

The Relationship Between Self-Confidence, Mood State, And Anxiety Among Collegiate Tennis Players

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The purpose of this study was to examine the relationship between self-confidence, anxiety, and mood states in collegiate tennis players. The Competitive State Anxiety Inventory - 2 (CSAI-2) and the Profile of Mood States (POMS) were utilized based on their ability to assess a number of different psychological states thought to be crucial for proper mental preparation prior to athletic competition as well as for their psychometric properties. These inventories were employed to determine pre-competition levels of anxiety, self-confidence and mood disturbance and their relationship to successful or unsuccessful tennis match outcome. Twenty-four collegiate tennis players completed the POMS and CSAI-2 30 minutes prior to their tennis match during their participation in the NCAA Regional (VII) Team Tennis Tournament. Results revealed winning tennis players displayed significantly higher self-confidence, lower cognitive and somatic anxiety levels, and lower total mood disturbance scores than losing players. In addition, winning tennis players exhibited the iceberg profile on the POMS, which is consistent with the findings in similar research conducted with successful athletes in other sports. As such, athletes who displayed high self-confidence and low anxiety levels were potentially able to remain calm and relaxed under pressure and were not as affected by negative events. Furthermore, these results suggest that mental state prior to the start of a tennis match plays a crucial role in overall success or failure.

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An individual's positive or negative mental state has long been thought to play a crucial role in his or her ability to perform sport specific tasks. This ability then either augments or detracts from his or her overall success or failures as an athlete. Players who are evenly matched in physical skills often rely upon their psychological skills to gain an advantage over their opponents. More specifically, self-confidence, mood disturbances, cognitive and somatic anxiety have all been linked as contributing factors to athletic performance (Hassmen & Blomstrand, 1995; Morgan, O'Connor, Ellickson, & Bradley, 1988; Ussher & Hardy, 1986).

Self-confidence is one of the most frequently cited psychological factors thought to effect sport performance and has been a primary focus of research conducted by sport psychologists as it is considered by many to be a key factor to successful performance (Feltz, 1988). Bandura's (1982) social cognitive theory suggests that an individuals' degree of self-efficacy influences performance both directly and indirectly via emotions and cognitions. Successful performance enhances perceived self-efficacy while repeated failures lowers self-confidence (Bandura, 1982; 1997). Hanton, Mellalieu, and Young (2002) found that anxiety increases as competition approaches and that self-confidence acts as a moderating variable that either increases or decreases anxiety levels based on the perception of the upcoming event. This relationship between self-efficacy and performance can create either an upward or downward spiral for future performance and self-efficacy based on past athletic success or failure.

The Competitive State Anxiety Inventory -2 (CSAI-2) has been instrumental in developing knowledge regarding changes in self-confidence and anxiety in the period immediately preceding athletic competition (Martens, Vealey, & Burton, 1990). Perry and Williams (1998) investigated the effects of intensity and direction of self-confidence and competitive trait anxiety on male and female tennis players. Participants completed a modified CSAI-2 and were then classified based upon their tennis ability and separated into novice, intermediate, or advanced groups. Results indicated the advanced group had a higher self-confidence level. Results showed less cognitive anxiety for the novice group and all three groups showed no difference for somatic anxiety.

Several studies have shown successful elite athletes to have lower pre-competition anxiety than less successful athletes (Highlen & Bennett, 1979; Mahoney & Avenier, 1977; Ussher & Hardy, 1986; Weinberg & Genuchi, 1980). However, other researchers have found somatic anxiety to peak rapidly and immediately preceding the start of competition in cricket players (Jones, Cale, & Kerwin, 1989), rowers (Ussher & Hardy, 1986), and golfers and gymnasts (Krane & Williams, 1987). The findings across these research studies suggest that there may be some disparity in anxiety levels between athletes across different sports.

Treasure, Monson, and Lox (1996) hypothesized that self-efficacy of wrestlers would be associated with higher levels of positive affect and lower levels of negative affect, somatic, and cognitive anxiety. In addition, they examined the relationship between pre-competition self-efficacy and different measures of performance and match outcome. Each athlete completed the CSAI-2, Positive and Negative Affect Schedule (Watson, Clark & Tellegen, 1988) and a questionnaire on self-efficacy 15 minutes prior to the commencement of his/her match. Results indicated that self-efficacy was positively correlated with positive affect, somatic, and cognitive anxiety prior to competition. Results also showed that the higher the precompetitive level of self-efficacy, the better the wrestlers performed.

The well-known iceberg profile, characterized by scores on the domain of the Profile of Mood States or POMS (McNair, Lorr & Droppleman, 1971), is thought to predict athletic performance (Morgan, 1974, 1985; Morgan & Pollock, 1977). The iceberg profile is characterized as the scores for the five negative mood states (anger, confusion, depression, fatigue, tension) all falling below the population mean (T score of 50), and the one positive mood state (vigor) approximately one standard deviation (T score of 60) above the population mean. The iceberg profile has been demonstrated in athletes competing in cycling (Hagberg, Mullin, Bahrke, & Limberg, 1979), rowing (Morgan & Johnson, 1978), running (Brown & Ramirez, 1978; Morgan & Costill, 1972; Morgan & Pollock, 1979; Morgan, O'Connor, Sparling & Pate, 1987b; Morgan et al., 1988), soccer (Hassmen & Blomstrand, 1995), swimming (Furst & Hardman, 1988; Morgan, Brown, Raglin, O'Connor & Ellickson, 1987a), and wrestling (Morgan & Johnson, 1977; Morgan, 1979). Based on many of these findings, Morgan (1985) then proposed a mental health model that associates positive mood states in athletes with higher performance levels and lower performance levels with low positive mood states.

A study performed by Morgan and Johnson (1977) examined the role of mental health upon mood states in successful and unsuccessful wrestlers. Results indicated that lower anxiety and higher vigor scores favored the successful athletes. The researchers concluded that positive mental health plays an important role in governing an athlete's likelihood of success.

Hassmen and Blomstrand (1995) investigated soccer players' mood states by completing the POMS before, immediately after, and two hours after each game during the season. Results revealed fatigue scores did not differ with regard to outcome. The researchers suggest that the differences observed for the five POMS disciplines really reflect a difference in mood state that is not due to differences in the physical effort expended in the game. The researchers concluded the outcome of games had a significant influence on the mood states of athletes.

Several other researchers have found contradicting results when utilizing the POMS test as a predictor of athletic performance (Daiss, LeUnes, & Nation, 1986; Frazier, 1988; Prapavessis

& Grove, 1991). Furthermore, several studies found the POMS did not differentiate between athletes of different ability levels (Berger & Owen, 1986; Craighead, Privette, Vallianos & Byrkit, 1986; Durtshi & Weiss, 1986). Robinson and Howe (1987) reported successful soccer players differed from unsuccessful players only on pregame POMS confusion scores. More recently, Hassmen, Koivula, and Hansson (1998) examined the relationship between precompetitive mood states and performance of elite male golfers. Results indicated precompetitive mood states were related to some golfers but not all golfers.

The purpose of this study was to examine the relationship between self-confidence, anxiety, and mood states in collegiate tennis players. The Competitive State Anxiety Inventory - 2 (CSAI-2) and the Profile of Mood States (POMS) were chosen based on their psychometric properties and their ability to assess several different areas known to be influential in sport competition. The CSAI-2 and POMS were utilized to determine pre-competition levels of anxiety, self-confidence and mood disturbance and their relationship to successful or unsuccessful tennis match outcome.

Methods

Participants

Twenty-four division I NCAA male tennis players volunteered to take part in this study during their participation in the NCAA Regional (VII) Team Tennis Tournament. The Regional Team Tennis Tournament consisted of eight teams competing against each other in a single elimination format tournament with the winning team advancing to the NCAA Team Championship. Each team consisted of six singles players and three doubles teams. Three singles matches were randomly selected from each of the team's top six singles players to participate in the study. From the eight teams competing in the quarterfinals, four teams were randomly selected for participation in this study. Players from both teams competing in singles position number 1, 3, and 5 were included. All four teams advancing to the semifinals participated in the study, which included two winning teams from the quarterfinals and two new teams. Players from both teams competing in singles position number 2, 4, and 6 were chosen. Players from both teams ranked 1, 4, and 6 were randomly selected for participation in the finals. Therefore, a total of twenty-four players participated in the study, with two players being analyzed twice (once as a participant in the quarterfinals and once again as a participant in the finals). Participants had a mean age of 20.4 years ($SD=1.96$) and 10.2 years ($SD=2.34$) playing experience. All teams had similar competition experience to minimize the effects of ability on match outcome. By this time in the tournament due to the single elimination format, athletes are more evenly matched in ability as weak athletes have already been eliminated.

Instrumentation

Profile of Mood States. McNair et al. (1971) developed the Profile of Mood States (POMS) test, which has been used extensively to measure mood states in a variety of situations and exercise. The POMS test consists of 65 adjectives describing mood, rated on a five-point Likert scale ranging from 0 (not at all) to 4 (extremely). The POMS is divided into 6 factors describing six mood dimensions that include: tension, depression, anger, fatigue, confusion, and vigor. The raw scores for the confusion subscale ranged from 0-28, the vigor subscale from 0-32, the fatigue subscale from 0-28, the depression subscale from 0-60, the anger subscale from 0-48, and the tension subscale scores ranged from 0-36. Test re-test reliability coefficients reported for each subscale were: depression ($r = .74$), tension ($r = .70$), anger ($r = .71$), confusion ($r = .68$), fatigue ($r = .66$), and vigor ($r = .65$) (McNair et al., 1971). Measures of internal consistency have been reported to be between 0.85 and 0.95 depending upon the subscale (McNair et al., 1971). Total mood disturbance scores were calculated by summing the 5 negative mood states, subtracting the vigor score, and adding a constant of 100 to prevent negative numbers (McNair et al., 1971). It is suggested by McNair et al. (1971) that not only does the total mood disturbance score make sense from a clinical perspective, but it can also be utilized as a single global estimate of affective state and is not associated in any way with any type of disturbed behavior. As such, lower total mood disturbance scores are desirable as it suggests that an individual is in a more positive overall affective state.

Competitive State Anxiety Inventory - 2. The Competitive State Anxiety Inventory - 2 (CSAI-2) measures pre-competition levels of anxiety (Martens et al., 1990) and is divided into three subscales: cognitive anxiety, somatic anxiety, and self-confidence. Somatic state anxiety is considered to be a reflexive response to various environmental stimuli, associated with the onset of an evaluative event (Martens et al., 1990). Cognitive state anxiety is defined as "negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences" (Morris, Davis, & Hutchings, 1981, p. 541). The CSAI-2 is comprised of 27 items each with a 4-point Likert-type scale ranging from 1 (not at all) to 4 (very much so). Hence, each subscale score was in the range of 9 to 36. Cronbach's alpha coefficients range from .79 to .90, demonstrating a high degree of internal consistency for each of the CSAI-2 subscales (Martens et al., 1990). The concurrent validity of the CSAI-2 is supported as it has been demonstrated to be highly congruent with the hypothesized relationships among scales of similar constructs and the CSAI-2 subscales (Martens et al., 1990).

Procedure

Twenty-four division I NCAA male tennis players volunteered to participate in this study and signed consent forms approved by the University Human Subject's Institutional Review Board, which also approved the study. Prior to the start of their tennis match, all participants completed the POMS and CSAI-2 using standardized instructions recommended by McNair et al. (1971) and Martens et al. (1990), respectively. The inventories took approximately 10-15 minutes to complete and were administered 30 minutes prior to competition to minimize changes between the time of psychological testing and start of performance, yet not so close that the completion of the inventories interfered with their athletic performance.

Results

The CSAI-2 was utilized to measure pre-competitive cognitive anxiety, somatic anxiety, and self-confidence. Results revealed that winning tennis players ($n = 12$) displayed a significantly higher self-confidence ($M = 29.42$, $SD = 2.78$) than losing players ($n = 12$, $M = 21.83$, $t = 7.21$, $p < 0.05$). In addition, winning tennis players exhibited a significantly lower cognitive anxiety ($M = 14.67$, $SD = 2.42$) than losing players ($M = 20.5$, $t = 4.50$, $p < 0.05$). Furthermore, winning players displayed a significantly lower somatic anxiety ($M = 13.4$, $SD = 3.14$) as compared to losing players ($M = 19.58$, $t = 4.68$, $p < 0.05$).

The POMS was used to obtain measures in mood disturbances prior to the match. Raw POMS data for winning and losing players were converted to T-scores using the T-values provided in the POMS manual for collegiate-aged males (McNair et al., 1971). The conversion of the raw subscale scores into T-scores not only facilitated the subscale comparisons among the athletes who participated in this study, but also against college norms. Results revealed winning tennis players exhibited the iceberg profile, while losing players did not demonstrate the iceberg profile. As such, winning players had lower scores on tension (38.65), depression (40.17), anger (44.83), fatigue (35.67), and confusion (34.00) and a higher vigor score (65.25) as compared to losing players (Table 1). Losing players also scored higher on anger (60.25), and lower on the vigor (52.08) when compared to college norms. Losing players were almost even with the mean on depression (49.75) and tension (49.00), while fatigue (40.58) and confusion (44.17) were below the mean. Results revealed that total mood scores were statistically significantly lower for winning tennis players ($M = 92.337$, $SD = 10.6$) when compared to losing players ($M = 139.7$, $SD = 9.6$, $t = 12.59$, $p = .000$).

Table 1.

POMS Norms and T Values for Winning and Losing Tennis Players

POMS	Norm	Win	Loss
Tension	50	38.65	49.00
Depression	50	40.17	49.75
Anger	50	44.83	60.25
Vigor	50	65.25	52.08
Fatigue	50	35.67	40.58
Confusion	50	34.00	44.17

Discussion

This study examined precompetitive anxiety, self-confidence, and mood states in collegiate tennis players. The results of this study were consistent with previous investigations that have suggested that successful performance is characterized by the iceberg profile (Furst et al., 1988; Hagberg et al. 1979; Hassmen & Blomstrand, 1995; Morgan, 1979b; Morgan et al., 1987; Morgan et al., 1988). Results of this study found winning tennis players demonstrated Morgan's (1980) iceberg profile as would be expected in an individual sport. Furthermore, winning tennis players in this study exhibited higher vigor scores than losing tennis players. A possible explanation is winning athletes who demonstrate a higher vigor score may have been able to maintain a positive attitude in the face of adversity. Winning and losing tennis players showed considerably lower scores on fatigue when compared to college-age norms. Thus, consistent with the results presented by Hassmen et al. (1998), it appears that fatigue did not play a role in overall match outcome.

Losing tennis players demonstrated higher scores on anger when compared to both college-age norms and winning tennis players. As a result of these emotions existing prior to the match, athletes may have been affected by these negative emotions, which in turn may have played a role in their decreased performance and subsequent loss. Tennis players who had a negative mindset prior to the commencement of their match may have created a situation in which they were so focused on the negative that they were unable to capitalize on any positive aspects of their game during their match.

The losing tennis players in this study had total mood disturbance scores that were significantly higher than the winning tennis players and college-age norms. Therefore, athletes who enter a match with low mood disturbances may be more relaxed and more capable of controlling negative emotions so as to minimize their influence on the match. Not only did the winning tennis players exhibit the iceberg profile, but they also had lower total mood disturbance scores than the losing tennis players. Therefore, if something negative occurred during the match, the player with the lower mood disturbance score may have been able to "shake it off" and continue without a significant change in his or her attitude or expectations. For example, the player with the lower mood disturbance score may have been able to come back and win the next game after a break of serve or next point after a double fault.

The results of this investigation, in general, confirm the findings reported in earlier studies that found successful athletes to exhibit higher self-confidence than unsuccessful athletes (Feltz, 1998; Treasure et al., 1996). Results suggest that athletes who have a higher self-confidence entering competition are more likely to be successful. One possible explanation is that confident athletes believe in their ability to perform well and win. In many ways it can be likened to creating a self-fulfilling prophecy or mindset that enhances the player's ability to either profit from positive events and/or reduce the impact of negative events during the tennis match. This notion of a self-fulfilling prophecy or that one's mental state prior to an athletic competition match may influence the outcome, is based on Bandura's (1977) self efficacy theory. The theory suggests that performance will be determined by an individual's belief that he or she has the ability to execute the skills required by the situation and the responsiveness of the environment. As such, self-confidence or efficacy expectation is a person's belief in his or her ability to succeed. Therefore, creating a positive mental outlook or expectation for success may strongly contribute to overall success or failure, as the results of this study would suggest.

Bandura's (1977) theory also suggests that outcome expectations are critical in evaluating the relationship between self-confidence and performance. Outcome expectations are centered around the idea that the things we do, whether they are positive or negative, will influence or make a difference in the end result. To put it simply, someone with a positive

outcome expectation believes that they have the power or the ability to control whether they win or lose. It may be that more self-confident players attribute the positive occurrences in the match to something that they are doing and/or have control over and the negative ones to chance or luck of their opponent. These findings would be consistent with those of Hanton and Connaughton (2002) in that perceived control acts as a moderating variable in how anxiety is interpreted. Aspects of anxiety that were believed to be controllable facilitated performance whereas uncontrollable factors had a debilitating effect on performance. In turn, increases or decreases in self-confidence were perceived to have more of a direct impact on performance. These factors would allow players who believe that they are in control to maintain their confidence and positive attitude even in the face of adversity.

Results of this study found winning tennis players demonstrated significantly lower levels of somatic and cognitive anxiety. This finding supports the numerous studies that have shown winning athletes to have lower pre-competitive anxiety than losing athletes (Highlen & Bennett, 1979; Mahoney & Avenier, 1977; Ussher & Hardy, 1986; Weinberg & Genuchi, 1980). One possible explanation is that because winning athletes have higher levels of self-confidence they manifested fewer negative expectations and concerns about performance than did the losing players. The higher arousal and anxiety levels that were experienced by the losing players may have influenced their performance in a negative manner and contributed to their loss.

While the results of this study are consistent with those reported in the literature, it is important to consider the impact that each player's physical ability may have on the results. There are two primary benefits for utilizing tennis players to examine the relationship between self-confidence, anxiety, and mood states. First, tennis is a sport in which playing position is relatively structured in that in most cases the person playing in the #1 singles position is the best player on the team, the second best player competes in the #2 singles position etc... Therefore, while there are differences in skill level, you generally have the best player on one team competing against the best player on the opposing team. This would be in direct contrast to a sport such as wrestling where individual matches are based solely upon the weight of the competitor rather than skill level. And second, in a regional tennis tournament, many of the weaker teams have already been eliminated and the teams remaining in the competition tend to be comprised of stronger athletes with more depth in skill level.

Bandura (1977) also addressed skill level in conjunction with self-efficacy theory and suggested that a player's belief in his or her ability has the power to supercede actual physical ability. Therefore, players who have a stronger belief in their own ability may triumph even if they are matched against an opponent with superior physical skills. Even something as simple as an athlete's win/loss record may only provide a superficial look at his or her ability as it is

influenced by the strength of his or her previous competitors. Due to the nature of sports in general, physical ability will never be able to be removed completely from the equation as it would be impossible to find athletes who were perfectly matched against each other with respect to skill level. However, the results of this study are consistent with those previously reported in the literature in that athletes with a positive mental outlook prior to competition tend to be more successful.

In conclusion, winning players were more self-confident and had lower anxiety and mood disturbance scores prior to their matches than the losing players. Based on the demands of the sport, it would seem logical that tennis players who fit into this profile were more likely to win their matches. As such, athletes who displayed high self-confidence and low anxiety levels were potentially able to remain calm and relaxed under pressure and were not as affected by negative events. The ability to get into the right mindset prior to competition and then maintain it throughout the match may be a key aspect of the game that separates the successful from the unsuccessful athletes. Players who demonstrate low self-confidence and high anxiety prior to the start of their match may be placing themselves at such a mental disadvantage that they are unable to overcome it regardless of how the match progresses. Furthermore, these results suggest that mental state prior to the start of a tennis match plays a crucial role in overall success or failure and that your ability to get mentally ready for competition may be an aspect of the game that you have to play well to succeed.

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