

## **An Analysis of Mental Training Programs' Influences on Intercollegiate Female Athletes' Selected Psychological Skills: A Single-Subject / Qualitative Design**

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### **Abstract**

A single-subject/qualitative design was employed to determine if psychological skills training (PST) programs influenced athletes' levels and interpretations of anxiety, concentration, motivation, and coping resources. Two female collegiate swimmers high in anxiety and low in motivation and coping skills were selected from a participant pool of 53 swimmers, divers, volleyball, and soccer players. Both athletes completed an inventory packet consisting of a modified version of the Sport Anxiety Scale (SAS), Sport Motivation Scale (SMS), and the Athletic Coping Skills Inventory-28 (ACSI-28) as well as an interview before and after an eight-week personalized PST program. Overall, the findings in this study were positive and indicated benefits from the PST program. Results indicated positive changes in both participants. Both had a reduction in total anxiety levels and an increase in total personal coping resources. Results are discussed in terms of overall strengths, weaknesses, and recommendations for future research.

The anxiety and performance relationship has been studied extensively in the field of sport psychology. Consequently, many theories have evolved from the research literature. From the drive theory (Spence & Spence, 1966) to the catastrophe cusp theory (Hardy & Fazey, 1987 as cited in Gould & Krane, 1992), researchers have sought to explain how arousal and anxiety affect performance both inside and outside of sport. Anxiety can be divided into various dimensions such as trait, state, somatic, and cognitive anxiety (Spielberger, 1966; Davidson & Schwartz, 1976). To obtain objective measures of anxiety and its various dimensions, several inventories have been developed to measure the distinct dimensions.

One inventory commonly used in sport is the Sport Anxiety Scale (Smith, Smoll, & Schutz, 1990). The SAS is a trait anxiety inventory that measures cognitive anxiety, somatic anxiety, and concentration disruption levels of athletes. Although the SAS is a reliable and valid measure, it strictly measures the amount (or intensity) of anxiety that athletes experience.

Facilitative and debilitating anxiety refers to whether a person perceives anxiety to be beneficial or detrimental to performance, respectively. Alpert and Haber (1960) discovered the value of distinguishing between facilitative and debilitating anxiety when using the Anxiety Achievement Test, which proved to be a better predictor of academic performance than traditional debilitating anxiety scales. In 1977, Mahoney and Avenier also discovered that anxiety in sport does not necessarily have to carry a negative connotation. The gymnasts with superior performances in this study used different methods of coping with anxiety. This may suggest that athletes could be taught to capitalize on anxiety's energizing properties

in a manner that is conducive to enhanced performance.

Jones and Swain examined directional interpretations of anxiety and have found relationships between an athlete's directional interpretation of anxiety and levels of competitiveness and performance (Jones & Swain, 1992; Jones, Swain, & Hardy, 1993). Highly competitive groups reported anxiety to be more facilitative than athletes who were less competitive. Likewise, good athletic performances were associated with more facilitative cognitive anxiety interpretations compared to poor performances. Facilitative and debilitating interpretations with respect to elite and non-elite athletic status were also studied (Jones, Hanton, & Swain, 1994; Jones & Swain, 1995; Lanzillo, Burke, Joyner, & Hardy, 2001). Elite athletes were found to have more facilitative interpretations of anxiety compared to their non-elite counterparts, while no significant differences were found in the amount of anxiety experienced.

Another common factor in athletic performance is motivation. Some researchers have sought to understand and measure motivation in terms of choice, effort, and persistence of certain behaviors (i.e., Smith, Smoll, & Curtis, 1979) while others have sought to understand motivations in terms of individual factors such as intrinsic psychological needs or external rewards (Deci, 1975; Deci & Ryan, 1985). Whether investigating motivation from the outcome or individual factor perspective, it is important to remember that the two are not independent of one another (Weiss & Chaumeton, 1992).

Researchers have found that an athlete's motivation level has subsequent consequences on athletic performance (Pelletier et al., 1995). As athletes' motivations to participate becomes more self-determined, they

are likely to display greater persistence (Pelletier, Brière, Blais, & Vallerand, 1988) and greater interest and satisfaction with their sports (Brière, Vallerand, Blais, & Pelletier, in press as cited in Pelletier et al., 1995). Considering the potential consequences of motivation, Pelletier et al. (1995) translated a French motivation inventory (EMS) to measure the various components of sport motivation. The EMS has subsequently been translated and validated in English, and is known as the Sport Motivation Scale (SMS). The SMS measures intrinsic motivation, extrinsic motivation, and amotivation (Pelletier et al., 1995).

Many different psychological skills training (PST) programs have been developed to teach athletes skills and techniques such as anxiety management, imagery, goal setting, concentration, self talk, thought stopping, and confidence (Weinberg & Williams, 1998). In fact, a growing body of empirical literature demonstrates the effectiveness of PST programs (Carboni, Burke, Joyner, Hardy, & Blom, 2002; Greenspan & Feltz, 1989; Vealey, 1994; Weinberg & Comar, 1994; Wilson, Burke, Joyner, & Hardy, 1998). Weinberg and Gould (1999) advocate the use of oral interviews and various written psychological inventories when designing individualized PST programs to optimize the effectiveness of the program. One such inventory that measures a variety of psychological skills is the Athletic Coping Skills Inventory – 28 (ACSI-28; Smith, Schutz, Smoll & Ptacek, 1995).

Martens (1987) requested that sport psychology professionals remain open to different scientific paradigms and research strategies. Smith (1988) also suggested that case studies and single-subject designs might provide insights important to the study of sporting behavior and the effectiveness of interventions. Case studies and single-sub-

ject designs allow researchers to investigate the internal experiences of participants. These designs are particularly useful when determining the effectiveness of psychological skills training due to the need for individualization. Previous studies have used single-subject designs to study the effectiveness of psychological interventions and their relationship to performance with notable success (Carboni et al., 2002; Greenspan & Feltz, 1989; Kendall, Harveaiko, Martin, & Kendall, 1990; Swain & Jones, 1994).

The purpose of this study was to determine if psychological skills training (PST) programs influenced athletes' levels of cognitive and somatic anxiety, interpretation of anxiety, concentration disruption, motivation, and coping resources. A single-subject design was chosen due to the need for individualization in PST programs. Two athletes with high intensity levels of debilitating cognitive and somatic anxiety as well as concentration disruption as measured by a modified version of the SAS; high levels of amotivation and extrinsic motivation, or low levels in intrinsic motivation as measured by the SMS, and/or limited personal coping resources as measured by the ACSI-28 were chosen to participate in the study and took part in an eight hour individualized psychological skills training program over the course of 7 to 10 weeks. It was hypothesized that following the individualized PST program a) athletes would have lower levels of cognitive and somatic trait anxiety prior to competition, b) athletes would interpret their anxiety as more facilitative, c) athletes would have a lower incidence of concentration disruption, d) athletes would have greater intrinsic motivation or lower levels of extrinsic and amotivation, and e) athletes would have greater personal coping resources.

## Method

### *Participants*

The participants (N = 2) in this study were chosen from a NCAA Division 1 school in the Southeastern section of the United States. Participant ages were 21 and 19 respectively. Both of the participants were from the university swim team and both were Caucasian. The participants were chosen from a subject pool of 53 athletes representing various sports including women's volleyball, women's swimming/diving, and women's soccer. Departmental and university approval was obtained to insure the well being of the participants throughout the investigation.

## Measures

### *Modified Version of the Sport Anxiety Scale (SAS)*

The Sport Anxiety Scale was designed to assess cognitive and somatic dimensions of competitive trait anxiety. It consists of 21 items divided into three subscales: somatic anxiety (9 items), worry (7 items), and concentration disruption (5 items). Participants are asked to respond to statements such as, "I am concerned about choking under pressure" on a 4-point ordinal scale where one equals "not at all" and four equals "very much so." Cronbach alpha reliability coefficients were .88, .82, and .74 for the somatic, worry, and concentration disruption subscales respectively. Test-retest reliability over 7 days exceeded .85 across all scales. Convergent validity was supported by correlating SAS responses of high school athletes (n=837) with their responses to the Sport Competition Anxiety Test and, to a lesser extent, the State Trait Anxiety Inventory. Finally, football players' SAS scores were predictive of their pre-game Tension and Confusion subscale scores on a short-

ened version of the Profile of Mood States, which established predictive validity (Smith, Smoll, & Schutz, 1990).

A directional scale was added to the SAS for the purpose of this study. Participants were asked to rate the degree to which the intensity of each symptom experienced is perceived to be either facilitative or debilitating to athletic performances. This was assessed on a scale ranging from -3 (very debilitating) to +3 (very facilitative).

### *Sport Motivation Scale (SMS)*

The SMS was designed to assess various components of intrinsic motivation, extrinsic motivation, and amotivation in the sport context. This scale consists of 28 items divided into seven subscales (four items each), which assess three types of intrinsic motivation (IM-to know, IM-for accomplishment, and IM-for stimulation) and extrinsic motivation (EM-external pressure, EM-internal pressure, and EM-identification) as well as a subscale to assess amotivation. Participants answer each statement based on the question, "Why do you practice your sport?" and then rate each statement on a 7-point Likert scale where 1 equals "not corresponding at all with why I practice" and 7 equals "corresponding exactly with why I practice." Cronbach alpha coefficients (N=593) ranged from .63 (EM-identification) to .80 (IM-to know, IM-for accomplishment) with a mean alpha coefficient of .75 reported. Confirmatory factor analysis (LISREL 7) supported the hypothesized seven-factor structure of the SMS. In addition, construct and convergent validity were demonstrated (Pelletier et al., 1995).

### *Athletic Coping Skills Inventory-28 (ACSI-28)*

The ACSI-28 was designed to measure individual differences in psychological skills within a sport context. It contains 28 items

and seven subscales: coping with adversity, peaking under pressure, goal setting/mental preparation, concentration, freedom from worry, confidence and achievement motivation, and coachability. Participants respond to each item on a 4-point Likert scale with 0 representing almost never and 3 representing almost always. Cronbach alpha coefficients (N=1027) ranged from .62 (concentration) to .78 (peaking under pressure). A total (Personal Coping Resources) alpha of .86 was reported. Smith et al. (1995) reported both convergent and predictive validity for the ACSI-28.

### **Procedure**

The coaches of the teams were contacted, informed about the purpose of the study, and asked to participate before setting up a time to meet with the athletes. At the team meetings, all athletes from the volleyball, swimming/diving, and soccer teams completed an inventory packet consisting of a letter of informed consent, the modified SAS, SMS, and the ACSI-28 without the coaches present. Athletes were identified for inclusion in the study based on how many of their scores fell above the 75% quartile for somatic anxiety, worry, concentration disruption, total anxiety levels on the SAS as well as the three extrinsic (EM-external control, EM-internal pressure, and EM-identification) and amotivation subscales on the SMS. Additionally those scores that fell below the 25% quartile for the three SAS directional subscales (somatic, worry, and concentration disruption), the three intrinsic motivation subscales (IM-for accomplishment, IM-for stimulation, and IM-to know) and all of the ACSI-28 subscales were flagged. Seven athletes who had the met the aforementioned criteria on over half of all the subscales (12 out of 22) were contacted about participating in the study; all but one were swimmers and the other was a soccer player. Two swimmers agreed to participate in the study, and

private, individual meetings were scheduled for the following week. The remainder were contacted two other times, but all declined to participate. One final attempt was made, and the athletes were offered the chance to participate with a lesser time demand (i.e., as controls receiving no intervention, but still participating in the interview and data collection), but all declined again.

At the individual meetings with the two participants, the researcher's educational approach to psychological skills training was discussed, the inventory packet was completed again, and an initial, semi-structured oral interview was conducted. The purpose of the interview was to determine how the athletes perceive their current psychological skills and to assure that the anxiety, confidence, motivation and coping resources they reported on the inventories coincided with their interview responses. The interview was also vital in deciding which psychological skills to focus on during the intervention.

Based on interview and inventory scores, needs assessments were developed with the assistance of an AAASP certified consultant, which served as a guide for developing the participants' intervention programs. Next, a second meeting was scheduled in which each athlete was provided with a copy of the needs assessment and an oral explanation of the evaluation. The needs assessments provided the athletes with written feedback about their current psychological strengths and weaknesses as well as psychological skill suggestions. Each of the athletes had an opportunity to agree/disagree or expound upon the assessment. The implementation of the individualized PST program then commenced. Although schedules varied due to individual needs, the PST consultant met with participant 020 for a total of 8.75 hours in 8 sessions over 10 weeks, and met with

participant 021 for a total of 8 hours in 7 sessions over 7 weeks.

Participant 020's first session was devoted to the second completion of the inventory packet and the initial interview (1 hour). The second session consisted of a review of the needs assessment (10 minutes), a self-talk lesson (40 minutes) and completing performance feedback sheets (10 minutes) to increase awareness of self-talk. Ways to interrupt and change negative self-talk were also discussed. The third session was devoted to concentration and arousal management through concentrated breathing techniques (1 hour). During the fourth session, progressive relaxation was discussed (20 minutes) and practiced (40 minutes). Participant 020's fifth session was a review of the relaxation techniques covered to that point (20 minutes) and imagery exercises (40 minutes) to optimize the vividness and controllability of images. Session six was devoted to debriefing the events of the swim team's final meet (1 hour). The seventh session was a discussion about goal setting (30 minutes) and goal setting exercises (30 minutes). Finally, the eighth session was a discussion about concentration (25 minutes), concentration exercises (25 minutes), and the completion of the final inventory packet, final interview, and social validity questionnaire (55 minutes). The social validity questionnaire was adapted from Weinberg and Gould (1999) and consisted of questions to assess the PSC/researcher's characteristics and the effectiveness of the intervention program. Each participant reported answers on a 7-point Likert scale.

Participant 021's first session consisted of completing the inventory packet again and the initial interview (1 hour). The second session was a review of the needs assessment (10 minutes) and how to use self-talk to build and maintain confidence (50 min-

utes). Session three was used to learn about imagery and its uses (1 hour). In session four, imagery scripts were designed for the participant to help build confidence and maintain the appropriate arousal level (60 minutes). The fifth session took Participant 021 through an active progressive relaxation exercise (20 minute discussion; 40 minute practice). Session six was a concentration lesson (25 minutes) followed by concentration exercises (35 minutes). And, the final session was devoted to goal setting discussion (20 minutes) and practice (10 minutes) followed by the inventory packet, final interview, and social validity questionnaire (1 hour).

Because the athletes were at various points in their seasons upon the start of the PST program, an A-B single-subject design was used in this study. Descriptive statistics were calculated to determine inventory means for the entire sample and each sport. Additionally, one-way ANOVAs and Scheffe post hoc tests were conducted to determine if the inventory scores of the three teams were significantly different.

Each participant's answers to the initial and final interview questions were compared to their scores on the respective inventories by the researcher and three independent observers. Two of the three independent observers were AAASP certified consultants and the other holds a Master of Science degree in Kinesiology with an emphasis in sport psychology. Interobserver agreement was reported for each participant's initial and final interview to determine the correspondence between the interview answers and the time 2 and time 3 scores.

Graphic representations of the results for cognitive and somatic anxiety levels, directional interpretations of anxiety levels, concentration disruption levels, motivation, and

personal coping resources were presented for each participant. Results were examined for decreases in anxiety intensity levels, debilitating anxiety interpretations, and concentration disruption, and increases in intrinsic motivation and personal coping resources.

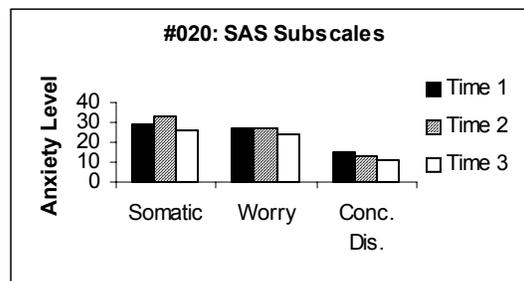
## Results

### *Participant 020*

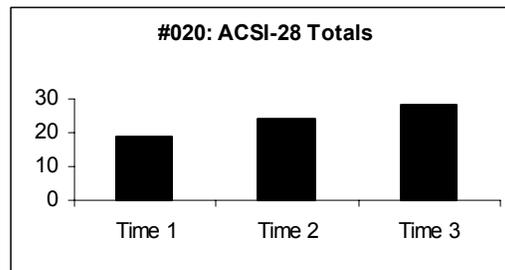
Initially (time 1), participant 020 had 18 scores that exceeded the cutoffs. When she completed the same inventory packet at the start of the intervention phase (time 2), 17 of her scores exceeded the cutoff. The only subscale cutoff she did not exceed on the SAS was the concentration disruption level. On the SMS, the scores that exceeded the cutoff were for amotivation, IM-for accomplishment, and IM-for stimulation. All eight scores on the ACSI-28 exceeded the cutoff.

With regard to changes in anxiety, motivation, and coping skills after the PST program, there were several positive changes found across the three time periods. Participant 020's total anxiety level was reported to be 73 prior to the intervention and 61 following the intervention. All of the anxiety levels were reduced (see Figure 1), and all of the directional scores became more facilitative with the exception of the concentration disruption direction scale, which remained the same. The greatest change was found in her SMS scores. The amotivation score dropped from 27 (Time 1) to 7 (Time 3). Her scores also indicated a shift to the higher end of the self-determinism continuum. While the coping resources as measured by the ACSI-28 did increase (see Figure 2), the change was not as marked as with the other two inventories.

*Figure 1.*  
Participant 020's Sport Anxiety Scale subscale levels.



*Figure 2.*  
Participant 020's Athletic Coping Skills Inventory-28 total scores



According to participant 020's social validity questionnaire, she believed the PST program was beneficial to her sport performance. She reported that her performance anxiety had been reduced, she no longer interpreted her anxiety to be as debilitating as before, her concentration disruption had been reduced, her motivation had increased, and her ability to cope with sport related stress had increased. Further, she reported the PST program was enjoyable and that the PST consultant was flexible and easy to relate to.

### *Participant 021*

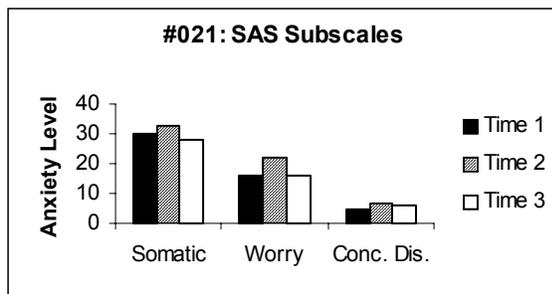
The first time the swimmers completed the inventory packet, participant 021 met or exceeded 12 of the cutoff scores for inclusion in the study. The second time, immediately preceding the PST program, she met or ex-

ceeded 10 of the cutoff scores. At the completion of the study, she met or exceeded only six of the cutoff scores.

Participant 021's SAS scores were similar for Time 1 and Time 3 with anxiety levels (see Figure 3) and debilitating interpretations during Time 2. Participant 021's most dramatic (dramatic & drastic) change over time was the ACSI-28 scores. Her total personal coping resources score (see Figure 4) was increased from 39 (Time 1) to 56 at the conclusion of the study. Her extrinsic motivation was decreased, however, her intrinsic motivation decreased as well.

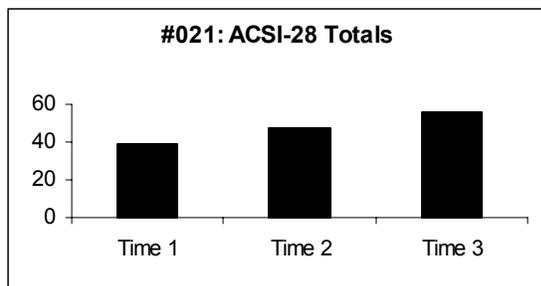
*Figure 3.*

Participant 021's Sport Anxiety Scale subscale levels.



*Figure 4.*

Participant 021's Athletic Coping Skills Inventory-28 total scores.



According to participant 021's social validity questionnaire, the PST program was only marginally helpful to her sport performance.

She did report that her anxiety interpretations had become much more facilitative following the PST program. This report collaborated with her directional scores on the SAS at Time 3 compared to Time 2 and 1.

## Discussion

The purpose of this study was to determine if a psychological skills training (PST) program could influence athletes' anxiety levels and interpretations as measured by the Sport Anxiety Scale, motivation as measured by the Sport Motivation Scale, and coping skills as measured by the Athletic Coping Skills Inventory-28, and qualitative questions. It was hypothesized that following a PST program, athletes would have lower levels of cognitive and somatic anxiety, more facilitative interpretations of anxiety, lower amotivation and extrinsic motivation, and higher levels of intrinsic motivation as well as personal coping resources. The two female swimming participants both had lower cognitive and somatic anxiety levels and more facilitative anxiety interpretations following the PST program. Both of the participants also had an overall increase in personal coping resources as well. While participant 021's extrinsic motivation decreased, so did her intrinsic motivation. Participant 020, on the other hand, experienced an increase in intrinsic motivation and a decrease in amotivation. Her extrinsic motivation scores increased as well, however, her overall motivation became more self-determined as compared before the PST program.

The qualitative aspect of this study added considerable depth to understanding how different athletes experience anxiety and motivation. While the inventories provided a base level of understanding, the interviews allowed the researcher to better understand the particular situations where anxiety was and was not a problem. Allowing the ath-

letes to expand upon answers enabled personalized PST programs, which in turn enhanced the efficacy of the program. For instance, participant 021 stated that swimming in events that she was not used to swimming in, increased her negative self-talk and decreased her confidence. Interventions such as imagery and self-talk were then designed to address that particular issue.

This study also emphasized the need to distinguish between facilitative and debilitating anxiety. Participant 021 experienced high levels of somatic anxiety, however she stated that, "...If I wasn't like that [nervous stomach, dry mouth, increased heart rate], I wouldn't be ready. It would mean that I was taking the race too lightly and I wasn't ready for it..." Therefore, if successful attempts at reducing her somatic anxiety level were made, the result might have been more negative than positive.

When interpreting this study's results, several factors must be considered. At the start of the intervention, the swimmers were 10 – 11 weeks into the competitive season. The season subsequently ended four weeks through their intervention program. This could have affected the results for two reasons. One, it makes logical sense that the variables under investigation would be more severe at the height of the competitive season and less severe at the conclusion. Second, literature supports the notion of mood disturbances while training in high volume (Morgan, Costill, Flynn, Raglin & O'Connor, 1988; Morgan, Brown, Raglin, O'Connor & Ellickson, 1987; Raglin, Morgan & O'Connor, 1991).

There was also a head coaching change within three weeks of the first data collection. The head coach of the swim team resigned unexpectedly, and the assistant swim coach became the interim head coach. This

event was likely the cause for the spike in anxiety levels and directional interpretations at the second data collection, immediately preceding the intervention. Both of the athletes had different relationships with the original and new coach, which could have further influenced motivation or coping resources depending on whom they had a better working relationship with.

Participant 020 was a senior in college, while participant 021 was a sophomore. This could have affected the findings as well. Participant 020 had been swimming longer and reported burnout. At the end of the season, her college career was over, whereas participant 021 had two more seasons. The differences in motivation trends could be attributed to the differences in the participants' futures. Participant 020 was no longer bound to the swim team by scholarship, whereas participant 021 was. This could help explain why participant 020's motivation became more self-determined than participant 021's. However, participant 020 did continue to swim competitively, and when asked about her motivation she stated, "...I have those [upcoming] meets, and I want to do decent at them. If I don't go my best times, I won't cry over it, because I am done. It's just fun now. So, I am more motivated now than I was."

The previous statement adds validity to the distinction of extrinsic and intrinsic motivation variables. Motivation cannot be reduced to a single variable and a person cannot be described as either high or low in motivation. As the participants' comments and Deci (1975) suggest, many factors contribute to an athlete's overall motivation. At the start of the study, participant 020's main reason for participating in swimming was her scholarship, and she reported that she felt controlled by the team and coach requirements. When the external control was

lifted, her intrinsic motivation and joy for the sport increased.

Another limitation to this study was the lack of control participants. Participants were not recruited to participate as control participants for this study, which further prevents cause and effect to be determined. Having control participants could have helped to determine if the participants in the treatment group experienced more positive changes following the PST program compared to the control group. Control participants would also help to guard against the threat to internal validity known as statistical regression to the mean. Since the participants in this study were chosen based on their outlying scores, there is a chance that their scores would move closer to the mean with time. If there were control participants whose scores remained at the extremes, internal validity would be enhanced.

Even though there are reasons to view the positive results with caution, there are also reasons to be optimistic about the findings. Both of the participants reported that the PST program was beneficial to their sport training, had reduced anxiety levels, lessened debilitating interpretations, and increased personal coping resources. Participant 020's motivation became more self-determined as well. Also, Greenspan and Feltz (1989) and Weinberg and Comar (1994) have collectively reviewed 68 pub-

lished studies and concluded that, in general, psychological interventions that are educationally based effectively improved the competitive performance of college and adult athletes. Overall, the findings of the current study would support this conclusion. Further, the qualitative nature of this study enhances our understanding of anxiety, motivation, and coping resources.

Future studies could better continue to study the effectiveness of psychological skills training programs in several ways. Female collegiate swimmers were chosen for inclusion in this study; however, future researchers should look at males and other age groups to increase generalizability. Researchers should examine PST programs utilizing various individual and team sports. Examining performance outcomes versus or in addition to psychological indices could also provide valuable feedback. Current research has focused on implementing PST with individual athletes from various teams and then examining psychological indices or performance outcomes. It would be interesting to see the effects that PST could have when designed for particular teams. Further, future researchers should incorporate control participants within the design of the study to determine cause and effect with more certainty. This is a practical area of interest with real world implications for sport in today's society.

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