

THE ASSOCIATIONS AMONG COLLEGIATE TENNIS COACHES' COACHING
EFFICACY, PERCENTAGE OF TIME SPENT TEACHING MENTAL SKILLS, AND
TEAM PERFORMANCE (WON-LOST RECORD)

By

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This document is dedicated to Jesus Christ my Lord and Savior.

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Abstract of Thesis Presented to the Graduate School
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There is a limited amount of research testing the relationships among coaching efficacy, coaching behavior and team performance. This study explored the relationships among Division I collegiate tennis coaches' coaching efficacy, percentage of time spent teaching mental skills to the athletes on their teams, and tennis team performance (won-lost record). A Pilot Study was conducted to gain feedback from coaches and experts regarding the viability of the assessments. Participants in this Pilot Study included two Division I collegiate tennis coaches and four applied sport psychology experts. Information acquired through the Pilot Study was used to further develop the assessments for the Major Study. Participants in the Major Study included 55 NCAA Division I tennis coaches (65% male; mean age = 41 years; 91% Caucasian American; 58% coached women's teams). Participants completed counterbalanced forms via a secure website. The Coaching Efficacy Scale was used to assess level of coaching efficacy. Results of a multiple regression showed that motivation efficacy was a significant negative predictor

of the percentage of time per week coaches spent teaching mental skills during the fall season, while game strategy efficacy was a significant positive predictor of the percentage of time per week coaches spent teaching mental skills during the fall season. Results of a simple linear regression showed that total coaching efficacy was a significant predictor of team performance. Post-hoc analyses indicated that motivation efficacy was a significant negative predictor of the percentage of time per week coaches spent on physical practice/drills during the fall and spring seasons while game strategy efficacy was a significant positive predictor of the percentage of time per week coaches spent on physical practice/drills during the fall and spring seasons. Correlation analyses also revealed low, significant positive correlations between the three variables of total coaching efficacy, motivation efficacy, and game strategy efficacy, and coach satisfaction with their team's performance. Further correlation analyses showed (a) a moderate, significant, positive relationship between team performance and coach satisfaction with their team's performance and (b) a low, significant, positive correlation between the percentage of time coaches spent teaching mental skills in the spring and being certified by the Professional Tennis Registry (organization of tennis teaching professionals and coaches). Separate MANCOVAs revealed positive multivariate effects between (a) years of playing experience at the professional level and teaching technique efficacy and (b) the percentage of time that coaches spent teaching mental skills in the spring and coach age. A separate One-Way ANCOVA follow-up Scheffe's test revealed coaches with a master's degree hold a 15% higher winning percentage compared to coaches with a bachelor's degree. Implications of these findings for research and practice are discussed.

CHAPTER 1 INTRODUCTION

Coaches play an integral role in the success of their athletes and athletic teams, influencing their athlete's self-esteem, skill learning, mental development, sport performance satisfaction, and performance outcomes (Barnett, Smoll, & Smith, 1992; Chelladurai, 1984; Gould, Dieffenbach, & Moffett, 2002; Horn, 2002; Horne & Carron, 1985; Schliesman, 1987). Moreover, research also shows that the skill learning and performance of athletes are directly affected by different types of coaching behavior (Horn, 2002). However, there is a limited amount of research demonstrating the role that coaches play in enhancing their athletes' performance and the process by which this performance enhancement takes place. Past research in this area, focused at the youth and Olympic sports levels, has explored the associations among coach characteristics (e.g., beliefs), coach behaviors, and outcomes among athletes (e.g. satisfaction, efficacy, performance) (Csikszentmihalyi, Rathunde, & Whalen, 1993; Gould, Dieffenbach, & Moffett, 2002; Smith, Smoll, & Curtis, 1979; Smith, Zane, Smoll, & Coppel, 1983; Smith & Smoll, 1990). There is a lack of research on the role that the characteristics (e.g., beliefs) of college coaches play in their own coaching behavior and the sport performance of their athletes. This is regrettable given the large number of NCAA collegiate student-athletes (339,000) and the large amount of time that these athletes spend with their coaches (National Collegiate Athletic Association, 2004).

Multiple Roles of Coaches

At the collegiate level, coaches assume diverse roles including teacher/instructor, organizer/planner, counselor, communicator, and motivator (Gould, 1987). The overlap in roles between coaches and teachers (e.g., providing instruction, guiding skill practice, offering performance feedback) encourages the examination of the academic teaching literature to gain insight and deeper understanding of the performance enhancement process between teacher and student.

Over the past two decades, high self-efficacy for classroom teaching (i.e., teachers' confidence that they can perform the actions that lead to student learning and performance) has been shown to reliably predict teacher practice (e.g., behavior) and student outcomes (e.g., achievement, motivation, self-efficacy) (Anderson, Greene, & Loewen, 1988; Armor et al., 1976; Ashton & Webb, 1986; Denham & Michael, 1981; Gibson & Dembo, 1984; Hoy & Woolfolk, 1993; Ross, Cousins, & Gaddalla, 1996; Tschannen-Moran, Hoy, & Hoy, 1998).

Based on the strong relationship between teacher efficacy and a number of variables [e.g., teacher behavior, successful student performance (i.e., academic achievement), student self-efficacy], it remains plausible that a coach's level of coaching efficacy could be related to, (a) his/her own coaching behavior, (b) the performance of their athletes and teams (e.g., won-lost record), and (c) the perceptions and beliefs (e.g., self-efficacy) of their athletes and teams.

Conceptual Model of Coaching Efficacy

Increasing interest in the relationships between coaching beliefs and behaviors and athlete and team outcomes led Feltz, Chase, Moritz, and Sullivan (1999) to develop a conceptual model of coaching efficacy and the Coaching Efficacy Scale (CES). The

conceptual model of coaching efficacy consists of three major components: (1) the sources of coaching efficacy information, (2) the dimensions of coaching efficacy, and (3) the outcomes of coaching efficacy. Coaching efficacy is defined as the extent to which coaches believe they have the capacity to affect the learning and performance of their athletes. The Coaching Efficacy Scale (CES) is comprised of four dimensions including game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy.

The outcomes of coaching efficacy as represented in the conceptual model include coaching behavior, player/team satisfaction, player/team performance and player/team efficacy. The research of Feltz et al. (1999) with high school basketball coaches supported this assertion. The investigators found that high self-efficacy coaches (the 15 highest scorers on the Coaching Efficacy Scale as assessed during the preseason) as compared to low self-efficacy coaches (the 15 lowest scorers on the CES as assessed during the preseason) provided more praise and encouragement to athletes, had players who were more satisfied with their overall experience of playing basketball for their coach, and had higher winning percentages during the sport season in which the research occurred.

Since the initial Feltz et al. (1999) study, there has been a limited amount of research testing the links between the dimensions and predicted outcomes of the conceptual model of coaching efficacy. In the one published study, Sullivan and Kent (2003) found support for the conceptual model of coaching efficacy in their investigation of the relationship between the efficacy of intercollegiate coaches and their leadership style (i.e., leadership behavior). Results indicated that dimensions of coaching efficacy

(motivation efficacy, teaching technique efficacy) predicted coaching leadership behaviors (training and instruction, positive feedback).

These findings support the conceptual model of coaching efficacy, suggesting that there may be associations between coaching efficacy dimensions and coaching efficacy outcomes [e.g., coaching behavior (providing more praise and encouragement, training and instruction, positive feedback), and the satisfaction and performance of athletes and teams].

Mental Skills Training and Coaching

One major meta-analysis (Greenspan & Feltz, 1989) and a critical review of the goal-setting literature (Weinberg, 1994) has shown that the use of mental skills (also known as psychological skills) and strategies by athletes positively influences their performance to a high degree (approximately 85%). Mental skills training involves applying “techniques and strategies designed to teach or enhance mental skills that facilitate performance and a positive approach to sport competition” (Vealey, 1988, p.319).

Athletes learn and develop many skills (e.g., technical, mental), based on information and training provided by their coaches. Coaches (e.g., age-group, high school, college) generally rate the importance of mental skills very highly (Gould, Damarjian, & Medbery, 1999a; Hall, Rogers, & Barr, 1990; Silva, 1984) despite reporting that they generally spend less than 10% of their training time on mental skills training (Gould et al., 1999a, Gould, Medbery, Damarjian, & Lauer, 1999b). These findings suggest that mental skills can improve sport performance, coaches believe mental skills are important, and coaches teach mental skills at a rate lower than would be expected based on the coaches’ ratings of the importance of mental skills.

Coaches can play a significant role in helping athletes develop mental skills (e.g., concentration/attention, anxiety control). Interviews with U.S. Olympic champions (Gould, Dieffenbach, & Moffett, 2002) showed that influential coaches taught athletes both directly (i.e., mentoring, teaching mental skills, planned teaching) and indirectly (i.e., fostering/nurturing/instilling important skills, modeling). Parents and athletes reported that the coach's self-confidence and the confidence that they placed in their athletes promoted mental (psychological) development (e.g., increases in confidence, reduction in worrying, better emotional control) in these athletes.

Coaching and the Sport of Tennis

Tennis coaches play a substantial role in the success of their athletes (Gould et al., 1999a, 1999b; Horn, 2002; United States Tennis Association (USTA), 1998; Weinberg & Jackson, 1990). At the collegiate level, where coaches work to satisfy the demands of the university, parents, the community, and their individual athletes, coaches also have the unique responsibility of coaching on-court during matches. At the junior level of tennis and on the professional tennis tours (i.e., ATP, WTA), on-court coaching is not allowed. To date, there has been a lack of research exploring the unique context of college tennis. Specifically, no research has examined the relationships among collegiate tennis coaches' coaching efficacy, their coaching behavior, and their teams' on-court performance (i.e., won-lost record).

Factors Associated with Tennis Success among Tennis Players

Tennis is challenging on both a physical and mental level. Weinberg (2002) supports this notion, proposing that high-level tennis results require that players: 1) possess good basic technique, stroke production, and movement, and 2) control their mental states through the use of their mental skills and strategies.

Physical demands are high as athletes are required to respond to a continuous set of emergencies including sprinting across the court, lunging in various directions, and stopping and starting very quickly while maintaining proper balance and technique (USTA, 1998). To deal with the mental demands of tennis, Weinberg (2002) focuses on eight key areas for high-level performance. These areas include commitment, motivation through effective goal setting, confidence, understanding and managing emotions, imagery, concentration, self-talk, and mental preparation. A high level of confidence has consistently ranked as one of the most important mental states among successful athletes (Jackson & Csikszentimihalyi, 1999; Orlick, 2000; Weinberg, 2002). Self-efficacy (i.e., situation specific confidence) has been the most often studied mental variable within sport psychology in general and within tennis in particular (Weinberg, 2002; Weinberg & Jackson, 1990).

Importance of Mental Skill Usage in Tennis

In sports such as tennis that require fine motor skills (i.e., intricate and precise muscle movements), mental skills are generally viewed as more important for successful performance as compared to sports that require gross motor skills (i.e., large, non-precise muscle movements) such as football or weightlifting (Mackenzie, 1997). Research suggests that mental skills such as arousal/anxiety control are essential for optimal muscle coordination and attentional focus in sports requiring fine motor skills (Weinberg & Gould, 1999).

Defrancesco and Burke (1997), in their applied research with 115 professional tennis players, found that a large percentage of professional tennis players utilized a variety of mental skills for performance enhancement. Players reported that their

performances were significantly affected by their motivation to compete, ability to maintain concentration throughout a match, and self-confidence.

Rationale for the Present Study

The existing literature provides preliminary evidence that coaching efficacy is related to a number of variables including player/team performance, player/team satisfaction, and coaching behavior. There is also evidence that mental skills usage by athletes is related to player/team performance as well. The recent creation of the Coaching Efficacy Scale (CES) now allows for empirical examination of the conceptual model of coaching efficacy. Practically no research to date, however, has examined the relationships between coaching efficacy and the outcome variables proposed by the conceptual model of coaching efficacy (e.g., coaching behavior, player/team performance, efficacy, and satisfaction). This research study explored the relationships among collegiate tennis coaches' coaching efficacy, percentage of time spent teaching mental skills to the athletes of their teams (individually and collectively), and tennis team performance (won-lost record).

CHAPTER 2 REVIEW OF LITERATURE

Research suggests that coaches play an important role in the success of their athletes and athletic teams (Barnett, Smoll, & Smith, 1992; Chase, Lirgg, & Feltz, 1997; Chelladurai, 1984; Gould, Dieffenbach, & Moffett, 2002; Horne & Carron, 1985; Riemer & Chelladurai, 1995; Schliesman, 1987). Several research studies within the field of sport psychology have examined the coach-athlete relationship. The results of these studies suggest that coaches: (a) influence their athlete's self-esteem (Barnett, Smoll, & Smith, 1992), (b) play an important role in influencing their athlete's growth and development (e.g., technical and mental growth and development) (Gould, Dieffenbach, & Moffett, 2002), and (c) influence their athlete's sport performance satisfaction (Chelladurai, 1984; Horne & Carron, 1985; Riemer & Chelladurai, 1995; Schliesman, 1987). Moreover, research also shows that the skill learning and performance of athletes are directly affected by different types of coaching behavior including the manner in which coaches organize practice sessions, the amount of time coaches allocate to teaching/learning activities, the types of learning activities and skill progressions that coaches use, the strategy decisions that coaches make in competitive situations, the way in which coaches use skill demonstrations, and the type, frequency, and the quality of the feedback that coaches give to individual athletes (Horn, 2002).

There is also anecdotal evidence that many athletes believe that their sport performance is enhanced by the behavior and attitudes of their coaches (Bloom, 2002; Gould, Dieffenbach, & Moffett, 2002). There is a dearth of research, however,

demonstrating the role that coaches play in enhancing the performance of their athletes and the process by which this purported performance enhancement takes place. Research to date in this area has examined the associations among coach characteristics (e.g., beliefs), coach behaviors, and outcomes among athletes (e.g. satisfaction, efficacy, performance) at both the youth level of sports (Csikszentmihalyi, Rathunde, & Whalen, 1993; Smith, Smoll, & Curtis, 1978; Smith, Zane, Smoll, & Coppel, 1983; Smith & Smoll, 1991) and the Olympic level of sports (Gould, Dieffenbach, & Moffett, 2002).

Ironically, there is a paucity of research on the role that coaches' characteristics (e.g., beliefs) and behaviors play in the sport performance of athletes at the collegiate level. This is surprising and unfortunate given that more than 339,000 student-athletes at 977 institutions across the United States (US) participate in collegiate sports (i.e., NCAA Divisions I, II, III) each year under the guidance of college coaches. In Division I alone, the most competitive of the three NCAA divisions, there are 321 institutions with nearly 150,000 student-athletes (National Collegiate Athletic Association, 2004). Over the course of the college academic year, collegiate coaches often have more hours of direct contact with their college student-athletes than any other person of authority.

Multiple Roles of Coaches

Collegiate coaching involves many different roles including those of teacher/instructor (e.g., the developer and honer of the technical, tactical, and mental skills of athletes), organizer and planner (e.g., organizer of team practices, competitions, and travel), counselor (e.g., the facilitator of problem solving to address the emotional challenges of athletes), and communicator and motivator (e.g., the conveyor of key information about team expectations and the motivator of athletes to perform up to their potential). Gould (1987) supports this multi-role view of sport coaches, asserting that

coaches must perform a number of roles (e.g., teacher, motivator, strategist, counselor, organizer, character builder) to effectively impact the learning and performance of athletes.

As coaches share many of the same roles as teachers (e.g., providing instruction, guiding the practice of skills, and offering feedback regarding performance), it is useful to examine the research on the key teacher variables that have been associated with successful student outcomes (e.g., higher grade point average, higher standardized test scores) to gain greater insight into the performance enhancement process.

Indeed, there are several important findings from teacher efficacy studies that are helpful in understanding how coaches may impact the performance of athletes. One such finding is that over the past 20 years, high self-efficacy for classroom teaching (i.e., teacher efficacy) has been repeatedly found to be an important aspect of teacher effectiveness (Ashton & Webb, 1986; Denham & Michael, 1981; Gibson & Dembo, 1984; Hoy & Woolfolk, 1993). Additionally, it has been asserted that teachers' sense of efficacy, or their confidence that they can perform the actions that lead to student learning and performance, is a particularly powerful construct, as it is one of the few teacher characteristics that reliably predicts teacher practice (e.g., behavior) and student outcomes (Ross, Cousins, & Gaddalla, 1996; Tschannen-Moran, Hoy, & Hoy, 1998). Furthermore, it has been found that high teacher efficacy is associated with teachers who report being more committed to their profession (Coladarci, 1992), better organized (Allinder, 1994), more willing to try new ideas to meet their students' needs (Stein & Wang, 1988), less critical of students when they (the students) make errors (Ashton &

Webb, 1986), more positive about teaching (Guskey, 1984), and more likely to use positive strategies for classroom management (Emmer & Hickman, 1990).

It has also been reported that teachers who possess high versus low levels of teacher efficacy also provide higher quality instruction (Rubeck & Enochs, 1991), plan more (Allinder, 1994), display more persistence in the face of failure, and spend more time on teaching as compared to teachers who possess low levels of teacher efficacy (Gibson & Dembo, 1984). Not surprisingly, therefore, are the findings that teachers' sense of efficacy is linked with students' level of achievement (Armor et al., 1976; Ashton & Webb, 1986) as well as with students' motivation and self-efficacy (Anderson, Greene, & Loewen, 1988).

Just as teacher efficacy has been shown to be an important variable in teacher effectiveness, teacher behavior, successful student performance (e.g., academic achievement) and student self-efficacy, it follows that coaching efficacy could be an important variable in coaching effectiveness and behavior, the successful performance of their student-athletes, and the self-efficacy of their athletes. Furthermore, we would expect that a coach's level of coaching efficacy would be related to his/her own coaching behavior (e.g., high quality instruction, time spent teaching), to the performance of their athletes and teams (e.g., won/lost record), and to the perceptions and beliefs (e.g., self-efficacy) of their athletes and teams.

Conceptual Model of Coaching Efficacy

Using Bandura's (1977, 1986) self-efficacy theory, Denham and Michael's (1981) multidimensional model of teacher efficacy, and Park's (1992) scale of coaching confidence, Feltz, Chase, Moritz, and Sullivan (1999) set out to explore coaching efficacy in sport. To accomplish this goal, Feltz et al. (1999) developed a conceptual model of

coaching efficacy (see Figure 1) and the Coaching Efficacy Scale (CES). The conceptual model of coaching efficacy consists of three major components: (1) the sources of coaching efficacy information, (2) the dimensions of coaching efficacy, and (3) the outcomes of coaching efficacy (see figure 1). Coaching efficacy is defined as the extent to which coaches believe they have the capacity to affect the learning and performance of their athletes. The Coaching Efficacy Scale (CES) is comprised of four dimensions including game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy. *Game strategy efficacy* is defined as the confidence coaches have in their ability to coach during competition and lead their team to a successful performance. *Motivation efficacy* is defined as the confidence coaches have in their ability to affect the mental skills and states of their athletes. *Teaching technique efficacy* is defined as the belief that coaches have in their instructional and diagnostic skills during practice (Myers, Wolfe & Feltz, in press) to positively influence their athletes. *Character building efficacy* is defined as the confidence coaches have in their ability to influence the personal development of their athletes as well as develop a positive attitude in their athletes toward their particular sport.

Instrument Development

According to Feltz et al. (1999), the CES was developed during a five-week seminar involving 11 coaches who had varying levels of experience in coaching and were graduate students in sport psychology. A framework for group discussions on the key components of coaching efficacy was developed by reviewing the *National Standards for Athletic Coaches* (National Association for Sport and Physical Education, 1995), preliminary work on a coaching efficacy scale (Park, 1992), and the coaching education

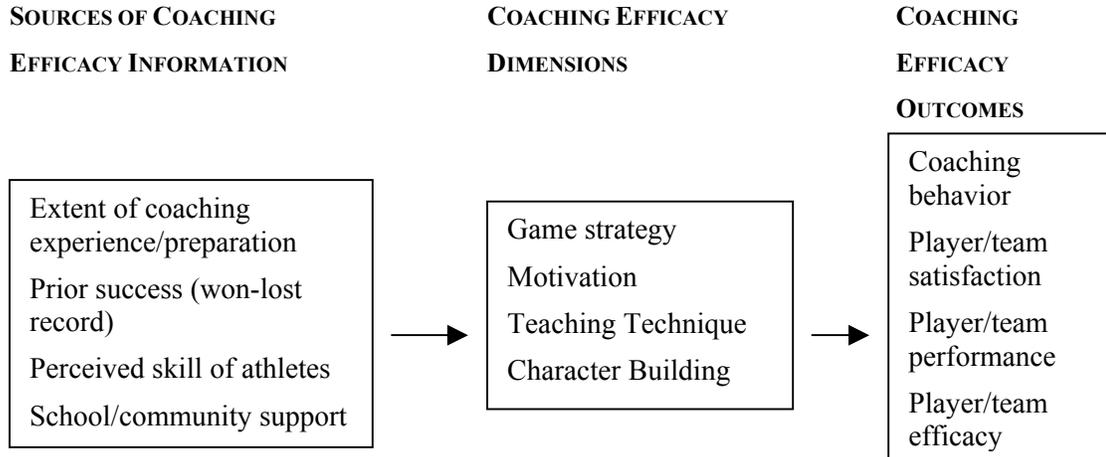


Figure 1. Conceptual model of coaching efficacy.

literature. Themes that emerged from the group's discussions were reduced to: teaching technique, implementing game strategies, motivating athletes, and developing athletes' character.

The dimensions of coaching efficacy that emerged from the seminar led to the generation of 41 items. Items were written by the participants during the seminar and included the stem: "How confident are you in your ability to." A 10-point Likert type rating scale was employed originally with categories ranging from 0 (*not at all confident*) to 9 (*extremely confident*). (Recent psychometric testing of the CES by Myers et al. (in press) has provided support for a 4-point rating scale rather than a 10-point rating scale). Nine collegiate and scholastic coaches evaluated the relevance of the items on a scale that ranged from 1 (*essential*) to 3 (*not essential*). Feedback from the content experts led the research team to conclude that all items were potentially important indicators of coaching efficacy. However, 17 of the original items were later dropped after considering the results of factor analyses. Because the decision to drop over 40% of the initial items appeared to be empirically driven, it is possible that the removal of these items decreased

the degree to which the current scale adequately represents the domain of coaching efficacy. The CES consists of the remaining 24 items.

In summary, Myers et al. (in press) call for the continued use of the CES for the intended purposes of obtaining measures to determine sources of coaching efficacy, examining the influence of coaching efficacy on coach behavior, and athlete and team variables, and assessing the ability of education programs to alter coaching efficacy. It is noteworthy that the CES is the only instrument purported to measure coaching efficacy and thus has a central role in coaching education research.

Findings from the Normative Coaching Efficacy Studies

According to the conceptual model of coaching efficacy developed by Feltz et al. (1999), sources of coaching efficacy include the extent of coaching experience/preparation (e.g., years in coaching), prior success (i.e., won/lost record), perceived overall ability of the team being coached, and school/community support. Furthermore, Feltz et al. (1999) posit that the outcomes of coaching efficacy include coaching behavior (e.g., type of feedback used, management strategies, coaching style), player/team satisfaction, player/team performance, and player/team efficacy. The researchers found in their study with high school basketball coaches that the most important sources of coaching efficacy were years of coaching experience and community support. They also found several differences between high self-efficacy coaches (the 15 highest scorers on the CES as assessed during the preseason) as compared to low self-efficacy coaches (the 15 lowest scorers on the CES as assessed during the preseason) in outcomes of coaching efficacy. First, high self-efficacy coaches as compared to low self-efficacy coaches behaved differently, providing more praise and encouragement (e.g., positive reinforcement, positive reinforcement plus technical

instruction, general encouragement, encouragement after a mistake) to athletes. Second, high self-efficacy coaches as compared to low self-efficacy coaches had players who were more satisfied with their overall experience of playing basketball for their coach. Third, high self-efficacy coaches as compared to low self-efficacy coaches had higher winning percentages during the sport season in which the research occurred. In order to collect coach and player data, coaches were observed both during the first and second half of the season. Player satisfaction was assessed in the second half of the season. In sum the research by Feltz et al. (1999) provides some preliminary evidence that there is a positive relationship between coaching efficacy and coaching behavior as well as a positive relationship between coaching efficacy and the satisfaction and performance of athletes and teams.

To date, there has been a limited amount of research on coaching efficacy. With the development of the CES in 1999, researchers are just now beginning to test the conceptual model of coaching efficacy. Three known studies have examined the sources of coaching efficacy (Barber, 1998; Chase, Hayashi, & Feltz, 1999; Maleté & Feltz, 2000), however, there has been only two known published studies (Myers, Tonsing, & Feltz, in press; Sullivan & Kent, 2003) since the initial Feltz. et al. (1999) study that has investigated the relationship between coaching efficacy, as measured by the CES, and predicted outcome variables such as coaching behavior, player/team performance, player/team satisfaction, and player/team efficacy.

Sullivan and Kent (2003) examined the relationship between the efficacy of intercollegiate coaches and their leadership style. These researchers, in accordance with Chelladurai and Saleh (1980), operationalized leadership style as the scores on five

dimensions of coaching leadership behavior (training and instruction, democratic behavior, autocratic behavior, social support, and positive feedback). In the Sullivan and Kent (2003) study, an international sample of 224 coaches (165 male, 58 female) completed Feltz et al.'s Coaching Efficacy Scale (CES, 1999) and the Leadership Scale for Sports (LSS; Chelladurai and Saleh, 1980). Participants included 122 American and 90 Canadian coaches. Sports coached included basketball, baseball, volleyball, softball, track, swimming/diving, gymnastics, golf, tennis, soccer, cross country, and hockey. The coaches ranged in age from 22 to 62 years ($M=40.10$, $SD=9.51$) and had coaching tenures from 1 to 33 years ($M=8.09$, $SD=7.27$). The self-reported version of the LSS that asks coaches to compare themselves to their perceptions of what would be their ideal coach was used in this study.

In the data analyses, two of the regression models, run to examine coaching efficacy subscales as predictors of coaching behavior, could not be tested due to concerns over the internal consistency of two of the leader behaviors (autocratic behavior and social support). Two of the remaining three regression models were significant, however. Training and instruction and positive feedback were both predicted by motivation efficacy and teaching technique efficacy. Both models accounted for 28% and 42% (respectively) of variation in closeness to their ideal leadership style, and both indicated positive relationships between leadership style (i.e., training and instruction, positive feedback) and efficacy (i.e., motivation efficacy, teaching technique efficacy). In other words, as coaches were more confident in their roles as motivators and teachers of tennis technique, they were closer to their image of the ideal leader with respect to using positive feedback and appropriate training and instruction; furthermore, these coaches

engaged in their ideal leader behaviors to a greater extent. Correlations between age, tenure at current position, and the coaching efficacy variables also revealed some interesting relationships. Specifically, age and tenure were positively correlated with game strategy efficacy and character building efficacy, and tenure alone was positively related to motivation efficacy. These results offer further validity for the conceptual model of coaching efficacy; specifically, these results suggest that there is a significant relationship between coaching efficacy sources (e.g., experience or tenure) and coaching efficacy dimensions (e.g., game strategy efficacy, character building efficacy, motivation efficacy).

These collective findings provide evidence in support of the conceptual model of coaching efficacy model. Specifically, these findings suggest that there may be associations between coaching efficacy dimensions (e.g., game strategy efficacy, motivation efficacy, teaching technique efficacy, character building efficacy) and coaching efficacy outcomes [e.g., coaching behavior (providing more praise and encouragement, training and instruction, positive feedback), and the satisfaction and performance of athletes and teams].

Mental Skills Training and Coaching

The use of mental skills (also referred to as psychological skills) and strategies by athletes has also been shown to influence the performance of athletes (Gould, Damarjian, & Medbery, 1999; Greenspan & Feltz, 1989; Weinberg, 1994). The terms mental skills/strategies and psychological skills/strategies will initially be used interchangeably with deference given to the researcher cited. According to Vealey (1988), psychological skills training involves applying “techniques and strategies designed to teach or enhance

mental skills that facilitate performance and a positive approach to sport competition” (p.319).

Within the sport psychology literature, there is currently no agreement regarding how to adequately or properly define and quantify mental skills (Murphy & Tammen, 1998). Vealey (1988) made a distinction between psychological skills and psychological methods, arguing that skills are basic mental components in sport performance while methods are strategies used to increase the level of the mental skills. According to Vealey, examples of psychological skills include volition, self-awareness, self-esteem, and self-confidence, while examples of psychological methods include goal-setting, imagery, relaxation, and thought control. Vealey (1988) further argues that we need to distinguish between the results to be achieved (i.e., changing psychological states) and the methods used to achieve them (i.e., psychological interventions). As this issue has yet to be resolved within the field of sport psychology, this study will use the general term “mental skills” to refer to mental or psychological skills, strategies and states that have been characterized as having an important relationship to the success of athletes and athletic teams.

In a review of the mental skills identified in mental skills training research, Murphy and Tammen (1998) totaled nineteen different mental skills that were identified in the research of six different researchers (Loehr, 1986; Mahoney et al., 1987; Nelson & Hardy, 1990; Smith et al., 1995; Thomas & Over, 1994; Vealey, 1988). The following list includes the nine mental skills that were included by at least two researchers in their scales and research. The mental skills and the number of researchers who included each skill in their scale or research are as follows: concentration/attention (6),

motivation/commitment (5), confidence (5), imagery/mental practice (5), anxiety control (4), preparation/goal setting (3), relaxation (3), attitude/thought control (2), and emotional control (2). Murphy and Tammen (1998) combined certain mental skills that they viewed as conceptually similar (e.g. motivation/commitment) although there will likely be future debate in the sport psychology literature as to the validity of combining these particular skills.

Athletes learn and enhance many skills, including mental skills, based on information and training provided by their coaches. Thus, it is important to assess the value that coaches place in teaching mental skills to their athletes and the percentage of time that coaches spend teaching these mental skills to the athletes on their teams. This information will aid those in the field of sport psychology in deepening their understanding of the role that coaches play in instilling mental skills in their athletes.

When asked about the importance of mental skills, coaches (e.g., age-group, high school, college) generally rate their importance as very high (Gould, Damarjian, & Medbery, 1999a; Silva, 1984). In a study by Silva (1984) to examine the general and specific areas of sport psychology deemed important by coaches, 90% of the participants (i.e., 200 high school and college coaches from various regions of the US) indicated that sport psychology could be of assistance in their sport and in the development of their athletes' potential. In a study by Gould et al. (1999a), 20 coaches of elite junior (i.e., ages 12-18) tennis players answered several questions regarding their experience with mental skills in tennis. On a 10-point Likert scale where 1=not important and 10=very important, coaches indicated that mental skills training was very important for junior players ($M=9$). However, when these coaches were asked about the amount of time that

they spend on mental skills training, they indicated that they spend about an average of an hour ($M=59.67$ minutes) each week on this training. It is somewhat surprising that coaches spend such a small amount of their contact time with athletes on mental skills training, particularly in light of the high level of importance (as indicated by a mean importance rating of 9) that the coaches placed on mental skills training.

Most elite junior tennis coaches spend approximately 10-30 hours a week training their junior athletes. Based on the above findings, mental skills training may be focused on less than 10% of this training time. The difficulty of teaching mental skills to athletes may explain the disparity between the importance or value placed on mental skills training by coaches and the amount of time they spent teaching mental skills to athletes.

The Gould et al. (1999a) study must be viewed with caution as opinions were solicited from only 20 United States Tennis Association (USTA) coaches. Furthermore, these 20 USTA coaches were selected to participate in the USTA educational program because of their potential to develop as a coach. Thus, this sample of coaches may represent a limited range of coaches (e.g., high level USTA coaches). Gould, Medbery, Damarjian, and Lauer (1999b) conducted a follow-up study to determine what a larger, more representative sample of tennis coaches would think about the issues identified in the previous study.

Participants in the follow-up study were junior tennis coaches attending the 1997 United States Tennis Association (USTA) Area Training Center Workshop held at the USTA Player Development Center in Key Biscayne, Florida. One hundred fifty-three of the 325 invited coaches attending the workshop returned surveys (47%). Of the 153 coaches, 125 (82%) were males and 28 (18%) were females. One hundred thirty-seven of

the coaches were Caucasian (90%), seven were African American (5%), three were Hispanic (2%), one was Asian American (1%), and three were of other descent (2%). The coaches varied in age and experience. The age range of these coaches was 24 to 68 and their mean age was 38.09 (SD=7.14). Coaching experience ranged from 1.5 to 45 years ($M=16.25$, $SD=7.34$). On average coaches were working with 10.9 sectionally ranked players ($SD=8.78$, range=0-45) and 2.5 nationally ranked players ($SD=2.13$, range=0-12).

The coaches survey used in the follow-up study consisted of 61 items – some open-ended and some closed-ended. These items were based on the findings of the Gould et al. (1999a) study. The questionnaire consisted of seven sections including demographic information, background-education, importance of mental skills in junior tennis, mental skills taught, how to teach mental skills, opinions about mental skills training, and opinions regarding mental skills training resources.

The educational degrees held among the coaches in the follow-up study are as follows: B.A. or B.S. degree (106 coaches, 68.6%), a M.S. degree (24 coaches, 15.6%), a high school diploma (11 coaches, 7.1%), junior college degree (7 coaches, 4.5%), and Ph.D. or Ed.D. (2 coaches, 1.3%). Four coaches attained other types of educational experience.

One hundred four (67.5%) of the coaches in the follow-up study held certifications in the United States Professional Tennis Association (USPTA), and 16 (10.4%) of the coaches held Professional Tennis Registry (PTR) certification. Twenty additional coaches (13%) held certification in both organizations while 13 (8.4%) held no certification. The USPTA and PTR certifications involve passing written and on-court

tests focusing on playing and teaching tennis. The majority of coaches (64.3%) had achieved Level I competency in teaching tennis as determined by the USTA Sport Science Division. Establishing Level I competency involves reading a tennis book (*Successful Coaching*, Martens, 1990) to become competent in the philosophical, mental, pedagogical, physiological, and management areas of coaching and then passing a self-study test on the content of this book. Additionally, nineteen coaches (12%) had Level IIA competency (i.e., competent in the sport psychology/motor learning area), 10 (6.5%) coaches had Level IIB competency (i.e., competent in the physiology/nutrition area), 22 coaches (14.3%) had Level IIC competency (i.e., competent in the sports medicine/biomechanical area), and four coaches (2.6%) had no USTA competency rating. Each of these Level II competencies involves reading two books and passing self-study tests on the content of each book.

The degree of sport psychology knowledge that coaches in the follow-up study possessed averaged 4.77 (SD=1.05) on a 7 point Likert scale (1=low, 7=high). Ninety-four (61%) of the coaches indicated that they had taken some type of sport psychology course. Rankings of the usefulness of eight different methods of developing sport psychology training skills (e.g., experience working with players, attending coaching clinics and presentations, taking a sport psychology coaching course, watching videos/listening to audio tapes) revealed that the most important (i.e., influential) ways that coaches developed their skills for teaching mental skills to their athletes were experience working with the players and attending coaching clinics and presentations. The least important method of developing mental training coaching skills was listening to audiotapes.

As occurred in the Gould et al. (1999a) study, using a scale where 1 = not important, 5 = somewhat important, and 10 = extremely important, coaches highly rated the importance of mental skills to junior tennis success ($M = 8.91$, $SD = 1.71$) (Gould et al., 1999b). Additionally, the coaches also indicated that on average 79.54% of their players had problems with the mental aspects of their game and these problems kept them from playing up to their potential. Only a small percentage of players (9.13%) were thought to need little or no help with the mental aspect of the game. However, there was great variability in the coaches' responses to this question with percentages of the players that had problems with the mental aspects of the game ranging from 0 to 100%.

Coaches in the Gould et al. (1999b) follow-up study were also asked to rate the importance in junior tennis of specific mental skills using a scale from 1 (not important) to 10 (very important). Of the 24 mental skill topics listed, eight of the skills had a mean score above nine, an additional seven of the skills had a mean score above eight, and an additional six of the skills had a mean score above seven. Only three of the mental skill topics received mean scores below seven with two of the mental skill topics (post match speech, media skills) receiving mean scores below five. The eight mental skill topics with scores above nine included enjoyment/fun, focus/concentration, self-confidence, emotional control, honesty/integrity, motivation/passion, practice intensity, and positive thinking/self-talk.

The coaches reported that they spent an average of 66.82 minutes per week on mental skills training. However, they also indicated that they would be willing to spend an average of 106.37 minutes each week on mental skills training. The coaches, using a scale where 1 = poor, 4 = average, and 7 = excellent, rated themselves as slightly above

average ($M = 5.17$, $SD = 1.25$) in their ability to develop mental skills in junior tennis players. They also felt that it is somewhat difficult to teach mental skills to junior tennis players as indicated by their teaching difficulty rating ($M = 4.97$, $SD = 1.4$) using a scale where 1 = easy, 4 = somewhat difficult, and 7 = difficult.

Greenspan and Feltz (1989) reviewed 23 published studies on the effectiveness of various mental interventions (e.g., stress inoculation, imagery, relaxation, reinforcement, systematic desensitization) in competitive sport settings including skiing, boxing, golf, karate, tennis, figure skating, volleyball, gymnastics, and basketball. They found that educational relaxation-based mental interventions and remedial cognitive restructuring interventions effectively improved the performance of collegiate and adult athletes in competitive situations. Specifically, they found that 18 out of the 20 studies reviewed demonstrated improvement. The three behavioral studies (i.e., using behavioral interventions such as performance contingent rewards) were dropped from this review due to the small number of such studies.

As defined by Greenspan and Feltz (1989), educational based interventions emphasize the development of mental skills necessary for optimal participation and enjoyment in sport while remedial interventions seek to change behaviors that have been debilitating to performance, satisfaction, and learning. In six of the eight studies reviewed in which causality could be inferred, positive results were reported for relaxation-based interventions (2/4 studies) and cognitive restructuring interventions (4/4 studies). In a later study, Weinberg (1994) examined 45 studies employing mental interventions in competitive sport settings. Positive performance effects were found in 38 (85%) of the studies, although causality could not be inferred in 20 of them.

Collectively, these findings support the notion that: 1) mental skills can indeed improve sport performance, 2) coaches (e.g., age-group, high school, college) believe in the importance of mental skills, and 3) coaches (e.g., age-group) teach mental skills at a rate lower than would be expected based on their ratings of the importance of mental skills.

Role of Coaches in Teaching Mental Skills

One of the most important behaviors in which coaches engage includes the teaching of a variety of sport-relevant skills to their athletes. One such coaching behavior involves the teaching of mental skills. Feltz et al. (1999) provided examples of coaching behavior such as type of feedback used, management strategies, and coaching style, although they did not intend this to be an inclusive list. According to Horn (2002), the term coaches' behavior or coaching behavior implies a plethora of actions that has been limited to an examination of mainly two dimensions of coaching behavior: leadership style and type of feedback. Furthermore, the reason for this limitation in the way that coaching behavior has been conceptualized has been attributed to measurement issues (i.e., reliable and valid measures are only available in the areas of leadership style and type of feedback). Horn suggests that many other dimensions of coaching behavior have not been tapped into and that the use of additional instruments (that measure other coaching behavior dimensions) in future research studies may help expand our knowledge base regarding the ways in which coaching behavior can affect the psychological growth and development of athletes. In accordance with Horn's (2002) suggestion, the present study will examine an area of coaching behavior that has been received limited attention to date, the teaching of mental skills to athletes.

Coaches can play an important role in aiding athletes in the development of mental skills such as concentration/attention, motivation/commitment, confidence, imagery/mental practice, anxiety control, preparation/goal setting, relaxation, attitude/thought control, and emotional control. Gould, Dieffenbach, & Moffett (2002) captured the influential role that coaches play with athletes in a study of US Olympic champions. Participants in the study included ten U.S. Olympic champions (six male, four female) representing nine different Olympic sports (e.g., skiing, swimming, ice hockey, speed skating, track and field) with an average of 2.4 Olympic game appearances each. These athletes had won 32 Olympic medals (28 gold, 3 silver, 1 bronze) between them. Four athletes participated in winter Olympic games while the remaining six athletes were summer game participants. Athletes were interviewed and also completed a battery of mental inventories. Parents were also interviewed as a part of the study to gather additional data and gain a more holistic perspective.

Summaries of the interviews showed that influential coaches taught athletes in both direct (i.e., mentoring, teaching mental skills, planned teaching) and indirect (i.e., fostering/nurturing/instilling important skills, modeling) ways. Parents and athletes commented that the confidence that these coaches possessed in their own abilities and the confidence that these coaches placed in their athletes promoted mental development (e.g., increases in confidence, reduction in worrying, increase in goal setting and mental preparation, increased concentration and focusing abilities, better emotional control) in these athletes. Some of the positive coach characteristics and behaviors that athletes and parents indicated as helpful with the successful development of athletes included a positive coaching style, the elite status of the coach (as a former athlete and/or as a

current coach), good communication patterns, overall trustworthiness, and a sense of optimism or overall positive attitude (Gould, Dieffenbach, & Moffett, 2002).

Coaching and the Sport of Tennis

Coaches play an integral role in the success of athletes within the sport of tennis (Gould et al., 1999a, 1999b; Horn, 2002; USTA, 1998; Weinberg & Jackson, 1990). Within tennis there are several different levels of competition ranging from the junior level to the collegiate level up to the professional level. Although the professional level arguably poses the greatest challenge for athletes, it can be argued that the collegiate level provides the greatest number of challenges for coaches. At the collegiate level, coaches have various demands placed on them from the university, parents, the community, the team, and their individual athletes. The demands from athletes not only include working extensively with athletes during practice and prior to competitions, but head coaches and assistant coaches also provide instruction and feedback to their athletes on-court during team matches and competitions. This on-court instruction by collegiate coaches is a unique responsibility since on-court coaching is not permitted at the junior level of tennis or on the professional tennis tours [i.e., Association of Tennis Professionals (ATP), Women's Tennis Association (WTA)]. Applied research on coaching efficacy and the resultant outcomes among tennis coaches is just now beginning.

The research by Feltz et al. (1999) with high school basketball coaches provided some preliminary evidence supporting a positive relationship between coaching efficacy and coaching behavior as well as a positive relationship between coaching efficacy and the satisfaction and performance of athletes and teams. There is no research to date demonstrating these relationships among collegiate tennis coaches. The Sullivan and

Kent (2003) study on the relationship between the efficacy of intercollegiate coaches and their leadership style is the first applied study in this area of research (i.e., collegiate coaching) utilizing the Coaching Efficacy Scale and outcome measures reflective of the conceptual model of coaching efficacy.

Factors Associated with Tennis Success among Tennis Players

Tennis is a sport that is challenging both physically and mentally. Broadly speaking, the physical fitness demands of a tennis match include flexibility, strength and endurance, power, agility and speed, aerobic and anaerobic fitness, and optimum body composition (i.e., proper percentage of muscle and fat). More specifically, some researchers characterize tennis as a sport in which athletes must respond to a continuous set of emergencies including sprinting across the court, quickly changing directions, stretching, reaching, lunging in various directions, and stopping and starting very quickly while maintaining proper balance and technique (United States Tennis Association, 1998).

Although an average point in tennis typically will not last more than 10 seconds, there may be as many as five changes of direction within this 10 seconds. Following a point, tennis players have a 25-second rest period, and on the changeovers (i.e. after the first three games of each set and then every two games thereafter) they have a 90-second rest period. These facts make tennis an anaerobic sport requiring speed and agility. The fact that a tennis match can last for more than three hours means that aerobic conditioning and muscular endurance have a role to play as well. Good aerobic capacity enables tennis players to recover effectively between points while muscular endurance may allow athletes to maintain muscle strength throughout matches and correct muscle imbalances that are evident due to tennis' one-sided nature (i.e., if you are a right-handed

tennis player, you use the muscles on the right side of the body more than the muscles on the left side of the body due to the biomechanics of the serve and other shots that demand an over-reliance on the dominant hand). Flexibility and power are also required in tennis to enable both extending the body to reach wide shots and exploding off the ground to hit overhead shots and serves (United States Tennis Association, 1998).

According to Weinberg (2002), the distinguishing trademark of many past and present tennis champions such as Chris Evert, Mats Wilander, Ivan Lendl, Monica Seles, and Pete Sampras was not so much their exceptional talent (they were very talented as are many tennis players), but rather the exceptionally consistent high level of play that they displayed from week to week and in Grand Slam competition. Accordingly, Weinberg proposes that to achieve consistent high level results in tennis, there are two basic requirements. First, players need to possess good basic technique, stroke production, and movement. Secondly, players must be able to control their mental states through the use of their mental skills and strategies.

It is evident that a number of factors or skills are important for success in tennis (e.g., physical, technical, tactical, mental). Although research has shown that a number of mental skills have been linked to positive changes in the performance, beliefs, and attitudes of athletes (Gould, Dieffenbach, & Moffett, 2002; Greenspan & Feltz, 1989; Murphy & Tammen, 1998; Weinberg, 1994), the area of mental skills remains the least understood of the four aforementioned influential factors.

Within the sport of tennis, Robert Weinberg (2002), an internationally recognized sport psychologist and expert in the application of mental skills to tennis, focuses on eight key areas in discussing how tennis players can excel from a mental perspective and

perform at a high level. These eight areas include commitment, motivation through effective goal setting, confidence, understanding and managing emotions, imagery, concentration, self-talk, and mental preparation. A high level of confidence has consistently ranked as one of the most important mental states among successful athletes (Jackson & Csikszentimihalyi, 1999; Orlick, 2000; Weinberg, 2002). Situation specific confidence or self-efficacy is the mental variable that has been studied most within the sport psychology literature in general and within tennis in particular (Weinberg, 2002; Weinberg & Jackson, 1990).

Weinberg and Jackson (1990) assessed the degree to which high school and age-group tennis coaches (i.e., coaches of children 12 and under, 14 and under, 16 and under, or 18 and under) used 13 strategies for influencing self-efficacy (SE), and how these same coaches evaluated the effectiveness of the 13 strategies. The 13 self-efficacy strategies were as follows: (1) encourage positive self-talk, (2) use instruction and drilling, (3) use positive verbal persuasion, (4) act confident oneself (in the coaching role), (5) emphasize improvements while downplaying match outcome, (6) liberally use rewarding statements, (7) employ hard conditioning drills, (8) set specific performance goals, (9) emphasize that failure results from lack of effort and not innate ability, (10) point out players who are similar and have also achieved success, (11) emphasize that feelings of anxiety are not fear, but a sign of readiness, (12) have the player imagine being successful, and (13) reduce anxiety via relaxation techniques. Two hundred twenty-two high school and age group tennis coaches (136 male, 86 female) from the Southwestern United States, averaging 12 years of coaching experience and a 58% winning percentage (in the last competitive season) participated in the study. Sixty-six

percent (66%) of the sample held a master's degree while 54% held an undergraduate degree in physical education or recreation. These coaches were administered a questionnaire that was a modified version of the questionnaire utilized by Gould, Hodge, Peterson, and Giannini (1989) to assess confidence building strategies in elite wrestling coaches. Frequency of using these strategies was assessed on a 5 point Likert scale where 1 = never, 3 = sometimes, and 5 = often. Effectiveness of the techniques listed on the questionnaire was assessed on a 5 point Likert scale where 1 = not effective, 3 = somewhat effective, and 5 = very effective.

Results showed that high school and age group tennis coaches used all 13 strategies designed to enhance self-efficacy (that were included in the study) to a moderate degree (frequency range = 3.08 to 4.79 on a 5 pt. scale with a mean frequency of 4.0) and that the techniques were at least moderately effective (effectiveness range = 3.24 to 4.38 on a 5 pt. scale with a mean effectiveness of 3.9). The most frequently used strategies to enhance self-efficacy included the following: encourage positive self-talk (4.79), instruction-drilling (4.51), verbal persuasion (4.44), act confidently oneself (in the coaching role) (4.44), emphasize improvement in technique while downplaying match outcome (4.26), and liberally use rewarding statements (4.26). The strategies rated most effective for enhancing self-efficacy included the following: encourage positive self-talk (4.38), liberally use rewarding statements (4.15), instruction-drilling (4.13), verbal persuasion (4.13), and act confidently oneself (in the coaching role) (4.00).

Discriminant function analyses revealed few between-coach differences (e.g., gender, having a coaching minor or not) in efficacy strategy frequency use and effectiveness ratings. Masters degree and bachelor degree coaches differed in their

ratings of how frequently they used certain efficacy strategies, with bachelor degree coaches using the following techniques more often: hard conditioning drills, setting specific goals, emphasizing that failure results from a lack of effort and not low ability, and identifying similar players who have achieved success. Masters degree and bachelor degree coaches also differed in their ratings of how effective certain efficacy strategies were with bachelor degree coaches rating the following techniques as more effective: verbal persuasion, emphasizing that failure results from a lack of effort and not low ability, and having the player imagine success. Additionally, coaches with a coaching minor as compared to coaches without a coaching minor felt that the following techniques were more effective in building self-efficacy in tennis players: instruction and drilling, verbal persuasion, emphasizing that anxiety is a sign of readiness, and having the player imagine success.

Importance of Mental Skill Usage in Tennis

In open sports (i.e., sports where the environment is constantly changing and thus movements have to be continually adapted) such as tennis that require fine motor skills (i.e., skills involving intricate movements using small muscle groups that tend to be precise and generally involve high levels of eye-hand coordination), mental skills are generally viewed as even more important for successful performance as compared to open or closed sports (i.e., sports where there is a stable, predictable environment and the performer knows exactly what to do and when) that require gross motor skills (i.e., skills involving large, non-precise muscle movements where the major muscle groups are involved in many fundamental movement patterns) such as football or weightlifting (Mackenzie, 1997). Research has shown that in sports requiring fine motor skills, mental

skills such as focus and concentration and arousal/anxiety control are essential for optimal muscle coordination and attentional focus (Weinberg & Gould, 1999).

In the sport of tennis, according to Weinberg (2002), there are several unique qualities embedded within the sport experience that pose mental challenges for a competitive player. High level competitive tennis is a game of precision requiring excellent timing, coordination, decision-making, quickness, focused attention and endurance. The average tennis match requires approximately 1,000 decisions to be made usually in less than one second. Biomechanically speaking, consistently creating the proper racquet face angle at impact is difficult as it requires the tennis player to take into account court position (their own and their opponent's) and the ball spin that their opponent produced while simultaneously moving into the proper position time and time again. Periodic failures to execute shots presumably honed in hours of practice can be mentally challenging for tennis players.

Another mental challenge within tennis involves the fact that during a typical match, only about 25 percent of the time is actually spent playing tennis. The other 75 percent of the time is spent between points and during changeovers. This "down-time" provides an ample opportunity for the mind to wander and focus on things irrelevant to winning that next point. Distracting thoughts range from "I can't believe the umpire called that shot out, it was so in" to "Come on, don't double fault." This "down-time" can be used productively to prepare for the next point, however, it is often the case that the time between points and games becomes a liability for the athlete.

A final major mental challenge that playing tennis involves is being on center stage with *nowhere to hide*. In tennis, like other sports such as boxing and golf, everyone

can see your successes as well as your collapses and extreme failures. The potential disappointment and frustration that comes with every double-fault, every missed overhead, every poorly timed drop-shot, every choked volley, and every unconverted break-point can be exacerbated by the moans of the crowd and the perception that all eyes are on the tennis player (Weinberg, 2002).

Defrancesco and Burke (1997), in their applied research with tennis players, found that a large percentage of professional tennis players utilized a variety of mental skills to enhance performance. They found that the most common strategies used by the 115 professional tennis players (60 males, 55 females representing 30 countries) at the 1992 Lipton Tennis Tournament included imagery/visualization, using a consistent pre-service or pre-service return preparatory routine (i.e., mental preparation), relaxation, goal-setting, and self-talk. Players reported that their motivation to compete, ability to maintain concentration throughout a match, and self-confidence considerably affected their performances.

Landin and Hebert (1999) reported on the development and implementation of a self-talk (ST) strategy designed to improve the volleying skill of five collegiate tennis players. A two-word ST strategy was developed, implemented, and evaluated using a single-case, multiple-baseline design. Dependent measures were movement patterns and outcome scores. After intervention, four players displayed immediate, positive changes on movement patterns. Notable improvements in outcome scores were also observed in all players, however, overlapping datapoints occurred for three players. Visual inspection of plotted values was supplemented by quantitative analysis using one-way ANOVAs to analyze 4 datapoints: the two baseline days just prior to intervention, and the two days

immediately post intervention. Significant differences were found between phases, with both movement pattern and outcome scores higher following intervention. Qualitative data were also collected for the study via surveys and interviews. Players reported in these surveys and interviews that they had increased levels of confidence following the intervention, and they offered explanations for the intervention's success that support the view of ST as a way of directing attentional focus and prompting movement patterns.

Rationale for the Present Study

According to the existing literature, there is some preliminary evidence that the beliefs of coaches regarding their coaching related abilities/competencies (e.g., coaching efficacy) can have an impact on a number of variables including player/team performance, player/team satisfaction, player/team efficacy, and coaching behaviors. There is also evidence that the use of mental skills by athletes can impact player/team performance as well. The creation of the Coaching Efficacy Scale (CES) within the past several years allows for empirical examination of the conceptual model of coaching efficacy, specifically the association between coaching efficacy [general coaching efficacy, four coaching efficacy subscales (game strategy, motivation, teaching technique, character building) and outcome variables (e.g., player/team performance, player/team satisfaction, player/team efficacy, and coaching behaviors).

Most of the research to date on coaching efficacy, a handful of studies in actuality, has focused on high school and junior coaches and their athletes. Additionally, these few studies have primarily focused on the sources of coaching efficacy and the relationship of these sources to coaching efficacy. Practically no research to date has examined the relationships between coaching efficacy and the outcome variables proposed by the conceptual model of coaching efficacy (e.g., coaching behavior, player/team

performance, efficacy, and satisfaction). The research study being proposed will explore the relationships among collegiate tennis coaches' coaching efficacy, percentage of time spent teaching mental skills to the athletes on their teams, and won/lost team record (i.e., their team's on-court performance).

Hypotheses

The following hypotheses were investigated in the research on tennis coaches:

1. Total coaching efficacy (i.e. overall mean score combining the four dimensions of coaching efficacy) will be a significant predictor of coaching behavior [percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season].
2. Each of the four dimensions of coaching efficacy (i.e., game strategy efficacy, motivation efficacy, teaching technique efficacy, character building efficacy) will be a significant predictor of coaching behavior.
3. Total coaching efficacy will be a significant predictor of team performance (i.e., won/lost percentage record of the coach's team) during the spring team competition season.
4. Each of the four dimensions of coaching efficacy will be a significant predictor of team performance during the spring team competition season.

Research Questions

This study explored the following research questions investigated in the research on tennis coaches:

1. Is there a significant association between coaching behavior [percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season] and team performance (i.e., won/lost percentage record of the coach's team)?
2. Is there a significant association between total coaching efficacy or the four dimensions of coaching efficacy (game strategy, motivation, teaching technique, and character building) and coach satisfaction with team performance (i.e., rated item on the Team Performance Questionnaire) during the spring team competition season?

3. Are there any significant differences in total coaching efficacy, coaching behavior, or team performance in association with years of coaching experience at different levels of competition (i.e., college/university level, total years), years of playing experience of the coach at different levels of competition (i.e., college/university level, professional level), type of coaching certifications (i.e., USPTA, PTR, either USPTA or PTR, USA High Performance), type(s) of USTA Sport Science Competency (i.e., Coaching, Sport Psychology/Motor Learning, Physiology/Nutrition, Sports Medicine/Biomechanics, None), number of conference titles at current school, and number of NCAA tournament appearances?
4. Are there any significant differences in any of the four dimensions of coaching efficacy (game strategy, motivation, teaching technique, and character building) in association with years of coaching experience at different levels of competition (i.e., college/university level, total years), years of playing experience of the coach at different levels of competition (i.e., college/university level, professional level), type of coaching certifications (i.e., USPTA, PTR, either USPTA or PTR, USA High Performance), type(s) of USTA Sport Science Competency (i.e., Coaching, Sport Psychology/Motor Learning, Physiology/Nutrition, Sports Medicine/Biomechanics, None), number of conference titles at current school, and number of NCAA tournament appearances?
5. Are there any significant differences in general coaching efficacy, coaching behavior, or team performance in association with the coach's age, gender, ethnicity, current coaching level (i.e., head coach, assistant/associate coach), level of education completed, ethnic make-up of the school home of the coach [i.e., a Majority European American College/University (MEACU) or a Historically Black College/University (HBCU)], and gender of the tennis team (i.e., men's or women's team)?
6. Are there any significant differences in any of the four dimensions of coaching efficacy (game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy) in association with the coach's age, gender, ethnicity, current coaching level (i.e., head coach, assistant/associate coach), level of education completed, ethnic make-up of the school home of the coach [i.e., a Majority European American College/University (MEACU) or a Historically Black College/University (HBCU)], and gender of the tennis team (i.e., men's or women's team)?

CHAPTER 3 METHOD

This chapter includes discussions of the research participants, instruments, and procedures in the Pilot Study and Major Study that constitute the present research.

Pilot Study

Following Institutional Review Board (IRB-02) approval, participants were recruited for the Pilot Study.

Pilot Study Participants

Participants (N=6) in the Pilot Study consisted of: (a) one Division I head tennis coach, (b) one Division I assistant/associate tennis coach, and (c) four applied sport psychology experts. Coaches were asked to make a slightly different contribution to the research than the experts. Specifically, the coaches were asked to pilot-test the assessments to be used in the Major Study so that the researchers could determine their readability, clarity and appropriateness for the target population. They were asked to provide written feedback regarding the time required to complete the assessment battery and any problems they experienced in completing the assessment battery. The experts were asked to: (a) provide written feedback regarding assessment items that seemed problematic (e.g., difficult to understand, poorly worded, inappropriate), and/or (b) suggest additional items or questions for inclusion in the assessment battery. These coaches and experts were asked to participate in the Pilot Study because the primary researcher either had a professional relationship with them or with a coach or expert who knew them and encouraged their participation. A total of fifteen coaches and experts

were asked to participate in the Pilot Study, but because of extremely busy work schedules and prior commitments, only the six mentioned above could participate, resulting in a participation rate of 40%. Coaches, as operationalized in the Pilot Study, are persons in head coach or assistant/associate coach positions at a NCAA Division I college or university. Experts, as operationalized in the Pilot Study, are persons with extensive research and/or consultation experiences in the area of applied sport psychology, particularly in the areas of coaching efficacy and sport confidence.

The coaches involved in the Pilot Study were well respected among their peers. The head coach, with 34 years of coaching experience, has helped his teams to nine top-20 finishes in the last 14 years and 12 conference titles. Because of this outstanding coaching record, he was honored with the National Coach of the Year Award twice during the time this record was being established. His career winning percentage of .711 is the third best among active collegiate coaches and the seventh best among all-time coaches. The assistant/associate coach, with six years of coaching experience, has also experienced considerable success with his teams, helping them to a NCAA championship, three conference titles, and a winning percentage of .927. He has been honored with the National Assistant Coach of the Year Award. The experts involved in the Pilot Study, two male and two female, all hold doctorate degrees and have amassed numerous publications in high-quality refereed journals in the area of applied sport psychology and/or have consulted with professional athletes and organizations for many years. All coaches and experts were of European American heritage.

Pilot Study Instruments

Participants completed and/or reviewed an Assessment Battery (AB) consisting of the following instruments in a counterbalanced order: (1) the Coaching Efficacy Scale

(CES; Feltz, Chase, Moritz, & Sullivan, 1999), (2) the Mental Skills Questionnaire for Sport (MSQS), and (3) Team Performance Questionnaire (TPQ). Counterbalancing was used as a means to control for any order effect on the results. Additionally, a Demographic Data Questionnaire (DDQ) was the last instrument in each AB. Below is a description of each of these instruments/questionnaires.

1. Demographic Data Questionnaire (DDQ). The DDQ, created by the principal investigator for this research project, was used to obtain the following information on the participating coaches: (a) years of coaching experience at each level of competition (i.e., college/university level, total years at all levels), (b) years of playing experience at each level of competition (i.e., college/university level, professional level), (c) type of coaching certifications, (d) type(s) of USTA Sport Science competency, (e) highest personal tennis ranking at each level of competition (i.e., college/university level, professional level), (f) additional coursework in sport science or psychology, (g) age, (h) gender, (i) ethnicity, (j) current coaching level (i.e., head coach, assistant/associate coach), (k) level of education completed, (l) ethnic make-up of the school home of the coach (i.e., a Majority European American College/University (MEACU) or a Historically Black College/University (HBCU)), (m) gender of tennis team, (n) highest national team ranking at current institution during tenure, (o) number of conference titles at current school, (p) NCAA titles at current school, and (q) number of NCAA tournament appearances.
2. Coaching Efficacy Scale (CES) (CES; Feltz, Chase, Moritz, & Sullivan, 1999). The CES is a 24 item self-report scale designed to measure the multidimensional aspects of

coaching efficacy, which include game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy. Responses on the CES range from 0 (not at all confident) to 9 (extremely confident). Game strategy efficacy and motivation efficacy are each represented by seven items. Teaching technique efficacy is represented by six items, while character building efficacy is represented by four items. In the Feltz et al. (1999) study, all factor loadings in both the first order confirmatory factor analysis (CFA) and the second order CFA were significant at $p < .05$, suggesting that each item was significantly related to the relevant latent variables. Discriminant validity was then assessed to test for redundancy by examining the correlations between the latent factors. Correlations between the four first-order factors ranged from .46 to .73, and the correlations with the second-order factor of total coaching efficacy ranged from .62 for character building efficacy to .88 for game strategy efficacy. Marginal support was also found for one overall coaching efficacy factor using various global fit indices. Feltz et al. (1999) reported coefficient alphas of .88, .91, .89, and .88 for game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy, respectively. Subsequent research with the CES has reported similar coefficient alphas (e.g., Sullivan and Kent, 2003). Concurrent validity of the CES was assessed by correlating it with measures of related constructs of self-esteem, general expectancy for success, and internal locus of control. Results indicated that the CES subscales were moderately correlated with self-esteem (.24 to .38), general expectancy for success (.30 to .56) and internal locus of control (.21 to .31) as expected (Feltz and Chase, 1998). Initial construct validity was assessed

through canonical correlation analysis with predicted sources of the four dimensions of coaching efficacy as well as through a comparison of high- and low- efficacy coaches on predicted outcomes. Results supported the hypothesized sources and outcomes of the Conceptual Model of Coaching Efficacy and demonstrate preliminary construct validity for the scale (Feltz et al., 1999). Sample items on the CES are as follows: How confident are you in your ability to make critical decisions during competition? (game strategy efficacy); How confident are you in your ability to motivate your athletes ? (motivation efficacy); How confident are you in your ability to coach individual athletes on technique ? (teaching technique efficacy); How confident are you in your ability to instill an attitude of good moral character? (character building efficacy)

3. Mental Skills Questionnaire for Sport (MSQS). The MSQS is a 14 item self-report measure that was primarily created by the principal investigator to obtain information on the amount of time (e.g., number of hours) that coaches spend teaching (i.e., instilling and developing) mental skills during the Fall 2003 and Spring 2004 seasons. The questionnaire also asks coaches the amount of time they spend as a collective group in all training sessions and meetings, all individual training sessions and meetings, and in physical practice/drills with their team members individually and collectively. As a validity check, the questionnaire also asks coaches how much time (in minutes) they spend in mental, technical, tactical, and physical fitness training. The amount of time (e.g., number of hours) that coaches spend teaching mental skills (MSQS) was assessed on a categorical scale from 0-20 hours (20 hours is the maximum number of hours per week during the

season that the NCAA allows collegiate tennis coaches to spend with their athletes). Sample items are as follows: (1) On average, how many total hours per week did you spend on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group)? (2) On average, how many total hours per week did you spend with your team as a collective group in all individual training sessions and meetings?

4. Team Performance Questionnaire (TPQ). The TPQ is a 4-item self-report measure, created by the principal investigator for this research project, that was used to obtain information from coaches on: (a) the won-lost record of their team during the Spring 2003 season and Spring 2004 season (i.e., season-to-date) for the Pilot Study, b) the won-lost record of their team during the Spring 2003 and Spring 2004 seasons for the Major Study, and c) their satisfaction with the team's performance during the 2003 and 2004 seasons. Sample items on the TPQ are: (1) Please indicate your team's won-lost record for the Spring 2004 Season and the previous Spring 2003 Season (if you coached that year); and (2) Please indicate how satisfied you are with your team performance for the Spring 2004 Season and the Spring 2003 Season? Satisfaction ratings on the TPQ range from 0 to 7 where 0=not satisfied at all and 7=extremely satisfied.

Pilot Study Procedure

Coaches

The five potential head tennis coach participants and five potential assistant/associate tennis coach participants for the Pilot Study were contacted via an invitation-to-participate e-mail (see Appendices A-B) to request their participation in the

Pilot Study. The invitation-to-participate e-mail included information about the purposes of and general procedures involved in the research, a request for the coach's participation, information on participation incentives (e.g., sharing results), and instructions for participating in the research (see Appendices A-B). This letter replaced the traditional informed consent by including the required information that is typically found in an Informed Consent Form.

Coaches were informed via the invitation-to-participate e-mail that participation in this project would take approximately 15 minutes and would involve: 1) completing the AB anonymously, 2) e-mailing the PI at tporter@ufl.edu regarding the length of time that it took to complete the questionnaire and any problems with the questionnaire (i.e., inappropriate items, wording) that they noticed, and 3) mailing the attached AB back to the PI in the enclosed self-addressed, stamped envelope, within one week. Coaches were also informed that they would receive tennis-specific sport psychology exercises, e-mail access to the lead researcher for free consultation in the area of sport performance enhancement for the next year, and a list of sport performance enhancement resources for participating in the Pilot Study. Completing and returning the AB and e-mailing the PI with the requested research-related information indicated informed consent to participate in the research. One follow-up phone call and one follow-up e-mail were made to each coach for two reasons: (1) to ensure that materials had been received, and (2) to remind coaches to review and complete the AB and provide the requested research-related information via e-mail.

To ensure anonymity for the coaches, they were instructed not to include their names on the AB. Additionally, a separate researcher (not associated with this research

project) was assigned to receive the mailed packets (i.e., Assessment Batteries) and separate/discard any information that could be used to identify participants. Researchers gathered Assessment Batteries (ABs) sent by mail and information sent via e-mail, and stored the materials in Dr. Carolyn Tucker's research lab, Psychology Building room #293. A Scanning Template was created to scan in the ABs. The Scanning Template was then tested to ensure functionality. Scanned data was checked for errors and then the data was cleaned as appropriate. Data that could not be scanned was stored or manually entered into a spreadsheet.

Experts

The five potential expert participants for the Pilot Study were contacted via an invitation-to-participate e-mail (see Appendix C) to request their participation in the Pilot Study. The invitation-to-participate e-mail included information about the purposes of and general procedures involved in the research, a request for the expert's participation, information on participation incentives (e.g., sharing results), and instructions for participating in the research (see Appendix C). This letter replaced the traditional informed consent by including the required information that is typically found in an Informed Consent Form.

Experts were informed via the invitation-to-participate e-mail that participation in this project would involve reviewing and commenting on an Assessment Battery (AB) (e.g., making comments on the assessments regarding items that seem difficult to understand or inappropriate, suggesting additional items or questions for inclusion) and that this work would take approximately 15 minutes. Those who agreed to voluntarily participate were asked to follow the instructions and return their comments via e-mail or fax within one week. Comments made regarding the AB and returned via e-mail or fax

to the researchers indicated informed consent to participate in the research. One follow-up phone call and one follow-up e-mail were made to the experts for two reasons: (1) to ensure that materials have been received, and (2) to remind experts to review the AB and provide their comments via e-mail or fax.

The feedback regarding the assessments was collected from the experts via e-mail and fax and then stored by researchers in Dr. Carolyn Tucker's research lab, Psychology Building room #293. Anonymity was not necessary for the experts as they were not completing any assessments, rather they only provided feedback on the assessments.

The feedback from the coaches and the experts was used to make any final changes to the AB before using the AB in the Major Study. These changes to the AB were submitted to the IRB-02 for approval before beginning Part II of this research project. The duration of the Pilot Study was two weeks.

Major Study

Following Institutional Review Board (IRB-02) approval, participants were recruited for the Major Study.

Major Study Participants

Researchers invited all tennis coaches at Division I universities and colleges in the United States of America (excluding pilot-study participants) to participate in the Major Study. Currently, there are 547 Division I head coaching positions (254 men and 293 women at universities and colleges). Some coaches head both the men's team and women's team at their respective universities and colleges. In these cases, researchers randomly assigned either the men's or women's team to that respective coach such that each coach was only asked to fill out the Assessment Battery for one tennis team (e.g., women's tennis team only). Researchers asked coaches who are known by the principal

investigator to encourage (e.g., informally one to one, via a support e-mail or letter) other coaches to accept the received invitation to participate in the research.

The final sample of participants for this study included 55 NCAA Division I tennis coaches (36 male, 19 female), resulting in a participation rate of 10%. The coaches ranged in age from 25 to 59 years of age (Mean=41, SD=10). Thirty-two (32) coaches (58%) indicated that the gender of their team was female while 22 coaches (40%) indicated that the gender of their team was male. One coach did not respond to this question. The ethnic composition of the participating coaches was as follows: 91% Caucasian/White/European American, 4% Hispanic/Latino(a) American, 2% African/Black American, and 2% Asian American. One participant wrote in his ethnicity as Black African and another participant further clarified her Caucasian/White/European American identity as Mixed Native American. One hundred percent (100%) of the coaches indicated that they coached at a predominately European-American college/university. Of the 55 coaches in the study, 87% (N=48) were head coaches while 9% (N=5) were assistant/associate head coaches. Two coaches failed to answer this question.

The coaches in the study had an average of 12 years of coaching experience at the college/university level (Mean=11.5, SD=7.5, Range=1-33) and 16 years of coaching experience overall (Mean=16.4, SD=8.9, Range=2-35). Coaches also averaged 3 years of playing experience at the college/university level (Mean=3.4, SD=1.3, Range=0-5) and 1 year of playing experience at the professional level (Mean=1.2, SD=1.7, Range=0-6). Seventy-five percent (75%) of all coaches in the study indicated that they had played at the college/university level for four years.

Forty-nine percent (49%; N=27) of the coaches in the study were either United States Professional Tennis Association (USPTA) certified (N=17), Professional Tennis Registry (PTR) certified (N=15), or both (N=5). Six coaches (11%) had participated in the United States Tennis Association (USTA) High Performance Program. In terms of USTA Sport Science competencies, 14 coaches (25%) had completed the Coaching Competency, six coaches (11%) had completed the Sport Psychology/Motor Learning Competency, four coaches (7%) had completed the Physiology/Nutrition Competency, and three coaches (6%) had completed the Sports Medicine/Biomechanics Competency. By contrast, 34 coaches (62%) held no USTA Sport Science competency. Fifty-five percent (55%; N=30) of the coaches indicated that they had received additional coursework in the areas of sport science or psychology.

Coaches reported that the average number of conference titles achieved at their current school was 3 (Mean=2.9, SD=4.3, Range=0-17) and that the average number of NCAA appearances was 4 (Mean=4.2, SD=5.6, 0-23).

Major Study Instruments

Participants completed the AB described in the Pilot Study (see pages 40 to 44) with the following modifications: (1) the CES was assessed using a 4-pt. Likert scale rating (where 1=low confidence and 4=complete confidence) in accordance with recent research on the psychometric properties of the CES (Myers, Wolfe, & Feltz, 2004) that suggested this change, (2) four items on the CES were modified slightly to lessen the overlap among the subscales (Myers et al., 2004) (e.g., “detect skill errors” became “detect skill errors during practice”), (3) two questions were added to the AB to (a) inquire about uncontrollable factors that may have influenced the won/lost record of the coach and (b) to account for psychological knowledge gained by coaches through

coursework, and (4) several questions (e.g., please list your three most important coaching responsibilities, do you work with the same particular players on-court during most singles matches) were excluded to shorten the time required to complete the AB and because it was determined that the questions were not central to the purpose of the study. Finally, three additional questions were added to assess additional areas of skills training. These additional questions resulted in the creation of the Skill Importance Questionnaire for Sport (SIQS). The SIQS is a 4-item self-report measure that has a 10 point Likert type rating scale (where 1=not important and 10=extremely important) that was created by the principal investigator to obtain information on the value that coaches place on the skills (mental, technical, physical fitness, tactical) that research has shown to be important within the sport of tennis (Silva, 1984). A sample item is as follows: (1) In general, rate on a scale from 1 to 10 how important the following skills are in college tennis success.

Major Study Procedure

All head and assistant/associate tennis coaches at Division I colleges/universities were contacted initially via letter and e-mail (the letter and e-mail contained the same information) to request their web-based participation in the Major Study. This research cover letter included information about the purposes of and research procedures involved in the research, a request for the coach's participation, information regarding participation incentives (e.g., sharing results, sharing of sport psychology resources with coaches) and instructions for participating in the research (see Appendices K1-K2). This cover letter replaced the traditional informed consent by including the required information that is typically found in an Informed Consent Form. Both a letter and identical e-mail were sent to recruit coaches for the Major Study because this method

increased the likelihood that experts would see the request for participation and thus increased the likelihood of participation in the research study.

In the letter and e-mail, the research project was explained to the coach, and she/he was invited to participate by going to a secure web address that was provided (i.e., <http://survey.psych.ufl.edu/coaches>), following the instructions, and completing the Assessment Battery (AB). Coaches were informed in the letter and e-mail that participation would involve completing an Assessment Battery (AB) online that would take approximately 15 minutes. Coaches were also informed that they would receive tennis-specific sport psychology exercises, e-mail access to the lead researcher for free consultation in the area of sport performance enhancement for the next year, and a list of sport performance enhancement resources for participating in the Major Study. Completion of this AB indicated informed consent to participate in the research.

The instructions at the website for research participation directed participants to complete the questionnaires in the order provided. Furthermore, these participants were told that their names would not be obtained, so as to assure anonymity. The duration of the Major Study was two months. Two follow-up e-mails were sent to potential participants: (1) to ensure that materials have been received, and (2) to remind coaches to complete the AB online.

The secure website was maintained by Department of Psychology Systems Programmer, Jim Yousse. Researchers transformed the assessments into their appropriate web format using the computer application Microsoft Frontpage. The Web-based Assessments were then transferred to Jim Yousse for posting onto the research website. Mr. Yousse created and maintained the Web-based Database that was used to

store the research data. Participant data stored on the Web-based Database was transferred to disk and stored in Dr. Carolyn Tucker's research lab, Psychology Building room #293. The Web-based Database was checked for errors by the researchers.

CHAPTER 4 RESULTS

This chapter includes discussions of the findings of the Pilot Study and the results of the Major Study that constitute the present research.

Pilot Study Findings

Coaches

As there were only two coaches that participated in the Pilot Study, no data analyses were conducted. A visual scan of the completed questionnaires was done however and it was found that both participants responded to every question. Coaches were asked to e-mail the PI regarding the length of time that it took to complete the questionnaire and any problems with the questionnaire (i.e., inappropriate items, wording) that they noticed. Only one coach indicated the length of time that it took to complete the questionnaire (15 minutes) and neither coach indicated any problems with completing the questionnaire. Both coaches endorsed items on the CES that were only in the high range (7 to 9 on a scale from 0 to 9).

Experts

Experts were asked to review and comment on the Assessment Battery (AB) (e.g., make comments on the assessments regarding items that seemed difficult to understand or inappropriate, suggest additional items or questions for inclusion). In regards to clarity, the following comments were forwarded: (1) two experts suggested changes to individual items on the CES, and (2) one expert suggested simplifying a question on the DDQ from years of coaching experience at the “Jr./High School, College/University, and

Professional level” to “total years coaching experience.” Experts also offered the following comments regarding additional items to include: (1) two experts commented that the won/lost record of the coach (team performance) could be influenced by other factors (e.g., injuries, strength of schedule) and thus they proposed that the researchers add a question to inquire about uncontrollable factors that may have influenced the won/lost record of the coach, (2) an expert suggested that several questions be added to assess other areas of skills training (e.g., technical, physical fitness) for comparison purposes and to reduce experimenters’ bias, and (3) one expert suggested including a question that asks coaches to list any coursework (undergraduate or graduate) that they have had in the areas of sport science/physical education/coaching/psychology. Finally, general changes were also offered by the experts as well: (1) two experts suggested that the AB be shortened or condensed as much as possible, particularly eliminating any questions that were not central to the purpose of the study, (2) an expert suggested that the 0-20 scale on the PSQS should be converted to a Likert Type Scale, and (3) one expert suggested that the researchers ask more in-depth questions about mental training.

Major Study Results

The Major Study results are separated into seven sections. The first section presents the independent and dependent variables, the descriptive data for these variables, and the internal consistencies of the scales used to assess these variables. In the second section, a correlational matrix is presented in order to provide some of the foundation for using specific analyses presented in later sections. In the third section, the hypotheses investigated in the study and the regression analyses to test them are presented, and the results of these analyses are discussed.

The fourth section includes a discussion of post-hoc findings related to hypothesis two. The fifth section includes a description of the first two research questions and the correlation analyses used to examine them; additionally, findings from these analyses are discussed. In the sixth section, research questions three and four and the correlation and MANCOVA analyses used to examine them are described, and the findings from these analyses are discussed. In the seventh section, research questions five and six and the correlation, ANCOVA and MANCOVA analyses used to examine them are described, and the results from these analyses are discussed.

Descriptive Data for the Predictor and Criterion Variables and Relevant Internal Consistency Findings

This section contains descriptive data for the predictor variables (i.e., Total Coaching Efficacy, Game Strategy Efficacy, Motivation Efficacy, Teaching Technique Efficacy, Character Building Efficacy), and criterion variables [i.e., Coaching Behavior or percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group in Fall and in Spring), and Team Performance or Won-Lost Record of Coach's Team during the Spring Team Competition Season]. Data were visually inspected to assure that there existed no significant outliers that may have corrupted or invalidated the results of the planned data analyses. Table 4.1 presents the descriptive data for the predictor and criterion variables used in this research.

As can be seen in Table 4.1, participants tended to score along a slightly restricted range for coaching efficacy and along the entire range of responses for team performance and coaching behavior [percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a

Table 4.1
Descriptive Statistics for Major Predictor & Criterion Variables

Variable	Min	Max	Mean	SD	Norm*
Motivation Efficacy	2.29	4	3.29	.46	7.44, .90
Game Strategy Efficacy	2.29	4	3.44	.45	7.61, .93
Teaching Technique Efficacy	2.33	4	3.56	.41	7.78, .87
Character Building Efficacy	3	4	3.79	.29	8.12, .80
Total Coaching Efficacy	2.65	4	3.48	.33	7.68, .74
Team Performance	.05	.97	.58	.20	N/A
% Mental Practice – Fall	0	1.00	.15	.18	N/A
% Mental Practice – Spring	0	1.00	.16	.17	N/A

Note: Efficacies (i.e., variables 1-5) were measured on a scale from 1 to 4 (as proposed by Myers et al., in press), with higher ratings indicating greater confidence. Team performance was measured by dividing the total of wins over the total number of contests. % mental practice was measured by dividing the time spent on mental practice/drills by the total amount of time spent with the team (individually and as a group). *Norms are based on original samples with high school coaches on a 0 to 9 scale (Feltz et al., 1999).

group)]. In regards to coaching efficacy, character building ratings were particularly high with a mean of 3.79 on a four point scale. This high mean value is a good sign as these coaches are impacting large numbers of our male athletes and female athletes every year. However, all efficacy scores were rather high with motivation efficacy displaying the lowest mean (3.29 on a four point scale). Table 4.1 also shows that a few coaches indicated that they incorporate mental skills/practice into all their activities with their athletes.

In addition to examining the distribution of scores on each of the predictor and criterion variables, the internal consistency of each scale was also examined. Table 4.2 presents the Cronbach's Alpha reliability and Spearman-Brown Split-Half reliability for the scales used to measure the variables investigated in the present study. As can be seen, most of the scales have adequate internal consistency as measured by Cronbach's Alpha method. The Character Building Efficacy Subscale demonstrates questionable Cronbach's Alpha reliability (.639) for the present sample, and thus results from this scale should be interpreted with caution. The newly created Skill Importance Questionnaire for Sport (SIQS) demonstrates questionable Cronbach's Alpha reliability (.566) and Spearman-Brown Split-Half reliability (.618) for the present sample, and thus results from this scale should be interpreted with caution as well. The Cronbach's Alpha reliability (.758) and Spearman-Brown Split-Half reliability (.673) for the newly created Mental Skills Questionnaire for Sport (PSQS) are adequate and the scale demonstrates good face validity.

Preliminary Analysis

A preliminary Pearson Product Moment Correlation Matrix was performed to examine the relationships between all relevant variables under study. The results will be discussed in terms of their implications for answering the research questions. Table 4.3 shows correlations among the major variables of interest. For all analyses in the present study, the criterion value was set at $p < .05$.

Several research questions were impacted by these preliminary findings. The following variables were excluded from the analyses due to problems with the data (e.g., invalid range, small frequencies) obtained during visual examination of computer

Table 4.2
Alpha reliability and Spearman-Brown Split-Half reliability coefficients for Major Study Measures

Measure	N	Alpha	Spearman-Brown
Coaching Efficacy Scale (CES)	55	.900	.919
Motivation Efficacy Subscale	55	.859	.841 (unequal length)
Game Strategy Efficacy Subscale	55	.836	.756 (unequal length)
Teaching Technique Efficacy Subscale	55	.813	.767
Character Building Efficacy Subscale	55	.639	.702
Mental Skills Questionnaire for Sport (PSQS)	55	.758	.673
Skill Importance Questionnaire for Sport (SIQS)	55	.566	.618

printouts of the raw descriptive data: (a) highest personal tennis ranking at each level of competition (i.e., college/university level, professional level); (b) amount of time in minutes devoted to mental, technical, tactical, and physical fitness training; and (c) highest national team ranking at current institution during tenure).

Results Regarding the Hypotheses

A Simple Linear Regression was used to test hypothesis one. Hypothesis one stated that total coaching efficacy (i.e., overall mean score combining the four dimensions of coaching efficacy) will be a significant predictor of coaching behavior [percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season]. As shown in Table 4.4, results of the Simple Linear Regression revealed that total coaching efficacy did not significantly predict the percentage of time coaches spent on mental practice and drills during the fall tennis

Table 4.3
Intercorrelations Between Coaching Efficacy, Team Performance, and Coaching Behavior

Variable	ME	GSE	TTE	CBE	TCE	TP	MP-F	MP-S
Motivation Efficacy (ME)	---							
Game Strategy Efficacy (GSE)	.534**	---						
Teaching Technique Efficacy (TTE)	.464**	.683**	---					
Character Building Efficacy (CBE)	.301*	.131	-.004	---				
Total Coaching Efficacy (TCE)	.829**	.865**	.789**	.333*	---			
Team Performance (TP)	.403**	.300*	.160	.314*	.384**	---		
% Mental Practice – Fall (MP-F)	-.254	.143	.029	-.129	-.057	-.016	---	
% Mental Practice – Spring (MP-S)	-.272*	-.002	-.018	-.093	-.131	.076	.882**	---

Note: * $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

season ($F(1,53) = .170, p = .682$). Additionally, results of the Simple Linear Regression revealed that total coaching efficacy did not significantly predict the percentage of time coaches spent on mental practice and drills during the spring tennis season, $F(1,53) = .930, p = .339$ (Table 4.5).

A Multiple Regression was used to test hypothesis two. Hypothesis two stated that each of the four dimensions of coaching efficacy (i.e., motivation efficacy, game strategy efficacy, teaching technique efficacy, character building efficacy) will be a significant predictor of coaching behavior [percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season]. Results of the Multiple Regression using the forced entry method revealed that the model significantly predicted the percentage of time coaches spent on mental practice and drills

Table 4.4
Multiple Regression - Motivation Efficacy and Game Strategy Efficacy Predicting
% Mental Practice (Fall)

Variable	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
(Constant)	.336	.356		.943	.350
Game Strategy Efficacy	.166	.073	.422	2.256	.028*
Motivation Efficacy	-.166	.061	-.438	-2.715	.009**
Teaching Technique Efficacy	-.024	.078	-.055	-.307	.760
Character Building Efficacy	-.032	.083	-.053	-.384	.703

Note: * $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

during the fall tennis season, ($F(4,50) = 2.685, p = .044$). R^2 for the model was .177, and adjusted R^2 was .111. In terms of individual relationships between the predictor variables and criterion variable, as shown in Table 4.4, game strategy efficacy ($t = 2.256, p = .028, \beta = .422$) and motivation efficacy ($t = -2.715, p = .009, \beta = -.438$) each significantly predicted the percentage of time coaches spent on mental practice and drills during the fall tennis season. Game strategy efficacy was a positive predictor of the percentage of time coaches spent on mental practice and drills during the fall tennis season while motivation efficacy was a negative predictor. In reference to the spring season, Multiple Regression using the forced entry method revealed that the model did not significantly predict the percentage of time coaches spent on mental practice and drills during the spring tennis season, ($F(4,50) = 1.443, p = .234$).

A Simple Linear Regression was used to test hypothesis three. Hypothesis three stated that total coaching efficacy will be a significant predictor of team performance (i.e., won/lost percentage record of the coach's team) during the spring (team competition) season. As shown in Table 4.5, results of the Simple Linear Regression

revealed that the model significantly predicted the won-lost percentage record of the coach's team during the spring (team competition season) ($F(1,53) = 9.158, p=.004$). R^2 for the model was .147, and adjusted R^2 was .131.

Table 4.5
Linear Regression - Total Coaching Efficacy Predicting Team Performance

Variable	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.247	.276		-.897	.374
Total Coaching Efficacy	.239	.079	.384	3.026	.004**

Note: ** $p < 0.01$ (2-tailed).

A Multiple Regression was used to test hypothesis four. Hypothesis four stated that each of the four dimensions of coaching efficacy (i.e., motivation efficacy, game strategy efficacy, teaching technique efficacy, character building efficacy) will be a significant predictor of team performance (i.e., won/lost percentage record of the coach's team) during the spring (team competition) season. Results of the Multiple Regression using the forced entry method revealed that the model significantly predicted the won-lost percentage record of the coach's team during the spring (team competition season). ($F(4,50) = 3.533, p=.013$). R^2 for the model was .220, and adjusted R^2 was .158. In terms of individual relationships between the predictor variables and criterion variable, no relationships were significant, however, motivation efficacy ($t = 1.885, p=.071$) approached significance in predicting team performance.

Post-Hoc Analyses Regarding Hypothesis Two

Two additional Multiple Regressions were run with coaching behavior operationalized as the percentage of time per week spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring

season. Similar to hypothesis two, it was believed that each of the four dimensions of coaching efficacy (i.e., motivation efficacy, game strategy efficacy, teaching technique efficacy, character building efficacy) would be a significant predictor of coaching behavior [percentage of time per week spent on physical practice/drills with team members (individually and as a group) during the fall season]. Results of the Multiple Regression using the forced entry method revealed that the model significantly predicted the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season ($F(4,50) = 8.813, p < .001$). R^2 for the model was .414, and adjusted R^2 was .367. In terms of individual relationships between the predictor variables and criterion variable, as shown in Table 4.6, game strategy efficacy ($t=4.396, p < .001, \beta = .694$) and motivation efficacy ($t = -4.552, p < .001, \beta = -.620$) each significantly predicted the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season. Game strategy efficacy was a positive predictor of the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season while motivation efficacy was a negative predictor.

In reference to the spring (team competition) season, and similar to hypothesis two, it was believed that each of the four dimensions of coaching efficacy (i.e., motivation efficacy, game strategy efficacy, teaching technique efficacy, character building efficacy) would be a significant predictor of coaching behavior [percentage of time per week spent on physical practice/drills with team members (individually and as a group) during the spring season]. Results of the Multiple Regression using the forced entry method revealed that the model significantly predicted the percentage of time per week coaches

Table 4.6
Multiple Regression - Motivation Efficacy and Game Strategy Efficacy Predicting
% Physical Practice (Fall)

Variable	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.471	1.043		1.410	.165
Game Strategy Efficacy	.944	.215	.694	4.396	.000**
Motivation Efficacy	-.815	.179	-.620	-4.552	.000**
Teaching Technique Efficacy	-.104	.227	-.070	-.458	.649
Character Building Efficacy	-.207	.243	-.098	-.852	.399

Note: ** $p < 0.01$ (2-tailed).

spent on physical practice/drills with team members (individually and as a group) during the spring season ($F(4,50) = 3.553, p = .013$). R^2 for the model was .221, and adjusted R^2 was .159. In terms of individual relationships between the predictor variables and criterion variable, as shown in Table 4.7, game strategy efficacy ($t = 2.459, p = .017, \beta = .597$), and motivation efficacy ($t = -3.218, p = .002, \beta = -.651$) each significantly predicted the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the spring season. Again, game strategy efficacy was a positive predictor of the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season while motivation efficacy was a negative predictor.

Results Regarding Research Questions One and Two

A Pearson Product Moment Correlation Matrix was used to test research questions one and two. Research question one asked if there is a significant association between coaching behavior [percentage of time per week spent on mental practice/drills (i.e.,

Table 4.7
Multiple Regression - Motivation Efficacy and Game Strategy Efficacy Predicting
% Physical Practice (Spring)

Variable	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
(Constant)	.651	1.179		.553	.583
Game Strategy Efficacy	.597	.243	.447	2.459	.017*
Motivation Efficacy	-.651	.202	-.505	-3.218	.002**
Teaching Technique Efficacy	.071	.257	.049	.276	.784
Character Building Efficacy	.018	.275	.009	.065	.948

Note: * $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season] and team performance (i.e., won/lost percentage record of the coach's team). As shown in Table 4.8, results of the Correlation Matrix revealed that there were no significant correlations between the percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season and team performance (won-lost percentage record of the coach's team) (Fall ($r = -.016, p = .910$), Spring ($r = .076, p = .579$)).

A Post-Hoc Correlation Matrix was conducted with coaching behavior operationalized as the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring season. The Correlation Matrix revealed no significant correlation between the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring

season and team performance (won-lost percentage record of the coach's team) (Fall ($r = -.200, p = .144$), Spring ($r = -.097, p = .483$)).

Research question two asked if there is there a significant association between total coaching efficacy or the four dimensions of coaching efficacy (motivation efficacy, game strategy efficacy, teaching technique efficacy, character building efficacy) and coach satisfaction with team performance (i.e., rated item on the Team Performance Questionnaire) during the spring team competition season. As shown in Table 4.8, results of the Correlation Matrix revealed that there is a significant, but low positive correlation between total coaching efficacy and coach satisfaction with their team's performance ($r = .332, p = .013$). Furthermore, there are significant, but low positive correlations between motivation efficacy and coach satisfaction with their team's performance ($r = .302, p = .025$), and between game strategy efficacy and coach satisfaction with their team's performance ($r = .295, p = .029$). Teaching technique ($r = .201, p = .141$) and character building ($r = .150, p = .273$) were not related to coach satisfaction with their team's performance. A Post-Hoc Correlation Matrix to examine research question two also revealed a significant relationship between team performance and coach satisfaction with their team's performance ($r = .672, p = .001$) which helps explain the relationships among coaching efficacy, coach satisfaction with their team's performance, and team performance.

Results Regarding Research Questions Three and Four

Research question three asked are there any significant differences in total coaching efficacy, coaching behavior, or team performance in association with the following

Table 4.8
Correlation Matrix (segment) - Intercorrelations among Coaching Behavior, Team Performance, Coaching Efficacy, and Coach Satisfaction

Variable	TP	MP-F	MP-S	PP-F	PP-S	GSE	ME	TTE	CBE	TCE
Team Performance (TP)	-									
% Mental Practice – Fall (MP-F)	-.016	-								
% Mental Practice – Spring (MP-S)	.076	.882**	-							
% Physical Practice – Fall (PP-F)	-.200	.252	.166	-						
% Physical Practice – Spring (PP-S)	-.097	.208	.247*	.887**	-					
Game Strategy Efficacy (GSE)	.300*	.143	-.002	.302*	.212	-				
Motivation Efficacy (ME)	.403**	-.254	-.272*	-.311*	-.241	.534**	-			
Teaching Technique Efficacy (TTE)	.160	.029	-.018	.116	.119	.683**	.464**	-		
Character Building Efficacy (CBE)	.314*	-.129	-.093	-.194	-.085	.131	.301*	-.004	-	
Total Coaching Efficacy (TCE)	.384**	-.057	-.131	.001	.011	.865**	.829**	.789**	.333*	-
Coach Satisfaction with Team Performance (CSTP)	.672**	-.068	-.031	-.134	-.145	.295*	.302*	.201	.150	.332*

Note: * $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

independent variables: (a) years of coaching experience at different levels of competition (i.e., college/university level, total years), (b) years of playing experience of the coach at different levels of competition (i.e., college/university level, professional level), (c) type of coaching certification(s) (i.e., USPTA, PTR, either USPTA or PTR, USA High Performance), (d) type(s) of USTA Sport Science Competency (i.e., Coaching, Sport Psychology/Motor Learning, Physiology/Nutrition, Sports Medicine/Biomechanics, None), (e) number of conference titles at current school, and (f) number of NCAA

tournament appearances. Competency and certification variables are coaching status variables.

Research question three was examined using two multivariate models – one with total coaching efficacy and team performance as dependent variables, and one with coaching behavior (percent of mental practice) in the fall and coaching behavior (percent of mental practice) in the spring as the dependent variables. Total coaching efficacy and team performance were included in the same model because they were found to be significantly correlated (see Table 4.8). Similarly, coaching behavior (percent of mental practice) in the fall and coaching behavior (percent of mental practice) in the spring were included in the same model because they were found to be significantly correlated (see Table 4.8).

To determine if the number of independent variables of interest in research question three could be reduced, a Preliminary Correlation Matrix to determine the relationships between the dependent variables (i.e., total coaching efficacy, team performance) and the independent variables in research question three was performed. As shown in Table 4.9, results revealed that several independent variables were not correlated with the dependent variables (i.e., total coaching efficacy, team performance) and thus were not included in the analyses to test the research question. These excluded variables were PTR-certified, USPTA or PTR certified, USA High Performance certified, Sport Psychology/Motor Learning Competency, Physiology/Nutrition Competency, Sports Medicine/Biomechanics Competency, and total years of coaching experience. Thus, to test research question three, a multiple analysis of covariance (MANCOVA) was performed in which the dependent variables were total coaching efficacy and team

Table 4.9
 Preliminary Correlation Matrix (segment) - Intercorrelations among Total Coaching Efficacy, Team Performance, % of Mental Practice, and Coaching Experience/Competency Variables (N=55)

	Total Coaching Efficacy	Team Performance	% Mental Practice – Fall	% Mental Practice – Spring
Total Coaching Efficacy	1			
Team Performance	.384**	1		
% Mental Practice – Fall	-.057	-.016	1	
% Mental Practice – Spring	-.131	.076	.882**	1
College Coaching Experience (Yrs.)	.288*	.090	-.065	-.136
Total Coaching Experience (Yrs.)	.209	.088	-.102	-.007
College Playing Experience (Yrs.)	-.126	-.366**	-.065	-.083
Total Playing Experience (Yrs.)	.213	.354**	-.145	-.192
USPTA Certification	.231	.080	-.137	-.162
PTR Certification	-.015	-.021	.174	.277*
Neither USPTA or PTR Certification	-.127	.066	-.087	-.147
USA High Performance Certification	.181	.070	-.160	-.130
Coaching Competency	-.142	-.282*	-.119	-.102
Sport Psychology/ Motor Learning Competency	.179	-.029	-.119	-.100
Physiology/ Nutrition Competency	.137	.052	-.014	-.049
Sports Medicine/ Biomechanics Competency	.090	.065	.032	.012
No USTA Sport Science Competency	.098	.316*	.153	.148
Conference Titles	.280*	.247	-.183	-.188
NCAA Appearances	.145	.334*	-.171	-.207

Note: * $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

performance and the independent variables were years of coaching experience at the college/university level, years of playing experience at the college/university level, years of playing experience at the professional level, USPTA certified, Coaching Sport Science Competency, no USTA Sport Science Competency, number of conference titles at current school, and number of NCAA tournament appearances. No significant multivariate effects were found for the independent variables.

As shown in Table 4.9, results of the Preliminary Pearson Product Moment Correlation Matrix revealed only one significant relationship between the dependent

variables [i.e., coaching behavior (percent of mental practice) in the fall and coaching behavior (percent of mental practice) in the spring] and the earlier listed independent variables of interest in research question three. The percentage of time per week coaches spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the spring season was positively correlated with certification from the Professional Tennis Registry (PTR) ($r=.277, p=.041$). Thus, to also test research question three a MANCOVA was performed in which the dependent variables were percentage of time per week coaches spent on mental practice/drills during the fall season and percentage of time per week coaches spent on mental practice/drills during the spring season, and the independent variable was certification from the Professional Tennis Registry (PTR). No significant multivariate effects were found ($F(2,52) = 2.849, p=.067, \lambda=.901$).

A Post-Hoc Correlation Matrix was conducted with coaching behavior operationalized as the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring season and with all the independent variables of interest in research question three. The Correlation Matrix revealed no significant correlations between the dependent variables [percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring season] and the independent variables in research question three.

Research question four asked whether or not there are any significant differences in any of the four dimensions of coaching efficacy (game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy) in association with

the following independent variables: (a) years of coaching experience at each level of competition (i.e., junior level, collegiate level, professional level), (b) years of playing experience of the coach at each level of competition, (c) type of coaching certification(s) (4), (d) types of USTA sport science competency (5), (e) number of conference titles at current school, and (f) number of NCAA tournament appearances. This research question was examined with game strategy efficacy, motivation efficacy, and teaching technique efficacy as dependent variables in one multivariate model given that these variables had earlier been found to be correlated (see Table 4.3). Character building efficacy was examined in a separate univariate statistical model.

To determine if the number of independent variables of interest in research question four could be reduced, a Preliminary Correlation Matrix to determine the relationships between the dependent variables (i.e., game strategy efficacy, motivation efficacy, teaching technique efficacy), and the independent variables in research question four was performed. As shown in Table 4.10, results revealed that several independent variables were not correlated with the dependent variables (i.e., game strategy efficacy, motivation efficacy, teaching technique efficacy) and thus were not included in the analyses to test the research question. These excluded variables were years of playing experience at the college/university level, type of coaching certifications, and type of USTA sport science competency. To test research question four, a multiple analysis of covariance (MANCOVA) was performed in which the dependent variables were game strategy efficacy, motivation efficacy, and teaching technique efficacy and the independent variables were years of coaching experience at the college/university level, years of

Table 4.10
Correlation Matrix (segment) - Intercorrelations among Game Strategy Efficacy, Motivation Efficacy, Teaching Technique Efficacy, and Coaching Experience/Competency Variables (N=55)

	Game Strategy Efficacy	Motivation Efficacy	Teaching Technique Efficacy
College Coaching Experience (Yrs.)	.309*	.093	.345**
Total Coaching Experience (Yrs.)	.206	.045	.349**
College Playing Experience (Yrs.)	-.165	-.098	-.010
Total Playing Experience (Yrs.)	.037	.261*	.203
USPTA Certification	.220	.220	.064
PTR Certification	-.058	-.076	.072
Neither USPTA or PTR Certification	-.084	-.124	-.071
USA High Performance Certification	.115	.218	.161
Coaching Competency	-.081	-.117	-.135
Sport Psychology/ Motor Learning Competency	.168	.153	.107
Physiology/ Nutrition Competency	.153	.065	.142
Sports Medicine/ Biomechanics Competency	.150	.000	.109
None (Competency)	.029	.093	.055
Conference Titles	.274*	.159	.318*
NCAA Appearances	.269*	.030	.142

Note: * $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

playing experience at the professional level, the number of conference titles at current school, and the number of NCAA tournament appearances. Results revealed a multivariate effect for playing experience at the professional level ($F(3,47) = 3.920$, $p = .014$, $\lambda = .800$). The Corrected Model for teaching technique efficacy was significant ($F(5,49) = 2.808$, $p = .026$), however, there were no other significant univariate effects found.

A Preliminary Pearson Product Moment Correlation Matrix revealed no significant correlations between the dependent variable of character building efficacy and the earlier listed independent variables of interest in research question four. Thus, the planned ANCOVA to test research question four with character building efficacy as the dependent variable was not indicated and thus not performed.

Results Regarding Research Questions Five and Six

Research question five asked whether or not there are any significant differences in total coaching efficacy, coaching behavior, or team performance in association with the following coach demographic variables: (a) coach's age, (b) gender, (c) ethnicity, (d) current coaching level (i.e., head coach, assistant/associate coach), (e) level of education completed, (f) ethnic make-up of the school home of the coach [i.e., a Majority European American College/University (MEACU) or a Historically Black College/University (HBCU)], and (g) gender of the tennis team (i.e., men's or women's team). This research question was examined using two multivariate models – one with total coaching efficacy and team performance as the dependent variables, and one with coaching behavior (percent of mental practice) in the fall and coaching behavior (percent of mental practice) in the spring as the dependent variables. Total coaching efficacy and team performance were examined in the same model given that these two variables are correlated as shown in Table 4.8. Similarly, coaching behavior (percent of mental practice) in the fall and coaching behavior (percent of mental practice) in the spring were included in the same model because they were found to be significantly correlated as shown in Table 4.8.

As shown in Table 4.11, a Preliminary Pearson Product Moment Correlation Matrix with the dependent variables and independent variables in research question five revealed a significant relationship between team performance and level of education completed ($r=.266, p=.050$). A one-way ANCOVA with team performance as the dependent variable and coach level of education completed as the independent variable was found to be significant, $F(4,50) = 2.666, p=.043$. A follow-up Scheffe's test revealed no significant differences in team performance in association with coach level of education completed. However, due to the small number of participants ($n < 10$) in several

Table 4.11
Correlation Matrix (segment) - Intercorrelations among Total Coaching Efficacy, Team Performance, % of Mental Practice, and Demographic Coaching Variables (N=55)

	Total Coaching Efficacy	Team Performance	% Mental Practice – Fall	% Mental Practice – Spring
Coach Age	.144	.116	.247	.359**
	.294	.399	.069	.007
Coach Gender	-.002	.053	-.019	.051
Coach Ethnicity	.054	.168	.029	.108
Coach level (Head Coach vs. Asst./Assoc. Coach)	-.168	.179	.066	.050
Education Level (B.A. vs M.S.)	.131	.373**	-.150	-.033
Ethnic Make-Up of School	(a)	(a)	(a)	(a)
Team Gender	.190	.124	.062	.025

Note: ** $p < 0.01$ (2-tailed). a Cannot be computed because at least one of the variables is constant.

of the level of education completed cells, some of the education levels were excluded and the analysis was re-run. As shown in Table 4.12, this new one-way ANCOVA revealed significance for the model, $F(1,46) = 7.419, p = .009$. A follow-up Scheffe's test revealed that coaches with a bachelor's degree averaged a winning percentage of 49% (range from 5% to 75%) while coaches with a master's degree averaged a winning percentage of 64% (range from 24% to 97%).

Table 4.12
Descriptive Data on Winning Percentages for Coaches with Bachelor Degrees and Master's Degrees

Variable	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
B.A.	22	.4870	.17656	.03764	.05	.75
M.S.	26	.6406	.20873	.04094	.24	.97
Total	48	.5702	.20758	.02996	.05	.97

Additionally, as shown in Table 4.11, a significant relationship was also found between the percentage of time per week coaches spent on mental practice/drills (i.e.,

instilling and developing mental skills) with team members (individually and as a group) during the spring season, and the variable coach age ($r=.359, p=.007$).

However, due to the correlation between the dependent variables [i.e., coaching behavior (percent of mental practice) in the fall and coaching behavior (percent of mental practice) in the spring], a MANCOVA was performed to examine differences in these variables in association with age. Results revealed that age was statistically significant ($F(2,52) = 4.612, p=.014, \lambda=.849$). Univariate results indicated that coach age was significantly associated with percent of mental practice time in the spring ($F(1,53) = 7.839, p=.007$) such that as coach age increased, the percentage of coaching time spent on mental practice increased.

A Post-Hoc Pearson Correlation was conducted with coaching behavior operationalized as the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring season in order to determine if these variables were associated with the independent variables of interest in research question five. The Correlation Matrix revealed no significant correlations.

Research question six asked whether or not there are any significant differences in any of the four dimensions of coaching efficacy (game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy) in association with the following coach variables: (a) coach's age, (b) gender, (c) ethnicity, (d) current coaching level (i.e., head coach, assistant/associate coach), (e) level of education completed, (f) ethnic make-up of the school home of the coach [i.e., a Majority European American College/University (MEACU) or a Historically Black College/University

(HBCU)], and (g) gender of the tennis team (i.e., men's or women's team). This research question was examined with game strategy efficacy, motivation efficacy, and teaching technique efficacy as dependent variables in one model, given earlier preliminary correlation results showing these variables to be correlated (see Table 4.3). Character building efficacy was examined in a separate univariate statistical model.

A Preliminary Pearson Product Moment Correlation Matrix revealed no significant relationships between the dependent variables (game strategy efficacy, motivation efficacy, teaching technique efficacy) and the earlier listed independent variables of interest in research question six. Similarly, a preliminary Pearson Product Moment Correlation Matrix revealed no significant correlations between the dependent variable of character building efficacy and the independent variables of interest in research question six. Thus, the planned MANCOVA and ANCOVA to test research question six were not indicated and thus not performed.

CHAPTER 5 DISCUSSION

The purpose of this research study was to test proposed relationships advanced by the Conceptual Model of Coaching Efficacy (Feltz et al., 1999). The Conceptual Model of Coaching Efficacy holds that several sources of coaching efficacy [extent of coaching experience/preparation (e.g., years in coaching), prior success (i.e., won-lost record), perceived overall ability of the team being coached, and school/community support] predict scores on the Coaching Efficacy Scale along four dimensions (motivation efficacy, game strategy efficacy, teaching technique efficacy, and character building efficacy). Furthermore, this model suggests that scores on the four dimensions of coaching efficacy predict several outcomes (coaching behavior, player/team satisfaction, player/team performance, and player/team efficacy). The present study focused on examining the relationships between coaching efficacy and the constructs of coaching behavior and team performance among college level coaches and athletes. More specifically, this research assessed the influence of total coaching efficacy and each of the four dimensions of coaching efficacy (motivation efficacy, game strategy efficacy, teaching technique efficacy, character building efficacy) on the percentage of time per week tennis coaches spent on mental practice/drills and the won-lost percentage record of a coach's team during the spring (team competition) season.

The previous chapters of this thesis have explained the importance of the research, the methodology used in conducting the study, and the results obtained from the study participants. This final chapter will provide a summary and discussion of seven general

areas. First, limitations of the Pilot Study will be discussed. Second, implications of the Pilot Study for the Major Study will be discussed. Third, Major Study findings related to coaching behavior will be discussed. Fourth, Major Study findings related to team performance will be discussed. Fifth, there will be a discussion of Major Study post-hoc findings for coaching behavior. Sixth, Major Study findings regarding the research questions will be discussed in more detail. Finally, there will be a presentation of limitations, implications for future research and conclusions in regards to the Major Study.

Pilot Study Limitations

The major limitation of the Pilot Study was the limited number of coaches (N=2) and experts (N=4) who participated. This low number of participants prevented a potentially wider range of feedback on the questionnaires and the experience of completing the questionnaires that were later used in the Major Study.

Pilot Study Implications for the Major Study

The participating coaches were asked to e-mail the PI regarding the length of time that it took to complete the questionnaire and any problems with the questionnaire (i.e., inappropriate items, wording) that they noticed. Findings revealed that the questionnaire took a short time to complete, that it appeared fairly straightforward, and that coaches tended to use the uppermost range of the CES. As a result of the latter finding, the researchers decided to utilize a 4-pt. Likert scale rating (where 1=low confidence and 4=complete confidence) for the CES in the Major Study as also suggested by recent research on the psychometric properties of the CES (Myers, Wolfe, & Feltz, in press) that suggested this change.

Experts were asked to review and comment on the Assessment Battery (AB) (e.g., make comments on the assessments regarding items that seemed difficult to understand or inappropriate, suggest additional items or questions for inclusion). Findings revealed that the AB was: (1) fairly easy to understand, (2) fairly clear, (3) could benefit from adding a few pertinent questions, (4) and could benefit from eliminating questions not central to the purpose of the study. As a result of these findings, two changes were made to improve clarity of the AB for the Major Study: (1) minor changes were made to several individual items on the CES to reduce overlap among the subscales and thereby improve the measure (Myers et al., in press), and (2) a question on the DDQ was changed from years of coaching experience at the “Jr./High School, College/University, and Professional level” to “total years coaching experience.” Furthermore, to strengthen the ability of the questionnaires to gather data relevant to the study’s purpose, items were added to the AB for the Major Study: (1) to account for additional factors that may have influenced the won-lost record of the coach, the following questions were added to the AB [Did anything happen to you or your team to influence your team record in 2004?; Which of the following issues influenced your team record in 2004? (injury, athlete left team, loss of scholarships, athlete lost eligibility, other)]; (2) to assess other areas of skills training (e.g., technical, physical fitness) for comparison purposes and to reduce experimenters’ bias, two stems questions (e.g., in general, rate on a scale from 1 to 10 how important the following skills are in college tennis) were created to examine skills training in four areas (mental, technical, physical fitness, tactical), and (3) to further quantify a coach’s knowledge of mental skills training, a question was added that asked coaches to list any coursework (undergraduate or graduate) that they have had in the

areas of sport science/physical education/coaching/psychology. Lastly, as a result of the Pilot Study findings, a few items (e.g., What are your three most important coaching responsibilities?) were eliminated from the Major Study questionnaires that were not central to the purpose of the study.

Major Study Findings for Coaching Behavior

Based on the Conceptual Model of Coaching Efficacy, the first hypothesis stated that total coaching efficacy will significantly predict the percentage of time per week coaches spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall and spring tennis seasons. Results of the present research indicate that total coaching efficacy did not significantly predict the percentage of time coaches spent on mental practice and drills during the fall or spring tennis seasons. Thus, hypothesis one was not supported.

There are several explanations of the stated finding from the test of hypothesis one. First, the Coaching Efficacy Scale (CES) was designed for use with high school coaches specifically. Perhaps there are unique differences between the high school and college context for coaches that obscure the predictive relationship between total coaching efficacy and coaching behavior. Conversely, perhaps this predictive relationship exists at the high school level and not the college level. Secondly, previous research has operationalized coaching behavior as “how one coaches” [e.g., the type of feedback used, management strategies, and coaching style (Feltz et al., 1999)]. There appears to be no published study that has specifically operationalized coaching behavior as the percentage of time per week coaches spend on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall and spring tennis seasons. Thirdly, it is possible that only certain dimensions of total coaching

efficacy significantly predict the percentage of time per week coaches spend on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) while the larger construct of total coaching efficacy does not predict this operationalization of coaching behavior. This issue is addressed through hypothesis two.

Based on the Conceptual Model of Coaching Efficacy, the second hypothesis stated that each of the four dimensions of coaching efficacy (i.e., game strategy efficacy, motivation efficacy, teaching technique efficacy, character building efficacy) will be a significant predictor of the percentage of time per week coaches spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season. Results obtained from participant data in this research partially supports hypothesis two. The data indicate that there is a relationship between two of the four dimensions of coaching efficacy and coaching behavior during the fall tennis season. More specifically, motivation efficacy and game strategy efficacy predicted coaching behavior during the fall season. Interestingly, motivation efficacy is a negative predictor of coaching behavior while game strategy efficacy is a positive predictor of coaching behavior. One possible explanation for this negative predictive relationship is that coaches with a high level of motivation efficacy believe that they can affect the mental skills and states of their athletes throughout their interactions with them, and thus, the coaches may spend less time on teaching these mental skills in a discrete manner (i.e., via specific mental practice/drills). Several coaches provided unsolicited comments in which they indicated

that they worked to incorporate mental skills throughout all of their interactions and trainings.

The finding that game strategy efficacy is a significant positive predictor of coaching behavior is not surprising given the shared cognitive skill and acuity that a coach needs to: (1) successfully strategize with their athletes during competition (i.e., game strategy), and (2) successfully instill and develop mental skills with their athletes through mental practice and drills. Furthermore, the coach with high game strategy efficacy may have a stronger desire to instill the ability to analyze situations and make critical and appropriate decisions in their athletes via mental practice and drills in a practice context.

The predictive relationship between the dimensions of coaching efficacy and the percentage of time per week coaches spent on mental practice/drills did not hold for the spring tennis season. This finding may be due to the fact that within the sport of collegiate tennis, the fall season and spring season are different in several key ways. First, the fall season consists of mainly on-court practice, physical conditioning, a few matches with players from other teams at invitational tournaments, a very small number of matches against other teams, and some competition within the team to assess the rank order of the tennis players. The spring season by contrast consists of many team matches, first outside of conference and then within conference. The spring season also includes conference championship competition and the NCAA championships for those teams that qualify. In sum, the fall season is generally classified as the “practice season” which prepares you for the spring “competition season” where the results most matter. Fall is used by many coaches to teach athletes new skills, techniques and strategies, work

with athletes on honing strengths, and build the physical fitness of the athletes on the team. Spring is focused on applying what has been learned and making subtle adjustments as necessary. Yet, the percentage of time per week coaches spent on mental practice/drills during the fall (Mean=.15, SD=.18) and during the spring (Mean=.16, SD=.17) suggests that the differences between the coach/team activities during fall versus spring do not explain the season-related differences in the associations between coaching efficacy and time coaches spend on mental practice skills. Further research is needed to determine if this season-related difference is actual or a statistical artifact.

Major Study Post-Hoc Findings Related to Coaching Behavior

Similar to hypothesis two, it was stated (post-hoc) that each of the four dimensions of coaching efficacy (i.e., game strategy efficacy, motivation efficacy, teaching technique efficacy, character building efficacy) will be a significant predictor of coaching behavior when this behavior is defined as the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season. Results obtained from participant data in this research partially supports this post-hoc assertion. The data indicate that the model of coaching efficacy significantly predicts the percentage of time per week coaches spent on physical practice/drills during the fall tennis season. More specifically, motivation efficacy and game strategy efficacy predicted the percentage of time per week coaches spent on physical practice/drills during the fall season. Motivation efficacy was a negative predictor of coaching behavior while game strategy efficacy was a positive predictor of coaching behavior. These findings closely mirror the findings from examining the dimensions of coaching efficacy as predictors of the percentage of time per week coaches spent on mental practice/drills. However, the dimensions of coaching efficacy accounted for 41% of the explained

variance in the percentage of time per week coaches spent on physical practice/drills, while the dimensions of coaching efficacy only accounted for 18% of the explained variance in the percentage of time per week coaches spent on mental practice/drills. Future research is required to determine the other factors that impact the percentage of time per week coaches spend on mental practice/drills.

It is noteworthy that motivation efficacy is a negative predictor of the percentage of time per week coaches spent on physical practice/drills while game strategy efficacy is a positive predictor of the percentage of time per week coaches spent on physical practice/drills. It may be that coaches who are more confident in their abilities to motivate their athletes, get more out of their athletes during practice, and thus spend less time in physical practice/drills. Conversely, coaches who are less confident in their abilities to motivate their athletes, may spend more time on the court with their athletes engaged in physical practice/drills. Feltz et al. (1999) found that low self-efficacy coaches (those scoring lowest on the CES in a sample of 69 coaches) as compared to high self-efficacy coaches (those scoring highest on the CES in a sample of 69 coaches) spent more time on instruction and organization (i.e., general technical instruction, mistake-contingent technical instruction, punitive technical instruction, organization). In regards to the finding that game strategy efficacy is a positive predictor of coaching behavior, it is plausible that coaches with high levels of belief in their ability to lead a team to a successful performance, take more time in physical practice/drills to develop and sharpen requisite skills to the point that the skills are reliable and virtually automatic.

In reference to the spring (team competition) season, it was stated (post-hoc) that each of the four dimensions of coaching efficacy (i.e., game strategy efficacy, motivation

efficacy, teaching technique efficacy, character building efficacy) will be a significant predictor of coaching behavior [percentage of time per week spent on physical practice/drills with team members (individually and as a group) during the spring season]. Results obtained from participant data in this research partially supports this post-hoc assertion. The data indicate that the model of coaching efficacy significantly predicts the percentage of time per week coaches spent on physical practice/drills during the spring tennis season. Motivation efficacy and game strategy efficacy were found to be significant predictors of the percentage of time per week coaches spent on physical practice/drills during the spring season. Again, motivation efficacy was found to be a negative predictor of coaching behavior, while game strategy efficacy was found to be a positive predictor of coaching behavior. The tested prediction model, however, explains only 22% of the variance in spring coaching behavior which is lower than the 41% of the variance in fall coaching behavior accounted for by the tested model. This difference in the amount of variance explained may be due to the differences between the fall and spring seasons discussed previously. With the dramatic increase in team competition during the spring season, there are likely more factors influencing coaching behavior as compared to the fall season, which is viewed as a time for learning, preparation, and development.

Major Study Findings Related to Team Performance

Based on the Conceptual Model of Coaching Efficacy, the third hypothesis stated that total coaching efficacy will be a significant predictor of team performance (i.e., won-lost percentage record of the coach's team) during the spring (team competition) season. Results obtained from participant data in this research support hypothesis three. Total coaching efficacy is a significant predictor of the won-lost percentage record of the

coach's team during the spring (team competition season), accounting for approximately 15% of the total variance. This finding provides support for the Conceptual Model of Coaching Efficacy and is in agreement with past related research which found that in a sample of 69 high school basketball coaches, the 15 highest scorers on total coaching efficacy scored significantly higher than the 15 lowest scorers on total coaching efficacy with regard to winning percentage (Feltz et al., 1999).

Based on the Conceptual Model of Coaching Efficacy, the fourth hypothesis stated that each of the four dimensions of coaching efficacy (i.e., game strategy efficacy, motivation efficacy, teaching technique efficacy, character building efficacy) will be a significant predictor of team performance (i.e., won-lost percentage record of the coach's team) during the spring (team competition) season. Results provided no support for hypothesis four. None of the individual efficacy dimensions were found to be significant predictors of team performance, although motivation efficacy did approach significance. Close examination of the data revealed that game strategy efficacy, motivation efficacy, and character building efficacy were all positively related to team performance while teaching technique efficacy was not related to team performance. The post-hoc analysis using game strategy efficacy, motivation efficacy, and character building efficacy in a multiple regression (excluding teaching technique efficacy) revealed that although the model was again significant, there were no significant individual relationships between the three predictor variables and team performance. Thus, it appears that the gestalt psychology principle that the whole is greater than the sum of its parts is true in this case. It appears to take all four dimensions of coaching efficacy collectively to predict team performance. This assertion makes sense from a conceptual and practical perspective.

To work effectively as an individual and as a collective group, tennis players desire to: 1) acquire and/or strengthen requisite skills and techniques, 2) build and maintain confidence in themselves and their teammates, 3) make the proper tactical decisions during competition to produce winning results, and 4) play for a coach that cares about their well-being beyond wins and losses and who sets appropriate boundaries. The four dimensions of coaching efficacy collectively address these four areas.

Major Study Results Regarding the Research Questions

In addition to the aforementioned hypotheses, several research questions were also investigated. Research question one asked if there is a significant association between coaching behavior [percentage of time per week spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the fall season and during the spring season] and team performance (i.e., won-lost percentage record of the coach's team). Results revealed no significant relationship between the percentage of time per week spent on mental practice/drills during the fall and spring seasons and team performance.

A Post-Hoc examination of the association between coaching behavior and team performance was also conducted with coaching behavior operationalized as the percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring season. Results revealed no significant relationship between the percentage of time per week coaches spent on physical practice/drills during the fall and spring seasons and team performance.

Research question two asked if there is there a significant association between total coaching efficacy or the four dimensions of coaching efficacy (game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy) and

coach satisfaction with team performance (i.e., rated item on the Team Performance Questionnaire) during the spring team competition season. Results revealed a low, but significant positive correlation between total coaching efficacy and coach satisfaction with their team's performance, and a low, but significant positive correlation between motivation efficacy and coach satisfaction with their team's performance, and between game strategy efficacy and coach satisfaction with their team's performance. Teaching technique efficacy and character building efficacy were found to be unrelated to coach satisfaction with their team's performance. One possible explanation for these findings can be drawn from the temporal proximity of each of the dimensions to team performance. Game strategy efficacy (i.e., the confidence coaches have in their ability to coach during competition and lead their team to a successful performance) and motivation efficacy (i.e., the confidence coaches have in their ability to affect the mental skills and states of their athletes) are exercised by a coach during competition as measured by each subscale. Teaching technique efficacy (i.e., the belief that coaches have in their instructional and diagnostic skills during practice) and character building efficacy (i.e., the confidence coaches have in their ability to influence the personal development of their athletes as well as develop a positive attitude in their athletes toward their particular sport) on the other hand are more likely to be exercised by a coach during practice as measured by these two subscales.

It is noteworthy that a moderate, significant positive relationship was found between team performance and coach satisfaction with their team's performance ($r=.672$, $p=.001$) via post-hoc analysis. This finding suggests that team performance may influence coach satisfaction with team performance more than level of coaching efficacy.

Research question three asked whether or not there are any significant differences in total coaching efficacy, coaching behavior, or team performance in association with the following variables: (a) years of coaching experience at different levels of competition (i.e., college/university level, total years), (b) years of playing experience of the coach at different levels of competition (i.e., college/university level, professional level), (c) type of coaching certification(s) (i.e., USPTA, PTR, either USPTA or PTR, USA High Performance), (d) type(s) of USTA Sport Science Competency (i.e., Coaching, Sport Psychology/Motor Learning, Physiology/Nutrition, Sports Medicine/Biomechanics, None), (e) number of conference titles at current school, and (f) number of NCAA tournament appearances. Results revealed that the percentage of time per week coaches spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the spring season was positively correlated with certification from the Professional Tennis Registry (PTR). This finding may reflect a difference in emphasis between the PTR and the United States Professional Tennis Association (USPTA). Perhaps the PTR emphasizes mental practice and the development of mental skills more than the USPTA, which is regarded as the more technically challenging certification to achieve.

No significant associations were found between percentage of time per week coaches spent on physical practice/drills with team members (individually and as a group) during the fall season and during the spring season and any of the following variables: (a) years of coaching experience at different levels of competition (i.e., college/university level, total years), (b) years of playing experience of the coach at different levels of competition (i.e., college/university level, professional level), (c) type

of coaching certification(s) (i.e., USPTA, PTR, either USPTA or PTR, USA High Performance), (d) type(s) of USTA Sport Science Competency (i.e., Coaching, Sport Psychology/Motor Learning, Physiology/Nutrition, Sports Medicine/Biomechanics, None), (e) number of conference titles at current school, and (f) number of NCAA tournament appearances.

Research question four asked whether or not there are any significant differences in any of the four dimensions of coaching efficacy (game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy) in association with (a) years of coaching experience at different levels of competition (i.e., college/university level, total years), (b) years of playing experience of the coach at different levels of competition (i.e., college/university level, professional level), (c) type of coaching certification(s) (i.e., USPTA, PTR, either USPTA or PTR, USA High Performance), (d) type(s) of USTA Sport Science Competency (i.e., Coaching, Sport Psychology/Motor Learning, Physiology/Nutrition, Sports Medicine/Biomechanics, None), (e) number of conference titles at current school, and (f) number of NCAA tournament appearances. Results revealed that coaches with more experience playing at the professional level possessed higher levels of teaching technique efficacy. It is possible that playing at the professional level in tennis has required the development of high technical proficiency which can then translate into high levels of efficacy in the role of teaching technique at the comparatively lower level of collegiate tennis. An equally plausible explanation, however, is that the small number of coaches ($n < 10$) in each level of playing experience led to a spurious result.

Research question five asked whether or not there are any significant differences in total coaching efficacy, coaching behavior, or team performance in association with (a) the coach's age, (b) gender, (c) ethnicity, (d) current coaching level (i.e., head coach, assistant/associate coach), (e) level of education completed, (f) ethnic make-up of the school home of the coach [i.e., a Majority European American College/University (MEACU) or a Historically Black College/University (HBCU)], and (g) gender of the tennis team (i.e., men's or women's team). Results obtained from participant data in this research revealed that coaches with a master's degree won 15% more matches than coaches with a bachelor's degree. The data for this sample seem to indicate that coaches with master's degrees have a competitive advantage in comparison to their counterparts with bachelor's degrees. However, it is difficult to ascertain which element(s) of a master's degree provides a coach an advantage in terms of team performance. Future research is required to clarify this finding as multiple theories could be offered at this point. For example, it could be that the coursework required in a master's degree program helps to develop higher levels of cognitive skill in coaches that in turn aids them in cognitively challenging tasks such as developing game strategy.

Results from the examination of research question five further revealed that the percentage of time per week coaches spent on mental practice/drills (i.e., instilling and developing mental skills) with team members (individually and as a group) during the spring season differed by coach's age; that is, older coaches spent more time on mental practice/drills. Within the research literature, age has been associated with level of coaching efficacy and discussed as a source of coaching efficacy as it relates to coaching experience (Sullivan & Kent, 2003). It may be true that the older and more experienced

that a coach becomes, the more time that a coach spends on mental practice. This could be because 1) the coach comes to believe in the value of mental skills more and more over time, and/or 2) the coach gets better at teaching and developing mental skills, and as a result remains in the sport longer due to higher levels of competitive success.

Research question six asked whether or not there are any significant differences in any of the four dimensions of coaching efficacy (game strategy efficacy, motivation efficacy, teaching technique efficacy, and character building efficacy) in association with (a) the coach's age, (b) gender, (c) ethnicity, (d) current coaching level (i.e., head coach, assistant/associate coach), (e) level of education completed, (f) ethnic make-up of the school home of the coach [i.e., a Majority European American College/University (MEACU) or a Historically Black College/University (HBCU)], and (g) gender of the tennis team (i.e., men's or women's team). Results revealed no significant relationships. Perhaps the dimensions of coaching efficacy are not related to these coach demographic variables because the dimensions of coaching efficacy were developed to measure coaching beliefs within the sporting context specifically. Additionally, the ethnic make-up of the school home of the coach variable was extremely homogeneous.

Limitations of Major Study

Although the findings of the current study generally support the hypotheses, some limitations should be considered when interpreting the results. The first limitation of the study concerns the sample size. Only fifty-five coaches out of a population of 647 coaches participated in the study and there was limited ethnic/racial diversity (91% Caucasian/White/European American). Though the information gained from this sample is valuable, the generalizability of this information is limited to a sample with similar characteristics. A second limitation involves the use of several newly created

assessments. The new assessments were necessary to examine the variables of interest (e.g., percentage of time per week coaches spent on mental practice/drills during the fall and spring seasons), however, the limited reliability and validity that comes with new assessments requires that research findings from data obtained via these assessments be viewed with caution. The internal reliability of some of the new assessments supports their use in the present study (e.g., PSQS, $\alpha=.758$, Spearman-Brown $=.673$). A third limitation of the present research is the use of retrospective self-report measures for all constructs, particularly measures of coaching behavior. Self-report measures have been shown to be valid and reliable for many constructs, however, all humans are sometimes inaccurate in recounting events, and this inaccuracy can be compounded when the measures are retrospective. A fourth limitation is that a social desirability scale was not administered to the research participants. This scale was excluded in an effort to minimize the number of measures in the AB and the psychological nature of the AB. Feedback from the Pilot Study suggested that coaches are leary of psychological research and are not likely to complete lengthy questionnaires.

A fifth limitation of the present research is the restriction of the sample to include only NCAA Division I tennis coaches. The findings cannot be generalized to NCAA Division II and III coaches especially given that coaching at the Division I level is more competitive, and involves the presence of far more athletic scholarships than is the case at the Division II and III level.

A sixth limitation is the use of online assessments. Online data collection can lead to a biased sample toward coaches who are more knowledgeable in computer usage. However, the Intercollegiate Tennis Association (ITA), the major association of NCAA

tennis coaches among all three divisions, collects data online and thus most coaches are familiar with online data processes. A seventh limitation of the present study involves collecting data over the summer. Collecting data over the summer, approximately six weeks after the end of the NCAA tennis championships, may have significantly lowered the number of respondents, as many coaches use the summer for recruiting trips and vacations. A final limitation of the present study involves validity concerns related to the rating scale structure of the CES (Myers et al., in press).

Major Study Implications for Future Research

The current study has several implications for future research. Specifically, further research should be conducted to generate deeper levels of understanding of (a) the positive relationship between game strategy efficacy and the percentage of time per week coaches spend on mental practice/drills and physical practice/drills, and (b) the negative relationship between motivation efficacy and the percentage of time per week coaches spend on mental practice/drills and physical practice/drills. To clarify the latter relationship, it may prove fruitful to use a qualitative method (i.e., interview, open-ended questionnaire) to ascertain the multiple challenges in attempting to motivate athletes. Coaches could be asked to list the challenges that they face in their coaching role and then rate the challenges on a continuum from very easy to very difficult. This information might aid in designing effective coaching education programs that are aimed at strengthening the ability of coaches to motivate athletes. Student-athletes could also be asked about the coaching behaviors that motivate them and those behaviors that discourage and frustrate them. Asking student-athletes, the end-consumer/client, this important question may help to construct a more holistic picture of how to effectively motivate athletes.

Additionally, to address the limitations of the present study, future researchers are advised to: (1) conduct similar research to this study with a representative and larger sample of coaches, (2) conduct comparable research in which tennis coaches report their coaching behavior shortly following the matches that they coach, and (3) include a social desirability measure as well as incentives strong enough to overcome the reluctance to participate in psychological research.

Major Study Conclusions

The primary objectives of this research study was to test proposed relationships advanced by Feltz et al.'s (1999) Conceptual Model of Coaching Efficacy. This study examined the relationships between coaching efficacy (based on Feltz et al.'s Conceptual Model of Coaching Efficacy) and the constructs of coaching behavior and team performance. More specifically, this research assessed the influence of total coaching efficacy and each of the four dimensions of coaching efficacy (motivation efficacy, game strategy efficacy, teaching technique efficacy, character building efficacy) on the percentage of time per week coaches spent on mental practice/drills and won-lost percentage record of the coach's team during the spring (team competition) season.

Results indicated that the levels of game strategy efficacy and motivation efficacy are predictive of the percentage of time per week coaches spend on mental practice/drills and physical practice/drills. Additionally, total coaching efficacy was shown to predict the won-lost percentage record of the coach's team during the spring (team competition) season. Significant positive relationships were also found between (a) coaching efficacy and satisfaction, (b) the percentage of time per week coaches spent on mental practice/drills and certification from the Professional Tennis Registry (PTR), (c) playing experience at the professional level and teaching technique efficacy, (d) level of

education and won-lost record of the coach's team, and (e) the percentage of time per week coaches spent on mental practice/drills during the spring season and coach age.

The major findings from this study provide support for the utility of the Conceptual Model of Coaching Efficacy, particularly with regard to predicting coaching behavior and team performance. However, it is important to note that this study only suggests that elements of coaching efficacy are predictive of coaching behavior and team performance – no implication of causality is implied.

Results of the present research also have important implications for the field of counseling psychology. The finding that coaches ranked themselves lowest in terms of motivation efficacy and the found negative association between motivation efficacy and percentage of time per week spent on mental practice/drills during the spring season suggest that the training of counseling psychologists in promoting human motivation, growth, and efficacy render them ideal members of tennis coach training staff and potentially effective consultants to coaches who desire to optimally motivate and fully develop their student-athletes (mind, body, spirit). Furthermore, research into coaching efficacy can provide an avenue by which counseling psychologists can gain better understanding of some of the major challenges that face coaches in effectively working with their teams. Studying coaching efficacy can provide counseling psychologists with an opportunity to bring the profession's focus on strengths and positive psychology into the athletic context.

The emphasis of counseling psychology on promoting growth, development, and well-being and on positively forming relations with others seems ideal for inclusion in coaching education programs that are aimed at increasing the motivation efficacy of

coaches and ultimately improving the satisfaction, motivation, and performance of athletes. Motivated athletes give more effort and are more persistent in the face of challenges (which generally leads to better sport performance outcomes).

Promotion of the psychosocial development, satisfaction, and performance success of collegiate student-athletes is important to these athletes and to their parents, coaches, and society at large. Providing coaches with psychological training and consultation that promotes their coaching efficacy in general, and motivation efficacy, character building efficacy, and game strategy efficacy in particular, may optimize their influence in promoting the growth and development and the success and satisfaction of the student-athletes they coach.

APPENDIX A
INVITATION E-MAIL TO HEAD COACHES IN PILOT STUDY

June 10, 2004

Dear Coach:

My name is **Terrence Porter, M.S.**, and I am a **doctoral fellow at the University of Florida conducting research in the area of Sport Performance and Behavior**. I have an extensive background in tennis as a **competitive junior player, PTR teaching professional, performance consultant and Division I volunteer assistant coach**.

As my passion involves working within the sport of tennis, my current research focus involves Division I. ITA coaches. **I have the support of several ITA coaches including Coach Bobby Bayliss and Coach Ray Reppert with whom I have had the pleasure of working with in different capacities in the past**. As far as my research is concerned, **I am currently collecting data on the differential roles that coaches play in the success of their athletes and teams**.

This is the first research of its kind in the country. **Results from this research will be shared with participating coaches**, as it will have potential for improving coaching effectiveness and related player-performance outcomes. I plan to conduct several studies within collegiate tennis to highlight and publicize the many positive aspects of the intercollegiate game and help prevent the elimination of more tennis programs.

I am writing this letter to you because I am requesting your assistance in this research project. **I am asking that you and your assistant coach fill out a short questionnaire that should take about 15 minutes to complete**.

I know from personal experience that you have a demanding job, but I would appreciate your assistance in this important, applied, tennis-specific research. As compensation for your valuable time, you will receive the results of this research as well as the following:

- 1. Tennis-specific sport psychology exercises to use in working with your tennis team (individually and collectively),*
- 2. E-mail access to the lead researcher for free consultation in the area of sport performance enhancement for one year, and*
- 3. A list of sport performance enhancement resources*

If you would like to participate in this study, please do the following *within one week of receiving this packet*:

- 1) Complete the questionnaire anonymously,**
- 2) E-mail me at tporter@ufl.edu the length of time that it took to complete the questionnaire and any problems with the questionnaire (i.e., items, wording) that you noticed (critical feedback is appreciated), and**
- 3) Mail the questionnaire back to:**

**Terrence Porter
University of Florida Psychology Department
P.O. Box 112250**

Gainesville, FL 32611-2250

I have included the questionnaire with this e-mailed cover letter to increase time responsiveness. **I will call your office within the next few days to ensure that you received the letter and packet and to answer any questions that you may have for me.** If you would like to talk with me before then, please give me a call at 352-256-5958.

This study is designed to ensure that your questionnaire responses will be anonymous and confidential. Your identity will remain confidential to the extent provided by law. Please *do not place your name* on the enclosed questionnaires. We will code questionnaires upon their return to us. Questionnaires will be kept in a locked filing cabinet in Dr. Tucker's research laboratory at the University of Florida. We do not believe that participating in this project will cause you any harm. However, you do have the right to stop reviewing the questionnaires if they make you feel uncomfortable, and to skip any questions that you find offensive. You can also choose, at any time over the course of the project, to discontinue your participation. There are no direct benefits for you participating in this study. If you should have questions about your rights as a research participant, please contact the University of Florida Institutional Review Board office at 352-392-0433 or irb2@ufl.edu.

Thank you for your consideration.

Sincerely,
Terrence Porter, M.S
CLAS Fellow & Doctoral Student,
University of Florida

Endorsed by:

Dr. Carolyn Tucker
Distinguished Alumni Professor,
Professor of Psychology and Director of Training,
Professor of Pediatrics,
Professor of Community Health and Family Medicine,
University of Florida

Dr. Peter Giacobbi
Assistant Professor,
Exercise and Sport Science,
University of Florida

Dr. Bonnie Moradi
Assistant Professor of Psychology
University of Florida

Attachments:
Questionnaire

APPENDIX B
INVITATION E-MAIL TO ASSISTANT/ASSOCIATE COACHES IN PILOT STUDY

June 10, 2004

Dear Coach:

My name is **Terrence Porter, M.S.**, and I am a **doctoral fellow at the University of Florida conducting research in the area of Sport Performance and Behavior**. I have an extensive background in tennis as a **competitive junior player, PTR teaching professional, performance consultant and Division I volunteer assistant coach**.

As my passion involves working within the sport of tennis, my current research focus involves Division I. ITA coaches. **I have the support of several ITA coaches including Coach Bobby Bayliss and Coach Ray Reppert with whom I have had the pleasure of working with in different capacities in the past**. As far as my research is concerned, **I am currently collecting data on the differential roles that coaches play in the success of their athletes and teams**.

This is the first research of its kind in the country. **Results from this research will be shared with participating coaches**, as it will have potential for improving coaching effectiveness and related player-performance outcomes. I plan to conduct several studies within collegiate tennis to highlight and publicize the many positive aspects of the intercollegiate game and help prevent the elimination of more tennis programs.

I am writing this letter to you because I am requesting your assistance in this research project. **I am asking that you fill out a short questionnaire that should take about 15 minutes to complete**.

I know from personal experience that you have a demanding job, but I would appreciate your assistance in this important, applied, tennis-specific research. As compensation for your valuable time, you will **receive the results of this research as well as the following**:

- 1. Tennis-specific sport psychology exercises to use in working with your tennis team (individually and collectively),*
- 2. E-mail access to the lead researcher for free consultation in the area of sport performance enhancement for one year, and*
- 3. A list of sport performance enhancement resources*

If you would like to participate in this study, please do the following *within one week of receiving this packet*:

- 1) Complete the questionnaire anonymously,**
- 2) E-mail me at tporter@ufl.edu the length of time that it took to complete the questionnaire and any problems with the questionnaire (i.e., items, wording) that you noticed (critical feedback is appreciated), and**
- 3) Mail the questionnaire back to:**

**Terrence Porter
University of Florida Psychology Department
P.O. Box 112250**

Gainesville, FL 32611-2250

I have included the questionnaire with this e-mailed cover letter to increase time responsiveness. **I will call your office within the next few days to ensure that you received the letter and packet and to answer any questions that you may have for me.** If you would like to talk with me before then, please give me a call at 352-256-5958.

This study is designed to ensure that your questionnaire responses will be anonymous and confidential. Your identity will remain confidential to the extent provided by law. Please *do not place your name* on the enclosed questionnaires. We will code questionnaires upon their return to us. Questionnaires will be kept in a locked filing cabinet in Dr. Tucker's research laboratory at the University of Florida. We do not believe that participating in this project will cause you any harm. However, you do have the right to stop reviewing the questionnaires if they make you feel uncomfortable, and to skip any questions that you find offensive. You can also choose, at any time over the course of the project, to discontinue your participation. There are no direct benefits for you participating in this study. If you should have questions about your rights as a research participant, please contact the University of Florida Institutional Review Board office at 352-392-0433 or irb2@ufl.edu.

Thank you for your consideration.

Sincerely,
Terrence Porter, M.S
CLAS Fellow & Doctoral Student,
University of Florida

Endorsed by:

Dr. Carolyn Tucker
Distinguished Alumni Professor,
Professor of Psychology and Director of Training,
Professor of Pediatrics,
Professor of Community Health and Family Medicine,
University of Florida

Dr. Peter Giacobbi
Assistant Professor,
Exercise and Sport Science,
University of Florida

Dr. Bonnie Moradi
Assistant Professor of Psychology
University of Florida

**Attachment:
Questionnaire**

APPENDIX C
INVITATION E-MAIL TO APPLIED SPORT PSYCHOLOGY EXPERTS IN PILOT
STUDY

June 10, 2004

“Name of expert”
“Title”,

Dear “Dr.....”:

I am writing to invite you to participate in a sport performance research project (tennis specific) that is being conducted by **Terrence Porter**, M.S., Doctoral Student, and endorsed by **Dr. Carolyn Tucker**, Distinguished Alumni Professor, **Dr. Peter Giacobbi**, Assistant Professor, and **Dr. Bonnie Moradi**, Assistant Professor. **The purpose of this research project is to gain a deeper understanding into the relationships among collegiate tennis coaches’ coaching efficacy, coaching behavior, and team performance by asking the experts - Division I collegiate tennis coaches.** This is the first research of its kind in the country. **Results from this research will be shared with all participants** as it will have potential for improving our understanding of coaching effectiveness and related player performance outcomes.

I am writing this letter to you because I am requesting your voluntary assistance in this research project as an expert in applied sport psychology. I am asking you to review my assessment battery (not complete the assessment battery) and make comments on the assessments regarding items that seem problematic (e.g., difficult to understand, poorly worded, inappropriate), and/or suggest additional items or questions for inclusion. **This process should take approximately 20 minutes.**

This study is designed to ensure that your comments on the questionnaire will be confidential. Your identity will remain confidential to the extent provided by law. There are no direct benefits for you participating in this study and I do not believe that participating in this project will cause you any harm. However, you do have the right to stop reviewing the questionnaires if they make you feel uncomfortable, and to skip any questions that you find offensive. You can also choose, at any time over the course of the project, to discontinue your participation. If you should have questions about your rights as a research participant, please contact the University of Florida Institutional Review Board office at 352-392-0433 or irb2@ufl.edu.

The following precautions will secure the confidentiality of your responses:

- 1) Please ***do not place your name*** on the questionnaires that are attached to this e-mail. We will code questionnaires upon their return to us.
- 2) Questionnaires will be kept in a locked filing cabinet in Dr. Tucker’s laboratory at the University of Florida.

If you would like to participate in this study, please do the following *within one week of receiving this packet:*

- 1) **AFTER reading this e-mailed letter, please review and place comments on the attached questionnaires (if you see any questions/ instructions that are unclear or you believe that a pertinent question was not asked). This process should take approximately 20 minutes to complete. To return the questionnaires with your comments, you can either:**
 - **Place your comments onto the attached questionnaires and e-mail them back to me at tporter@ufl.edu, or**

- **Fax them to: Terrence Porter at 352-392-7985. All identifying information will be removed from the questionnaires before the information is processed.**

I have included the questionnaire with this e-mailed cover letter to increase time responsiveness. **I will call your office within the next few days to ensure that you received the letter and packet and to answer any questions that you may have for me.** If you would like to talk with me before then, please give me a call at 352-256-5958.

I hope that you find this research study interesting and valuable. I look forward to your participation and believe that this study offers great potential for gaining deeper understanding of key performance related areas in collegiate tennis and promoting the successful performance of collegiate tennis players at the Division I level. If you have any questions or desire further information about this study, please contact me, **Terrence Porter, M.S.**, Principal Investigator, **at 352-256-5958 or e-mail him at tporter@ufl.edu.**

Thank you for your consideration and best of luck with your own research.

Sincerely,
Terrence Porter, M.S
CLAS Fellow & Doctoral Student,
University of Florida

Endorsed by:

Dr. Carolyn Tucker
Distinguished Alumni Professor,
Professor of Psychology and Director of Training,
Professor of Pediatrics,
Professor of Community Health and Family Medicine,
University of Florida

Dr. Peter Giacobbi
Assistant Professor,
Exercise and Sport Science,
University of Florida

Dr. Bonnie Moradi
Assistant Professor of Psychology
University of Florida

**Attachment:
Questionnaire**

APPENDIX D
OVERVIEW AND INSTRUCTIONS FOR PILOT STUDY COACHES

OVERVIEW AND INSTRUCTIONS:

Greetings Coaches!

The purpose of this research project is to gain a deeper understanding into the relationships among collegiate tennis coaches' coaching efficacy, coaching behavior (i.e., amount of time spent teaching psychological skills), and team performance (i.e., won-lost record) by asking the experts - Division I collegiate tennis coaches.

If you would like to participate in this study, please do the following *within the next week*.

- 1) Complete the questionnaire anonymously,
- 2) E-mail me at tporter@ufl.edu the length of time that it took to complete the questionnaire and any problems with the questionnaire (i.e., items, wording) that you noticed (critical feedback is appreciated), and
- 3) Mail the questionnaire back to:

Terrence Porter
University of Florida Psychology Department
P.O. Box 112250
Gainesville, FL 32611-2250

I will call your office within the next few days to ensure that you received the letter and packet and to answer any questions that you may have for me. If you would like to talk with me before then, please give me a call at 352-256-5958.

Lastly, I would appreciate your help in getting other Division I head coaches and their assistant/associate coaches to participate in the larger data collection that I will begin in about 2 weeks. This larger data collection will ask coaches to fill out the same assessments online at a website which should decrease the amount of time to complete the questionnaires due to the fact that most questions involve pointing and clicking one's mouse. Please let me know if you're willing to help by e-mailing or calling other coaches.

Thank you for your consideration,
Terrence Porter, M.S.

APPENDIX E
OVERVIEW AND INSTRUCTIONS FOR PILOT STUDY EXPERTS

OVERVIEW AND INSTRUCTIONS:

Greetings, Applied Sport Psychology Experts!

The purpose of this research project is to gain a deeper understanding into the relationships among collegiate tennis coaches' coaching efficacy, coaching behavior (i.e., amount of time spent teaching psychological skills), and team performance (i.e., won-lost record) by asking the experts - Division I collegiate tennis coaches.

If you would like to participate in this study, please do the following within the next week.

- 1. Please review the assessment battery (*do not complete the assessment battery*) and make comments on the assessments regarding items that seem problematic (e.g., difficult to understand, poorly worded, inappropriate, do not fit the construct of interest), and/or suggest additional items or questions for inclusion.**
- 2. To return the questionnaires with your comments, either:**
 - **Place your comments onto the enclosed questionnaires and e-mail them back to me at tporter@ufl.edu, or**
 - **Fax them to: Terrence Porter at 352-392-7985.** All identifying information will be removed from the questionnaires before the information is processed.

I will call your office within the next few days to ensure that you received the letter and packet and to answer any questions that you may have for me. If you would like to talk with me before then, please give me a call at 352-256-5958.

Lastly, the major study will utilize online data collection which should decrease the amount of time to complete the questionnaires due to the fact that most questions involve pointing and clicking one's mouse. Please let me know if you desire to see that version when it is ready (approx. one week from now).

**Thank you for your consideration,
Terrence Porter, M.S.**

APPENDIX F
COACHING EFFICACY SCALE (CES) – PILOT STUDY

CES

Coaching confidence refers to the extent to which coaches believe that they have the capacity to affect the learning and performance of their athletes. Think about how confident you are as a coach. Rate your confidence for each of the items below. Your answers will be kept completely confidential.

How confident are you in your ability to--

	Not at all Confident					Extremely Confident				
	0	1	2	3	4	5	6	7	8	9
1. maintain confidence in your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. recognize opposing team's strengths during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. mentally prepare athletes for game/meet strategies?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. understand competitive strategies?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. instill an attitude of good moral character?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. build the self-esteem of your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. demonstrate the skills of your sport?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. adapt to different game/meet situations?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. recognize opposing team's weakness during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. motivate your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. make critical decisions during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. build team cohesion?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. instill an attitude of fair play among your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. coach individual athletes on technique?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. build the self-confidence of your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. develop athletes' abilities?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. maximize your team's strengths during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. recognize talent in athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. promote good sportsmanship?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. detect skill errors?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. adjust your game/meet strategy to fit your team's talent?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. teach the skills of your sport?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. build team confidence?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. instill an attitude of respect for others?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX G
PSYCHOLOGICAL SKILLS QUESTIONNAIRE FOR SPORT (PSQS) – PILOT STUDY

PSQS (FALL 2003 and SPRING 2004 SEASON)

We are interested in the amount of time that coaches spend in different activities with their team members during the **FALL 2003 and SPRING 2004 TENNIS SEASON (during the 20 hour period)**. Please read the **stem question** below carefully and then respond to each item by filling in the appropriate circle.

Important: *If you coach both the men's and women's teams at your school, please answer the following questions in reference to either the women's or men's team. Please fill in the circle below to indicate your reference point.*

Women's Tennis Team

Men's Tennis Team

Please fill in only one circle in response to **each** question. Your responses will be kept completely confidential.

Stem Question: On average, how many **total hours per week** did you spend--

	0 hrs	1-3 hrs	4-6 hrs	7-10 hrs	11-13 hrs	14-16 hrs	17-20 hrs
1. In the fall with your team as a collective group in all training sessions and meetings?	<input type="radio"/>						
2. In the spring with your team as a collective group in all training sessions and meetings?	<input type="radio"/>						
3. In the fall in all individual training sessions and meetings with team members?	<input type="radio"/>						
4. In the spring in all individual training sessions and meetings with team members?	<input type="radio"/>						
5. In the fall on physical practice/drills with team members (<u>individually and as a group</u>)?	<input type="radio"/>						
6. In the spring on physical practice/drills with team members (<u>individually and as a group</u>)?	<input type="radio"/>						

	0 hrs	1-3 hrs	4-6 hrs	7-10 hrs	11-13 hrs	14-16 hrs	17-20 hrs
7. In the fall on mental practice/drills (i.e., instilling and developing psychological skills) with team members (<u>individually and as a group</u>)?	<input type="radio"/>						
8. In the spring on mental practice/drills (i.e., instilling and developing psychological skills) with team members (<u>individually and as a group</u>)?	<input type="radio"/>						
9. In the fall in competitive matches <u>where teammates compete against one another</u> ?	<input type="radio"/>						
10. In the spring in competitive matches <u>where teammates compete against one another</u> ?	<input type="radio"/>						
11. In the fall in competitive matches where your team competes <u>against other teams</u> ?	<input type="radio"/>						
12. In the fall in competitive matches where your team competes <u>against other teams</u> ?	<input type="radio"/>						

13. In general, rate on a scale from **1 to 10 how important mental skills are in college tennis success** (1 = not important; 5=somewhat important; 10=extremely important).

14. On average, how much **time** (in minutes) do you specifically devote (e.g., give talks, lead exercises, discuss) to **mental skills training per week**?

APPENDIX H
TEAM PERFORMANCE QUESTIONNAIRE (TPQ) – PILOT STUDY

APPENDIX I
DEMOGRAPHIC DATA QUESTIONNAIRE (DDQ) – PILOT STUDY

DDQ

Please provide the requested information by selecting each of your answers. Your responses will be kept completely confidential.

What is your gender?

- Male
- Female

What is your race/ethnicity:

- African-American/Black-American
- Asian-American
- Caucasian/White/European-American
- Cuban/Cuban-American
- Hispanic/Latino(a)-American
- Indian/Indian-American
- Mexican/Mexican-American/Chicano(a)
- Native American
- Pacific Islander American
- Puerto Rican American
- Other (please specify: _____)

Approximately how many years of coaching experience do you have at the following levels?

College/University level _____ years

Jr./High School, College/University, and Professional level _____ years

Approximately how many years of playing experience do you have at the following levels?

College/University level _____ years

Professional level _____ years

What is your highest personal tennis ranking at the following levels:

College/University _____

Professional _____

Current coaching level:

- Head Coach
- Assistant/Associate Head Coach

Ethnic make-up of the school at which you coach:

- Majority European American College or University (MEACU)
- Historically Black College or University (HBCU)

Highest level of education that you have completed:

- Middle/Junior High School
- High School
- Some College/Technical School/Associate's Degree
- College
- Professional/Graduate School (Master's level)
- Professional/Graduate School (Doctoral level)

Current Coaching Certifications (Select all that apply):

- USPTA
- USPTR
- None
- Other

USTA Sport Science Competency (Select all that apply):

- Level I (coaching)
- Level IIA (sport psychology/motor learning)
- Level IIB (physiology/nutrition)
- Level IIC (sports medicine/biomechanics)
- None

*Please place your answers to the following statements
in the blanks provided.*

Please list your **three most important coaching responsibilities**:

- 1) _____
- 2) _____
- 3) _____

Highest national team ranking at current institution during tenure _____

Number of conference titles at current school _____

Number of NCAA appearances _____

Please indicate your age: _____

APPENDIX J
INVITATION LETTER TO MAJOR STUDY HEAD COACHES

July 14, 2004

Dear Coach:

My name is **Terrence Porter, M.S.**, and I am a **doctoral fellow at the University of Florida conducting research in the area of Sport Performance and Behavior**. I have an **extensive background in tennis as a competitive junior player, teaching professional (PTR), performance consultant and Division I volunteer assistant coach**. I am writing to invite you to participate in a sport performance research project (tennis specific) that is endorsed by **Dr. Carolyn Tucker**, Distinguished Alumni Professor, **Dr. Peter Giacobbi**, Assistant Professor, and **Dr. Bonnie Moradi**, Assistant Professor.

As my passion involves working within the sport of tennis, my current research focus involves Division I ITA coaches. **I have the support of several ITA coaches including Coach Bobby Bayliss and Coach Ray Reppert with whom I have had the pleasure of working in different capacities in the past**. As far as my research is concerned, **I am currently collecting data on the differential roles that collegiate coaches play in the success of their athletes and teams**. This is the first research of its kind in the country. **Results from this research will be shared with participating coaches**, as it will have potential for improving coaching effectiveness and related player-performance outcomes. I plan to conduct several studies within collegiate tennis to highlight and publicize the many positive aspects of the intercollegiate game and help prevent the elimination of more tennis programs.

You and other **NCAA Division I Head Tennis Coaches** are being invited to voluntarily participate in this project. Participation will involve completing questionnaires on a secure website that should **take approximately 15 minutes**. **In addition to receiving the results of this research, you will receive:**

1. *Tennis-specific sport psychology exercises to use in working with your tennis team (individually and collectively),*
2. *E-mail access to the lead researcher for free consultation in the area of sport performance enhancement for one year, and*
3. *A list of sport performance enhancement resources*

This study is designed to ensure that your comments on the questionnaire will be confidential. Your identity will remain confidential to the extent provided by law. There are no direct benefits for you participating in this study and I do not believe that participating in this project will cause you any harm. However, you do have the right to stop reviewing the questionnaires if they make you feel uncomfortable, and to skip any questions that you find offensive. You can also choose, at any time over the course of the project, to discontinue your participation. If you should have questions about your rights as a research participant, please contact the University of Florida Institutional Review Board office at 352-392-0433 or irb2@ufl.edu.

The following precautions will secure the confidentiality of your responses:

- 1) **You will not be asked to include your name with the questionnaires.** The secure website will generate a code so that the researchers can keep your data together.
- 2) Questionnaire data will be downloaded from the secure website via secure connection to the Psychology Department at the University of Florida, where it will be accessed only by my research colleagues and assistants.

If you agree to participate in this study, please do the following *as soon as your schedule allows*:

- 1) **Please go to the website address <http://survey.psych.ufl.edu/coaches>, follow the instructions, and complete the questionnaire. The letters “www” do not appear in the website address.**

*****We also desire for assistant/associate head coaches to complete the questionnaire as well. Please pass this letter along to your assistant/associate coach only after visiting the website and completing the short survey if you so choose.**

I hope that you find this research study interesting and valuable. I look forward to your participation and believe that this study offers great potential for gaining deeper understanding of **the differential roles that collegiate coaches play in the success of their athletes and teams** at the Division I level. If you have any questions or desire further information about this study, please contact me, **Terrence Porter, M.S.**, Principal Investigator, at **352-256-5958** or e-mail him at **tporter@ufl.edu**.

Sincerely,
Terrence Porter, M.S
CLAS Fellow & Doctoral Student,
University of Florida

Endorsed by:

Dr. Carolyn Tucker
Distinguished Alumni Professor,
Professor of Psychology and Director of Training,
Professor of Pediatrics,
Professor of Community Health and Family Medicine,
University of Florida

Dr. Peter Giacobbi
Assistant Professor,
Exercise and Sport Science,
University of Florida

Dr. Bonnie Moradi
Assistant Professor of Psychology
University of Florida

APPENDIX K
INVITATION E-MAIL TO MAJOR STUDY HEAD AND ASSISTANT/ASSOCIATE
COACHES

June 14, 2004

Dear Coach:

My name is **Terrence Porter, M.S.**, and I am a **doctoral fellow at the University of Florida conducting research in the area of Sport Performance and Behavior**. I have an **extensive background in tennis as a competitive junior player, teaching professional (PTR), performance consultant and Division I volunteer assistant coach**. I am writing to invite you to participate in a sport performance research project (tennis specific) that is endorsed by **Dr. Carolyn Tucker**, Distinguished Alumni Professor, **Dr. Peter Giacobbi**, Assistant Professor, and **Dr. Bonnie Moradi**, Assistant Professor.

As my passion involves working within the sport of tennis, my current research focus involves Division I ITA coaches. **I have the support of several ITA coaches including Coach Bobby Bayliss and Coach Ray Reppert with whom I have had the pleasure of working in different capacities in the past**. As far as my research is concerned, **I am currently collecting data on the differential roles that collegiate coaches play in the success of their athletes and teams**. This is the first research of its kind in the country. **Results from this research will be shared with participating coaches**, as it will have potential for improving coaching effectiveness and related player-performance outcomes. I plan to conduct several studies within collegiate tennis to highlight and publicize the many positive aspects of the intercollegiate game and help prevent the elimination of more tennis programs.

You and other **NCAA Division I Tennis Coaches** are being invited to voluntarily participate in this project. Participation will involve completing questionnaires on a secure website that should **take approximately 15 minutes**. **In addition to receiving the results of this research, you will receive:**

1. *Tennis-specific sport psychology exercises to use in working with your tennis team (individually and collectively),*
2. *E-mail access to the lead researcher for free consultation in the area of sport performance enhancement for one year, and*
3. *A list of sport performance enhancement resources*

This study is designed to ensure that your comments on the questionnaire will be confidential. Your identity will remain confidential to the extent provided by law. There are no direct benefits for you participating in this study and I do not believe that participating in this project will cause you any harm. However, you do have the right to stop reviewing the questionnaires if they make you feel uncomfortable, and to skip any questions that you find offensive. You can also choose, at any time over the course of the project, to discontinue your participation. If you should have questions about your rights as a research participant, please contact the University of Florida Institutional Review Board office at 352-392-0433 or irb2@ufl.edu.

The following precautions will secure the confidentiality of your responses:

- 1) **You will not be asked to include your name with the questionnaires.** The secure website will generate a code so that the researchers can keep your data together.

- 2) Questionnaire data will be downloaded from the secure website via secure connection to the Psychology Department at the University of Florida, where it will be accessed only by my research colleagues and assistants.

If you agree to participate in this study, please do the following *as soon as your schedule allows*:

- 1) **Please go to the website address <http://survey.psych.ufl.edu/coaches>, follow the instructions, and complete the questionnaire. The letters “www” do not appear in the website address.**

I hope that you find this research study interesting and valuable. I look forward to your participation and believe that this study offers great potential for gaining deeper understanding of **the differential roles that collegiate coaches play in the success of their athletes and teams** at the Division I level. If you have any questions or desire further information about this study, please contact me, **Terrence Porter, M.S.**, Principal Investigator, at **352-256-5958** or e-mail **him at tporter@ufl.edu**.

Sincerely,
Terrence Porter, M.S.
CLAS Fellow & Doctoral Student,
University of Florida

Endorsed by:

Dr. Carolyn Tucker
Distinguished Alumni Professor,
Professor of Psychology and Director of Training,
Professor of Pediatrics,
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APPENDIX L
COACHING EFFICACY SCALE (CES) – MAJOR STUDY

CES

Coaching confidence refers to the extent to which coaches believe that they have the capacity to affect the learning and performance of their athletes. Think about how confident you are as a coach. Rate your confidence for each of the items below. Your answers will be kept completely confidential.

How confident are you in your ability to--

	Low Confidence		Complete Confidence	
	1	2	3	4
1. maintain confidence in your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. recognize opposing team's strengths during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. mentally prepare athletes for game/meet strategies?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. understand competitive strategies?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. instill an attitude of good moral character?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. build the self-esteem of your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. demonstrate the skills of your sport?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. adapt to different game/meet situations?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. recognize opposing team's weakness during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. motivate your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. make critical decisions during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. build team cohesion?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. instill an attitude of fair play among your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. coach individual athletes on technique?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. build the self-confidence of your athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. develop athletes' abilities?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. maximize your team's strengths during competition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. recognize talent in athletes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. promote good sportsmanship?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. detect skill errors?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. adjust your game/meet strategy to fit your team's talent?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. teach the skills of your sport?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. build team confidence?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. instill an attitude of respect for others?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX M
MENTAL SKILLS QUESTIONNAIRE FOR SPORT (MSQS) – MAJOR STUDY

Directions: We are interested in the amount of time that coaches spend in different activities with their team members during the Fall 2003 and Spring 2004 Tennis Season (during the 20 hour period).

For questions 1-8, please read the stem question below carefully and then type in your answer to each question.

For questions 13-16, please read each question and type in your answer. Your responses will be kept completely confidential.

Stem Question: On average, how many total hours per week did you spend--

Questions 1-8	Fall 2003	Spring 2004
With your team as a <u>collective group</u> in all training sessions and meetings?	1 _____	2 _____
In all <u>individual</u> training sessions and meetings with team members?	3 _____	4 _____
On physical practice/drills with team members (<u>individually and as a group</u>)?	5 _____	6 _____
On mental practice/drills (i.e., instilling and developing psychological skills) with team members (<u>individually and as a group</u>)?	7 _____	8 _____

On average, how much time (in minutes) do you specifically devote (e.g., give talks, lead exercises, discuss) to the following types of training per week?

13. Mental Skills	
14. Technical Skills	
15. Physical Fitness	
16. Tactical Skills	

APPENDIX N
SKILL IMPORTANCE QUESTIONNAIRE FOR SPORT (SIQS) – MAJOR STUDY

For questions 9-12, please read each question and type in your answer.

In general, rate on a scale from 1 to 10 how important the following skills are in college tennis success (1=not important; 10=extremely important).

9. Mental Skills	
10. Technical Skills	
11. Physical Fitness	
12. Tactical Skills	

APPENDIX O
TEAM PERFORMANCE QUESTIONNAIRE (TPQ) – MAJOR STUDY

TPQ

PART I.

Directions: Please indicate your team's won/lost record for the Spring 2004 Season and the previous Spring 2003 Season (if you coached your current team during the Spring 2003 Season).

	# of Wins	# of Losses						
1. Team Record <u>Spring 2004</u>	_____	_____						
2. Team Record <u>Spring 2003</u>	_____	_____						
3. Please indicate how satisfied you are with your team's performance for the <u>Spring 2004 Season</u> and the <u>Spring 2003 Season</u> ? (0=not satisfied at all, 7=extremely satisfied)								
	0	1	2	3	4	5	6	7
Spring 2004 Season	<input type="radio"/>							
Spring 2003 Season	<input type="radio"/>							

PART II.

Directions: Please respond appropriately to the questions below regarding your singles players.

	Yes	No
4. Did anything happen to you or your team to influence your team record in 2004?	<input type="radio"/>	<input type="radio"/>

*****If you answered "Yes" to #4, then go to #5 (otherwise skip #5)**

5. Which of the following issues influenced your team record in 2004? (Select all that apply)

Injury	_____
Athlete left team	_____
Loss of scholarships	_____
Athlete lost eligibility	_____
Other (please list)	_____

APPENDIX P
DEMOGRAPHIC DATA QUESTIONNAIRE (DDQ) – MAJOR STUDY

DDQ

Please provide the requested information by selecting each of your answers. Your responses will be kept completely confidential.

What is your gender?

- Male
- Female

What is your race/ethnicity:

- African-American/Black-American
- Asian-American
- Caucasian/White/European-American
- Cuban/Cuban-American
- Hispanic/Latino(a)-American
- Indian/Indian-American
- Mexican/Mexican-American/Chicano(a)
- Native American
- Pacific Islander American
- Puerto Rican American
- Other (please specify: _____)

Approximately how many years of coaching experience do you have at the following levels?

College/University level _____ years
Total years of coaching experience _____ years

Approximately how many years of playing experience do you have at the following levels?

College/University level _____ years
Professional level _____ years

What is your highest personal tennis ranking at the following levels:

College/University _____
Professional _____

Current coaching level:

- Head Coach
- Assistant/Associate Head Coach

Ethnic make-up of the school at which you coach:

- Majority European American College or University (MEACU)
- Historically Black College or University (HBCU)

Highest level of education that you have completed:

- Middle/Junior High School
- High School
- Some College/Technical School/Associate’s Degree
- College
- Professional/Graduate School (Master’s level)
- Professional/Graduate School (Doctoral level)

Current Coaching Certifications (Select all that apply):

- USPTA
- USPTR
- None
- Other _____

USTA Sport Science Competency (Select all that apply):

- Level I (coaching)
- Level IIA (sport psychology/motor learning)
- Level IIB (physiology/nutrition)
- Level IIC (sports medicine/biomechanics)
- None

Please place your answers to the following statements in the blanks provided.

Have you had any additional course work in the areas of sport science or psychology?

No _____

Yes _____

Highest national team ranking at current institution during tenure _____

Number of conference titles at current school _____

Number of NCAA appearances _____

Please indicate your age: _____

I answered the team-related questions (e.g., hrs. spent meeting as a group, won-lost record) in reference to the following team that I coach:

Men’s Team _____

Women’s Team _____

THANK YOU for completing our questionnaire. Please click the "Submit" button and you will be provided with the website address to access the tennis performance exercises and sport performance resources.

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BIOGRAPHICAL SKETCH

Terrence William Porter was born July 9, 1973, in Washington, DC. Terrence grew up with his parents, Carey and Renee, his brother, Carey Porter, Jr., and his maternal grandparents, aunt, and cousins. He attended Our Lady Queen of Peace Elementary School in SE Washington, DC, and graduated in 1987. He attended Bishop McNamara High School in Forestville, MD, and graduated in 1991. Terrence attended the University of Notre Dame as a Notre Dame Scholar, and graduated with a Bachelor of Arts degree in psychology in 1995. He attended Miami (OH) University, graduating in 1997 with a Master of Science degree in sport performance and behavior, and receiving induction into the prestigious Phi Kappa Phi Honor Society for maintaining a 4.0 grade point average. After graduating, Terrence served for a short time as a substitute teacher at his former high school, Bishop McNamara, before working for three years at with a national trade association in the areas of governments affairs, marketing, and public relations. In 2000, Terrence decided to continue his education at the University of Florida in the counseling psychology Ph.D. program. Terrence will receive his Master of Science degree in 2005 and plans to continue on to receive his Ph.D.