

## **The Effects of a Mental Training Program on Juniors Pre-Competitive Anxiety, Self-Confidence, and Tennis Performance**

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This investigation reports the impact of a season-long Mental Training Program (MTP) on two elite junior tennis players. The two reported cases were part of a study in which MTP players ( $n = 5$ ) in addition to their tennis practice were exposed to 5 different psychological skills: goal setting, positive thinking and self-talk, concentration and routines, arousal regulation techniques, and imagery. Another group of elite junior tennis players ( $n = 4$ ) followed the same amount and quality of tennis practice but received no mental training practice. Program effectiveness was evaluated through (a) the Competitive State Anxiety Inventory-2 (CSAI-2), (b) the athletes' appraisal on 8 aspects of tennis performance, and (c) tennis-specific statistical data of two selected cases. The results indicated an increase in the direction dimension of the somatic anxiety, cognitive anxiety and self-confidence for the intervention group at the posttest. Moreover, the intensity of self-confidence, as well as the overall tennis performance, were greater for all the participants of the intervention group after the MTP. Results on two selected cases are reported which clearly demonstrate the effectiveness of the MTP in eliminating specific performance problems.

Mental training programs (MTP) for sport appeared in the field of sport psychology approximately 20 years ago. They were targeted at helping top level adult sporting competitors to reach higher levels of performance. Recently attention has shifted towards helping competitive performance of top and even less advanced young athletes. Published research dealing with the topic of MTP has a time range from as long as 1 year (Savoy, 1993), where an optimal combination of certain mental techniques is studied over time, to as short as several minutes where the importance shifts towards the immediate effectiveness of one mental technique (Theodorakis, 1996). There have been many studies done in different sports dealing with both recreational (Efran, Lesser, & Spiller, 1994) and competitive athletes (Patrick & Hrycaiko, 1998). All of them showed a direct relationship between the use of one or a set of psychological techniques and improvement in performance. Given that sound technique is very important in tennis, most of the research is done in the field of technique improvement by using several psychological programs or techniques (Atienza, Balaguer, & Garcia-Merita, 1998; Noel, 1980; Rhea, Mathes, & Hardin, 1997). The results of these studies demonstrated technique improvement for the experimental as compared to the control group. However, competitive performance is a multifaceted issue, which involves many other parameters than simply technique improvement.

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The present MTP was formed after making a thorough review of the following issues: (a) the most common mental strategies currently used by professional tennis players and their coaches in order to enhance performance, (b) tennis-specific mental demands, and (c) the current state of knowledge about MTP and the psychological skills used, as well as their mediating effect in performance enhancement. These factors will be presented and critically analyzed below. Furthermore, potential problems deriving from past research works employing MTP are critically.

The most common mental strategies used by professional tennis players to enhance their performance are goal setting, self-talk, a pre-service or pre-service return preparatory routine (concentration), relaxation and imagery (Defrancesco & Burke, 1997). As for what strategies the coaches use, in order to enhance their athletes' self-efficacy beliefs, Weinberg and Jackson (1990) found that the most prominent were encouraging positive self-talk, modeling confidence themselves and verbal rewards/persuasion. Weinberg, Grove, and Jackson (1992), after comparing the most potent mental strategies used by American and Australian tennis coaches for enhancing their players' self-efficacy ended up to the same conclusion.

Taylor (1995) suggests that the most important factors that are related to performance for most sports are motivation, trust and self-confidence, intensity/arousal regulation and concentration. However, the importance of any one of them differs according to the specific demands of each sport. Tennis is a sport requiring fine and accurate movements, relatively long in duration with many short bursts. This means that building and maintaining self-confidence is the primary goal for intervention in tennis (Barling & Abel, 1983; Defrancesco & Burke, 1997). An important part of this process involves developing sound thinking skills. The first step in acquiring these skills is to teach players to become aware of their thoughts and to regulate them during critical competitive situations. Useful techniques that players may use are thought stoppage, positive body language, positive and motivational key words, goal setting, imagery, focus on the process rather than the outcome and the ability to increase/decrease intensity (Taylor, 1995).

There are only a few published studies addressing the implementation and evaluation of a season-long MTP for elite adult athletes (Savoy & Beitel, 1997), or tennis players in particular (Davis, 1991; Daw & Burton, 1994; Rolo, Brito, & Colaco, 2001), and only one referring to elite junior tennis players (Davis, 1992). Most of the programs employ a combination of mental skills, such as goal setting (Davis, 1992; Daw & Burton, 1994; Patrick & Hrycaiko, 1998), concentration-refocusing techniques (Davis, 1991; Rolo et al., 2001; Savoy & Beitel, 1997), relaxation-energizing techniques (Davis, 1991, 1992; Patrick & Hrycaiko, 1998), imagery (Davis, 1992; Daw & Burton, 1994; Patrick & Hrycaiko, 1998; Rolo et al., 2001; Savoy & Beitel, 1997), and positive self-talk (Davis, 1991; Landin & Hebert, 1999; Patrick & Hrycaiko, 1998; Savoy & Beitel, 1997). Although all these studies generally showed performance improvement after the completion of the MTP, they also revealed some other useful information. Savoy and Beitel (1997) found that a MTP that is more targeted at addressing individual rather than a group's mental needs, is more effective at increasing state self-confidence. Daw and Burton's (1994) study revealed that in order for a MTP to be successful there has to be full compliance with its organization from both the athletes and their coach. Otherwise, there will be no practice time and feedback for individual goals and no adequate on-court time to practice the psychological skills. On the contrary, if there is full compliance with the MTP, participants enjoy using it and they, as well as their coaches, are pleased with the results (Patrick & Hrycaiko, 1998).

The aforementioned studies concluded that mental training helps, to a certain degree, both to regulate anxiety, and improve self-confidence and performance in adult athletes. However, there is lack of scientific evidence regarding the extent to which such programs can be effective

at helping elite young competitors regulate their pregame anxiety and improve both their confidence and match performance. Therefore, a major aim of the present study is to extend the MTP literature on young elite tennis players by providing further evidence for the effectiveness of a season long MTP.

In terms of each of the psychological skills used in the current MTP, there is scientific evidence that they can influence most of the CSAI-2 factors. Burton (1988) found that the use of performance goals had a significant positive impact on cognitive anxiety, self-confidence and concentration in young swimmers. Feltz and Riessinger (1990) investigated the merits of emotive imagery in enhancing self-efficacy beliefs and performance on a competitive muscular endurance task. They found that, at the end of the study, the imagery participants had higher efficacy and performance scores than the control participants. In a recent study with elite junior roller skaters, Vadocz and Hall (1997) found that visual imagery ability and motivational arousal imagery were predictors of cognitive state anxiety. Visual imagery ability also predicted somatic state anxiety, while motivational imagery was a predictor of self-confidence. A study of observed self-talk and behavioral assessments with junior tennis players found that negative self-talk was associated with losing and bad performance, but it failed to show a relationship between positive self-talk and better performance (Van Raalte, Brewer, Rivera, & Petitpas, 1994). The authors believed that this finding is explained by the fact that positive self-talk is more internalized and thus difficult to observe than negative self-talk, which is difficult to hide. Terry, Coackley, and Karageorghis (1995), studied the relevance of the matching hypothesis for anxiety interventions in junior tennis players. The results rejected the matching hypothesis and showed that although all techniques were effective in reducing state anxiety and increasing self-confidence, centering proved the most effective intervention in reducing cognitive anxiety, whereas mental rehearsal reduced somatic anxiety. Self-confidence was the only component for which the combined intervention proved superior to either centering or mental rehearsal alone. Finally, the concentration grid completed by the control group was effective only in decreasing cognitive anxiety prior to competition.

It is not the scope of this paper to discuss the theories developed to explain the relationship between state anxiety and performance. Instead, only the results of certain studies in this field are presented. As for the relationship of anxiety and performance there is no conclusive evidence whether the levels of precompetitive anxiety can predict performance (Gould, Petlichkoff, & Weinberg, 1984). The only consistent finding is the significant curvilinear trend between somatic state anxiety and performance (Burton, 1988). However, there seems to be a positive linear trend for self-confidence and performance (Barling & Abel, 1983; Burton, 1988), although some inconsistency in the scientific results also exists (Jones & Cale, 1989). These inconsistencies, which limit the generality of the results, may occur for a number of reasons, as for instance different sports studied (e.g., more complex sports with higher decisional demands such as tennis require lower levels of arousal than less complex sports such as sprinting) or different levels of expertise (novices generally need lower levels of arousal in order to perform well than experts in most sports). The main reason, however, is the prevalence of the intensity-alone approach for measuring competitive anxiety, as anxiety has largely been viewed as negative and detrimental to performance. Nevertheless, some recent findings suggest that this is not always the case, and that anxiety can have a positive effect and thus, the interpretation of one's anxiety symptoms should also be measured (Jones, Swain, & Hardy, 1993). For example, two athletes may feel their heart racing before an important match but one interprets it as a sign of readiness to compete and the other as a sign of nervousness. According to Perry and Williams (1998), only the latter athlete needs physical relaxation skills. Although it seems reasonable to assume that precompetitive anxiety exists in all athletes, regardless of age, a recent study revealed that children up to 11 years old do not suffer from high levels of

precompetitive anxiety as their adolescent counterparts (Pandelidis, Chamoux, Fargeas, Robert, & Lac, 1997). Consequently, the last goal of the present study was to address the problem of precompetitive anxiety and its effect on the performance of elite adolescent tennis players.

In summary, the goals of the present study were: (a) To examine if a 25-week-long MTP, combining goal setting, positive thinking and self-talk, arousal regulation techniques, concentration and routines, as well as imagery, influences the athletes' somatic anxiety, cognitions as well as enhances self-confidence and perceived performance in 8 major components of tennis in elite junior players, (b) to extend the literature on MTPs and assess their applicability to tennis, and (c) to present a detailed report of the effect of the MTP on 2 selected cases.

## METHOD

### Participants

The total number of participants in the MTP were 9 elite junior tennis players (mean age 14.1,  $SD = 1.57$ ) from the northwest part of Greece whose parents signed an informed consent in order to participate in the study. When their initial ranking was obtained (end of December 2001), four of them were ranked in the best 10 junior tennis players of their age group and the rest in the best 25 in Greece. However, at the time of the study (January 2002), some of the participants changed age group and subsequently their ranking changed also. All the participants were initially allowed to participate in the MTP, but due to their engagement in other activities (school, foreign languages etc.) only 5 of them (1 male and 4 females) could attend the minimum of 80% of the program and complete all the assignments required to be considered as the MTP group (mean age 13.2,  $SD = 1.30$ ). The remaining 4 participants (2 males and 2 females) did not follow the MTP (mean age 15.2,  $SD = 1.26$ ) and did not engage in mental training.

### Instrumentation

Typically, one of the principal instruments measuring state anxiety and confidence in sports is the Competitive State Anxiety Inventory-2, or simply CSAI-2 (Martens, Vealey, & Burton, 1990). The CSAI-2 consists of 3 different factors namely cognitive and somatic anxiety and state confidence, each of them being represented by 9 questions. All the participants completed the translated CSAI-2 5–10 minutes prior to their 1st match. The CSAI-2 was found previously to be a valid and reliable instrument for the measurement of state cognitive and somatic anxiety as well as state confidence for the Greek population (Iosifidou & Doganis, 2001; Tsobatzoudis, Barkoukis, Kaisidis, & Grouios, 1996). Since CSAI-2 fails to measure the individual's interpretation of those symptoms, in terms of whether they are perceived to be positive or negative in relation to the upcoming athletic event, a "direction" scale was added as proposed by Jones and Swain (1992). The internal reliability analysis of a somatic and cognitive direction subscale was previously examined with coefficients being .81 and .89 correspondingly (Jones & Hanton, 1996). Specifically, each athlete rated the degree to which the experienced intensity of each symptom was either facilitative or debilitating to subsequent performance on a scale ranging from  $-1$  (*debilitative*) to  $+1$  (*facilitative*) with "0" being *totally unimportant*. Thus, the possible direction scores on each subscale ranged from  $-9$  to  $+9$ .

### Performance Measures

Performance is even more difficult to assess as it consists of many different components. The instrument used in this study was a set of 8 questions, each related to a different aspect of

tennis performance. Specifically, each player was asked to appraise his or her performance on a 5-point scale (1 being “not good at all” and 5 being “very good”) on the following aspects: 1) his or her physical feelings; 2) quality of technique; 3) timing and rhythm; 4) concentration; 5) amount of effort exerted; 6) mental attitude and thoughts; 7) level of self-confidence during the match; and 8) comparison of his or her performance with what he or she was expected to play, given the opponent. An overall performance score was obtained from the sum of all these 8 items.

## **Intervention**

The study began at the 1st winter indoor national junior tennis tournament at the beginning of January. All 9 participants completed the CSAI-2, approximately 10 minutes prior to their 1st match and the self-appraisal of performance, during the first half-hour after its completion. During that time they received no feedback of any kind that could influence their perception about their performance. The same procedure was followed by all participants at the most important summer national junior tournament, which took place at the beginning of July. The organization and implementation of the program was made according to Jim Loehr (1990), one of the leading sport psychology consultants in tennis. No problems were encountered concerning the integration of the MTP into the practice and tournament schedule of the athletes, as the first author, who conducted all sessions, was also the federation coach responsible for their tennis training. The MTP consisted of 5 different psychological skills: goal setting, positive thinking and self-talk, concentration and routines, arousal regulation techniques, and finally imagery. There was one 60-minute session every week for each of them, the first one being an introductory session, emphasizing the importance of mental skills in tennis, and the last one (the 25th) a revision of what was done until then. In terms of the mental skills, except for goal setting that lasted 3 weeks, all other skills lasted 5 weeks covering a total of 25 weeks for the intervention program. A typical session started with some written basic information for the mental skill that would be taught, how it would help the athletes as well as how it could be implemented into practice and competition matches, questions, and finally implementation of the mental exercises of that session. The content of each of the 5 mental skills is outlined below.

Goal setting started with the athletes reading a text emphasizing the importance of setting appropriate goals. The text also required the players to write down their performance goals for the upcoming 6-month period of the study, following the procedure that Orlick (1986) recommends in his book *Psyching for Sport: Mental Training for Athletes*. All players had their goals reviewed by the first author at a one-on-one meeting and target dates were set. Goals involved both the physical aspect (tennis performance, e.g., improve the depth of my 2nd serve; and conditioning, e.g., improve time at the “spider drill”), as well as the mental one (e.g., make less than 2 negative statements or gestures at the upcoming practice or tournament match). They were all based on the individual needs of each athlete. The first author following the suggestions of Gould (1998) revised all goals, and progress was charted according to Loehr (1991).

In the “positive thinking and self-talk” sessions, the athletes were taught the importance of self-talk and its link to negative thoughts, negative emotions and low performance. The first step was for them to become aware of their negative thoughts, comments or acts before, during and after practice. The technique used in the study was that each time an athlete made a negative comment or gesture he or she had to perform a vertical jump, not for the sake of punishment, but in order to become aware of it. Then they were taught to use positive body language, as well as to change a negative thought into a positive one, by using a trigger (Zinsser, Bunker, & Williams, 1998). Progress was charted for each practice.

During the “arousal regulation techniques” sessions the participants firstly understood that there is an optimal level of arousal at which one performs his/her best and that the scope of these sessions was to try to find it. To this effect, they were required to rehearse their more recent best and worst tournament matches as vividly as possible. Then they completed the CSAI-2 and the set of 8 questions for those matches. By doing this they became aware that their pre-match arousal and confidence level is different when they performed poorly or well. In addition, given that the first author was their federation coach for over one year, he knew if someone needed more relaxation or psyching-up techniques, so the plan for their arousal regulation strategies was formed accordingly. All athletes learned both some relaxation and activation techniques, such as centering, progressive muscle relaxation, making quick movements (fast sprints, hops, etc.) and filling their bodies with positive energy, as well as how and when to implement them during both practice and competition matches (Nideffer, 1976). Finally, they were instructed to implement an activation or relaxation technique, just before their competition matches, if they felt they needed it.

During the “concentration and routines” sessions, the participants understood the importance of concentration during practice and tournament matches and learned what and why they should focus their attention. Thus, they were taught the “routine” between points that Jim Loehr (1991) suggests in his book “Mental Toughness Training” (pp. 130–131) and tried to implement it at their subsequent tennis practices. In addition, they were involved in some concentration exercises, such as watching a steady tennis ball and trying to observe it for 5–10 minutes without making any irrelevant thoughts (count the number of irrelevant thoughts during that time period and chart progress), focus on a “mantra” and play the “jump-hit” or the “watch the reams of the ball” exercises for 5–10 minutes at each practice (Gallwey, 1976).

Finally, at the “imagery” sessions, the athletes of the MTP group were given an audiotape. The audiotape began with a short relaxation exercise, and then required the participants to visualize themselves executing both their techniques and tactics perfectly, hitting all their shots with confidence and winning all points (Martin, Moritz, & Hall, 1999). The players imagined hitting all their shots exactly where they wanted—positive imagery (Woolfolk, Parrish, & Murphy, 1985), as well as reacting properly when an opponent was playing “in the zone” (Syer & Connolly, 1984). All the participants of this group were also keeping a daily log of all the mental exercises they were doing. They also rated themselves on a ten-point scale (from 0, “I can see no image and experience no positive emotions at all”, to 10, “I can see very vivid and real images and experience strong emotions”) according to the vividness of their images and emotions. The investigator reviewed the log weekly before the beginning of each new session.

The results of this investigation are reported in two sections. The main section presents the results of 2 selected cases of female junior tennis players who worked extensively to develop their psychological skills through the MTP, which was adjusted to fulfill their individual needs. Both players were selected for this analysis as they were very much committed to the MTP, had no absences at all, and did all the mental exercises they were assigned to do both on- and off-court. The names of the two players are deliberately changed to ensure their anonymity. The second part of the results’ section is concerned with the changes of each participant’s individual CSAI-2 and the 8 item self appraisal scores (pretest vs. posttest).

## RESULTS

### Case Study #1

Christy was a 14.5-year-old girl who was ranked number 25 girls under 14 the previous year, started as number 50 girls 16 at the beginning of the new season/study. She had good solid

groundstrokes and a technically correct 1st serve. She was not trying to hit winners but rather she was hitting deep loopy shots and expected that her opponent would make a mistake. She had absolutely no net game and she was going to the net only if she was forced to go. When at the net, she was either easily passed without even trying to hit a volley or she was hitting it on the racket frame and was losing the point. Christy's way of dealing with this problem was to hit deep loopy shots so that her opponents could not bring her to the net. She was successful with this tactic, given that in most matches she was moving to the net only once or twice per match. Christy's biggest problem was double faulting. This was, however, a problem she could not avoid; hence, she had to face it in every game she was serving. Christy's 1st serve was pretty good and could not be characterized as problematic. When she was missing it, however, and began her routine for the 2nd serve she was becoming very tense. She was squeezing her eyes as if she did not want to see the result of her serve and her arm was moving as a stiff unit; there was little elbow bent and definitively no wrist acceleration. The problem existed even in practice matches but it was aggravated in tournaments. From a personal interview, it was made clear that the problem began at a cognitive level. Every time she was missing her 1st serve she was saying to her self: "Don't double fault now, just don't." Statistics were kept for all her games (she lost at the 3rd round of qualifications) at the first winter national tennis tournament, to find out the exact number of double faults she was performing per set. She was double faulting on average, twice every game she was serving, and had 10.1 double faults per set! She was missing 66% of her 2nd serves. This, of course, was affecting her confidence for both her serve- and overall performance.

Both practice and the MTP targeted at helping Christy overcome her fear of the net game, as well as establishing a pre-service routine that would help her relax and execute a flowing kick 2nd serve. In terms of the net problem, she started to practice her volleys with younger players who were unable to hit the ball hard. In addition, every time she was at the net and a ball was coming towards her, she had to call out "reams" as a cue word and focus on the reams of the ball. By doing this, she was accomplishing two things: Firstly, she was sure that she was focusing on the ball, and secondly she was preventing her "conscious self" from having irrelevant distracting thoughts (Gallwey, 1976). Even though during the first week there were some problems related to her trust for this new technique (e.g., sometimes she was closing her eyes before hitting a volley, she was missing it, and she was accusing the "reams" for doing so), the overall results were very promising. After 3-4 weeks, she overcame her fear and could easily hit 5-6 consistent volleys in a row, at a normal pace. However, the problem was only partially solved. At practice matches, she was still not moving to the net, unless she was forced to do so. In order to solve this new problem we set a performance goal for Christy. She had to win at least one point from the net, by hitting a volley or an overhead, in order to get a game. This rule existed in all her practice matches. At the beginning she was losing to some of her teammates that she could previously defeat with her old style of game. However, as she began to gain experience with her net game, she gradually started to win more and more points from the net. Finally, Christy refined her net tactics after she started working with imagery. By the end of the study Christy was a much better player who was trying to hit winners at the opponent's short balls and she was approaching the net for volleys. At the summer national tournament, Christy qualified for the main draw girls 16. She lost at the 3rd round against the number 3-seeded player, after having eliminated 2 better-ranked players and she played three excellent matches. As for her net game, she won on average 4 points per match from the net and had 5.7 winners per match.

In terms of her double-fault problem, the MTP focused predominately on developing a pre-service routine using relaxation, thought stopping, self-talk, and imagery as the primary psychological skills. The routine started with bouncing the ball 4 times and catching it. Then

the relaxation component of her routine followed, which included 2 relaxation breaths; during the first one the athlete was advised to imagine the air passing through her body and dissipating any tension existing in it. During the second, she was to visualize the air entering her brain and “pushing” all her worries out of it. Self-talk included the cue-word *relax* to remind herself to relax before her serve. Then she had to watch the height of the net, over which she had to hit her 2nd serve, as well as her target into the opponent’s service box. Finally, she had a quick visual image of where and how her racket would make contact with the ball, in order to hit a perfect kick serve. The thought-stopping technique was used if an irrelevant thought passed through her mind during her routine. It involved saying to herself the cue-word “stop” and then the implementation of the pre-service routine from its beginning. Part of this routine was demonstrated to be effective in improving the consistency of the serve in university students (Theodorakis, 1996). It is important to note that the routine was developed in parts and was completed and refined after about 3 months of practice. The first positive results concerning the stiffness of her service motion and her double fault percentage, however, were apparent after about 2–3 weeks of training. What is interesting to note is that Christy made only 7 double faults in 3 matches during the summer national tournament that is 1 double fault per set or 4.1%!

### **Case Study #2**

Helen was a very talented 11-year-old girl who won the Ten-and-Under Girls National Championship the previous year. She was selected on behalf of the Federation about 2 months before the winter indoors national tournament, during which the present study was initiated. All her strokes were rather efficient and she liked to go for winners and move to the net. She was from a small city and everybody in her tennis club was proud of her. From that age, she was like a role model for the other athletes of her team. A number of “significant others” (her parents, other athletes, etc.) were expecting her to be the best and win all her matches. Some of their typical comments to her were “Now that you are the best, nobody can beat you,” “Helen you are going to win the national winter tournament aren’t you?” and so forth. Helen was introverted and she was not replying to any of these kinds of comments. Her mother was the only person she seemed to trust.

Helen was enjoying tennis practice and conditioning exercises. She was also enjoying practice matches and competition, and in fact, she was fighting for every point, no matter what the score was. The first time I saw Helen competing in a tournament was at the beginning of the study. She was playing the 12-and-under category for the first time and she was the number 5-seeded player. She came to the courts’ site about one hour before her first match was scheduled and during all this time, she was sitting near her mother and seemed to watch other matches. About 20 minutes before her match I asked her: “Aren’t you going to start your warm-up?” She replied that she was not feeling well and that she did not want to play her match. I took her for a walk to find out what was happening. She admitted that her body and especially her stomach was so stiff and tight that she could not breathe normally. She was breathing very fast and shallowly, her face was white and she was trying not to cry. I tried to explain to her that it was only a game and should try to have fun. She did not seem to take these comments seriously and told me that she wanted to stay alone and then, she sat again close to her mother, and was not talking to anybody. She completed the CSAI-2 about 5–10 minutes before her match and she was waiting to be called to start playing. It was the first time that Helen played so passively, she was only pushing the ball into the court and she was waiting for her opponent to lose the point. All her shots lacked power and she was squeezing her racket. What was most astonishing, however, was that, after she made a mistake, she watched her father’s reactions



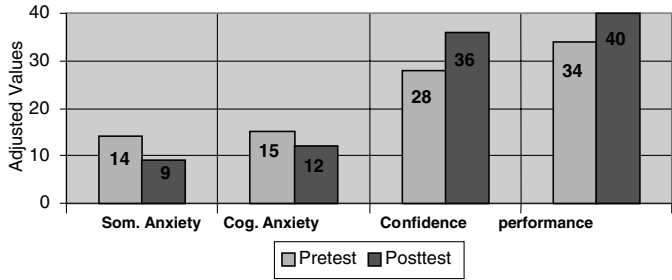


Figure 1A. Participant 1 CSAI-2 and performance scores.

as if she would ask him: “Did I do anything wrong? Did I disappoint you?” Her father was uneasy, but his behavior was in the “normal” limits considering the situation. She finally won 6–3, 6–3 after a 2-hour match.

After her match, she looked relieved and she was gradually relaxing. We had a conversation in which she said that during the match she wanted to vomit and that she did not enjoy her match at all. She wanted to win so badly because she did not want to disappoint her parents, who spent so much money and time to come to see her. This last comment was unexpected given that Helen was only 11 years old and her parents did not face any financial problems. I tried to explain to her that going to tournaments is a good opportunity to meet with other athletes and make new tennis friends. It was also a good opportunity to play with other athletes that she does not have the chance to play at practice matches and see to what degree she can implement the tactics she had learned against good opponents. She seemed to consider these comments quite seriously.

The following day was exactly as the previous one for Helen. She was sitting close to her mother, was not talking to anyone, and her face was pale. When I tried to talk to her, she was jittery and she told me: “Please coach, I would like to stay on my own.” Her 2nd match was a real disaster. She played even more passively than in her first match, she took 2 toilet breaks and finally lost 6–3, 6–3 against a mediocre player. One noticeable thing was the change in her father’s behavior when it became clear that Helen was going to lose the match. Her father became so furious that he could not conceal his disappointment and anger for her bad performance. To her detriment, Helen had been watching him on almost all the points she lost. After her match, Helen was not willing to talk to anybody and she was crying. The only thing she said was that she wanted to quit tennis because she disappointed her father so badly.

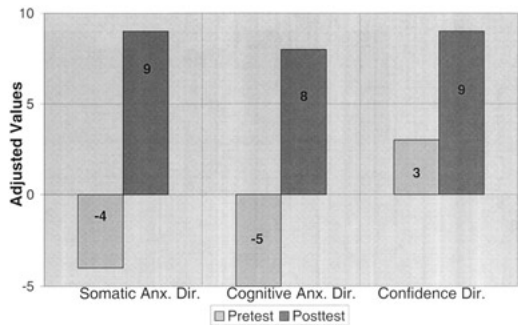


Figure 1B. Participant 1 CSAI-2 direction scores.

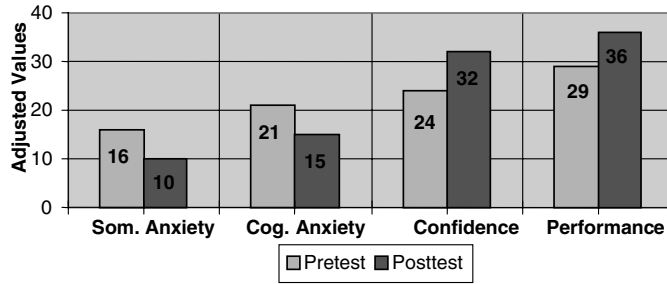


Figure 2A. Participant 2 CSAI-2 and performance scores.

She just wanted to leave and be away from everybody. Her mother told me that she doubted that Helen had slept the night before and she had barely eaten breakfast.

As for her CSAI-2 questionnaires, she had high intensity and very low cognitive direction scores meaning that she was very worrisome and she perceived this as debilitating to her subsequent performance. What was common in both CSAI-2s (1st and 2nd matches) was the score of the following 2 items: “I am concerned that I may not do as well in competition as I could” and “I am concerned that others will be disappointed with my performance.” She scored 4 for their intensity and -1 for their direction. The same was true for the direction and intensity of somatic anxiety, meaning that she was experiencing excessive somatic anxiety and she was perceiving her pre-match bodily signs as being debilitating to her subsequent performance. Her overall confidence scores were very good.

The intervention program included both the athlete and her parents. In terms of her parents, the first author had a meeting with them following the tournament, during which a thorough discussion took place as to how they should behave in order to help their daughter perform according to her potential, during tournaments. Her parents agreed that they had never seen Helen perform so poorly in a tournament match in the past, but had no idea why this had happened. During the discussion it was emphasized how they unconsciously created all this pressure for Helen only after her victory at the 10-and-under national championship, as she was not a recognized athlete previously. Her father also admitted that sometimes he stressed the fact that he pays a lot of money for Helen to go to the tournaments in an effort to make her try harder!

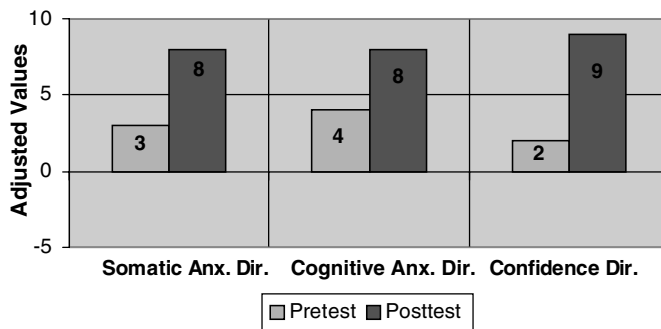


Figure 2B. Participant 2 CSAI-2 direction scores.

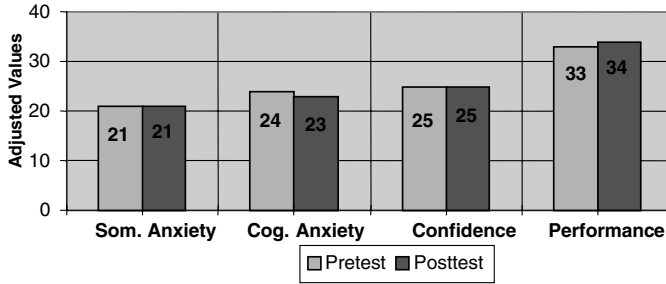


Figure 3A. Participant 3 CSAI-2 and performance scores.

In terms of his behavior during his daughter’s matches, he said that he was furious because he thought she was not trying hard enough. At that point, her mother admitted that Helen asked her if she and her father still loved her after her loss. In order for the parents to be educated properly, they were given a 6-page instructional manual emphasizing some “proper” behaviors for their part, after considering some of the most prominent articles and books published in this field area (e.g., Crespo & Miley, 1999; Defrancesco & Johnson, 1997). Both parents were required to study it and try to improve their behavior. One of the key points they had to work on at every practice was to stay calm and relaxed, regardless of their daughter’s performance. Moreover, they were instructed not to initiate any kind of discussion about tennis at home. Finally, a meeting was organized one month later (two days prior to the following tournament) during which they were asked to describe how they would behave in certain situations before and during their daughter’s match. Both parents’ cooperation was excellent.

Helen’s intervention program consisted of the MTP described above with special emphasis given to two goals: 1) to reduce her distracting thoughts related to watching her father and being concerned with his reactions and emotions during competition, and 2) to minimize the importance of winning, and substitute it with succeeding in specific performance goals. In terms of the first goal, she developed a between-points routine, firstly because it would help her keep her concentration on her game and secondly because it would be impossible for her to do her routine and watch her father at the same time. Furthermore, every time she was worried about her father’s reactions, she would implement the ‘thought-stopping’ technique described

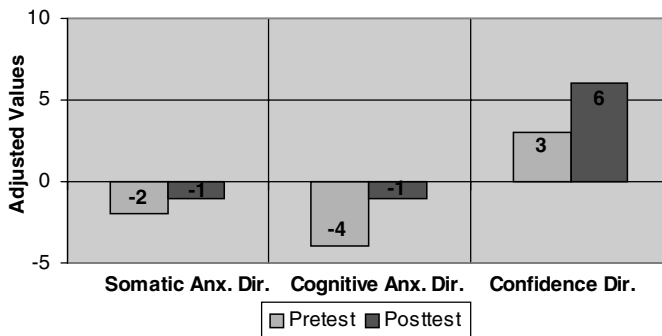


Figure 3B. Participant 3 CSAI-2 direction scores.

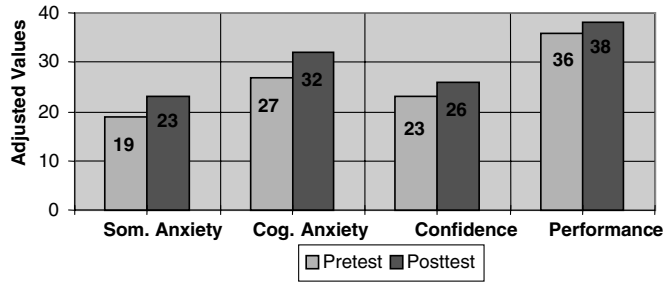


Figure 4A. Participant 4 CSAI-2 and performance scores.

earlier. After she had learned her routine, a little game was initiated for her practice matches. Every time she noticed she was watching her father, she had to perform a vertical jump, just to help herself become aware of it, and had to count and record the total number of vertical jumps performed. In addition, Helen set the goal not to watch her father more than 5 times during her practice matches for the time period before her next tournament in 4 weeks, and charted her progress. This goal was communicated to her father, who was responsible for recording the number of times his daughter watched him during practice and matches. Although, there are no pre-intervention data, the results of this intervention technique were very promising. Helen watched her father on average 6.3 times per practice match during the first week and 0.4 times the week before her last tournament (the end of the study). She also played at five tournaments and completed 14 official matches following the end of the 6-month intervention period. The mean number of times she watched her father during tournament matches decreased from 13.2 during the 1st tournament to only 2.8 at the summer national junior tournament.

As for the second goal, that is, to decrease the importance of winning and succeed in performance goals, the following approach was applied. The first step was to convince her parents to adopt a new attitude concerning Helen’s success and failure in tournament matches. This new attitude stressed the importance of having fun during competitions, playing against good opponents that she does not have a chance to play against in practice matches, meeting with other athletes and making new tennis friends. In addition, her parents had to convince her that their love and affection towards her was completely independent with the result or with

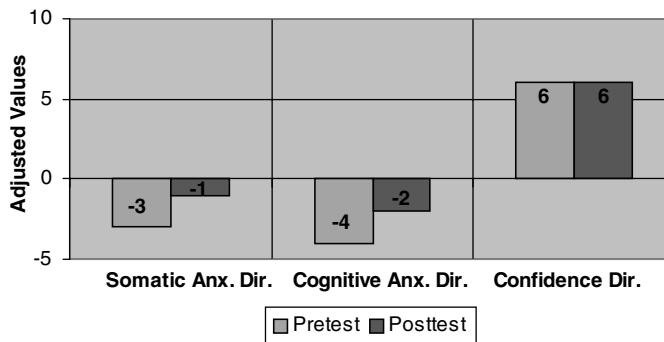


Figure 4B. Participant 4 CSAI-2 direction scores.

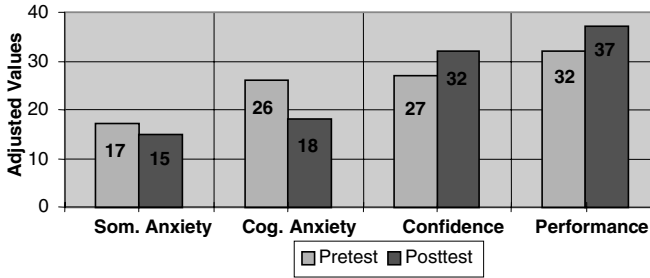


Figure 5A. Participant 5 CSAI-2 and performance scores.

how she performs at her tennis matches. The second step was for Helen to have 2–3 specific strategic goals and 1–2 mental goals written on a 12 × 8 cm-index card for each tournament match she was playing. She had to put the index card into her bag and read it during each changeover. At the end of the match she had to rate the degree of accomplishment of her performance goals. Examples of strategic goals are, hit 3 drop-shots per set, use short angled shots and hit winners to the other side, and so forth, whereas mental goals included, stay calm when making mistakes, do my between-points routine at the end of each point, energize myself when feeling tired, or relax myself when feeling tense and/or worried. Even though it is difficult to assess the effectiveness of this intervention program, the results of both Helen’s CSAI-2 Cognitive and Somatic Direction scores indicated an increase from the pretest to the posttest. Specifically, the direction of Somatic Anxiety increased from –2 at the pretest to +3 at the posttest, whereas the direction of Cognitive Anxiety increased from –5 at the pretest to +3 at the posttest, meaning that she started not to perceive the whole competitive environment and her pre-match bodily feelings as a threat or sign of a subsequent bad performance. Finally, there was also a decrease in her Somatic and Cognitive Intensity scores (Somatic: pretest = 18, posttest = 16, Cognitive: pretest = 26, posttest = 18), meaning that that she started to make adjustments at the somatic (e.g., was able to relax her body before her match), as well as at the cognitive level (e.g., decrease the importance of disappointing the others with her performance).

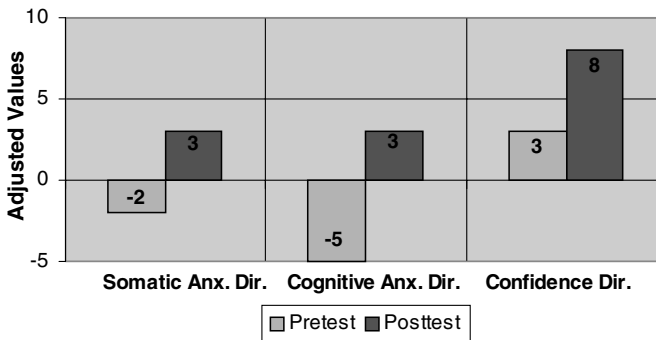


Figure 5B. Participant 5 CSAI-2 direction scores.

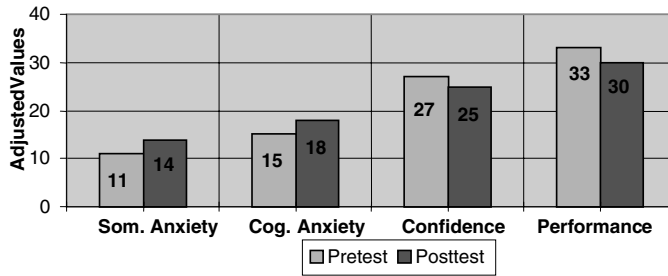


Figure 6A. Participant 6 CSAI-2 and performance scores.

**Intragroup Differences**

Figures 1A–5A show CSAI-2 intensity scores and the 8-item tennis Performance scores of each individual participant in the MTP group and Figures 6A–9A depict the same scores for the non-MTP group. Figures 1B–5B present CSAI-2 Direction scores for each participant of the MTP group and Figures 6B–9B the same scores for the non-MTP group.

After a thorough look at the charts, it becomes evident that there was an improvement in the Perceived Performance and intensity of Self-Confidence for all the MTP group athletes at the posttest, as compared to the pretest, and a corresponding decrement for the non-MTP group. This was also the case for the direction of Somatic and Cognitive Anxiety, as well as for Self-Confidence, only for the MTP group. The non-MTP group did not show any particular trend in these latter factors. For the intensity of Somatic and Cognitive Anxiety, there was not a clear trend between the pre- and the posttest neither for the non-MTP, nor for the MTP group participants.

**DISCUSSION**

The present study was designed to evaluate the effects of a season-long MTP on the intensity and direction of precompetition somatic and cognitive anxiety, as well as on self-confidence. Additionally, its effect on overall performance was studied, with special emphasis on the perceived performance. Finally, two selected cases are reported for an in-depth understanding

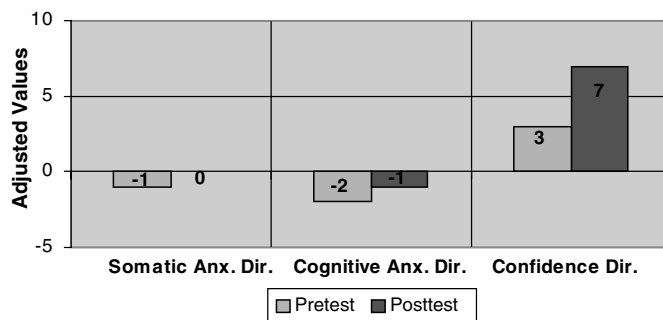


Figure 6B. Participant 6 CSAI-2 direction scores.

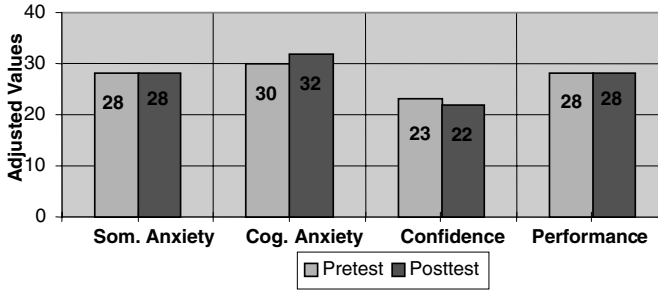


Figure 7A. Participant 7 CSAI-2 and performance scores.

of the potential factors that may produce anxiety as well as affect self-confidence and perceived performance in junior tennis players.

Overall, it was demonstrated that in the 2nd tournament all the participants of the MTP group exhibited greater performance. A number of other studies have found that MTP have a positive effect on performance. Bakker and Kayser (1994) reported better performance for the experimental group of female hockey players, when compared to the control group. Likewise, Davis (1991) applied an 8-week mental training program on a tennis player, and found satisfactory progress on 4 of the 5 performance areas. Positive results for tennis performance are also reported by Daw and Burton (1994) who applied a psychological skills training program to collegiate tennis players. Finally, improvement in self-confidence of a female basketball player was found, after the application of an individualized mental training program (Savoy, 1997). In the present study, none of the athletes who formed the non-MTP group showed performance improvement at the posttest. More specifically, one player had about the same performance (participant 7) while the others performed worse at the posttest. Two possible reasons accounted for the decrease in performance for the non-MTP group. Firstly, although the level of the two tournaments was equal (all Greek juniors participated in both tournaments), the importance of the second tournament was higher, as the winners would get bonus credits for university entrance, according to the Greek legislation concerning incentives in sport. Secondly, the participants, at the beginning of the study, expected that a positive self-evaluation would influence their coach's perception about their performance efficiency. This is also true for the

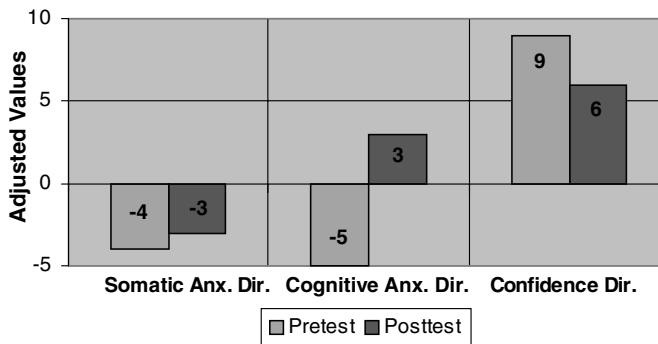


Figure 7B. Participant 7 CSAI-2 direction scores.

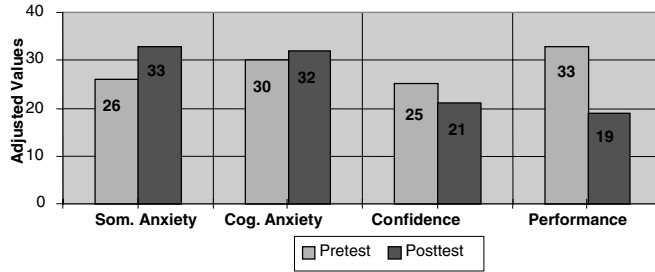


Figure 8A. Participant 8 CSAI-2 and performance scores.

athletes of the MTP group, who rated themselves high at the pretest, and consequently could not exhibit any significant improvement at the posttest. This means that, although the actual improvement in performance was high, as showed in the two cases, this was not clearly depicted in the figures.

In terms of the CSAI-2 factors, Self-confidence was the one that showed the greatest difference between the two groups at the pre- and posttest. Specifically, all the athletes who formed the MTP group had higher scores in the intensity and direction of pre-match self-confidence at the 2nd tournament compared to the 1st. This was an expected result given that the major part of the present MTP (goal setting, positive self-talk, and imagery) was targeted at increasing self-confidence. As it has been shown (Defrancesco & Burke, 1997), self-efficacy is a major mental element found in great players. Positive impact of MTP on the self-confidence of athletes has been found by Bakker and Kayser (1994) and Daw and Burton (1994). Additionally, Landin and Hebert (1999) report that a self-talk strategy, designed to improve the volleying skill of tennis players, increased their self-confidence. It seems that young athletes between 12–14 years of age have a rather vague impression of what they can accomplish and thus by having attainable goals facilitates their awareness of their capabilities. This increased awareness enabled them to exert greater effort, exhibit higher performance, and build up their self-confidence. On the contrary, only one participant of the non-MTP group had a higher pretest value on the direction dimension of self-confidence, while all others scored lower in both the intensity and direction dimension of self-confidence.

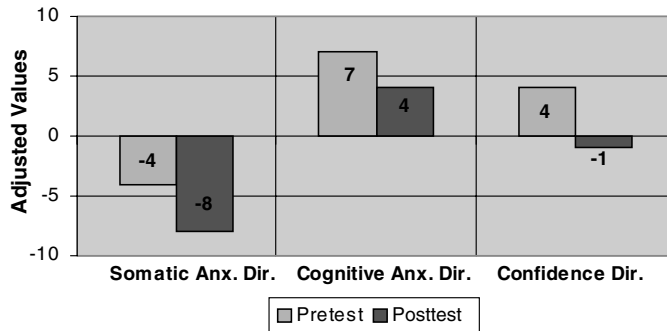


Figure 8B. Participant 8 CSAI-2 direction scores.



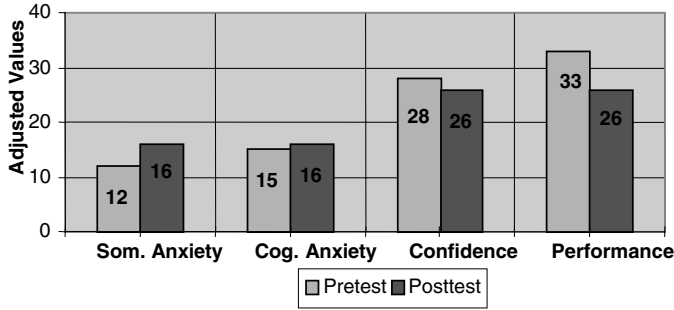


Figure 9A. Participant 9 CSAI-2 and performance scores.

Another important finding of this study was the increase in the pre-match direction dimension of somatic and cognitive anxiety of the MTP group at the 2nd tournament. Practically this implies that these athletes perceived both their pre-match bodily signs and their thoughts, as being facilitative for their subsequent performance. For example, participant 1 scored 3 on the item “I am concerned about this competition,” but she put -1 (meaning that she perceived this as having debilitating effect on her subsequent performance) at the pretest, and +1 (facilitative perception) at the posttest. In the same vein, participant 5 marked 3 at the item “I feel my body tight” but put -1 at the pretest and +1 at the posttest. These are two typical examples of how the present MTP helped the young tennis players to modify their perceptions.

As for the intensity of somatic and cognitive anxiety non-MTP group participants failed to make the appropriate adjustments, in order to improve their performance. In fact all but one did not perform equally well the 2nd tournament. On the other hand, although there was not a particular trend in the intensity of somatic and cognitive anxiety among the MTP group athletes, they all improved their performance. This could be attributed to the fact that each tennis player requires varied levels of arousal his/her performance. Hanin (1978) conceptualized this notion, called “zones of optimal functioning,” meaning that there is a certain range of arousal levels at which each athlete performs his/her best. In this study, however, although it is reasonable to assume that the MTP group players did make deliberate adjustments in their arousal levels, there was not any objective means of measuring and evaluating it. A number of studies have found that

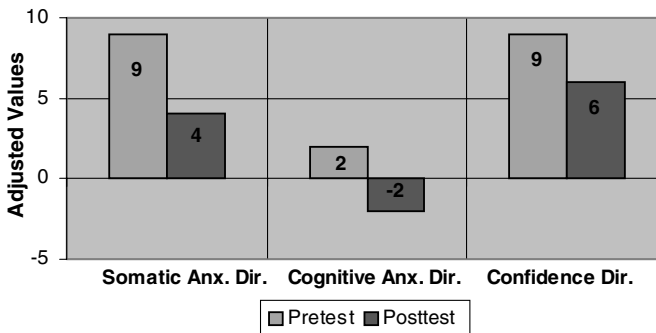


Figure 9B. Participant 9 CSAI-2 direction scores.

the direction dimension of somatic and cognitive anxiety are more related to performance than the intensity dimension (Jones & Hanton, 1996; Jones & Swain, 1992) and that elite performers with positive expectations about the upcoming competition, perceive the symptoms of anxiety as more facilitative, than less competent and with lower expectations athletes. Therefore, it may be argued that mental training programs contribute to the enhancement of the readiness to recognize and interpret signs of anxiety and create a more positive expectation about the upcoming performance (Terry & Mayer, 1998). Additionally, it has been suggested (Perry & Williams, 1998; Thelwell & Maynard, 1998) that less skilled athletes may not have developed the ability to recognize and interpret the direction of anxiety and that elite athletes develop cognitive strategies over time to interpret the direction of precompetition anxiety (Hanton & Jones, 1999). To this effect, Davis and Cox (2002) have proposed that future research should attempt to examine the relationship between the enhancement of self-awareness of athletes and the interpretation of anxiety symptoms. To sum up, it appears that season long PTPs may assist athletes develop an accurate and optimistic interpretation of precompetition anxiety, which, in turn, will enable them to enhance their performance by eliminating the debilitating effects of the anxiety symptoms.

### **PRACTICAL CONCLUSIONS AND LIMITATIONS**

The current study has both theoretical and practical implications. From a theoretical point of view the study adds to the existing knowledge related to the effect of season long MTP on tennis performance. From a practical point of view, the study emphasizes the importance of the season long MTP in regulating performance variables, such as anxiety and self-confidence. It seems that coaches and trainers have good reasons to incorporate in their training sessions MTPs, targeting at eliminating performance weaknesses. To this effect, coaches should teach athletes techniques to regulate their anxiety and work by adopting a season-long goal setting process. In addition, they should try to help their athletes believe in their abilities by emphasizing their strengths, before a match, as these self-efficacy beliefs will have a positive impact on during-match self-confidence and performance. CSAI-2 results also stress the importance of eliminating a number of possible factors that may influence negatively a player's self-confidence, regarding his upcoming match. These may be comments, which refer to the player's technical or tactical weaknesses, referrals to any bad past performances, especially against the same opponent, too much emphasis on the opponents' strengths or winning, and so on.

The major weakness of this study is, of course, the small number of participants. This was due to three main reasons: Firstly, it was very difficult to engage in a season-long MTP a large number of elite junior athletes. Secondly, MTPs are predominantly individually oriented and hard to conduct in a large scale. Finally, despite the hard work of some sport psychologists to establish sport psychology as a primary scientific major in Greece, its acceptance by many coaches and athletes is still very limited, especially when it is demanding in time. Future studies should aim at replicating this research work with a larger number of participants from different sports, in order to generalize the findings. Further, given that in tennis the existing knock out system of the tournaments prevents the collection of data over a number of matches, in order to obtain measures of performance, it is inevitable that these can only be collected in the first match. Finally, it would be interesting to find out how somatic and cognitive anxiety fluctuate during tennis performance and therefore what techniques are used by young athletes, participating in a season-long MTP, implement, in order to make the appropriate performance adjustments.

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