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State Anxiety Factors with Road Race Competitors

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State Anxiety Factors with Road Race Competitors

Walter Clayton Davis, B.A.

**An Abstract Presented to the Faculty of the Graduate
School of Lindenwood College in Partial
Fulfillment of the Requirements for the
Degree of Masters of Art**

September, 1995



Abstract

The purpose of this study was to examine any significant relationships between a variety of factors and state anxiety using road race athletes. The factors examined were age, years of racing, expectations, finishing place, and accuracy of expected finish. Sixty eight subjects completed the Competitive State Anxiety Inventory-2 (CSAI-2), an instrument that measures cognitive state anxiety, somatic state anxiety, and self confidence in a sports setting. Results indicate no significant relationships of gender, distance raced, and accuracy of pre-race expectations with CSAI-2 scores of the runners. Cognitive state anxiety was found to correlate to pre-race expectations (-.27). Self confidence correlated to age (.20), and somatic state anxiety correlated with age (-.43), expected finish (-.25), and actual finish (-.21). The CSAI-2 scores were also examined for any differences between runners who raced short distances (5 kilometers or less) and runners who raced long distances (more than 5 kilometers), along with examining for differences between male and female runners. No significant differences were found in CSAI-2 scores between genders, or short and long distance runners.

State Anxiety Factors with Road Race Competitors

Walter Clayton Davis, B.A.

**A Culminating Project Presented to the Faculty of the Graduate
School of Lindenwood College in Partial
Fulfillment of the Requirements for the
Degree of Masters of Art**

September, 1995

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Chapter I

Introduction

Anxiety in sports competition has been a topic that has created a large amount of research (Gould, Tuffey, Hardy, & Lochbaum, 1993). The purpose of this study was to examine age, years of racing, gender, distance raced, expectations, and finishing place and their relationship to anxiety in road race athletes. There are two different types of anxiety, namely trait and state anxiety (Karteroliotis & Gill, 1987; Martens, Vealey, & Burton, 1990; Ryska, 1993). State anxiety (A-state) is an existing emotional state of tension and worry that can be activated by the person under certain conditions (i.e. beginning of a competition or taking a test). Trait anxiety refers (A-trait) to existing anxiety levels that do not require activation by an internal or external event. The variables in this study were examined under specific conditions that can activate state anxiety. In this study the specific conditions were the competitive environment of road races. Trait anxiety was not examined in this study.

It is believed that competitive state anxiety is a multidimensional construct (Caruso, Dzewaltowski, Gill, & McElroy, 1990; Gould, Horn, & Spreemann, 1983; Karteroliotis & Gill, 1987; Martens et al., 1990; Swain, Jones, & Cale, 1990). Martens, Vealey, and Burton have broken the dimensions of competitive state anxiety into three components (1990). The first component is the cognitive A-state, which is the thoughts and concerns of the athlete about the competition. The second dimension of competitive

state anxiety is the somatic A-state. The somatic A-state are the physical symptoms that occur in relation to the competitive event, such as sweaty palms or a nervous feeling in the person's stomach. Self confidence of the athlete is the third factor of competitive state anxiety. The self confidence of an athlete can be defined as the amount of faith the athlete has in his or her athlete abilities.

The Competitive State Anxiety Inventory-2 (Martens et al., 1990) is a research instrument that measures the somatic A-state, cognitive A-state, and self confidence of athletes. Athlete was defined in this study as any individual competing in a sport, regardless of skill level. The Competitive State Anxiety Inventory-2 (CSAI-2) is the instrument that was used to measure the state anxiety of the road race athletes in this study. The CSAI-2 is a state anxiety measure developed specifically for research in sports psychology. It has been found to be a valid instrument for research of anxiety in the sports setting (Barnes, Sime, Dienstbier, & Plake, 1986; Burton, 1988, Jones, Swain, & Cale, 1990; Gould, Petlichkoff, Weinberg, 1984; Swain, Jones, & Cale, 1990; Taylor, 1987). The CSAI-2 yields three separate independent scores that measure the cognitive A-state, somatic A-state, and self confidence of the athlete.

Past research in state anxiety has examined the relationship of gender with state anxiety (Elko & Ostrow, 1985; Jones & Cale, 1989; Jones, Swain, & Cale, 1991; Wittig, Duncan, & Schurr, 1987). There was some indication of differences in state anxiety scores between men and

women athletes (Jones et al., 1991; Wittig et al., 1987) with men exhibiting slightly higher CSAI-2 scores. A problem with the studies of Jones et al. (1991) and Wittig et al. (1987) is that the men and women that participated in the research competed in separate sports, thus creating a different context for the two groups. A portion of the male athletes in Jones et al. (1991) competed in rugby, while a portion of the female athletes competed in netball, two very different sports.

It is not uncommon for men and women to be separated from each other in sports competition. There are different standards for men and women in most sports, such as in high school sports men play baseball and women play fast pitch softball. Baseball and softball are fairly similar in how the games are structured with only a few minor differences in rules and equipment, yet these minor differences create different settings. Road races are different from most sports in that men and women are not separated from each other. Men and women road race athletes cover the same distance, the same course, and run side by side with the only difference being that men's and women's results are separated from each other.

Past research has found that there is a relationship of state anxiety with the setting of the competition and with the expectations of the athlete (Jones et al., 1991; McCann, Murphy, & Raedeke, 1992; Power, 1982). Some settings produce higher levels of anxiety than others, for example, time trials for cyclists have been found to produce lower levels of state anxiety than organized races (McCann et al., 1992). The expectations and

state anxiety scores are lower for the time trial cyclists than the cyclists racing in a formal competition. There was also a relationship found between the expectations and the state anxiety of the athlete (Jones et al. 1990; Power, 1982) It was found that state anxiety increased as performance expectations increased.

This study examined various factors and their relationship to state anxiety in athletes. The factors studied were age, years of racing, gender, distance raced, expectations, actual finish, and accuracy of pre-meet expectations. Data was gathered to examine the following four research questions.

1. Is there a difference in the levels of competitive state anxiety between male and female runners? This study examined the distributions and means of CSAI-2 scores of male and female road race athletes. The null hypothesis is that there is no significant difference in the distributions and means of the CSAI-2 scores of men and women road race athletes. An accepted null hypothesis would indicate that there is no difference in the levels of competitive state anxiety between male and female runners. The alternate hypothesis is that there is a significant difference in the distributions and means of CSAI-2 scores between men and women road race athletes. An accepted alternate hypothesis would indicate that there is a difference in the levels of competitive state anxiety between male and female runners.

2. Is there a difference in the levels of competitive state anxiety between runners who raced short distances (5 kilometers or less) and runners who raced long distances (more than 5 kilometers)? This study examined the distributions and means of CSAI-2 scores of short and long distance runners. The null hypothesis is that there is no significant difference in the distributions and means of the CSAI-2 scores of short and long distance runners. An accepted null hypothesis would indicate that there is no difference in the levels of competitive state anxiety between the two groups of runners. The alternate hypothesis is that there is a significant difference in the distributions and means of CSAI-2 scores between short and long distance runners. An accepted alternate hypothesis would indicate that there is a difference in the levels of competitive state anxiety between the two groups of runners.

3. Is there a relationship between the accuracy of pre-competition expectation of performance with state anxiety? The accuracy of the athlete is measured as either exceeded, met, or failed in his or her pre-competition expectations. The accuracy of pre-competition expectations was examined with the CSAI-2 scores for any significant relationships. The null hypothesis is that whether the athlete exceeds, meets, or fails in their expectations does not have a relationship with CSAI-2 scores, which would indicate that accuracy of pre-race expectations does not correlate with state anxiety.

4. *Is there any significant linear relationships with CSAI-2 scores, age, years of experience, expectations, and performance?*

This study examined all possible pairings of the factors for any significant correlations. The null hypothesis is that there is not any significant correlation between the two variables examined. The alternate hypothesis is that there is a significant relationship between the two variables examined.

Chapter II

Review of Literature

Exercise and sport has been found to be helpful in reducing anxiety and depression with the general population (Berger & Owen, 1992; International Society of Sport, 1992; Ragheb & McKinney, 1993). Participation in sports is helpful with mental fitness as well as physical fitness. There is, however, a limit to the benefits of sports. Research has found that when the intensity of competition increases, there will be a point where the benefits decrease as intensity rises (Berger & Owen, 1992). High intensity exercise has been found by Berger and Owen (1992) to increase stress levels. Berger and Owen (1992) state that the fatigue experienced by the athlete in high intensity exercise negates the benefits of exercise lowering stress and anxiety levels.

This increase in stress and anxiety found in high intensity sports can be countered by a variety of stress reduction techniques (Clingman & Hillard, 1994; Costa, Bonaccorsi, & Scrimali, 1984; Grey, Haring, & Banks, 1984; Griffiths, Steel, Vaccaro, Allen, & Karpman, 1985; Lanning & Hisanaga, 1983; Mace & Carroll, 1985; Maynard & Cotton, 1993). In addition to lowering anxiety levels, these techniques and strategies have been found to be helpful in increasing performance as well (Crocker, 1989; Crocker, Alderman, & Smith, 1988; Elko et al., 1985; Grey et al., 1984; Griffiths et al., 1985).

Anxiety Reduction Methods

Biofeedback is one method found to reduce pre-competition anxiety levels (Costa et al., 1984). This method uses electronic equipment to monitor physical stress and relay this information back to the athlete through an audible signal. The subject practices concentrating on relaxing his or her body to decrease the tone of the signal. As the individual is able to relax his or her body the audible sound emits a lower tone in relation to the level of physical relaxation attained. Eventually the athlete becomes skilled enough to where he or she is able to relax without the assistance of the audible tone. The difficult part of this method is that not all coaches and therapists have access to or knowledge of the electronic equipment needed.

Simpler approaches have focused on breathing exercises, self statements, mental imagery, and progressive relaxation methods (Grey et al., 1984; Lanning & Hisanga, 1983; Mace & Carroll, 1985). The breathing exercises used relied on taking the athlete through a series of steps to slow down the breathing process and relax the body in the process. The progressive relaxation technique focused on tensing and relaxing certain muscles, starting with smaller muscle groups and progressing to larger muscle groups until the entire body was relaxed. The use of breathing exercises and progressive relaxation was found to reduce the trait anxiety levels of the athletes (Lanning & Hisanga, 1983; Mace & Carroll, 1985).

The mental imagery approach was also found to reduce trait anxiety

(Grey et al., 1984). In addition to lower trait anxiety it was found that mental imagery lowered physiological tension as measured by skin conductance with electronic equipment attached to the subjects (Grey et al., 1984). The mental imagery approach focuses on guiding the athlete through describing the events of a competition and the athlete's reactions to the events. The intent of the mental imagery approach is to desensitize the athlete to events that may increase his or her anxiety and mentally prepare the athlete for various situations that may arise in competition.

More recent methods of anxiety reduction have focused on cognitive techniques (Crocker, 1989; Crocker et al., 1988; Elko & Ostrow, 1985; Maynard & Cotton, 1993; Griffiths et al., 1985). The cognitive techniques focused more on reduction of state anxiety than on reduction of trait anxiety. Cognitive theories revolve around the thought patterns that occur under certain conditions, in this case a sports environment. The cognitive interventions strive to have the athlete view conditions in a different perspective where the competition does not appear as stressful.

The cognitive methods used in past research had an individualized approach in addressing specific situations with each individuals. The intervention was different for each individual in that different competitive situations elicit different responses among athletes (Crocker, 1989, Maynard & Cotton, 1993). The focus on individualizing the techniques used for each athlete increased the effectiveness of the interventions used to lower state anxiety (Maynard & Cotton, 1993).

Dimensions of Competitive State Anxiety

State anxiety has been found difficult to measure as a single variable (Martens et al., 1990). Research has found that competitive state anxiety is better viewed as a construct of three components (Burton, 1988; Caruso et al., 1990; Gould et al., 1984; Karateroliotis & Gill, 1987; Martens et al., 1990; Swain et al., 1990). The components that make up competitive state anxiety were found to be the cognitive A-state, the somatic A-state, and the self confidence (Martens et al., 1990). Martens, Vealey and Burton (1990) found that the three components of state anxiety function as independent variables. The environment created by sports competition will influence all three components with the exact reaction to the competitive environment differing from individual to individual (Martens et al., 1990). One athlete may respond with higher levels of cognitive A-state than somatic A-state when faced with a certain sporting situation, while the other athlete may react with higher levels of somatic A-state than cognitive A-state.

The CSAI-2, developed by Martens, Vealey, and Burton (1990) measures the cognitive A-state, somatic A-state and self confidence of athletes. The CSAI-2 is divided into three subscales that independently measures each of the three components of competitive state anxiety. Research has found that the three scales of the CSAI-2 correlate with each other (Gould et al., 1984; Martens et al., 1990; Swain et al., 1990). There is a positive correlation of cognitive A-state with somatic A-state in previous studies (Gould et al., 1984; Martens et al., 1990; Swain et al., 1990), with

correlations ranging from .44 to .60. The self confidence scale was found to have a negative correlation with both the somatic A-state and the cognitive A-state scales (Gould et al., 1984; Martens et al., 1990; Swain et al., 1990), with the correlations ranging from -.31 to -.60.

The proximity of competition, in regards to the amount of time before or after competition, has been found to have a relationship with the internal correlations of the CSAI-2 scores (Karteroliotis & Gill, 1987; Swain et al., 1990). Swain, Jones, and Cale (1990) found that when they administered the CSAI-2 to athletes one week, two days, one day, two hours, and thirty minutes before competition, the correlations of the CSAI-2 scores with each other increased as competition neared. The correlation between the cognitive A-state and the somatic A-state increased from a correlation of .19 when given the CSAI-2 one week before competition, to .64 when surveyed thirty minutes before competition (Swain et al., 1990). The correlation of self confidence scores with cognitive A-state scores went from -.43 one week before competition to -.62 thirty minutes before competition (Swain et al., 1990). The correlation of self confidence scores with somatic A-state scores went from -.48 to -.63, over the same time span (Swain et al., 1990).

Karteroliotis and Gill (1987), found similar results in the internal relationships of the three CSAI-2 scales. They found that the CSAI-2 scores correlated the strongest with each other right before and during athletic activity. Baseline scores established earlier did not correlate as

strong as scores collected just prior to and during competition (Karteroliotis & Gill, 1987). Post competition CSAI-2 measures had lower correlations than baseline CSAI-2 scores (Karteroliotis & Gill, 1987). Both Swain et al. (1990), and Karteroliotis and Gill (1987) concluded that the three scales of the CSAI-2 function independent of each other when away from the context of sports competition, but function as components of state anxiety when in the context of sports competition.

State and Trait Anxiety

Past research in sports and anxiety have focused on two different types of anxiety, trait and state. This study focused only on state anxiety and did not examine trait anxiety. Past research has found there is a relationship between trait anxiety and state anxiety (Cooley, 1987; Huband & McKelvie, 1986; Maynard & Howe, 1987; Ryska, 1993). Todd Ryska (1993) theorized that athletes exhibiting high levels of trait anxiety would report higher levels of state anxiety than athletes with low trait anxiety. Ryska used the Sport Competition Anxiety Test (SCAT), a competitive trait anxiety measure developed by Rainer Martens (1977), to compare trait anxiety with the state anxiety scales of the CSAI-2.

The results of the study by Ryska (1993) found that there is a relationship of SCAT scores with CSAI-2 scores, which he concluded confirmed a relationship of trait anxiety with state anxiety. Ryska (1993) found that there is a significant difference in the means of CSAI-2 scores between athletes with high trait anxiety and low trait anxiety. Athletes

exhibiting high trait anxiety scored higher on the cognitive and somatic measures, and lower on the self confidence measures of the CSAI-2 (Ryska, 1993).

Eric Cooley (1987) also examined the relationship between state and trait anxiety. Cooley (1987) found that there is a relationship between the state anxiety scores and the trait anxiety scores. Cooley administered the SCAT and the State Anxiety Inventory (Martens, 1977), an earlier form of the CSAI-2, to tennis athletes. The SCAT was found to have correlation of .52 with the State Anxiety Inventory (Cooley, 1987).

Time Factors

The instructions for the CSAI-2 direct the researcher to administer the survey within one hour of competition (Martens et al., 1990). The test developers (Martens et al., 1990) state that the CSAI-2 is most effective if given within this time frame. The reason for this is that past research has found a relationship between the time of administration and state anxiety scores (Abadie, 1989; Ashton, 1981; Clingman & Hillard, 1994; Gould et al., 1984; Huband & McKelvie, 1986; Jones & Calc, 1989; Swain et al., 1990). State anxiety scores were found to change as the time until the start of competition (Abadie, 1989; Ashton, 1981; Clingman & Hillard, 1994; Gould et al., 1984; Huband & McKelvie, 1986; Jones & Calc, 1989; Swain et al., 1990).

Previous studies administered the CSAI-2 at various points in time in order to examine differences in scores taken one week, two days, one

day, two hours, and thirty minutes before the start of actual competition (Jones et al., 1991; Swain & Jones, 1992). Somatic A-state scores were found to increase over the time span with the scores at their highest thirty minutes before the start of competition (Jones et al., 1991; Swain & Jones, 1992). Cognitive A-state scores had the same pattern of increasing with time with the highest scores taken thirty minutes before the start of the event (Jones et al., 1991; Swain & Jones, 1992). The self confidence scale of the CSAI-2 was found to have the exact opposite reaction to the proximity of competition. Self confidence scores were found to decrease as the time until the start of the event nears. Self-confidence scores were found to be the lowest thirty minutes before the start of the event (Jones et al., 1991; Swain & Jones, 1992). Once the competition is finished, state anxiety measures were found to return to previously established baseline levels (Abadie, 1989; Ashton, 1981; Huband & McKelvie, 1986).

Setting and Expectations

The setting of the competition has been found to correlate with the anxiety levels of athletes (Dowthwaite & Armstrong, 1984; Matheson & Mathes, 1991; McCann et al., 1992). McCann, Murphy, and Raedeke (1992) gave the CSAI-2 to a group of cyclists in two different settings. The first setting was a time trial where there was no formal competition and the second setting a large road race competition. McCann et al. (1992) found that CSAI-2 scores taken just prior to the time trial were significantly different from scores collected before the road race. The somatic A-state

and cognitive A-state scores were found to be lower for the cyclists prior to the time trial than the scores found just prior to the road race (McCann et al., 1992). The self-confidence scores of the cyclists were higher just prior to the time trial than scores collected just prior to the road race (McCann et al., 1992).

Research has found a relationship with the level of importance placed upon the competition and the levels of anxiety experienced by the athletes (Dowthwaite & Armstrong, 1984; Matheson & Mathes, 1991). In important events, such as a major championship tournament, athletes will exhibit different levels of state anxiety than experienced during non-championship events (Dowthwaite & Armstrong, 1984; Matheson & Mathes, 1991). In two separate studies, a group of soccer players (Dowthwaite & Armstrong, 1984) and gymnasts (Matheson & Mathes, 1991) were examined at two different points in time during their respective seasons. They were given the CSAI-2 during competitions over the course of the regular season, and then again just prior to league championship tournaments held at the end of the season (Dowthwaite & Armstrong, 1984; Matheson & Mathes, 1991). Both studies found that the cognitive and somatic state anxiety scores were higher during the championship competitions than measures taken during the regular season (Dowthwaite & Armstrong, 1984; Matheson & Mathes, 1991). Self confidence reacted differently in that scores were found to be lower during the championship competitions than during the regular season (Dowthwaite & Armstrong,

1984; Matheson & Mathes, 1991).

The state anxiety levels can rise and fall within the competition depending on how critical the situation is in determining the outcome of the competition (Fisher & Zwart, 1982; Krane, Joyce, & Rafeld, 1994). The more critical the situation is on the outcome of a game the higher the cognitive and somatic state anxiety is likely to be (Krane et al., 1994). Self confidence has the opposite reaction of cognitive and somatic state anxiety in that it decreases when the athlete is placed in a critical situation (Krane et al., 1994). Krane, Joyce, and Rafeld (1994) found that state anxiety increased at certain times in a softball game with college women. These times were found to be key moments in the game, such as preparing to bat with the score tied (Krane et al., 1994).

Age and Gender

The relationship of age and anxiety has been another area of sport psychology research (Elko & Ostrow, 1985; Power, 1982). Results of previous studies found that the age of the athlete does not have any significant relationship with state anxiety (Elko & Ostrow, 1985; Power, 1982). Sean Power (1982) examined the relationship of trait anxiety with the age of the athlete using SCAT scores. Power (1982), did find a relationship between age and trait anxiety. There was a .32 correlation of age with SCAT scores (Power, 1982).

Research into the relationship of gender with state anxiety have had mixed results (Elko & Ostrow, 1985; Jones et al., 1987; Martens et al.,

1990; Wittig et al., 1987). Previous studies conflict with one another in whether or not there are differences in anxiety levels according to gender (Elko & Ostrow, 1985; Jones et al., 1987; Martens et al., 1990; Wittig et al., 1987). Some of the studies have indicated that gender is a factor in competitive state anxiety (Elko & Ostrow, 1985; Wittig et al., 1987). These studies have found that women exhibit higher levels of cognitive and somatic state anxiety than men (Elko & Ostrow, 1985; Wittig et al., 1987), and lower levels of self confidence just prior to competition (Jones et al., 1991). Jones and Cale (1989) also studied gender and state anxiety with athletes and found different results than previous research (Elko & Ostrow, 1985; Wittig et al., 1987). Jones and Calc (1989) examined the CSAI-2 scores of men and women athletes for gender differences and found there was no significant difference in the CSAI-2 scores between men and women athletes.

Anxiety and Performance

In sport psychology research, performance is a popular areas to examine since performance is a primary concern of sports. Research into the measurement of state anxiety follows this trend by attempting to find out if there is a relationship of state anxiety with performance (Cook, Gansneder, Rotella, Malone, Bunker, & Owens, 1983; McAuley, 1985). Discovering the exact nature of this relationship has been elusive to researchers (Burton, 1988). Some of the past research found no significant relationship of state anxiety with performance (Cook, Gansneder,

Rotella, Malone, Bunker, & Owens, 1983; McAuley, 1985). Other studies had different results and found that performance correlated with cognitive state anxiety and somatic state anxiety measures (Barnes et al., 1986; Maynard & Cotton, 1993; Maynard & Howe, 1987; Rodrigo, Lusiardo, & Pereira, 1990). Damon Burton (1988) and Jim Taylor (1987) also examined performance with state anxiety and found in their results a correlations of performance to all three scales of the CSAI-2.

Studies of pre competition anxiety scores of golfers (Cook et al., 1983; McAuley, 1985) with performance found no significant relationship of golf scores with anxiety measures. These studies generated evidence to support the claim that there is no relationship of performance with state anxiety before competition. However, McAuley (1985) found in his study that post competition anxiety scores of state anxiety correlated with performance. Golfers who scored better during competition reported lower cognitive and somatic state anxiety scores after the competition than golfers who performed worse (McAuley, 1985). The golfers who performed better also reported higher self confidence scores after competing than other golfers.(McAuley, 1985).

Barnes et al. (1986) found that only pre meet cognitive state anxiety was a predictor of performance with swimmers, while somatic state anxiety and self confidence were not found to have a relationship to performance. In a study of male soccer players, the cognitive and somatic CSAI-2 scores correlated by $-.52$ and $-.43$ respectively with performance, while self

confidence was not found to be a factor. Two additional studies by Maynard & Cotton (1993) and Maynard & Howe (1987) further complicate the issue with their finding that only somatic state anxiety having a relationship with performance by accounting for 22% of variance in field hockey athletes, while not finding any significant relationship of cognitive and self confidence with performance.

Damon Burton (1988) and Jim Taylor (1987) found that a relationship existed with performance and pre-competition CSAI-2 scores in all three areas of state anxiety, the cognitive, somatic, and self confidence factors. Results of the studies found that cognitive anxiety has a negative correlation with performance, indicating that high cognitive state anxiety is detrimental to performance (Burton, 1988; Taylor, 1987). Somatic anxiety was found to have an inverted U relationship with performance (Burton, 1988). The inverted U relationship is where performance increases with somatic state anxiety until at around mid point of the range of somatic state anxiety scores performance declines with increased somatic state anxiety (Burton, 1988). The inverted U relationship of anxiety and performance was first presented in 1908 in the work of Yerkes and Dodson (1908), Burton's study (1988) was able to narrow this relationship down to just somatic state anxiety. Self confidence was found to have a positive correlation with performance (Burton, 1988; Taylor, 1987). This indicated that athletes with higher self confidence scores tended to perform better than athletes with low self confidence.

Two factors have been suggested as complicating the issue of anxiety and performance, social desirability variable and what is known as the Zone of Optimal Functioning (ZOF) hypothesis developed by Hanin (1980). Jean Williams and Vikki Krane found that athletes vary in the amount of social distortion exhibit before competition (1989). Williams and Krane theorized that social distortion factors could be causing some of the inconsistencies in state anxiety research (1989). In a follow up study they found that when factoring in the Marlow-Crowne Social Desirability Scale with the CSAI-2 they were able to find clearer correlations of state anxiety with performance the lower the amount social distortion.

The Zone of Optimal Functioning hypothesis (Hanin, 1980) emphasizes the role of individual differences. The ZOF theory believes that too little or too much anxiety is detrimental to optimal performance, that somewhere between is a zone of anxiety where the individual functions at optimal levels, the ZOF. The ZOF of one individual can vary from another. Gould et al. (1993) attempted to create a complex formula that accounted for the ZOF and state anxiety differences to measure this but was unsuccessful. Vikki Krane was more successful in that she identified athletes ZOF for state anxiety using the CSAI-2 (1993)., Krane found that athletes that had CSAI-2 scores below or above his or her athletes established ZOF, were more likely to have decreases in performance depending on how far out of his or her ZOF they were.

A third explanation for the difficulty in connecting state anxiety with

performance is individual differences in personality and life stressors (Felsten & Wilcox, 1990; Raglin & Turner, 1993). Raglin and Turner explored differences in anxiety levels and performances using the ZOF theory (1993) and found results similar to Krane's (1993) of athletes, but expressed that future research should examine the personality differences, such as trait anxiety, to account for differences in anxiety/performance relationships. Gary Felsten and Kathy Wilcox (1990) found that performance can vary according the life stressors that the person is feeling. They found that athletes experiencing low stress have a tendency to perform better than athletes with high life stressor events.

Chapter III

Methods

Subjects

The subjects used for this study were runners that competed in three separate road races. The races were held on the 15th, 16th, and 23rd of July, 1995. The weather conditions were clear, with no wind and temperatures in the mid-80s (Fahrenheit) for all three races. All three races were held for individual competition and no teams were formally recognized at all three events. All runners were competing solely for themselves and not for any team or club. The race held on July 15th was a distance of 10 kilometers (6.2 miles). In the second race on July 16th the runners competed in either 3 kilometer (1.92 miles) or 5 kilometer (3.1 miles) races. In the third race on July 23rd, the runners competed in distances of either 3 kilometers (3k) or 15 kilometers (9.3 miles).

The three races had a combined total of 544 runners competing. There was a 12.5 % response rate of runners agreeing to participate in this study, yielding a sample size of 68 participants. The participants were then asked to complete the CSAI-2 questionnaire, along with providing their race number, age, the number of years they have been competing in road races, gender, and where they expected to finish in the race. Table 1. contains the number of participants by gender and distance raced. The participants' ages ranged from 15 to 72, with a mean age of 33.38. The average number of

years of racing was 6.37, with the lowest reported number of years being 1 and highest reported being 30 years of experience. The sample is made up of 46 males and 22 females. Thirty nine of the runner opted to compete in races of 5 kilometers (5k) or less, and the other twenty nine runners competing in distances more than 5k.

Table 1.

Total Number of Runners by Gender and Distance Raced

	5k or less	More than 5k	Total
Male Runners:	22	24	46
Female Runners:	17	5	22
Total:	39	29	68

Instrument

The instrument used to measure the state anxiety of the subjects was the Competitive State Anxiety Inventory-2 (CSAI-2). The CSAI-2 was developed by Martens, Vealey, and Burton (1990), specifically for measurement of state anxiety in a sports setting. The purpose of the instrument is to measure three aspects of state anxiety, cognitive state anxiety, somatic state anxiety, and self confidence. Each of these three aspects are measured on separate scales on the CSAI-2.

The cognitive subscale of the CSAI-2 measures the thoughts and concerns of the subject about the competition. The somatic subscale measures the physical symptoms that occur within the context of sports

competition. An example of somatic symptoms can be the feeling of "butterflies" in the competitors stomach, sweaty palms, and so on. The third component of the CSAI-2 is the self confidence scale. The self confidence scale measures the level of confidence the subject has in relation to the competition.

The CSAI-2 has nine items for each of the three subscales for a total of 27 items. Each item contains a statement such as "I feel mentally relaxed" (item number 21) and the respondent is asked to circle his or her response to the statement on a Likert scale of either: 1. Not At All, 2. Somewhat, 3. Moderately So, or 4. Very Much So. Items numbered 1, 4, 7, 10, 13, 16, 19, 22, and 25 relate to cognitive anxiety and are totaled according to the number value of each response. The somatic scale are items numbered 2, 5, 8, 11, 14, 17, 20, 23, and 26 are added together in the same manner, except for item number 14, with is given the following point value for each response, 1=4, 2=3, 3=2, 4=1. The self confidence items are numbers 3, 6, 9, 12, 15, 18, 21, 24, and 27. The self confidence score is calculated in the same manner as the cognitive scale. The range of scores for each of the scales in from 9 to 36.

The instructions of CSAI-2 direct that the test be given within one hour before competition (Martens et al., 1990). Martens, Vealey, and Burton (1990) state that this is necessary to minimize the effects of trait anxiety and maximize measurement of state anxiety. State anxiety has been found to be best measured within this time frame by the test developers

(Martens et al., 1990). This has been validated by outside researchers using the CSAI-2 (Ashton, 1981; Huband & McKelvie, 1986, Swain & Jones, 1992). The emphasis on the CSAI-2 as a tool for measuring state anxiety in sporting events does not allow for testing of the reliability of the test in a test/retest format because conditions from one sporting event to another will vary because of variables that cannot be controlled such as weather.

Internal consistency of the items was checked by the authors (Martens et al., 1990) and found to be consistent.

The validity of the CSAI-2 was checked by the developers (Martens et al., 1990) with four separate measures of state anxiety. It was found that the CSAI-2 correlated stronger with state anxiety measures than with trait anxiety, which the authors (Martens et al., 1990) concluded validates the CSAI-2 as a state anxiety measure. Additional research has found the construct validity of the CSAI-2 to be sound enough for research use (Gould et al., 1984; Swain et al., 1990). The multidimensional nature of competitive state anxiety, as measured by the CSAI-2 has also been reinforced by the test authors (Martens et al., 1990) and outside researchers as well (Caruso et al., 1990; Burton, 1988; Gould et al., 1984; Swain et al., 1990).

Procedures

The data was obtained from runners as they registered for the race and picked up their race number within one hour of the start of the race. The runners were asked to read the anti-social desirability instructions and

complete a five item survey (Appendix A), in addition to the CSAI-2 (Appendix B). The five items on the survey asked for the person's race number, age, sex, number of years competing, and a rating of how they expected to finish in the field. After the race was completed, the CSAI-2 scores were calculated, along with the final race results. Descriptive data and statistics was then calculated using the SPSS/PC+ software package (Norusis, 1991).

The data was used to examine the four research questions asked earlier. The first question asked if there was a difference in the levels of competitive state anxiety between male and female runners. A two tailed t-test was done to compare the distributions and means of the male and female runners' CSAI-2 scores. The null hypothesis is that there is no significant difference in CSAI-2 scores between male and female runners. The null hypothesis would be rejected if the t-test statistic ($p < .05$) exceeded the critical value (C.V.). The alternate hypothesis is that there is a significant difference in the CSAI-2 scores between male and female runners. This would indicate that there is significant differences in the levels of competitive state anxiety between male and female runners.

The second question asked if there was a difference in the levels of competitive state anxiety between runners who competed in short distances (5K or less) and runners who competed in long distances (more than 5K). A two tailed t-test was done to compare the distributions and means of the CSAI-2 scores of the two groups of runners. The null hypothesis is that

there is no significant difference in CSAI-2 scores between short and long distance runners. The null hypothesis would be rejected if the t-test statistic ($p < .05$) exceeded the critical value (C.V.). The alternate hypothesis is that there is a significant difference in the CSAI-2 scores between short and long distance runners. This would indicate that there is significant differences in the levels of competitive state anxiety between runners who compete at short distances (5K or less) and runners who compete at long distances (more than 5K)..

The third research question examines if there is a significant relationship between the accuracy of pre-competition expectations of performance with state anxiety. For this question a chi square (χ^2) statistic with a 3X3 contingency table was used. The null hypothesis is that there is no relationship with CSAI-2 scores and the accuracy of pre-race expectations. The alternate hypothesis is that there is a relationship of CSAI-2 scores with the accuracy of pre-race expectations.

In order to perform the chi-square for the third research question the CSAI-2 scores must be collapsed into ordinal data, along with setting a criteria for whether the athlete exceeded, met, or failed (the EMF variable) in his or her expectations. The EMF variable is calculated using the expected finish (EXP) of the runner on a scale of 1 to 100, with 1 meaning a finish in the top 1 percent and 100 meaning to finish in the bottom 1% of the field. The actual finish (ACT) is obtained from the race directors using the race number of the participant and is then scored using the same scale

as the expected finish. The actual finish (ACT) is then subtracted from the expected (EXP) finish using the following formula: $EXP - ACT = EMF$. If the EMF score is 10 or greater, then the subject exceeded his or her expectations by at least ten percent. If the EMF score is -10 or less, then the subject failed in his or her expectations by at least ten percent. Any EMF scores between -10 and 10 indicates that the subject met his or her expected finish within ten percent. Ten percent is an arbitrary used in this study as the criteria for whether the athlete is judged to have exceeded, met, or failed in predicting his or her performance.

The CSAI-2 scores were also collapsed into three groups. The three groups correspond to the top third (high state anxiety), the middle third (average state anxiety), and the bottom third (low state anxiety) scores within the distribution of scores for cognitive (COG), somatic (SOM), and self confidence (SC) measures for the sample. From this data a 3X3 contingency was done for the χ^2 statistic ($p = .05$, $df = 4$, $C.V. = 9.49$) for EMF by COG, EMF by SOM, and EMF by SC.

The fourth research question examines if there is any significant linear relationships of CSAI-2 scores with age, years of experience, expectations, and performance. A Pearson's correlation coefficient (r) was calculated for all combinations of the variables. A total of 12 separate Pearson's correlation coefficients were calculated ($p < .05$). The null hypothesis is that there is no significant relationship between the CSAI-2 scores and the variable examined. In order for the null hypothesis to be

rejected the level of significance (p) must be below .05. The alternate hypothesis is that there is a linear relationship between the CSAI-2 scores and the variable examined. If the alternate hypothesis is accepted the Pearson's r can indicate if there is a positive or negative relationship between the CSAI-2 score and the variable examined.

Chapter IV

Results

Descriptive Data

Eighty runners completed surveys but only 68 subjects were used for the final study. Twelve of the subjects were rejected from the study and were not included in the data due to the subjects not completing all the items contained in the questionnaire. The number of subject was large enough to accurately compute all the desired statistics. Table 2 contains the descriptive data for all of the interval variables used in the study.

Table 2.

Descriptive Statistics of Variables

Variable	Mean	Std. Dev.	Minimum	Maximum
Age	33.38	13.49	15	72
Years of Competing	6.37	6.22	1	30
Expected Finish	44.72	27.51	1	97
Actual Finish	45.07	27.35	1	100
CSAI-cognitive	14.34	4.32	9	27
CSAI-somatic	14.37	4.27	9	25
CSAI-self confidence	24.40	6.93	10	36

The mean of the expectations of the participants was an expected finish in the top 44.72 percent of the field. The actual finish of the participants had a mean of finishing in the top 45.07 percent of the total population competing. The mean for actual finish for the total population of runners competing in the three races was 50 percent. Results indicated that the participants involved in the study performed 4.93 percent better than population mean, but performed .35 percent worse than their expected finish.

Road race athletes are not included in the normative tables of the CSAI-2, so it is difficult to compare the means of this sample with the population means. Martens, Vealey, and Burton (1990), do provide norms for various sports such as track and field, golf, swimming, and others. Track and field is the sport that has the most in common with road race athletes, in that they both involve running as the primary skill required.

The norms of track and field athletes differ from the scores of the road race athletes.. The means of the track and field athletes for cognitive, somatic and self confidence are 20.34 (S.D.=5.76), 18.73 (S.D.=5.68), and 22.88 (S.D.= 5.79), respectively. The road race competitors in this sample reported lower levels of cognitive state anxiety (14.34) and somatic state anxiety (14.37) than the track and field athletes. The runners in this sample reported higher scores in the self confidence measure (24.40) on the CSAI-2. This can indicate that the road race athletes in this study exhibited less state anxiety, and more self confidence than athletes competing in a

track and field setting.

Gender

The first research question examined differences in CSAI-2 scores for male and female runners. Table 3 contains the results of T-tests performed. The results of the t-tests for male and female CSAI-2 scores indicate that there is no significant difference between the men and women runners. All three tests performed had a level of significance of .05 with 66 degrees of freedom. The critical value for rejection of the null hypothesis of no difference in CSAI-2 scores between the genders is 1.99 for all three scales. The null hypothesis was accepted for all three scales.

Table 3.

T-Tests for CSAI-2 scores by Gender

	CSAI-cog.	CSAI-som	CSAI-sc
Mean of Men (n=46):	14.41 ($\sigma=4.48$)	14.20 ($\sigma=4.51$)	25.26 ($\sigma=7.05$)
Mean of Women (n=22):	14.18 ($\sigma=4.07$)	14.73 ($\sigma=3.81$)	22.60 ($\sigma=6.46$)
T-Test (Male,Female):	.20	-.48	1.50

($p < .05$, $df=66$, $C.V.=1.99$)

The t statistic for cognitive, somatic, and self confidence scores between male and female runners was found to be .20, -.48, and 1.50, respectively. None of the t-scores exceeded the critical value of 1.99 for rejection of the null hypothesis. It appears, that based upon this data, that

CSAI-2 scores are consistent between male and female athletes.

Distance Raced

The second research question was whether or not there is a difference in the levels of competitive state anxiety between runners who race in short distances (5K or less) and runners who race in long distances (more than 5K). Do runners who chose to compete at distances of 5k or less (distance 1) score differently on the CSAI-2 than runners who compete at distances longer than 5k (distance 2)? The results listed in table 4 indicate that there is no significant differences in CSAI-2 scores between runners competing in distance 1 and runners competing in distance 2. The t-statistic was calculated to examine the differences in means between the two groups of runners. The null hypothesis is that there is no significant differences in the means of the two groups. The critical value for rejection of the null hypothesis is 1.99 ($p < .05$, $df = 66$).

Table 4.

T-Test of CSAI-2 scores by Distance Raced

	CSAI-cog.	CSAI-som	CSAI-sc
Mean of Dist 1 (n=39):	14.72 ($\sigma=4.45$)	14.31 ($\sigma=4.10$)	24.77 ($\sigma=7.00$)
Mean of Dist 2 (n=29):	13.83 ($\sigma=4.17$)	14.45 ($\sigma=4.57$)	23.90 ($\sigma=6.92$)
T-Test (Dist 1, Dist 2):	.84	-.13	.51

($p < .05$, $df = 66$, C.V. = 1.99)

A t-score of .84 was found for cognitive state anxiety scores, -.13 for somatic state anxiety scores, and .51 for self confidence. None of these three results exceeded the critical value for rejection of the null hypothesis. Acceptance of the null hypothesis means that there is no significant difference in the distribution of CSAI-2 scores between the two groups.

Pre-Race Expected Finish and Actual Finish

The third research question asks if there is a relationship between the accuracy of pre-competition expectation of performance with state anxiety. Will a runner who places higher expectations that he or she are capable score differently on the CSAI-2 than a runner who underestimates his or her abilities? A 3X3 contingency table was created to calculate a chi-square statistic for all three scales of the CSAI-2 with runners who exceeded, met, or failed (EMF) in their expectations. Table 5 contains the results of the chi-square for cognitive state anxiety (CSAI-cognitive) with the EMF variable, along with expected outcomes (e) for each cell.

Table 5.

Chi-Square for Exceeded/Met/Failed (EMF) Expected Finish with CSAI-cognitive scores (3X3).

	Exceeded	Met	Failed	Total
High Cognitive A-state:	7 (e=5.6)	9 (e=10.2)	5 (e=5.3)	21
Middle Cognitive A-state:	5 (e=5.0)	11 (e= 9.2)	3 (e=4.8)	19
Low Cognitive A-state:	6 (e=7.4)	13 (e=7.0)	9 (e=7.0)	28
Total:	18	33	17	68

$$\chi^2 = 2.38 \text{ (} p < .05, \text{ df} = 4, \text{ C.V.} = 9.49 \text{)}$$

The chi-square value of 2.38 that resulted from the data does not exceed the critical value of 9.49 for rejection of the null hypothesis, therefore the null hypothesis is accepted. The null hypothesis is that there is no significant relationship between whether the runner exceeds, meets, or fails in his or her pre-race expectations and with whether they score in the top, middle, or lower third of the distribution of the CSAI-2 scale. The acceptance of the null hypothesis indicates that there is no relationship between accuracy of pre-race expectations and cognitive state anxiety.

Table 6.

Chi-Square for Exceeded/Met/Failed (EMF) Expected Finish and CSAI-somatic scores (3X3).

	Exceeded	Met	Failed	Total
High Somatic A-state:	8 (e=5.6)	10 (e=10.2)	3 (e=5.3)	21
Middle Somatic A-state:	7 (e=6.4)	8 (e=11.6)	9 (e=6.0)	24
Low Somatic A-state:	3 (e=6.1)	15 (e=11.2)	5 (e=5.8)	23
Total:	18	33	17	68

$\chi^2 = 7.73$ ($p < .05$, $df = 4$, C.V. = 9.49)

Similar results are found when a chi-square is calculated for somatic state anxiety with the accuracy of pre-race expectations. Table 6 contains the results of this chi-square statistic. The chi-square value was found to be 7.73 for the accuracy of pre-race expectations with somatic state anxiety. This is closer to exceeding the critical value of 9.49 ($p, .05$, $df=4$) than the other two scales of the CSAI-2, but not enough to satisfy a 95% confidence

interval for rejection of the null hypothesis. The null hypothesis is accepted. No significant relationship could be found with the accuracy of pre-race expectations with somatic state anxiety.

The third subscale of the CSAI-2, the self confidence measure, also accepted the null hypothesis of no significant relationship between self confidence and the accuracy of pre-race expectations. Table 7 contains the 3X3 contingency table and chi-square for self confidence and pre-race expectations. The chi-square value was found to be 5.04, which is under the critical value of 9.49 ($p < .05$, $df = 4$) for rejection of the null hypothesis.

Table 7.

Chi-Square for Exceeded/Met/Failed (EMF) Expected Finish
with CSAI-self confidence scores (3X3)

	Exceeded	Met	Failed	Total
High Self Confidence:	5 (e=5.3)	9 (e=9.7)	6 (e=5.0)	20
Middle Self Confidence:	6 (e=5.8)	14 (e=10.7)	2 (e=5.5)	22
Low Self Confidence:	7 (e=6.9)	10 (e=12.6)	9 (e=6.5)	26
Total:	18	33	17	68

$$\chi^2 = 5.04 \text{ (} p < .05, \text{ df} = 4, \text{ C.V.} = 9.49 \text{)}$$

It does not appear that the success or failure of runners predicting finishing place within 10 percent has any significant relationship with the CSAI-2 scores of distance runners competing in open road race events. The chi-square statistics calculated did not detect any significant

relationships between the two variables.

Correlation of Variables

The fourth research question examined any significant linear relationships of CSAI-2 scores with age, years of experience, expectations, and performance. The null hypothesis is that there is no significant linear relationship between the CSAI-2 scores and the variables examined. The null hypothesis is rejected if the level of significance (p) is less than .05. The first group of correlations focused on the experience of the runners. The experience variables are the number of years the runner has been competing in road races and age of the athlete. The relationship of CSAI-2 scores with the age and number of years racing was examined using the Pearson's r statistic. All significant linear relationships found when the null hypothesis was rejected are listed in table 8. Correlations where the null hypothesis of no significant linear relationships was accepted are not included tables 8 and 9. The reason for this is that the null hypothesis of no significant linear relationship is accepted when p is greater than .05 ($p > .05$).

Table 8.

Pearson's r for Age and Years of Racing ($n=68$, $p < .05$)

	Age	Years of Racing
CSAI-cognitive:	*	*
CSAI-somatic:	-.43	*
CSAI-self confidence:	.20	*

* Null hypothesis of no significant linear relationship accepted

The null hypothesis was rejected in only two of the correlations examined of CSAI-2 scores with experience factors. The number of years competing was not found to have a linear relationship with CSAI-2 scores. This can indicate that the number of years racing does not have a relationship with competitive state anxiety. It was found in this study that two of the CSAI-2 scales, the somatic and self confidence measures, correlated with the age of the runner. The self confidence of the road race athlete, as measured by the CSAI-2, had a .20 correlation with the age of the runner. This can indicate that self confidence increases as the runner ages. Another positive note for aging runners found in this study is that the CSAI-2 somatic scale had a -.43 correlation with the age of the runner. This can indicate that as the runner ages, his or her will have a decrease in somatic anxiety symptoms before racing.

Table 9.

Pearson's r for Expected and Actual Finish (n=68, p<.05)

	Expected Finish	Actual Finish
CSAI-cognitive:	-.27	*
CSAI-somatic:	-.25	-.21
CSAI-self confidence:	*	*

* Null hypothesis accepted of no significant linear relationship.

The second group of correlations examined the relationship of CSAI-2 scores with the expected and actual finish of the runners. The

results are listed in table 9. The expected finish of the runners in this study was found to correlate with two of the CSAI-2 measures, the cognitive and somatic scales. Self confidence was not found to have a relationship with the expected finish of the runners in this study. There was a $-.27$ correlation of cognitive state anxiety with the expected finish of the road race athletes. Somatic state anxiety was found to have a $-.25$ correlation with the expected finish of the road race athletes. The correlation of cognitive and somatic state anxiety with pre-race expectations can indicate that runners with lower expectations of their performance are likely to report lower cognitive and somatic state anxiety.

The actual finish of the runners in this study was found to correlate with only the somatic scale of the CSAI-2. The cognitive state anxiety and self confidence of the participants was not found to have a relationship with the actual finish of the runners. There was a correlation of $-.21$ of somatic state anxiety with the finishing place of the road race athletes. This can indicate that athletes who finish better in the field of runners are likely to report higher somatic state anxiety.

Chapter V

Discussion

This study did not find any differences in the CSAI-2 scores between male and female athletes. The issue of whether there is gender differences in competitive state anxiety is still unclear (Elko & Ostrow, 1985; Jones & Cale, Jones et al., 1991; 1989; Wittig et al, 1987). Some of the previous studies found that there are gender differences in state anxiety levels (Elko & Ostrow, 1985; Jones et al., 1991; Wittig et al., 1987), while the results of another study found that state anxiety scores did not vary between male and female athletes (Jones & Cale, 1989). The results of this study take the side of Jones and Cale (1989) that no gender differences exist with male and female athletes.

One possible explanation for the conflicting results of studies examining gender is the environment and subjects where the data is collected. One problem with some of the past research was that the male and female athletes competed in different sports (Jones et al., 1991; Wittig et al., 1987). There is some differences in state anxiety from one sport to another (Martens et al., 1990). Some of the differences in competitive state anxiety believed to be found may be a result of differences in the competitive environment and the types of individuals who choose different sports. The demands and skills needed be successful a female rugby player will be different than the demands and skills needed for a female cyclist, so the differences in sport may be a factor.

One of the reasons for choosing road race athletes to examine gender differences in state anxiety is that the competitive environment and conditions are the same for male and female runners. The male and female athletes in this study were competing in the same sport at the same time. This eliminated the problem of differences across different sports from influencing the data. Road racing is a sport where the demands and conditions are identical for male and female athletes. Most of the equipment required is the same, such as shoes, shorts, and a shirt. Training methods used are identical for male and female runners. The race tactics are also identical for male and female runners.

This study indicates that male and female athletes exhibited similar CSAI-2 scores when tested under the exact same conditions. Future research into gender differences should attempt to eliminate any differences in environment and sport between male and female athletes. A limitation of this study was that athletes participating in only one sport was used. The conclusion reached in this study of no gender differences in CSAI-2 scores may only be true for road race athletes. This study indicates that further research may be useful in examining differences in sports and competitive environment. Another area to examine is other sports where men and women compete under the same environment and rules such as tennis, golf, or swimming.

The distance raced was not a factor in the state anxiety scores of the runners in this study. A possible limitation of this study with examining

differences in state anxiety scores with the distance raced was that the differences in distance raced was not large enough to detect any differences in CSAI-2 scores. There are populations of runners who compete at different distances not covered in this study. Middle distance runners who compete in distances from 800 meters to 1600 meters (1 mile) were not examined. Marathon and Ultra-Marathon runners who race at distances of 26.2 miles or more were not included in this study. Future study into the relationship of distance raced and state anxiety should attempt to include a wider range of distances raced.

The accuracy of pre-race expectations with state anxiety scores was not found to have a relationship with each other. It was found that athletes who place higher performance expectations than what they are capable of do not score differently on CSAI-2 measures than athletes who correctly predict their performance. This result is helpful in that athletes who expect to perform better than they are currently capable of will not experience higher levels of state anxiety than they would if they had lower expectations.

One possible weakness in examining the accuracy of pre-race expectations with state anxiety is in the research design used. The ten percent margin of error for determining whether an athlete exceeded, met, or failed was an arbitrary cut off point. Future research may use a different method of determining success or failure. Another method of measuring success or failure of the athlete's pre-race expectation may be developed. Some of the athletes just barely met the criteria for failure to meet his or her

expectations, while other athletes were well beyond the ten percent margin. A different method of measuring success or failure that produces interval data may be more useful in the future.

The number of years of competitive experience of the road race athlete correlated with only two variables in this study, the age and expectations of the athlete. The expected finish of the athlete had a $-.26$ correlation with the years of experience, which indicates that the athlete expects to finish better in the race as he or she gains experience in the sport. The age of the athlete correlated with more variables than the number of years competing. Age was found to have a relationship with the number of years competing, actual finish, somatic state anxiety, and self confidence. It appears that life experience accumulated as one ages has more of an impact on state anxiety and performance than the number of years competing.

The relationship of age with state anxiety scores is inconsistent with previous research, which found no relationship of age with anxiety measures in sports (Elko & Ostrow, 1985, Power, 1982). As mentioned earlier, a limitation of this study was that only road race athletes were used so these conclusions may only occur with this population and not with other athletes. Another limitation of this study was that a majority of the participants in this study were adults. The average age for the participants in this study was 33.38 years of age. Younger athletes may not of been accurately represented in this study. One possible explanation for the

differences in the results of this study with previous research into age and sports anxiety is that the previous studies relied on college students for their research subjects (Elko & Ostrow, 1985, Power, 1982), while this study was conducted outside of the college setting.

This study found that there was a correlation of $-.21$ of somatic state anxiety with actual finish. The results of this study is consistent with the findings of Rodrigo et al. (1990) of a relationship of somatic state anxiety with performance. Somatic state anxiety was found to correlate with performance in other studies as well (Burton, 1988; Barnes et al., 1986; Maynard & Cotton, 1993; Maynard & Howe, 1987; Taylor, 1987), but these studies found that other components of state anxiety correlated with performance also. This study found that only somatic state anxiety correlated with performance. Somatic state anxiety was found to have a positive relationship with performance in most of the studies that found a relationship (Burton, 1988; Barnes et al., 1986; Maynard & Cotton, 1993; Maynard & Howe, 1987). This study is consistent with these finding in that somatic state anxiety was found to have a positive relationship to performance.

The self confidence of the athlete did not correlate with performance or expectations. The only external variable that did correlate with self confidence in this study was the age of the athlete. This lack of significant relationships with the variables examined in this study can indicate that self confidence is not an important component of competitive

state anxiety as originally believed by the CSAI-2 authors (Martens et al., 1990). Future research may focus on isolating the self confidence scale of the CSAI-2 examining other relationships with the scale.

Appendix A**Anti-Social Desirability Instructions of the CSAI-2****Read Before Completing Survey:**

The effects of highly competitive sports can be powerful and very different among athletes. The inventory you are about to complete measures how you feel about this competition at the moment you are responding. Please complete the inventory as honestly as you can. Sometimes athletes feel they should not admit to any nervousness, anxiety, or worry they experience before competition because this is undesirable. Actually, these feelings are quite common, and to help us to understand them we want you to share your feelings with candidly. If your are worried about the competition or have butterflies or other feelings that you know are signs of anxiety, please indicate these feelings accurately on the inventory. Equally, if you feel calm and relaxed, indicate those feelings as accurately as you can. Your answers will not be shared with anyone. We will be looking only at group responses.

Thank you and good luck.

Please complete the following items.

Race Number: _____ Age: _____

Division (circle one): Men Women

Years of Competing: _____

On a scale of 1 to 100, (1 meaning finishing first in the field to 100 meaning last) where do you expect to finish in today's overall field (either in Men's or Women's division): _____

(over)

Appendix B

The Competitive State Anxiety Inventory-2 (CSAI-2)

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. 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. There are no right or wrong answers. Do *not* spend too much time on any one statement, but chose the answer which describes you feelings *right now*.

	Not at All	Somewhat	Moderately So	Very Much So
1. I am very 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 this competition as I could.....	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 can 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.....
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 will 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 picture myself reaching my goal.....1.....2.....3.....4
25. I'm concerned I won't be able to concentrate.....1.....2.....3.....4
26. My body feels tight.....1.....2.....3.....4
27. I'm confident of coming through under pressure.....1.....2.....3.....4

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