be instructed how to use it. Their sport psychology homework will only require your signature showing that they did complete it. Their homework will not take more than 5 minutes each evening.

The general results (no individual data) of this study will be used in a Michigan State University Master thesis. They will also be made available to your figure skating club, participating skaters, coaches, and parents.

Please be aware that your child's skating coach is fully aware and supports your child's participation in this seminar. Please mail the signed permission slip, and the off-ice skating training questionnaire back to me by January 25 in the self addressed stamped envelope enclosed.

I thank you for your cooperation and look forward to the possibility of working with your child in this study.

If you have any questions or concerns regarding this please call me at (517) 333-3833, or Dr. Deborah Feltz (Academic Advisor) at (517) 355-4732.

Sincerely,

Deborah Garza
MSU graduate student
Member GCFSC

Permission for participating in sport psychology intervention

My child Name Age Sex

_____ _____ _____

is (are) allowed to participate in the study to determine if a technique being proposed will be instrumental in improving self-efficacy, state anxiety, and performance in competitive figure skaters. I understand that the results will be used in a Michigan State University masters thesis and will be made available to the figure skating club, participating skaters, coaches, and parents.

_____

Parents Signature

_____

Child's Signiture

_____

Date

APPENDIX O

Phone Call Conversation to Subjects

Hello, _____(Subjects Name)_____, how is your skating practice going? Response from subject. How is your competition skating routine going? Response from subject. Have you been doing your homework workbook every night? Response from subject. Are you having your parents sign the forms? Response from subject. Do you find that this intervention is helping you? Response from subject. Do you have any questions or problems with your workbooks? Response from subject. Please be sure not to discuss your workbook with the other skaters. Good luck at the competition.

APPENDIX P

Second Letter of Information

Dear Parents:

I will be implementing the second half of my sport psychology intervention. On Sunday, March 17, 1996 from 12:00 - 1:30 p.m. at the log cabin located next to the Garden City Ice Arena.

I thank all of you that have participated in the first half of my sport psychology seminar. I am hoping all of your children that have taken part in the first half will be able to take part in the second half. At this time they will learn the other two interventions that were not taught to them, as well as how to think more positively about thier skating.

If you choose to continue your participation in this study **please have your child bring their workbooks with them to the second session.**

The general results (not individual) will be sent directly to you if you check the line below and hand this paper in to me at the second intervention session.

If you have any questions or concerns regarding this seminar please call me at (517) 333-3833, or Dr. Deborah Feltz (Academic Advisor) at (517) 355-4732.

I thank you for your cooperation and look forward to seeing you at the second half of this seminar.

Sincerely,

Deborah Garza
MSU graduate student
Member GCFSC

Name: _____

____ Please check here if you would like the general results sent to you.

APPENDIX Q

Second Letter of Information

Dear Coach:

Thank you for allowing your students to participate in my sport psychology seminars. Please fill out the enclosed coaches performance evaluations and return them to me no later than March 24, 1996.

The general results (not individual) will be sent directly to you if you check the line below and return this paper with your coaches performance evaluations.

If you have any questions or concerns regarding this seminar please call me at (517) 333-3833 or Dr. Deborah Feltz (Academic Advisor)
(517) 355-4732.

I thank you for all of your cooperation and help in this study.

Sincerely,

Deborah Garza
MSU graduate student
Member GCFSC

Name: _____

_____ Check here if you would like a copy of the general results sent to you.

APPENDIX R

Table 5

Summary Table of ANOVAs for Pretreatment Comparisons

Dependent Variables	F (2,24)	Sig of F
Performance		
Jumps	0.05	.95
Spins	0.01	.99
Moves	0.04	.96
Self-Efficacy		
Jumps	0.11	.90
Spins	0.64	.54
Moves	0.12	.89
CSAI-2		
Cognitive	0.81	.46
Somatic	0.11	.90
Confidence	0.21	.82

Table 6

Summary Table of Repeated Measure ANOVAs for Off-Ice Skating Training Questionaire (3 X 2)

DEPENDENT VARIABLES	df	MS	F	p
Question 2 - Stretching				
Intervent	2	5.39	1.97	.161
Pre/Post	1	18.96	31.03	.001
Intervent by Pre/Post	2	8.69	14.21	.001
Within cells error	24	.61		
Question 4 - Walking Out Routine				
Intervent	2	18.39	27.21	.001
Pre/Post	1	11.57	113.64	.001
Intervent by Pre/Post	2	10.24	100.55	.001
Within cells error	24	.10		
Question 6 - Drawing out Routine				
Intervent	2	13.56	26.62	.001
Pre/Post	1	21.41	66.06	.001
Intervent by Pre/Post	2	21.41	66.06	.001
Within cells error	24	.32		

Table 7

One-Way ANOVAs For Intervention Effectiveness Questionaire

DEPENDENT VARIABLES	df	MS	F	p
Imagery Practice				
Between Groups	2	2516.70	1365.85	.001
Within Groups	24	.84		
Total	26			
Imagery Effectiveness				
Between Groups	2	22.26	659.65	.001
Within Groups	24	.37		
Total	26			
Intervention Helpfulness				
Between Groups	2	.44	2.83	.08
Within Groups	24	.16		
Total	26			

APPENDIX S

Table 8

Pearson Correlations Between Performance, Self-Efficacy and State Anxiety Pre-Test

VARIABLES	PPRFJUMP	PPRFSPIN	PPRFMOVE	PSEJUMP	SESPIN	PSEMOVE	PCASICOG	PCSAISOM	PCSAICON
PPRFJUMP		.8585 (27) p=.000	.5474 (27) p=.012	.2360 (27) p=.236	.5003 (27) p=.008	.6450 (27) p=.000	-.1563 (27) p=.436	-.2556 (27) p=.198	.2810 (27) p=.156
PPRFSPIN			.5577 (27) p=.003	.0867 (27) p=.667	.5063 (27) p=.007	.6428 (27) p=.000	-.1611 (27) p=.422	-.3645 (27) p=.062	.3575 (27) p=.067
PPRFMOVE				-.2160 (27) p=.279	.0626 (27) p=.757	.2001 (27) p=.317	-.2896 (27) p=.184	-.2950 (27) p=.135	.1974 (27) p=.324
PSEJUMP					.5015 (27) p=.008	.4781 (27) p=.012	-.2574 (27) p=.195	-.2784 (27) p=.160	.3446 (27) p=.078
PSESPIN						.8173 (27) p=.000	-.2574 (27) p=.195	-.4062 (27) p=.036	.4373 (27) p=.023
PSEMOVE							-.2910 (27) p=.141	-.3839 (27) p=.048	.5510 (27) p=.003
PCSAICOG								.7252 (27) p=.000	-.4689 (27) p=.014
PCSAISOM									-.6642 (27) p=.000

Table 9

Pearson Correlations Between Performance, Self-Efficacy and State Anxiety Post-Test

VARIABLES	PPRFJUMP	PPRFSPIN	PPRFMOVE	PSEJUMP	SESPIN	PSEMOVE	PCASICOG	PCSAISOM	PCSAICON
PPRFJUMP		.8465 (27) p=.000	.5081 (27) p=.007	.4292 (27) p=.025	.7426 (27) p=.000	.6913 (27) p=.000	-.3972 (27) p=.040	-.4500 (27) p=.019	.3214 (27) p=.102
PPRFSPIN			.6075 (27) p=.001	.1826 (27) p=.362	.6387 (27) p=.000	.5596 (27) p=.002	-.2301 (27) p=.248	-.3866 (27) p=.046	.2054 (27) p=.304
PPRFMOVE				.1470 (27) p=.464	.1626 (27) p=.418	.2746 (27) p=.166	-.3291 (27) p=.094	-.3577 (27) p=.067	.0995 (27) p=.621
PSEJUMP					.5876 (27) p=.001	.5126 (27) p=.006	-.5527 (27) p=.003	-.5937 (27) p=.001	.4334 (27) p=.024
PSESPIN						.7998 (27) p=.000	-.5476 (27) p=.003	-.5601 (27) p=.002	.4438 (27) p=.020
PSEMOVE							-.3925 (27) p=.043	-.4052 (27) p=.036	.4284 (27) p=.026
PCSAICOG								.7896 (27) p=.000	-.6301 (27) p=.000
PCSAISOM									-.5535 (27) p=.003

APPENDIX T

St. Paul's College
University of Manitoba
430 Dysart Road, Winnipeg, Manitoba, Canada R3T 2M6
(204) 474-8589 FAX: (204) 275-5421

Ms Debra Lynn Garza
215 Arbor Glen Drive, #201
East Lansing, MI
USA 48823

Dear Debra:

Thank you for your kind comments concerning my work on sport psychology with figure skaters. I am happy to grant you permission to use the videotape, *Sport psyching for figure skaters*, as part of your intervention seminars. I will definitely look forward to receiving a copy of the final write-up describing the procedures and results.

I believe I sent you a copy of a study that one of my students completed concerning a combination of walk-outs and positive self-talk for improving performance of figures. You might find the details of our procedure to be helpful in planning the various components of your intervention strategies.

Best wishes.

Sincerely yours,

G. Milton-Harris

for Garry L. Martin, Ph.D., C. Psych.
Professor of Psychology

GLM/clm

DEBORAH LYNN GARZA
215 Arbor Glen #201
East Lansing, MI 48823

September 1, 1995

Dr. Garry L. Martin
43 Bright Oaks Bay
Winnipeg, Manitoba
Canada R2M 2L9

Dear Dr. Martin,

First off I would like to extend my appreciation to your extensive interest in the sport of figure skating. I feel that your sport psychology interventions for figure skating have been very helpful to many skaters. Being a former competitive figure skater, and having a hard time dealing with all of the mental pressures of the sport has lead me to pursue a career in sport psychology.

I am currently working of my thesis at Michigan State University under the guidance of Dr. Deborah Feltz, and Dr. Richard Albrecht. This thesis is entitled <u>The effects that selected mental techniques have on self-efficacy, state anxiety, and performance in competitive figure skaters.</u> I will be teaching and measuring the effects of three different interventions on three separate subject groups. The first intervention is the paper freestyle drawing, which is a modification of your paper patch test. The second intervention is the walk through on the floor, which is much like the second section of your video tape <u>Sport psyching for figure skaters.</u> The third intervention is a positive self-talk exercise.

I am writing to ask for your permission to use the second portion of your video tape <u>Sport psyching for figure skaters</u> as part of my intervention seminars.

The results that I will be looking for are comparisons between the three different interventions, their effects on state anxiety, self-efficacy, and performance, and which one works best for which skating level.

Once the data has been collected and analyzed I would be happy to send you a copy.

Thank you

Deborah Lynn Garza
MSU graduate student

APPENDIX U

THE EFFECTS OF SELECTED MENTAL PRACTICE TECHNIQUES ON STATE ANXIETY, SELF-EFFICACY, AND PERFORMANCE IN COMPETITIVE FIGURE SKATERS

CODE BOOK

Variable Name	Variable Label	Values
ID	ID number	01-27
COACH	Skating Coach	01-09
AGE	Subjects Age	10-18
LEVEL	Competitive Level	1 = p r e - preliminary 2=prelim 3 = p r e - juvenile 4=juvenile 5=intermed 6=novice
INTERVEN	Intervention	1=STRETCH 2=WTF 3=PFD
OISTWTF	Pre-Off Ice - WTF	0=Never 1=1-2 2=3-4 3=5-6 4=7 or more
OISTPFD	Pre-Off Ice - PFD	0=Never 1=1-2 2=3-4 3=5-6 4=7 or more
CASICOG	Pre-CSAI Cognitive	0-36
CSAISOM	Pre-CSAI Somatic	0-36
CSAICONF	Pre-CSAI Confidence	0-36
SEJUMP	Pre-Jump Self-Efficacy	0-100
SESPIN	Pre-Spin Self-Efficacy	0-100
SEMOVES	Pre-Connect Moves S-E	0-100
PERFJUMP	Pre-Jump Performance	0-96

Variable Name	Variable Label	Values
PERFSPIN	Pre-Spin Performance	0-60
PERFMOVE	Pre-Connect Moves Perf	0-30
PCSAICOG	Post-CSAI Cognitive	0-36
PCSAISOM	Post-CSAI Somatic	0-36
PCSAICON	Post-CSAI Confidence	0-36
PSEJUMP	Post-Jump Self-Efficacy	0-100
PSESPIN	Post-Spin Self-Efficacy	0-100
PSEMOVES	Post-Connect Moves S-E	0-100
PPRFJUMP	Post-Jump Performance	0-96
PPRFSPIN	Post-Spin Performance	0-60
PPRFMOVE	Post-Connect Moves S-E	0-30
TOTPERF	Total Performance Score	
TOTSE	Total Self-Efficacy Score	
POISTWTF	Post-Off Ice - WTF	0=Never 1=1-2 2=3-4 4=5-6 5=7 or more
POISTPFD	Post-Off Ice - PFD	0=Never 1=1-2 2=3-4 3=5-6 4=7 or more
GOALSET	Pre-Off Ice - Goal Set	0=Never 1=1-2 2=3-4 3=5-6 4=7 or more
STRETCH	Pre-Off Ice - Stretcing	0=Never 1=1-2 2=3-4 3=5-6 4=7 or more

Variable Name	Variable Label	Values
DANCE	Pre-Off Ice - Dancing	0=Never 1=1-2 2=3-4 3=5-6 4=7 or more
MUSLRE	Pre-Off Ice - Muscle Relax	0=Never 1=1-2 2-3-4 3=5-6 4=7 or more
PGOALSET	Post-Off Ice - Goal Set	0=Never 1=1-2 2-3-4 3=5-6 4=7 or more
PSTRETCH	Post-Off Ice - Stretching	0=Never 1=1-2 2-3-4 3=5-6 4=7 or more
PDANCE	Post-Off Ice - Dancing	0=Never 1=1-2 2-3-4 3=5-6 4=7 or more
PMUSLRE	Post-Off Ice - Muscle Relax	0=Never 1=1-2 2-3-4 3=5-6 4=7 or more
PTOTPERF	Post Total Performance Score	
PTOTSE	Post Total Self-Efficacy Score	
PERFCHG	Coaches Perf Eval - Perf Chg	-5 = Much Worse 0 = No Change +5 = Much Change
IMAGPRAC	Imagery Practice	1 -30

Variable Name	Variable Label	Values
IMAGEFF	Imagery Effectiveness	1 - 35
INTHELP	Intervention Helpfulness	1 = Not at all helpful 2 = Somewhat helpful 3 = Moderate helpful 4 = Very helpful
FLEXIBL	Flexibility	0 -
PFLEXIBL	Post Flexibility	0 -

APPENDIX V

	ID	COACH	AGE	LEVEL	INTERVEN	OSTWTF	OSTPPD	CSAICOG	CSAISOM	CSAICONF
1	1	5	15	1	3	1	1	18	21	20
2	2	5	10	1	3	0	0	12	12	28
3	3	7	15	2	3	1	0	21	16	24
4	4	5	12	2	3	1	0	22	24	9
5	5	2	10	3	3	0	0	18	26	17
6	6	5	10	4	3	2	1	19	16	25
7	7	1	14	5	3	1	0	24	25	18
8	8	8	12	5	3	1	0	14	17	31
9	9	8	15	6	3	1	0	36	30	21
10	10	3	10	1	2	2	0	22	26	16
11	11	3	11	1	2	1	1	12	12	28
12	12	5	10	2	2	2	1	25	25	22
13	13	5	12	2	2	2	1	23	26	20
14	14	9	15	3	2	1	0	23	30	22
15	15	6	12	4	2	0	0	12	17	29
16	16	2	10	5	2	1	1	23	26	20
17	17	6	12	5	2	1	1	36	26	18
18	18	1	13	6	2	2	0	12	12	28
19	19	3	15	1	1	2	2	23	26	15
20	20	5	10	1	1	2	0	31	29	18
21	21	7	11	2	1	1	0	27	25	20
22	22	7	12	2	1	0	0	28	23	14
23	23	5	13	3	1	1	0	25	16	14
24	24	8	11	4	1	1	2	16	9	35
25	25	8	11	5	1	0	0	26	16	34
26	26	5	15	5	1	0	2	24	31	19
27	27	4	13	6	1	1	0	17	20	16

	SEJUMP	SESPIN	SEMOVES	PERJUM	PERSPIN	PERMOV	PCSAICOS	PCSAISOM	PCSAICON	PSEJUMP
1	53.00	55.00	15.00	1.38	2.20	2.20	16	20	22	56.00
2	43.00	41.00	39.00	1.63	2.20	2.40	10	10	32	49.00
3	46.00	73.00	49.00	1.50	2.30	2.30	21	15	28	50.00
4	27.00	24.00	18.00	4.33	3.20	4.20	19	20	12	40.00
5	41.00	73.00	30.00	4.75	4.50	4.40	14	17	26	89.00
6	15.00	94.00	84.00	5.00	6.00	3.60	15	15	27	30.00
7	39.00	87.00	85.00	4.56	4.40	3.60	20	20	22	45.00
8	80.00	87.00	79.00	5.19	4.90	3.40	11	13	36	85.00
9	40.00	66.00	78.00	4.63	4.10	2.30	26	30	25	50.00
10	52.00	56.00	18.00	2.31	2.00	3.20	10	20	30	65.00
11	41.00	43.00	31.00	4.01	4.70	5.00	16	15	27	43.00
12	56.00	60.00	51.00	2.25	2.40	3.20	20	20	26	69.00
13	22.00	25.00	19.00	2.25	3.60	3.60	16	20	28	42.00
14	37.00	56.00	34.00	3.44	3.40	2.30	16	21	32	60.00
15	52.00	31.00	73.00	5.63	4.20	2.20	15	16	28	59.00
16	86.00	79.00	92.00	4.38	4.10	2.00	18	14	19	94.00
17	28.00	36.00	30.00	4.94	4.90	2.30	28	20	29	66.00
18	30.00	95.00	98.00	5.00	5.00	4.00	10	10	33	75.00
19	37.00	46.00	13.00	3.56	1.90	2.60	19	17	21	90.00
20	39.00	39.00	39.00	1.63	1.90	1.60	32	28	19	41.00
21	43.00	38.00	43.00	1.75	2.50	2.60	28	26	20	40.00
22	16.00	27.00	22.00	1.63	2.60	3.40	30	32	12	17.00
23	44.00	58.00	32.00	4.69	5.50	3.20	25	16	15	45.00
24	65.00	95.00	98.00	5.50	4.40	2.40	11	14	31	80.00
25	65.00	95.00	91.00	5.31	5.70	4.60	13	12	32	98.00
26	32.00	49.00	45.00	5.13	4.20	4.00	26	30	18	30.00
27	80.00	100.00	100.00	5.13	4.70	2.20	10	14	21	90.00

	PSESPAN	PSEMOVES	PPRFJUM	PPRFSPAN	PPRFMOV	POSTWTF	POSTPFD	TOTPERF	TOTSE	GOALSET
1	49.00	17.00	1.31	2.50	2.20	1	4	18.33	41.00	2
2	50.00	45.00	2.69	2.50	3.20	0	4	20.00	41.00	1
3	60.00	37.00	3.06	3.20	2.60	1	4	22.00	56.00	1
4	56.00	22.00	4.69	3.90	5.00	1	4	41.33	23.00	0
5	59.00	95.00	4.94	5.50	5.20	0	4	47.67	64.67	1
6	100.00	90.00	5.50	6.20	4.40	2	4	52.67	64.33	1
7	90.00	90.00	5.19	4.20	4.00	1	4	45.00	70.33	2
8	80.00	81.00	5.31	5.10	3.20	1	4	49.67	82.00	3
9	80.00	80.00	4.75	4.20	3.40	1	4	43.00	61.33	1
10	70.00	30.00	3.50	2.20	3.60	4	0	27.00	42.00	2
11	55.00	33.00	4.20	5.70	5.20	4	1	45.67	45.00	1
12	72.00	60.00	2.63	3.30	4.00	4	1	25.33	55.67	1
13	36.00	32.00	3.13	4.00	4.40	4	1	30.00	22.00	0
14	80.00	50.00	4.13	4.10	3.00	4	0	34.33	42.33	2
15	76.00	76.00	5.94	5.50	4.60	4	0	52.33	52.00	2
16	92.00	90.00	5.06	5.00	4.20	4	1	40.33	85.67	1
17	70.00	65.00	5.69	5.60	3.40	4	1	47.33	31.33	4
18	100.00	100.00	4.94	5.10	5.00	4	0	50.00	74.33	4
19	64.00	14.00	3.69	2.20	3.60	2	2	29.67	32.00	2
20	40.00	41.00	1.75	1.90	2.00	2	2	17.67	39.00	1
21	36.00	45.00	1.75	2.60	3.60	1	1	23.67	41.33	0
22	29.00	20.00	1.63	2.70	3.60	0	0	23.00	21.67	0
23	60.00	32.00	4.38	6.00	4.00	1	1	49.67	44.67	1
24	100.00	97.00	5.69	4.50	3.60	1	0	49.67	86.00	3
25	93.00	92.00	5.94	5.90	5.20	1	0	57.67	83.67	0
26	48.00	46.00	5.00	5.00	4.20	0	0	50.00	42.00	1
27	100.00	100.00	5.25	5.00	3.20	1	0	47.67	93.33	1

	STRETCH	DANCE	MUSLRE	PGOALSET	PSTRETCH	PDANCE	PMUSLRE	PTOTPERF	PTOTSE	PERFCHG
1	1	0	1	2	1	0	1	22.67	40.67	1
2	1	0	0	1	1	0	0	28.00	48.00	2
3	0	0	2	3	0	0	2	33.00	49.00	4
4	0	0	0	0	0	0	0	46.33	39.33	1
5	0	0	0	1	1	0	0	54.33	31.00	2
6	2	2	2	1	2	2	2	59.33	73.33	1
7	1	1	4	2	1	1	4	50.33	75.00	2
8	3	1	0	4	4	1	1	51.67	82.00	2
9	4	1	0	1	4	1	0	45.33	70.00	2
10	1	0	0	2	1	0	0	32.00	55.00	4
11	2	1	0	1	4	1	0	54.33	45.33	3
12	1	1	1	1	1	0	0	31.67	67.00	3
13	0	1	0	0	0	1	0	37.33	36.67	3
14	1	1	3	2	1	1	3	40.67	63.33	2
15	0	1	0	1	1	1	0	57.67	70.33	2
16	1	0	0	4	4	2	2	50.67	92.00	3
17	4	2	2	4	3	0	4	54.67	67.00	3
18	3	0	4	4	3	0	2	51.67	91.67	2
19	2	0	1	2	3	0	2	33.00	56.00	1
20	1	0	0	1	4	0	0	19.00	40.67	1
21	0	0	0	0	4	0	0	24.00	40.33	0
22	0	0	0	0	4	0	0	23.67	22.00	0
23	1	0	0	4	4	0	0	50.00	45.67	0
24	1	1	2	1	4	1	1	51.33	92.33	1
25	1	1	0	3	4	1	0	60.00	94.33	1
26	0	1	0	1	4	1	0	50.33	41.33	0
27	4	0	2	3	4	1	1	50.00	96.67	1

	IMAGPRAC	IMAGEFF	INTHELP	FLEXIBL	PFLEXIBL
1	30	28	4	.	.
2	30	25	4	.	.
3	28	25	4	.	.
4	30	30	4	.	.
5	30	29	4	.	.
6	30	25	4	.	.
7	30	30	4	.	.
8	28	29	4	.	.
9	30	25	4	.	.
10	27	27	3	.	.
11	28	27	4	.	.
12	25	25	4	.	.
13	30	30	4	.	.
14	30	25	4	.	.
15	25	24	3	.	.
16	30	29	4	.	.
17	30	27	4	.	.
18	30	30	4	.	.
19	0	0	3	13.0	16.00
20	0	0	3	12.5	15.00
21	0	0	4	13.0	15.30
22	0	0	3	14.5	16.00
23	0	0	3	13.0	14.30
24	0	0	4	15.0	18.00
25	0	0	4	15.0	16.30
26	0	0	4	14.0	15.30
27	0	0	4	16.0	17.30

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