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The effect of psychological skills training on competitive state anxiety in collegiate swimmers

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The Effect of Psychological Skills Training on Competitive State Anxiety In Collegiate Swimmers

The present study examined the effects of psychological skills training on competitive state anxiety, as measured by the Competitive State Anxiety Inventory-2 (CSAI-2). Participants were 60 swimmers from an intercollegiate Division III team who were randomly assigned to a control, goal setting, imagery, or relaxation group. One hour prior to the first competition of the season, participants completed the CSAI-2. Over the following 5 weeks, participants engaged in 10 sessions of psychological skills training. A control group received no training. All participants completed the CSAI-2 again, one hour prior to competition in a final swim meet. It was hypothesized that participants engaging in psychological skills training would report lower levels of cognitive and somatic anxiety and show higher levels of self-confidence than the control group. Also, it was hypothesized that participants engaging in imagery training would report lower levels of anxiety and show higher levels of self-confidence than all other groups. Results revealed that participants in the imagery group decreased cognitive and somatic anxiety, and increased self-confidence consistently more than any other condition from the first competition to the final competition.

Performance under pressure, no matter the sport, can bring about physiological, behavioral, and psychological changes that can have a large effect on the outcome of the performance. An important factor within sports competition is anxiety, which can have many different effects on a person. Some athletes find it hard to control and regulate anxiety in a competitive situation, and therefore it becomes a reason for poor performance outcomes. Other athletes learn to use anxiety in a positive way in order to help ease the pressures of a competitive situation and to enhance performance. Although talent and physical strength play a large role in sport performance, success largely depends upon mental and emotional factors. An athlete must first be able to cope with, and regulate his or her anxiety and use it to his or her advantage before performance is enhanced. The level and the degree to which proper mental preparation is used can greatly affect an athlete's performance. A better athlete, therefore, is one who can control his or her anxiety while performing in a high anxiety atmosphere.

During the 1970s research in applied sport psychology and mental training with athletes emerged and since then has continued to be a very prevalent topic of study. Sport psychologists commonly implement psychological skills training to athletes at a variety of levels in order to manage

anxiety and enhance performance. Psychological skills training programs are designed to teach athletes strategies or techniques on how to cope with and regulate anxiety and stress that is associated with a competitive situation in order to enhance performance (Vealey, 1988). The most common and effective training programs teach skills such as imagery, relaxation, self-talk, and goal setting (Burton, 1988; Fletcher & Hanton, 2001; Weinberg, Seabourne, & Jackson, 1987). While research on the use of training programs and performance is vast, results differ on which strategies are the best. In addition, past research on the use of training programs and competitive anxiety regulation has not been conclusive and research is being conducted to find the most beneficial training program in reducing competitive anxiety.

State and Trait Anxiety

Previous research that focused on anxiety has been helpful in establishing different anxiety constructs. Until the 1950s, literature on anxiety did not differentiate between a general tendency of anxiousness and an immediate state of anxiety in any given situation. Speilberger (1966) was the first to propose that there are different types of anxiety. Therefore, the state-trait theory of anxiety was proposed, which posits that anxiety consists of two different components: state anxiety and trait anxiety.

State anxiety is characterized as specific instances of conscious perception of feelings such as fear or nervousness, which activates physiological reactions (e.g., increased heart rate, quickened breath, or sweaty palms). This type of anxiety is an immediate emotional reaction. So, if an individual is in a situation in which he or she experiences a high level of state anxiety, he or she might automatically experience feelings of nervousness through an increase in heart rate or sweaty palms.

While state anxiety is measured by conscious perceptions of feelings that activate physiological reactions, trait anxiety is measured by the general predisposition to respond in a certain way across many situations. Trait anxiety is the tendency to perceive certain situations as potentially more threatening, making situations seem worse than they actually are (Spielberger, 1966). The physiological reactions to the perceived threatening situations are the characteristics of state anxiety. Trait and state anxiety can exist independent of the other, but they can also be present at the same time. So, an individual with high levels of anxiety either perceives more situations as threatening, reacts to threatening situations with high levels of state anxiety, or both. State anxiety can be compared to a reaction that is continually present at some level of intensity, which is why it is experienced in the form of physiological reactions, whereas trait anxiety can be compared to a predisposed physiological reaction that is only activated by certain stimuli.

Cognitive and Somatic Anxiety. Building upon Spielberg's state-trait theory of anxiety, subsequent research identified further components of state and trait anxiety, proposing that anxiety is a multidimensional construct (Liebert & Morris, 1967). The multidimensional theory of anxiety proposes that the anxiety response consists of both cognitive and somatic anxiety components, and has since been used as a major theory within the area of competitive anxiety research.

Cognitive anxiety was examined by Morris, Davis, and Hutchings (1981) and is referred to as the mental component of anxiety, in that it is caused by negative thoughts and feelings about success, and negative self-evaluation. Within the realm of sport, cognitive anxiety is commonly brought about in negative performance evaluation, which leads to negative self-evaluation. Both negative performance evaluation and negative self-evaluation can be brought about by anxiety (Martens, Burton, Vealey, Bump, & Smith, 1990). For example, if a swimmer thinks that he or she will not do well in the upcoming competition, and becomes worried that he or she is not good enough to win the race, the swimmer possesses high levels of cognitive anxiety.

Somatic anxiety is different from cognitive anxiety in that it is the emotional and physiological feelings that come directly from unconscious arousal (Morris et al., 1981). Within the realm of sport, somatic anxiety is characterized by feelings of nervousness before a competition such as butterflies in the stomach, an elevated heart rate, or clammy hands (Martens et al., 1990). For example, depending on the level of somatic anxiety present, a swimmer may experience certain physiological responses due to

feeling nervous before a competition, such as tense muscles or shortness in breath.

Self-Confidence. Just as important as controlling competitive anxiety is managing self-confidence in sports settings. Self-confidence in the realm of sport can be broadly described as an athlete's overall feelings about his or her specific sport. In particular, self-confidence can be described as healthy arrogance or optimism. An athlete must have some level of self-confidence or belief that he or she can achieve their goal in order to perform well. A higher level of self-confidence can increase the probability that an athlete will perform well and achieve his or her goal. This is because the level of anxiety that is tolerable in order to perform well will increase as the level of self-confidence increases (Hardy, 1990).

Hanton, Mellalieu, and Hall (2004) examined elite athletes' perceptions of the influence of self-confidence on competitive anxiety. Results from this study revealed that self-confidence is an important factor in influencing athletes. Self-confidence influences the experience of competitive anxiety symptoms, perception of control, and the direction and intensity of anxiety. Those athletes with low self-confidence showed a loss of perceived control and higher levels of anxiety, while athletes with high self-confidence showed a strong perception of control and lower levels of anxiety. Hanton et al. suggest that in order for athletes with high self-confidence to maintain their present state of self-confidence, athletes must regularly participate in psychological skill strategies, such as imagery.

Imagery

Many athletes might not realize it, but imaging or visualizing a certain routine or skill before competition can have immensely positive outcomes on anxiety regulation and performance. Past research has shown imagery to be beneficial in performance enhancement and, in some studies, in anxiety reduction (Page, Sime, & Nordell, 1999; Vadocz, Hall, & Moritz, 1997; Weinberg et al., 1987).

Morris, Spittle, and Watt (2005) developed a working definition of imagery that is useful. They suggest that "Imagery, in the context of sport, may be considered as the creation or re-creation of an experience generated from memorial information, involving quasi-sensorial, quasi-perceptual, and quasi-affective characteristics, that is under the volitional control of the imager, and which may occur in the absence of the real stimulus antecedents normally associated with the actual experience" (p. 19). In general terms, imagery is the ability to create or re-create a certain experience using the senses (Vealey & Greenleaf, 1998). By using imagery, an athlete can gain the opportunity to see and believe in his or her own success and this helps build confidence in an athlete's perceived sport ability.

Imagery may be useful for athletes by the creation or re-creation of external events in the mind. The process of imagery comes from the recall of information from memory and it is done without the use of any apparent muscular movement (Harris & Harris, 1984). The information that is recalled can be used to re-create an event, such as a previous performance that was successful, in order to help increase confidence for an upcoming competition. The information recalled from the memory can also be used to re-create an unsuccessful performance to evaluate positive and negative aspects about that performance in order to improve upon it during the next competition. Thus, re-creating experiences through imagery enables an athlete to re-create or reconstruct past experiences into positive experiences for an upcoming competition. Another way imagery can be used is to create new experiences in the mind by taking pieces of information from several different past experiences and creating a new experience. This enables an athlete to create an ideal performance in his or her mind in advance in order to become accustomed to the competition environment. Creating new experiences is also helpful in giving athletes confidence in themselves about the outcome of upcoming competitions.

Imagery is also of use in the absence of external stimuli (Vealey & Greenleaf, 1998). For example, a basketball player does not need a basketball in his or her hands to experience hitting a free throw shot. Imagery enables athletes to practice skills and strategies without having to be in a practice environment or even be physically active.

One of the first experimental studies examining imagery use by athletes was done by Hall et al. (1990) and examined individual differences in imagery use by athletes. Results suggested that athletes use imagery for performance improvement more than imagery for practice improvement. Another finding from this study was that the use of internal and external perspectives by athletes was equal in frequency. An internal perspective is when an athlete imagines being inside of his or her body and feels the sensations that are a part of performance. An external perspective is when an athlete observes him or herself from third-person view, such as watching a movie (Morris et al., 2005). When imagining a performance, athletes reported switching back and forth between internal and external perspectives regularly. Results also revealed that athletes imagined themselves winning more often than losing in a particular competition, and experienced athletes used imagery more often than less experienced athletes. This finding is important because it indicates the importance of motivation within imagery. Hall's study also indicated that more experienced athletes use imagery more often than less experienced athletes due to the motivational function it provides.

An athlete might want to increase his or her level of arousal in order to increase motivation and prepare to perform well, or to decrease his or her level of arousal in order to reduce anxiety or nervousness before competition. Imagery is used not only to enhance athletic performance, but also to cope with the anxiety and stress that competition may bring about (Harris & Harris, 1984). Motivational imagery has been shown to be most effective for anxiety and self-confidence before competition (Moritz et al., 1996). Hale and Whitehouse (1998) examined the motivational and cognitive rating of a competitive situation when manipulated by imagery. Participants were 24 male soccer players and they were first shown either pressure- or challenge-oriented videotape and then were asked to imagine the same situation themselves. They were then asked to complete the CSAI-2 (Martens et al., 1990) to evaluate their cognitive and somatic anxiety and self-confidence. A challenge-oriented imagery process was designed to be more motivational and non-threatening compared to a pressure-oriented imagery process. Results from this study revealed that, participants in the pressure-oriented imagery group reported higher levels of cognitive and somatic anxiety and lower levels of self-confidence compared to participants in the challenge-oriented imagery. Results of the study by Hale and Whitehouse also indicate that overall, differences in imagery type can manipulate the intensity of competitive anxiety, and motivational imagery is more useful in reducing competitive anxiety. Therefore, the type of imagery used plays an important role in the level of anxiety and self-confidence within athletes.

Relaxation

Relaxation is a practical technique to use in many different situations such as sleep, stress, and athletic performance. The rigorous training athletes go through can become physically exhausting, so much so that it is hard for the athletes' muscles to fully relax. During these time periods, many athletes may not experience quality, restful sleep because their body is not able to fully relax. Athletes that do not wake up feeling rested could benefit from learning how to use relaxation skills. When athletes experience worry or anxiety, their muscles tend to tense up and contract (Williams & Harris, 1998). Tense muscles are detrimental to athletic performance in several areas. Once relaxation is learned, bodily responses can easily be connected with specific behaviors and types of performances, and then anxiety can be regulated depending on these bodily responses.

One of the more popular approaches to learning how to relax is the use of progressive muscle relaxation (PMR) developed by Jacobson (1938, as cited by Williams & Harris, 1998). This technique instructs individuals to tighten and loosen various muscle groups in the body in order to feel and recognize the difference between muscle tension and muscle relaxation so that after a successful training session, an individual will feel completely refreshed and have increased energy and alertness. The goal of PMR is to train the muscles to become responsive to different levels of tension, which is beneficial for athletes before, during, and after competition, especially for athletes who only have a

short amount of time between events or need to recover quickly from fatigue (Harris & Harris, 1984).

Research on the effects of relaxation techniques on competitive anxiety is sparse. A study by Weinstein and Smith (1992) examined the use of PMR and meditation. Participants were previously diagnosed as anxious, and were taught either a technique similar to PMR or a meditation technique in hopes of reducing state anxiety levels. Results showed that both cognitive and somatic anxiety were reduced using PMR and meditation.

Although research on the use of PMR for competitive anxiety reduction is not extensive, the research done is encouraging for athletes. Lanning and Hisanaga (1983) examined the use of PMR for competitive anxiety reduction and improved athletic performance. Participants were 24 female high school varsity volleyball players who were randomly assigned to either a treatment or a control group. Immediately prior to practice, the treatment group took part in seven 30-minute sessions of PRM during an 18-day period, and also completed the Sport Competition Anxiety Test (SCAT) pre- and post-training. Serving percentage was also calculated pre- and post-training for participants in the training group. Results indicated that participants using PMR significantly reduced levels competitive anxiety and improved performance when compared to a control group. These results indicate that PMR is very effective in helping reduce levels of competitive anxiety, which also helps improve performance.

Goal Setting

In sport, both imagery and relaxation are commonly used psychological skills and they have been shown to successfully reduce competitive anxiety and enhance performance. Another frequently used psychological skill used is goal setting. Past research has been extensive and has been linked not only to performance enhancement, but also to anxiety reduction, and positive changes in self-confidence and motivation.

Locke and his colleagues established a simple and widely accepted definition of the term *goal*. Simply put, a goal is "what an individual is trying to achieve; it is the object or aim of an action, usually within a specific time limit" (Locke, Shaw, Saari, & Latham, 1981, p. 126). The definition of a goal provided by Locke et al. (1981) is a very good general description, but as goal setting became popular in sport psychology, researchers saw the need to make distinctions between different types of goals. Sport psychologists differentiate between subjective, general objective, and specific objective goals (McClements, 1982, as cited by Gould, 1998), as well as outcome, performance, and process goals (Burton, 1989).

Subjective goals are those that include general statements of intent, such as "I want to swim fast", or "I want to have fun" (Weinberg & Gould, 1999). General objective goals are those that focus on accomplishments such as making a team or winning a championship. Specific objective goals are different from general objective goals in that specific objective goals are stated in measurable, verifiable terms, such as setting a goal time to achieve in a certain swimming event.

Burton (1989) separates objective goals into three different realms: outcome, performance, and process goals. Outcome goals refer to the winning or losing of a certain event or scoring more points than an opponent. Burton also states that outcome goals not only depend on the ability of the athlete, but also on the ability of the opponent as well. For example, a swimmer could achieve a personal best time in an event, but because the swimmer did not finish in first place, he or she would not have achieved his or her outcome goal. Performance goals are achieved when an athlete's actual performance in improved upon from previous performance. That is, performance goals are not dependent upon winning or losing, but rather on the comparison of the athlete's previous performances. For example, a swimmer who improves his or her time in the 100 freestyle by two seconds would achieve his or her performance goal. Process goals are focused on the specific technique or skills that are needed to improve the overall performance of an athlete to perform well. Process goals are usually focused on during practice settings rather than competitive settings. For example, a swimmer may set a goal of holding his or her streamline past the flags off of each wall. The distinction between

different types of goals is important because it helps sport psychologists, coaches, and athletes understand how and why goal setting is effective in enhancing performance.

Locke et al. (1981) suggest performance is affected by goals in four different ways. First, goals help important characteristics of certain tasks become accessible and are brought to the performer's attention so that he or she can take action. Second, goals help generate excitement about achieving the goal and thus serve as motivation. Third, setting goals helps to provoke immediate effort to achieve the goals and also helps to perpetuate the effort until the goals are achieved. Finally, the goal setting process helps to develop and apply new strategies in performance methods.

Burton (1983, as cited by Gould, 1998) proposed that anxiety, self-confidence, and motivation are all influenced by an athlete's goals. Burton suggests that athletes should not focus solely on outcome goals. Only focusing on outcome goals can result in unrealistic expectations because these types of goals do not depend only on the athlete. The unrealistic expectations that outcome goals bring about can lower an athlete's self-confidence, motivation, and effort, and can increase anxiety and lead to poor performance. Instead, Burton suggests that performance goals need to be set. Unlike outcome goals, performance goals help the athlete form realistic expectations, which can increase an athlete's self-confidence, motivation, and effort, and can decrease anxiety and lead to improved performance.

Burton (1989) examined the impact of performance goals on collegiate swimmers' cognitions and performance. Members of a collegiate swim team participated in a season long goal setting training program that examined the effects of setting individual performance goals compared to setting outcome goals that focused on winning or finishing in a certain place. Swimmers completed various questionnaires, including the CSAI-2, and a daily training log in which swimmers set performance goals before practices and which were evaluated after each practice. During the five-month season, swimmers were educated on goal setting principles and met with the experimenter weekly to evaluate their personal goals. Overall results indicated that the goal setting training program was successful in enhancing swimmers' perceived ability, competitive cognitions, and actual performance. Specifically, swimmers who showed a higher ability to successfully set performance goals were less anxious and performed better than swimmers with a lower ability to successfully set performance goals.

Although results from Burton's (1989) study supports the effectiveness of setting performance goals, a study by Zimmerman and Kitsantas (1997) examined the effects of process goals, rather than performance goals, on a dart-throwing task. Results from the study showed that process goals helped improve skill acquisition more effectively than performance goals. In fact, Kingston and Hardy (1997) suggest that the reason process goals may be more useful alone or in conjunction with performance goals is that performance goals create stress and anxiety due to the high level of importance and action requirements that are necessary to accomplish performance goals. Because process goals are more specific, they direct the athlete to the behaviors to engage in during performance and they can help alleviate stress and anxiety.

Kingston and Hardy (1997) used golfers to compare the effect of a goal-setting program focused on process-oriented goals with a traditional (performance-oriented) goal-setting program and a no training condition. Golfers were given various questionnaires at the beginning of the study including those to assess skill level and competitive state anxiety (CSAI-2). After being randomly assigned to a condition, golfers were given a goal-setting program to follow for 54 weeks. Results from this study indicated that the group using the process-oriented goal-setting program improved on skill level at an earlier stage than the group using a typical, performance-oriented goal-setting program. In addition, the group using process-oriented goal setting showed large improvements in self-efficacy, control of competitive anxiety, and concentration. Further support of the use of outcome, performance, and process goals together comes from a study done by Filby, Maynard, and Graydon (1999). The participants in the multiple goal-setting group set

outcome, performance, and process goals, while the participants in the single goal-setting group set only outcome, performance, or process goals. Results from this study showed significant benefits of using a multiple goal-setting strategy. Participants in this group performed better in practice and competitive settings than participants using only one type of goal or no goals at all.

The Present Study

A substantial amount of research and debate on the relationship between competitive state anxiety and sport performance has been completed. However, empirical findings investigating the relationship between certain psychological skills usage (i.e., imagery, goal setting, or relaxation) and competitive state anxiety have not been researched in depth. Therefore, the goal of the present study was to investigate the effects of psychological skills usage on competitive state anxiety. Specifically the effect of imagery, goal setting, and relaxation on competitive state anxiety in collegiate swimmers was examined. It was hypothesized that participants engaging in psychological skills training would report lower levels of cognitive and somatic anxiety and higher levels of self-confidence than the control group. It was also hypothesized that participants engaging in imagery training would report lower levels of cognitive and somatic anxiety and higher levels of self-confidence than all other groups.

Method

Participants

Participants consisted of 60 swimmers from an intercollegiate NCAA Division III liberal arts college swim team. The team was in-season during the duration of the study. All participants were volunteers. Interested participants were contacted after a team meeting and each participant completed a letter of informed consent.

The swimmers ranged in age from 18 to 22. There were 27 male participants and 33 female participants. The athletes were randomly assigned to four different experimental groups. Fifteen participants were assigned to each group: a control group, a goal-setting group, an imagery group, and a relaxation group. After beginning the experiment, four participants, two from the control group, one from the goal-setting group, and one from the imagery group, dropped from the experiment. Two of the participants left the swim team, and the other two did not come to any testing sessions.

Testing Materials

Competitive State Anxiety Inventory-2 (CSAI-2). In order to measure competitive levels of cognitive and state anxiety and self-confidence, participants were asked to complete the CSAI-2 (Martens et al., 1990). The CSAI-2 examines the intensity of competitive state anxiety and self-confidence. The scale is comprised of 27 items, with 9 items on each subscale. Example of cognitive anxiety items include "I am concerned about this competition" and "I am concerned I will not be able to concentrate." Somatic anxiety items include "My body feels tense" and "My hands are clammy." Self-confidence items include "I feel comfortable" and "I am confident I can meet the challenge." Participants indicated their responses on a 4-point scale ranging from 1 = *not at all* to 4 = *very much so*. Possible scores on each of the subscales range from 9 to 36 with the higher the score the greater the cognitive or somatic anxiety state or the greater the self-confidence. Martens et al. (1990) reported reliability coefficients ranging from .79 to .90, for the three CSAI-2 subscales respectively, which is an indication that the CSAI-2 has a high degree of internal consistency.

Sport Imagery Questionnaire (SIQ). A modified version of the SIQ, developed by Rainier Martens (Weinberg & Gould, 1999) was used to measure the participants' self-reported use of imagery. Participants were asked to complete a 16 item, self-report questionnaire relevant to swimming situations in order to assess his or her self-rating of imagery usage. The questionnaire includes four scenes common to sports: practicing alone, practicing with others, recalling a peak performance, and performing in a competition. Questions included "How well did you see yourself doing the activity?" and "How well did you see yourself in competition?" Participants are encouraged to take a minute to generate images and then are asked to rate the vividness of visual, auditory, kinesthetic, and mood the participant felt during imaging. Participants

indicated their responses on a 5-point scale ranging from 1 = *no image present* to 5 = *extremely clear and vivid.* The questionnaire was administered immediately after the first and last imagery session.

Mental Imagery Audiotape. Participants engaged in a 5-10 minute mental imagery exercise that was verbally administered by the experimenter the first time through. Subsequent training used a recorded audiotape of the same exercise. Participants were instructed to complete the exercise twice a week in the presence of the experimenter. Participants were shown to a secluded room where they were asked to stand, sit, or lie in a comfortable position with their eyes closed. The experimenter then instructed the participants to take a deep breath and visualize an aspect of their performance in the exact way that they would like to perform in reality. The experimenter sequentially talked the participants through a race. For example, the experimenter began by saying, "Imagine you are stepping up onto the block. Now imagine taking your mark, hearing the start, and diving into the water" and so on.

Progressive Muscle Relaxation Audiotape. Modeled after Jacobson's (1938) technique, participants engaged in a 5-10 minute relaxation exercise that was verbally administered by the experimenter the first time through. Subsequent training used a recorded audiotape of the same exercise. Participants were instructed to complete the exercise twice a week in the presence of the experimenter. Participants were shown to a secluded room where the lights were turned off, and participants were instructed to lie down on their back. The exercise began with the experimenter instructing the participant to contract a muscle group and concentrate on the feelings of tension that are produced and then instructed the participant to relax the muscle group and concentrate on the feelings of relaxation produced. The experimenter started with the dominant hand and arm, and then proceeded to the nondominant hand and arm, face, neck, shoulders, back, abdomen, buttocks, dominant leg, nondominant leg, and feet.

Goal Setting Strategy Handout. In order for participants to effectively use goal setting to enhance performance, they were given a handout with suggestions about how to set goals. For example, it is suggested that in order for a goal to be most beneficial to the athlete, the goal must be specific and quantitative. The last page of the handout consisted of blank sheet of paper as a place to write practice and competition goals.

Procedure

The experimenter met with the participants from the swim team to explain what their involvement would entail. The participants were told that they could discontinue their participation in the study at any time. Each swim team member who agreed to participate in the study signed informed consent forms, and then participants were told which experimental group they were assigned to. Participants were asked to complete the CSAI-2 approximately 1 hr before competition in the first swim meet of the season, which was held on a Friday. Jones, Swain, and Cale (1990) employed this timing and found it acceptable because it did not interrupt the swimmers' warm-up routine. It was emphasized that every question should be answered honestly, that there were no right or wrong answers, and that each questionnaire would be treated with complete confidentiality.

Beginning the following Monday, participants began the psychological skills training twice a week for a total of ten times. After five weeks, participants were asked to complete the CSAI-2 again, approximately 1 hr before competition in a final swim meet. Control group participants were told that they were participating in an experiment examining competitive anxiety as a season progresses.

At the completion of the experiment, participants were thanked for their involvement, were debriefed on the purpose of the study, and had the option of having their scores sent to them via mail.

Results

As an initial test of the hypothesis that participants engaging in psychological skills training would report lower levels of cognitive and somatic anxiety and show higher levels of self-confidence than the control group over time, a 4 (condition) X 2 (time of test) mixed analysis of variance was performed on each subscale of the CSAI-2.

Unfortunately, because the groups differed initially in levels of anxiety, the results of the ANOVAs did not provide clear tests of the hypothesis. As an alternative, paired *t* tests were used to compare pre- and post-training scores on each subscale for each training condition. One-tailed tests were used because it was expected that both cognitive and somatic anxiety would decrease over time and that self-confidence would increase over time. The means used in these tests are presented in Table 1.

As expected the imagery training resulted in lower cognitive anxiety ($t(13) = 2.44, p = .015$), lower somatic anxiety ($t(13) = 2.01, p = .033$), and higher self-confidence ($t(13) = 2.01, p = .033$) post-training compared to pre-training.

The goal setting group showed lower levels of cognitive anxiety after training ($t(12) = 2.21, p = .024$), but no improvements in somatic anxiety or self-confidence. Training in relaxation did not result in any significant changes in the levels of anxiety or self-confidence.

Interestingly, the control group showed reduced somatic anxiety ($t(12) = 3.45, p = .003$) and increased self-confidence ($t(12) = -1.88, p = .043$) over the course of the swimming season, but no improvement in cognitive anxiety. The absolute level of improvement in the control condition was not as large as that in the imagery condition.

Participants in the imagery group also completed the SIQ two separate times. The SIQ was distributed to participants in the imagery group immediately after the first and last training sessions to describe how vividly and effectively the participants were able to use imagery throughout training. Participants' scores increased from the first training session ($M = 53.50$, $SD = 7.501$), to the last training session ($M = 58.07$, $SD = 9.119$), $t(13) = -1.72$, $p = .055$, one-tailed.

Discussion

Participants from all conditions revealed lower levels of cognitive and somatic anxiety and higher levels of self-confidence from pre- to post-testing, though not all effects were statistically significant. The imagery group was the only treatment in which a significant decrease in both anxiety levels and a significant increase of self-confidence level was revealed. Participants in the imagery group also revealed higher scores on the SIQ from pre- to post-testing, which suggests that participants' imaging became more vivid and participants used imagery training effectively over the training period.

It was predicted that the CSAI-2 subscales would change as a function of time. Anxiety was expected to decrease after a psychological skills training program was completed, while self-confidence was expected to increase after participants completed a psychological skills training program. In partial support of the hypothesis, the results indicated that no matter the condition, all participants, even those in the control group, reported lower levels of anxiety and higher levels of self-confidence from pre- to post-testing. It appears likely that the swimmers' anxiety levels decreased and self-confidence levels increased over time because the competition situation became less threatening and participants did not perceive the situation as a negative evaluation. Hale and Whitehouse (1998) suggest that when athletes perceive a situation as a threat and as a possible negative evaluation of themselves, their levels of cognitive and somatic anxiety are high and level of self-confidence is low. Another possible explanation for the findings is that participants could have already possessed levels of self-confidence high enough to facilitate anxiety symptoms and participants in the experimental groups maintained or increased self-confidence with the use of psychological skills training. Hanton et al. (2004) suggest that low self-confidence can negatively affect anxiety symptoms and perceived control. They posit that psychological skills training can help to maintain and increase self-confidence levels.

The use of specific psychological skills has been previously shown to enhance performance, yet the use of those skills has not previously been shown to consistently decrease competitive anxiety. The results of the present study fully support the prediction that imagery would be the most beneficial psychological skill in reducing anxiety and increasing self-confidence over time compared to using goal setting, relaxation, or no skill at all. In support of the hypothesis, the results revealed that participants in

the imagery group decreased cognitive and somatic anxiety, and increased self-confidence consistently more than any other condition from the first competition to the final competition.

VanDenberg and Smith (1993; as cited by Vadocz et al., 1997) administered the CSAI-2 to high school wrestlers before and after a nine-week combined imagery and relaxation training program, and also to a control group. VanDenberg and Smith revealed that cognitive and somatic anxiety both decreased significantly for participants in the experimental group, but not for the control group. Although imagery and relaxation were both used for the study, the results provide support for the use of imagery as a way to reduce competitive anxiety. Page et al. (1999) also used the CSAI-2 in a study to determine the effect of a single imagery session on competitive anxiety in collegiate female swimmers. Results from the study revealed an overall reduction of both cognitive and somatic anxiety and an overall increase of self-confidence, suggesting that imagery does in fact help reduce levels of competitive anxiety.

Participants in the imagery group completed the SIQ after the first and last training sessions in order to measure imagery ability. The results from the SIQ revealed that imagery participants improved their imagery ability over the 5-week training period. Imagery ability has been thought to influence the use of imagery and the effect it has on competitive anxiety (Hall, Buckolz, & Fishburne,1992). Previous research by Vadocz et al. (1997) support the hypothesis that high imagery ability is associated with higher imagery use, and therefore lower competitive anxiety and higher self-confidence.

Goal setting is regarded as a beneficial psychological skill in enhancing performance within sport psychology. Research in anxiety reduction with the use of goal setting is sparse, though. Results from the present study revealed that participants in the goal setting group only significantly decreased cognitive anxiety levels over the course of training. One possibility for the present findings is that participants were asked to set several different kinds of goals, such as outcome, performance, and process goals. Previous research is equivocal on which type of goal is the most beneficial. Burton's research (1989) revealed that performance goals led swimmers to perform better, but also to form realistic expectations, which, in turn, resulted in higher self-confidence and lower cognitive anxiety. Because of the results of past research, participants in the present study were asked to set various types of goals. Therefore, the participants in the goal-setting group may not have benefited fully from the training because of the variety of goal setting techniques specified in the handout. Also, the training for the participants in the goal setting group was more indirect than training for imagery or relaxation in that participants were asked to write goals the first training session, but only to re-evaluate and add goals in subsequent training sessions. Participants in the goal setting group only had to re-read what they had written each session, which is less time consuming and demanding than the training for imagery and relaxation in which participants had to listen to recorded instructions each training session.

Similar to goal setting, previous research has shown that relaxation is a way to help enhance performance, but research regarding anxiety reduction and relaxation use is even more limited. Results from the present study revealed that participants in the relaxation group did not significantly decrease cognitive or somatic anxiety levels and did not significantly increase self-confidence over the course of training. Previous research on the effects of relaxation on anxiety has shown that relaxation is more effective when combined with imagery training in reducing anxiety (Weinberg et al., 1987). The present study did not combine relaxation and imagery training therefore, this is a possible explanation of why results of the relaxation group were not significant in reducing anxiety. Also, the duration of training for PMR may have been too short for athletes to develop an unconscious, automatic effort to relax tensions that might inhibit anxiety reduction before competition, which is the goal of PMR (Williams & Harris, 1998).

Whereas participants in both the goal setting and relaxation groups did not significantly reduce anxiety or increase self-confidence, participants in the control group did not significantly decrease cognitive anxiety, but did significantly decrease somatic

anxiety and significantly increased self-confidence. This could be a result of the initial inequality in experimental groups. Post-testing, the control group reported the lowest levels of cognitive anxiety compared to all other conditions, although the control group also reported the lowest levels of cognitive anxiety pre-testing. It seems likely that the groups differed in skills in spite of random assignment to conditions.

Advances in the area of psychological skills training and competitive anxiety have been encouraging in previous literature. However, this study indicates that many issues remain that need to be more thoroughly researched. Much of the research concerning competitive anxiety and psychological skills only use a combination of one or two psychological skills, instead of the use of multiple skills separately. Also, much of the research has put an emphasis on using psychological skills in order to enhance performance, rather than decrease anxiety. Results from previous studies that have examined anxiety reduction with the use of psychological skills training have been mixed, which makes it difficult to design strategies and techniques that would optimize the reduction of anxiety for all types of athletes.

The present study has highlighted some important issues for sport psychologists, competitive state anxiety researchers, coaches, and athletes, especially swimmers. The relationship between the use of psychological skills and the amount of anxiety experienced by the athlete has important implications for mental preparation and pre-competition routines. Research in this area can provide concrete guidelines for when and how to use psychological skills training to enhance mental preparation and reduce competitive anxiety. While some previous studies, such as Page et al. (1999), have only used certain psychological skills for a short period of time, other studies such as Burton (1989) have used certain psychological skills for the duration of a sport season. Results from both of these studies showed that the psychological skills used were able to enhance athlete performance and help reduce anxiety. Further research should focus on determining a practical time to implement psychological skill training programs that will provide the most beneficial results for competitive anxiety reduction.

Another important implication from the present study is the determination of a psychological skills training program most beneficial in reducing competitive anxiety. The present study revealed that imagery was the best psychological skill in reducing competitive anxiety. Previous studies, though, have shown that a combination of imagery and relaxation is the most beneficial for competitive anxiety reduction (Weinberg et al., 1987). According to Williams and Harris (1998), an athlete's physical control, such as skill level, strength, or technical skills, rarely changes during competition or between two competitions that closely follow each other. An athlete's mental control, on the other hand, varies greatly during the course of a competition. An athlete can easily lose concentration or become nervous and focus on negative aspects of the competition, which in turn can negatively affect the athlete's subsequent performance. The use of a training program can be extremely helpful in preventing variability in mental control, especially in reducing anxiety and increasing self-confidence, and has potential to positively affect an athlete's performances.

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Table 1

Mean Scores on the Three Subscales of the CSAI-2 as a Function of Psychological Skills Training and Time of Test (With Standard Deviations in Parentheses)

		CSAI-2 Subscale		
Condition	Time	Cognitive Anxiety	Somatic Anxiety	Self-Confidence
Imagery	Pre-Training	20.29 (4.07)	18.36 (5.09)	20.79 (6.15)
	Post-Training	18.07 (3.65)	15.64 (4.52)	25.00 (5.78)
Goal Setting	Pre-Training	18.69 (3.12)	17.08 (4.86)	24.08 (5.19)
	Post-Training	16.92 (2.90)	15.77 (4.97)	24.62 (3.73)
Relaxation	Pre-Training	19.53 (5.59)	16.93 (2.84)	22.07 (3.94)
	Post-Training	19.40 (5.49)	16.40 (3.89)	23.27 (5.13)
Control	Pre-Training	15.77 (2.62)	18.31 (2.02)	22.54 (4.31)
	Post-Training	15.23 (4.00)	15.85 (2.82)	24.31 (4.61)